"In passing, these experiments demonstrate that global word shape does not play any role in reading. If we can immediately recognize the identity of "words," "WORDS," and "WoRdS," it is because our visual system pays no attention to the contours of words or to the pattern of ascending and descending letters: it is only interested in the letters they contain. Obviously, our capacity to recognize words does not depend on an analysis of their overall shape."

Dehaene, S. (2009). Reading in the brain: The new science of how we read. New York: Penguin.

"Very few studies have utilized more than one measure of phonological awareness (Wagner, 1986), and those that have done so only partially supported the theoretical hierarchies. For example, deletion and phoneme reversal, which as expected were difficult, were also highly correlated with decoding in several studies, while segmentation and tapping yielded conflicting findings (Backman, 1983; Lundberg et al., 1980; Torneus, 1984; Zifcak, 1981). Two recent studies (Stanovich, Cunningham, & Cramer, 1984; Yopp, 1988) addressed the issue of task comparability directly by administering extensive test batteries to large numbers of subjects. Stanovich et al. (1984) administered 10 measures of phonemic awareness to 58 kindergarten children and found that seven of the measures (those not involving rhyme) correlated with a measure of reading ability given a year later. A factor analysis showed that one major factor accounted for about half of the variance among the phonemic awareness measures. Yopp (1988) gave 10 different tests of phonemic awareness to her subjects (96 kindergarten children), counterbalancing for task sequence. As a criterion measure she used the number of trials required to decode six pseudowords. The data were subjected to factor analysis and multiple regression analysis in relation to the criterion task. Yopp found that with the exception of the word-to-word matching task, all had at least moderate reliabilities. **The two deletion tasks were the most difficult** and the rhyming and auditory discrimination tasks the easiest. Sound isolation and a phoneme deletion task were the best predictors of learning rate. The factor analysis revealed that two factors accounted for 68% of the variance. Phoneme blending, auditory segmentation, phoneme counting, and sound isolation loaded highly on one factor she labeled "simple phonemic awareness," while **the two deletion tasks loaded highly on a second factor, "compound phonemic awareness."** The major difference between these two is that the first factor requires only one operation and then a response, while **the second factor demands performing an operation and holding a given sound in memory while performing another operation. These results suggest that in addition to basic awareness of phonemes, the ability to manipulate phonemes mentally is important for decoding."** (p.241)
Lenchner, O., Gerber, M. M., & Routh, D. K. (1990). Phonological awareness tasks as predictors of decoding ability: Beyond segmentation. *Journal of Learning Disabilities*, *23*, 240-247.

"Our results thus clearly reinforce the view that serial order STM plays a key role in the development of decoding abilities. Moreover, they also highlight that the role of this process is not limited to the very beginning of reading instruction, but continues after the first school year and its focus on the basic skills involved in learning to read and spell. This interesting result suggests that although children in the second grade begin to master decoding thanks to improved knowledge of GPC rules, they still rely heavily on

order STM when reading nonwords. It also indicates that the measurement of order STM capacity in kindergarten is a consistent predictor of nonword reading ability, which remains robust over this age range. … We observed that order STM capacity assessed in kindergarten was also an independent predictor of nonword spelling abilities 1 and 2 years later, in first and second grade. This result strongly supports the hypothesis that temporary storage of the order of the phonemes is necessary to update the phonological representation as they are successively converted into the respective graphemes in the course of writing (Lervag & Hulme, 2010; Romani et al., 2014)." (p.16)

Binamé F., & Poncelet M. (2016). Order short-term memory capacity predicts nonword reading and spelling in first and second grade. *Reading & Writing, 29*, 1–20.

"In summary, this longitudinal study has highlighted that order STM, like phonological processes, is an essential component in learning to read and spell. More precisely, our results have provided supplementary evidence that order STM plays a specific role, that of temporarily maintaining the order of a sequence of phonemes during the application of GPCs in reading or PGCs in spelling. The absence of a link between order STM and word reading and spelling indicates that the serial order component is involved only in the processing of unfamiliar written or spoken sequences, and that it no longer contributes when an orthographic representation can be directly accessed in long-term memory to support subsequent reading or spelling. The fact that order STM capacity before literacy instruction independently predicts nonword reading and spelling in the first and second grades underlines that it is a consistent and robust predictor of reading and spelling development. Whereas phonological awareness is a predictor of literacy acquisition which is related to the language system, order STM capacity has the advantage of being a robust preschool predictor of later reading and spelling skills which is not dependent on the language network. Therefore, in combination with previous studies showing that dyslexic children and adults have difficulties with retaining serial order information, the results reported here emphasize the need to take memory for serial order into account in a clinical context. In particular, they suggest that some measure of order STM should be included in clinical assessment and screening tests, and that the role of this type of memory in literacy development should be taken into account in clinical interventions." (p. 17)

Binamé F., & Poncelet M. (2016). Order short-term memory capacity predicts nonword reading and spelling in first and second grade. *Reading & Writing, 29,* 1–20.

"In learning to read, two main processes are described: phonological recoding and word recognition. Phonological recoding enables activation of phonological representations of orally known words from effortful sequential grapheme-phoneme conversion. When written words are familiar, phonological recoding is replaced by the process of word recognition, which is usually described as a rapid and automatic activation of orthographic lexical representations from the parallel processing of letters. Numerous studies with expert readers have provided evidence that the phonological code continues to play a role during word recognition. In contrast, the nature of this phonological activation is different: it is rapid and automatic (Ferrand & Grainger, 1992, 1993; Lukatela, Frost, & Turvey, 1998). An interesting question arises when children read familiar written words; do they activate the phonological code rapidly and automatically during the word recognition process like in expert reading? … Our results do not support this proposition and suggest that the slow and serial phonological recoding is rapidly replaced by an automatic phonological process that enables the rapid and automatic activation of sublexical phonological representations from letters. In contrast, the automatic orthographic process, enabling access to the orthographic lexicon, seems to develop more slowly and to become effective later." (Sauval, Perre, & Casalis, 2017, p.52, 61).

Sauval, K., Perre, L., & Casalis, S. (2017). Automatic activation of phonological code during visual word recognition in children: a masked study in grades 3 and 5. Reading and Writing: An Interdisciplinary Journal, 30(1), 51-67.

"Phonological representations are the sound-based codes stored in the lexicon for each word (Anthony et al., 2010; Gillon, 2002). It is generally accepted that phonological representations are initially a holistic articulatory gesture associated with the meaning of a word (Maillart et al., 2004; Snowling and Hulme, 1994). The lexical restructuring (Metsala & Walley, 1998) and segmentation (Fowler, 1991) hypotheses

suggest that with the rapid increase in vocabulary during the pre-school years, more finely grained phonological representations are developed and stored. As vocabulary continues to develop, so phonological representations become more specific, with lexical items segmented into increasingly smaller units. Precise, well-defined phonological representa¬tions are important for distinguishing between similar sounding lexical items, retrieving words and performing phonological awareness tasks (Fowler, 1991). It has been suggested that it may be more difficult to segment and manipulate low quality phonological representations (Elbro et al., 1998). Phonological representations are of interest to both clinicians and researchers alike, as there is evidence to suggest that the establishment of precise and well-defined phonological representations is vital for achieving language competence and later for literacy acquisition (Bishop and Snowling, 2004)." (p. 212-214)

Claessen, M. & Leitão, S. (2012). Phonological representations in children with SLI. *Child Language Teaching and Therapy, 28*(2), 211–223.

"For most researchers in this area, the most parsimonious hypothesis is that dyslexics' phonological representations are somewhat degraded (i.e., less precise, less well specified, less categorical, and/or noisier). … A new study (Boets et al., 2013) reports that activations of superior temporal regions for speech are normal in dyslexia, although being less well connected to downstream frontal regions. These findings support the hypothesis of a deficit in the access to phonological representations rather than in the representations themselves. … Of course, the most crucial finding, that of normal activations for phonological representations, is a null result and will need to be replicated". (p. 274-275)

Ramus, F. (2014). Neuroimaging sheds new light on the phonological deficit in dyslexia. *Spotlights Trends in Cognitive Sciences, 18*(6), 275-275.

Boets, B. et al. (2013) Intact but less accessible phonetic representations in adults with dyslexia. *Science, 342,* 1251–1254.

"Another possible objection is that structured word inquiry will be difficult to implement with struggling readers who exhibit more general learning difficulties. For example, specific language impairment is manifest as a difficulty in acquiring language despite otherwise normal IQ, normal hearing, and an adequate learning environment. The cognitive deficits extend beyond phonology to include deficits in semantics, syntax, and discourse. Important for present purposes, approximately one third of children with specific language impairment in kindergarten are dyslexic in later grades (Catts, Adlof, Hogan, & Weismer, 2005), with some estimates higher still (McArthur, Hogben, Edwards, Heath, & Mengler, 2000; Snowling, Bishop, & Stothard, 2000). Other cases of reading disorders will be attributed to even broader deficits, including low IQs. This raises the question as to whether SWI is appropriate for these populations of children. We agree that future research is needed to answer this question, but there is every reason to believe our theoretical arguments for structured word inquiry apply to these populations as well. Indeed, as far as we are aware, memory and learning is best when information is encoded in a meaningful and organized manner for all individuals. In general support of this claim, meta-analyses show that morphological intervention are more effective for struggling readers (P. N. Bowers et al., 2010; Goodwin & Ahn, 2010, 2013). In our view the default assumption should be that all subgroups of learners will benefit from instruction that correctly represents the writing system

Finally, a skeptic might note that the empirical evidence in direct support of SWI is limited, with only three published SWI intervention studies in total and only one carried out with young children (ages 5–7; Devonshire et al., 2013). In fact, we agree that caution is warranted at present. But given the strong theoretical motivation for SWI that we have just detailed, the growing evidence that morphological instruction is useful, especially for young and struggling readers, and the promising initial evidence for SWI, we think it is time to carry out more empirical research on SWI. This is our goal: to motivate future empirical studies of SWI in order to assess whether indeed this method is more effective than phonics that is currently failing too many children

SUMMARY In contrast with the vast amount of empirical research on phonics, the research on SWI is only beginning. Nevertheless, we would argue that the theoretical motivation for SWI is extremely strong (see Table 1). Furthermore, the empirical evidence is highly promising. Morphological instruction is a

central feature of SWI, and the evidence from the three meta-analyses of morphological instruction (P. N. Bowers et al., 2010; Goodwin and Ahn, 2010, 2013) show that morphological instruction benefits all students, but it is particularly beneficial for less able and younger students. In addition, the three existing SWI studies report improvements in decoding (Devonshire et al., 2013), spelling (Devonshire & Fluck, 2010), and vocabulary knowledge (P. N. Bowers & Kirby, 2010), with morphological instruction directed at children as young as 5 years of age (Devonshire et al., 2013)." (p.15)

Bowers, J.S., & Bowers, P.N. (2017). Beyond phonics: The case for teaching children the logic of the English spelling system. *Educational Psychologist*, DOI: 10.1080/00461520.2017.1288571

"Importantly, genetic heritability increases once the children undergo formal instruction especially at school (Asbury and Plomin 2014, pp. 22–30; Samuelsson et al. 2007). There is also evidence that new sets of genes come into play as children grow older and there are specific (e.g. for reading or numeracy) as well as general sets of genes (Byrne et al. 2009; Calvin et al. 2010; Kovas et al. 2013). There is also evidence from longitudinal studies of a strong genetic component to achievement growth (Grasby and Coventry 2016; Pokropek and Sikora 2015). The much larger effects of prior achievement than early cognitive ability on achievement in the LSAC data (Model 3 in Tables 5, 6) may reflect the effects of new sets of genes as children grow older.

Genes are also important for educational attainment. Baker et al. (1996) concluded that 57 % of the variance in educational attainment in Australia was due to genetic factors. Later Australian studies concluded that at least as much of 50 % but possibly up to 65 % of the variation in educational attainment is due to genetic endowments and as little as 8 % due to the shared environment (Le et al. 2011; Miller et al. 2001). These studies which show that the shared environment is a much weaker contributor to variation in educational outcomes are consistent with the other literature cited in this paper that find weak SES effects, net of other influences.

The importance of genes should not be dismissed as some modern version of the eugenics movement. Many behavioural genetic studies led Turkheimer (2000) to conclude that genes are an important component of variation for all behavioural outcomes, but variation among families is not, so it is no surprise that genes are important for education. This does not mean that schooling and teachers have no influence or that some students cannot be taught. Despite 19th-century arguments to the contrary, history shows that just about everyone can be taught to read and write, perform quite advanced mathematical tasks, participate in civil and political society and perform complex cognitive tasks. Given human potential, there is no reason why students should not be taught advanced skills suited to their interests." (p.122-123)

Marks, G.N. (2016). Is SES really that important for educational outcomes in Australia? A review and some recent evidence. *The Australian Educational Researcher*, First Online 10 December 2016.

"The 3-cueing approach is a microcosm of the culture of education. It didn't develop because teachers lack integrity, commitment, motivation or intelligence. It developed because they were poorly trained and advised. They didn't know the relevant science or had been convinced it was irrelevant. Lacking this foundation, no such group could have discovered how reading works and how children learn." (p. 304)

Seidenberg, M. (2017). *Language at the speed of sight: How we read, why so many can't, and what can be done about it* (1st Ed.). New York: Basic Books.

"This paper demonstrates that the emphasis on students' socioeconomic status (SES) in research and policy circles in Australia is unwarranted. The bivariate relationships between SES and educational outcomes are only moderate and the effects of SES are quite small when taking into account cognitive ability or prior achievement. These two influences have much stronger relationships with students' outcomes than SES and their effects cannot be attributed to the influence of SES at earlier points of time. The theoretical explanations for socioeconomic inequalities in education (e.g. schools and cultural factors) are problematic and are not supported by empirical work. The much weaker than assumed effects of SES has implications for research and policy."

Marks, G.N. (2016). Is SES really that important for educational outcomes in Australia? A review and some recent evidence. *The Australian Educational Researcher*, First Online 10 December 2016.

"Acknowledging that the effect sizes were small, Vaughn et al. (2011), suggested that we need to question whether multi-component-based approaches are the most beneficial, and instead consider the impact of specific training focussed on vocabulary-building and/or background knowledge. This is a dilemma for those designing intervention approaches intended for use with a heterogeneous sample of students who are struggling with reading. The theories of reading referred to in this paper highlight a wide range of skills and processes needed to read successfully. Some students may have difficulties spanning a number of these components whereas others may have more isolated impairments; different intervention approaches will be more beneficial than others in supporting the underlying components of reading (Duff & Clarke, 2011). If an intervention is created to broadly target struggling readers then it will need to be flexible enough to ensure that a level of personalisation is possible. (p.125)

Paul, S-A.S., & Clarke, P.J. (2016). A systematic review of reading interventions for secondary school students. *International Journal of Educational Research, 79*, 116–127.

"It was found that Reading Recovery had a .31 treatment effect on achievement after controlling for baseline achievement and motivational differences among the treatment and comparison students." (p.47)

Bates, C.B., D'Agostino, J.V., Gambrell, L., & Xu, M. (2016). Reading Recovery: Exploring the effects on first-graders' reading motivation and achievement. *Journal of Education for Students Placed at Risk, 21*(1), 47-59.

"Our results also indicated that oral reading fluency contributed significantly to comprehension, which is consistent with findings across a variety of diverse samples from students ranging from the primary to the secondary grades (Daane et al., 2005; Fuchs et al., 1988; Jenkins et al., 2003; Pinnell et al., 1995; Yavanoff et al., 2005). This finding was supported at the holistic level, as oral reading was more predictive of students' reading comprehension within the SEMs. Further, students participating in this study answered on average 1.5more comprehension questions correctly following oral as opposed to silent reading, even as the passages were held constant (see Table 1). Importantly, the silent reading fluency measures did not contribute significantly to reading comprehension. This finding is consistent with some previous literature, which suggests that prior to fifth grade, students comprehend better after oral reading than after silent reading (Elgart, 1978; Fletcher & Pumphrey, 1988; Prior & Welling, 2001)." (p.192)

Price, K.W., Meisinger, E.B., Louwerse, M.M., & D'Mello, S. (2016). The contributions of oral and silent reading fluency to reading comprehension. *Reading Psychology, 37*(2), 167-201.

"Reading researchers have acknowledged the shortcomings of existing vocabulary and comprehension measures and have called for the creation of reliable, valid, and sensitive measures (see Paris & Stahl, 2005; Pearson et al., 2007). There has been an emphasis on determining the effectiveness of vocabulary instruction based on attaining gains on standardized comprehension tests. Although creating standardized comprehension measures sensitive enough to detect vocabulary growth will greatly improve our understanding of developmental vocabulary growth and, possibly, effects from long-term interventions, it may be unrealistic to consider gains on standardized tests our only benchmark for determining whether a vocabulary intervention is beneficial. If vocabulary instruction of target words or strategies helps children better understand the local context of what they are reading, it is a worthwhile endeavor. Even if standardized tests are improved and can detect differences due to interventions, it is unlikely that these measures will capture growth from short-term vocabulary interventions. Not only have custom measures been necessary to detect these changes in past studies, they will likely remain important in the future. The good news is that the overall positive effects found for custom measures suggest that vocabulary training does increase comprehension for all students. In addition, students identified as having reading problems made more than three times the gains than students with no indicated reading problem. This pattern, however, was not the same with the vocabulary outcomes. Students with reading difficulties made equivalent gains in vocabulary knowledge as those without. This finding suggests that vocabulary instruction is more beneficial for understanding text for students with reading problems than for those without reading difficulties." (p.33-34)

Elleman, A.M., Lindo, E.J., Morphy, P., & Compton, D.L. (2009) the impact of vocabulary instruction on passage-level comprehension of school-age children: A meta-analysis. *Journal of Research on Educational Effectiveness, 2*(1), 1-44.

" … we need to question whether multi-component-based approaches are the most beneficial, and instead consider the impact of specific training focussed on vocabulary-building and/or background knowledge. This is a dilemma for those designing intervention approaches intended for use with a heterogeneous sample of students who are struggling with reading. The theories of reading referred to in this paper highlight a wide range of skills and processes needed to read successfully. Some students may have difficulties spanning a number of these components whereas others may have more isolated impairments; different intervention approaches will be more beneficial than others in supporting the underlying components of reading (Duff & Clarke, 2011). If an intervention is created to broadly target struggling readers then it will need to be flexible enough to ensure that a level of personalisation is possible. … There is a significant number of students entering secondary school with very poor reading skills but a paucity of rigorous research into effective interventions for these students. Interventions which focus on improving reading skills via CAI appear to have no benefit. No studies have investigated the impact of tutor led one-to one support in word recognition or decoding using an RCT design. Interventions focussing specifically on reading comprehension skills produce gains in these abilities but effect sizes are small. These studies mostly use strategy based techniques; only one directly targets student's language comprehension. The feasibility of scaling up interventions in secondary schools needs more consideration." (p.125)

Paul, S-A.S., & Clarke, P.J. (2016). A systematic review of reading interventions for secondary school students. *International Journal of Educational Research, 79*, 116–127.

"Our results indicated that babies did not learn to read. In total, out of 14 different measures of early reading skills, there were 13 null findings. We saw no evidence for the effects on conventional reading, as program developers had indicated on their promotional websites and testimonials, or on any of the pre-alphabetic or partial alphabetic phases of reading. Even with a greater dosage of treatment than in previous studies, there were no effects of the intervention on children's speech processing efficiency, word learning skills, phonological processing, orthographic knowledge, letter recognition, sight word reading, or reading with meaning." (p.827-8)

Neuman, S.B., Kaefer, T., Pinkham, A., & Strouse, G. (2014). Can babies learn to read? A randomized trial of baby media. *Journal of Educational Psychology, 106*(3), 815–830.

"The major finding was that the treatment group demonstrated a moderate to small effect size advantage on reading and spelling measures over the comparison group more than a decade after a reading intervention that took place when the students were in Grades 2 or 3. The results provided some support for our hypothesis that students who received the 8-month explicit reading treatment would achieve higher reading (although not spelling) outcomes than students who received the regular school-based intervention when the effect size data are considered. … Ideally, one would want to build on the initial large effects seen immediately posttreatment on word recognition, reading rate, spelling, and passage reading (with respective effect sizes of 1.69, .96, 1.13, and .78) by providing the kind of extended instruction that would facilitate an accelerated growth rate over time, especially in fluency (automaticity) and comprehension. To close the achievement gap between struggling readers and typical readers, more extensive efforts are clearly required. … The results from this long-term follow-up provide further support for the hypothesis that reading intervention (especially when provided to remedial students, as opposed to younger at-risk students in kindergarten and first grade) is more appropriately viewed as analogous to insulin therapy, rather than as an inoculation against further reading failure (see Coyne, Kame'enui, Simmons, & Harn, 2004, for a discussion of this debate). That is, students in need of explicit and systematic instruction in the early stages of reading acquisition are likely to require ongoing evidence-based support to acquire more complex skills. The challenge posed by Blachman et al. (2004) almost a decade ago to alter standard instruction so that an accelerated growth trajectory is the norm remains a challenge for the field today." (p.53-5)

Blachman, B.A., Schatschneider, C., Fletcher, J.M., Murray, M.S., Munger, K.A., &. Vaughn, M.G. (2014). Intensive reading remediation in Grade 2 or 3: Are there effects a decade later? *Journal of Educational Psychology, 106*(1), 46–57.

"Currently, measures of ORF are frequently used to monitor reading progress and predict performance on future reading outcomes, which are often used to make decisions about intervention placement and retention (O'Connor, Swanson, & Geraghty, 2010). One of the challenges in measuring ORF ability across time is the selection of passages that are equivalent or parallel within the same grade level (Betts et al., 2009; Christ & Ardoin, 2009; Francis et al., 2008). Historically, ORF passages were selected directly from classroom curriculum materials to ensure high content overlap between assessment and instruction (Deno, 1985; Good & Jefferson, 1998). However, random sampling of curriculum materials or selection of materials based on readability formulae does not adequately control for features of text (i.e., difficulty, length, and genre) previously found to impact the measurement of fluency ability across time (Betts et al., 2009; Christ & Ardoin, 2009; Francis et al., 2008). Such inconsistencies in passage features across alternate passages and assessment time points make it difficult to know whether a student's ORF is improving, declining, or holding steady when solely examining changes in observed reading fluency scores over time (Francis et al., 2008). Consequently, when measuring ORF, the effects of passage features that extend beyond noninterval assessments of difficulty level must be statistically addressed using procedures that equate alternate forms within grade (see Betts et al., 2009; Francis et al., 2008). Furthermore, results of this study suggest that equating procedures must move beyond simply controlling for text difficulty, genre, and administration order and should include language and discourse features. Finally, text characteristics that affect the assessment of ORF have been typically underestimated in efforts to use these assessments to understand individual differences in student progress, need for intervention, and related issues. Although the assessment of ORF is sensitive to these individual differences, the present study shows that reading is an interaction of reader and text characteristics. More attention to text characteristics in assessing ORF would lead to more rigorous psychometric measures that would improve the precision by which student reading progress is assessed when using measures of ORF." (p.178)

Barth, A.E., Tolar, T.D., Fletcher, J.M., & Francis, D. (2014). The effects of student and text characteristics on the oral reading fluency of middle-grade students. *Journal of Educational Psychology, 106*(1), 162–180.

"In our own work, we, like the authors of previous studies, have found preservice and inservice teachers hold both accurate knowledge and misconceptions about dyslexia. In two studies using a survey on teacher knowledge of basic language constructs (Washburn et al., 2011a, 2011b), we asked preservice and inservice teachers to indicate their understanding of five true and false statements about characteristics and treatment of dyslexia. In both studies we found the majority of preservice and inservice teachers understood that individuals with dyslexia often experience difficulty with language-based activities (decoding, spelling), but an overwhelming majority of teachers indicated that colored overlays and/or tinted lenses would help individuals with dyslexia." (p.10)

Washburn, E.K., Mulcahy, C.A., Malatesha Joshi, R., & Binks-Cantrell, E. (2016). Teacher Knowledge of Dyslexia. *Perspectives on Language and Literacy, Fall, 2016*, 9-13.

" … the first alternative and preference is to skip over the puzzling word. The second alternative is to guess what the unknown word might be. And the final and least preferred alternative is to sound the word out. Phonics in other words, comes last" (p.26).

Smith, F. (1979). *Reading without nonsense*. New York, NY: Teachers College Press.

"Descriptive studies have typically focused on lesson-to-text match (LTTM): the match between the instruction of phonics elements in teacher guides and the words in student texts (Stein et al., 1999). Such a focus began with Chall's (1967/1983) analyses of four first-grade reading programs: two code emphasis and two meaning emphasis. Chall observed that the teacher guides of the meaning-emphasis basal programs included phonics instruction; however, the phonics elements taught did not systematically match the words in students' texts as they did in the code emphasis programs

For each of the four decades following Chall's (1967/1983) work, researchers have analyzed and compared LTTM in meaning- and code-emphasis first-grade reading programs, and, as a result, shifts in various copyrights are evident. In reading programs copyrighted in the 1970s, Beck and McCaslin (1978) reported that patterns of LTTM had not changed from those reported by Chall (1967/1983) and noted that the analysis of two reading interventions _ code-emphasis programs provided a higher "potential for accuracy" when decoding words, whereas the LTTM of meaning-emphasis programs did not. Four copyrighted programs of the 1980s were analyzed by Meyer et al. (1987), who noted that meaning-emphasis programs continued to have low LTTM. Three out of four of the programs analyzed were meaning-emphasis, and their LTTM was less than 10%. Stein et al. (1999) found that decodable texts and lessons mandated for adoption in California and Texas in the 1990s featured LTTMs similar to the meaning-based programs analyzed by Beck and McCaslin (1978)." (p.483-484)
Murray, M. S., Munger, K. A., & Hiebert, E. H. (2014). An analysis of two reading intervention programs: How do the words, texts, and programs compare? *Elementary School Journal, 114,* 479-500.

"English words do not always have regular correspondences between letters and sounds (i.e., many speech sounds can be spelled in different ways). These irregularly spelled words tend to occur with great frequency in English (e.g., *have, of, they*), and in texts read by beginning readers, they account for more than 50% of words (Adams, 1990). A reader's word-reading accuracy and automaticity are positively influenced by the frequency with which words appear in print (Gernsbacher, 1984; Zinna, Liberman, & Shankweiler, 1986). Texts should feature enough highly frequent words so that they can be learned; however, research has not established guidelines indicating how many of these words should be included or how often they should be repeated within texts (Mesmer et al., 2012)." (p.485)
Murray, M. S., Munger, K. A., & Hiebert, E. H. (2014). An analysis of two reading intervention programs: How do the words, texts, and programs compare? *Elementary School Journal, 114,* 479-500.

"With respect to LTTM, we examined the programs' adherence to guidelines such as those proposed by Beck (1997), which were based on her earlier reviews of first-grade texts and programs (Beck & Block, 1979; Beck & McCaslin, 1978). She recommended 70% to 80% decodability, since only 30% to 50% may not provide beginning readers with enough opportunity to practice what they had learned, and 100% would result in a stilted, artificial-sounding text. It should be noted that Beck's work was descriptive rather than empirical—student performance was not connected to the match of lessons and student texts." (p.487)
Murray, M. S., Munger, K. A., & Hiebert, E. H. (2014). An analysis of two reading intervention programs: How do the words, texts, and programs compare? *Elementary School Journal, 114,* 479-500.

"Repeated readings (RR) has garnered much attention as an evidence based intervention designed to improve all components of reading fluency (rate, accuracy, prosody, and comprehension). Despite this attention, there is not an abundance of research comparing its effectiveness to other potential interventions. The current study presents the findings from a randomized control trial study involving the assignment of 168 second grade students to a RR, wide reading (WR), or business as usual condition. Intervention students were provided with 9–10 weeks of intervention with sessions occurring four times per week. Pre- and post-testing were conducted using Woodcock-Johnson III reading achievement measures (Woodcock, McGrew, & Mather, 2001, curriculum-based measurement (CBM) probes, measures of prosody, and measures of students' eye movements when reading. Changes in fluency were also monitored using weekly CBM progress monitoring procedures. Data were collected on the amount of time students spent reading and the number of words read by students during each intervention session. Results indicate substantial gains made by students across conditions, with some measures indicating greater gains by students in the two intervention conditions. Analyses do not indicate that RR was superior to WR. In addition to expanding the RR literature, this study greatly expands research evaluating changes in reading behaviors that occur with improvements in reading fluency. Implications regarding whether schools should provide more opportunities to repeatedly practice the same text (i.e., RR) or practice a wide range of text (i.e., WR) are provided." (p. 13)

"The most consistent finding across all of the measures employed within this study was that students indeed made huge improvements in reading behavior, as indicated by WJ-III performance, reading rate, reading expression, and eye movement patterns. A second consistent finding was that the magnitude of changes across assessment measures was not reliable across students' skill levels. For the majority of employed measures, the students in the lowest achievement group made the greatest gains across time. Although such great gains are highly favorable in potentially allowing these students to "catch up" to their higher-achieving peers, maximum growth for all students would seem to be a better outcome. … these results are generally consistent with past research suggesting that RR improves students' reading achievement (Therrien et al., 2006). However, it is interesting that RR failed to produce greater gains in students' achievement compared to WR. These results strongly suggest that previously observed improvements in students' reading achievement as a result of RR implementation were largely due to additional time spent reading as opposed to repeatedly reading text. … "Given the lack of differences in outcomes between the RR and WR conditions, practitioners should thoughtfully consider the potential benefits and drawbacks of each set of procedures when providing students with a fluency-based intervention. Although results of this study would suggest that RR might not benefit students more than WR, there is strong evidence to suggest that RR improves students' fluency and comprehension on passages on which intervention is provided. Thus, if intervention will expose students to specific content and/or materials that they may need to read later in class, then RR may be the best set of procedures. However, a drawback of RR is that students may become annoyed with repeatedly reading passages more than once, especially if the material is not of interest to them. WR addresses this issue, as students read materials only once. Furthermore, WR exposes them to a significantly broader range of words. For example, students in the RR condition read an average of 9000 words comprising unique (i.e., non-repeated) text sequences across the 10 weeks of intervention, whereas students in the WR condition read an average of 28,815. One would expect that, by reading a greater variety of texts, students would be exposed to a greater breadth of vocabulary and contextual information. However, ensuring that passages are at an appropriate reading level might be of particular importance for WR intervention given that students are provided with only one opportunity to read words correctly and understand materials. Despite the wide use of RR-based intervention within elementary schools and its extensive literature base, there clearly remains much left unknown regarding RR as an intervention for improving elementary students' reading achievement. This study demonstrates the importance of employing multiple measures, including a true control group, and not assuming that an intervention deemed "empirically valid" will be of great benefit for all students regardless of age and skill level." (p. 34-5)

Ardoin, S.P., Binder, K.S., Foster, T.E., & Zawoyskia, A.M. (2016). Repeated versus wide reading: A randomized control design study examining the impact of fluency interventions on underlying reading behaviour. *Journal of School Psychology, 59,* 13–38.

"In a more recent series of meta-analyses investigating randomised controlled trials of nonpharmacological interventions, the investigators concluded that, along with neurofeedback, cognitive training, and restricted elimination diets, behavioural interventions cannot be recommended as interventions for core ADHD symptoms until better evidence of their effectiveness is reported by blinded assessments." (p.1245)
Thapar, A., & Miriam Cooper, M. (2016). Attention deficit hyperactivity disorder. *Lancet, 387,* 1240–50.

"Reading has been shown to rely on a dorsal brain circuit involving the temporoparietal cortex (TPC) for grapheme-to-phoneme conversion of novel words (Pugh et al., 2001), and a ventral stream involving left occipitotemporal cortex (OTC) (in particular in the so-called "visual word form area", VWFA) for visual identification of familiar words. In addition, portions of the inferior frontal cortex (IFC) have been posited to be an output of the dorsal reading pathway involved in phonology. While this dorsal versus ventral dichotomy for phonological and orthographic processing of words is widely accepted, it is not known if these brain areas are actually strictly sensitive to orthographic or phonological information. Using an fMRI rapid adaptation technique we probed the selectivity of the TPC, OTC, and IFC to orthographic and phonological features during single word reading. We found in two independent experiments using different task conditions in adult normal readers, that the TPC is exclusively sensitive to phonology and the VWFA in the OTC is exclusively sensitive to orthography. The dorsal IFC (BA 44), however, showed orthographic but not phonological selectivity. These results support the theory that reading involves a

specific phonological-based temporoparietal region and a specific orthographic-based ventral occipitotemporal region. The dorsal IFC, however, was not sensitive to phonological processing, suggesting a more complex role for this region." (p. 248)

Glezera, L.S., Eden, G., Jianga, X., Luetjeb, M., Napoliellob, E., Kima, J., & Riesenhuber, M. (2016). Uncovering phonological and orthographic selectivity across the reading network using fMRI-RA. *NeuroImage, 138*, 248–256.

"Results suggest that WM training is ineffective at enhancing TD children's cognitive or academic skills and that, when positive effects are observed, they are modest at best. Thus, in line with other types of training, far-transfer rarely occurs and its effects are minimal."

Sala, G., & Gobet, F. (2017). Working memory training in typically developing children: A meta-analysis of the available evidence. *Developmental Psychology*, Online version, http://dx.doi.org/10.1037/dev0000265

"One of the intentions from this review was to provide educators instructing middle school students with LD about instructional practices associated with improved outcomes in reading comprehension. There are several instructional practices that teachers can use with confidence to improve reading comprehension. The findings from this synthesis support the use of summarization or main idea strategy instruction as a means to improve understanding of text. Providing students with self-monitoring tools or ways to record the results of their efforts related to a particular behavior also may improve comprehension outcomes. Other strategies that were found to be effective include mnemonics, mapping, and questioning. The most consistent finding across this body of studies was the use of explicit instruction including modeling, feedback, and opportunities for practice. Middle school students with LD will benefit from explicit instruction designed to support better understanding of text." (p.338)

Solis, M., Ciullo, S., Vaughn, S., Pyle, N., Hassaram, B., & Leroux, A. (2012). Reading comprehension interventions for middle school students with learning disabilities: A synthesis of 30 years of research, *Journal of Learning Disabilities, 45*, 327-340.

"While the extent to which students need to explicitly know about grammar is still hotly debated (Locke, 2010), there is widespread agreement that teachers' grammatical knowledge needs to be richer and more substantive than the grammar they may need to teach to students. Teacher subject knowledge requires 'a higher degree of grammar consciousness than most direct learners are likely to need or want' (Leech, 1994: 18), with an ability to be 'conscious analysts of linguistic processes' (Brumfit, 1997: 163) and possess 'conscious awareness' (Armstrong, 2004: 223) of how texts are structured. It has been argued that teachers who understand grammatical forms may be better placed to support developing writers (Andrews, 2005), to identify linguistic development in their students (Gordon, 2005), and to 'make the analysis explicit' (Hudson, 2004: 113) when examining texts with their students. The problem that current English teachers have with attaining the level of grammatical subject knowledge outlined above has arisen for two reasons: first, the fall from favour of grammar teaching in Anglophone countries following the Dartmouth Conference in the USA in 1966, due to the widespread view that the formal teaching of grammar had no beneficial impact on students' linguistic facility (Hudson and Walmsley, 2005); second, the tendency in the UK for teachers to follow a literature degree route into teaching, along with is a shortage of applicants from a linguistics route (Shortis and Blake, 2010). As a result, many current English teachers were not taught grammar at school or university, a point also noted in the US context by Kolln and Hancock (2005), and by Gordon in New Zealand (2005). Of course, teachers who have literature degrees and are keen readers themselves do have a lot of knowledge about texts that they can draw on in language teaching, and they also have a substantial amount of implicit grammatical knowledge about texts. However, as Andrews (2005) points out, it is likely that 'a teacher with a rich knowledge of grammatical constructions and a more general awareness of the forms and varieties of the language will be in a better position to help young writers' (2005: 75). This subject knowledge problem extends into initial teacher training courses, with Kolln and Hancock (2005) complaining that most pre-service programs for English teachers in the USA do not address grammatical knowledge, and a number of UK studies reporting weaknesses in grammatical knowledge (Andrews, 1994, 1999; Bloor, 1986; Burgess et al., 2000; Chandler et al., 1988; Hislam and Cajkler, 2006; Williamson and Hardman, 1995; Wray, 1993). In Australia, Louden et al. (2005) conducted a survey which indicated that teachers do not feel confident about teaching grammar when they complete

their training, and Harper and Rennie's pre-service teachers (2009) 'showed limited understandings in their ability to analyse the parts and structure of sentences, and their knowledge of metalinguistic terms did not seem to extend past the basic concepts of "noun", "verb" and "adjective" ' (2009: 27)." (p.51-2)

Myhill, D., & Watson, A. (2014). The role of grammar in the writing curriculum: A review of the literature. *Child Language Teaching and Therapy 30*(1), 41-62.

"Executive Summary

The What Works Clearinghouse (WWC) was established in 2002 "to be a central and trusted source of scientific evidence for what works in education." It has released over 700 intervention reports, quick reviews, and single study reviews, but these reports and the procedures and standards that guide them have received extensive criticism from multiple individuals and organizations. This report reviews criticisms of WWC publications and policies, errors identified in their publications, and issues regarding the transparency and accountability of the WWC. This review is based on findings from a series of Freedom of Information Act (FOIA) requests submitted by the National Institute for Direct Instruction (NIFDI) and subsequent appeals. Three conclusions appear clear: 1) The WWC suffers from a lack of transparency in their policies and guidelines, 2) the conclusions they create in their reports can be misleading, and 3) the reports are potentially damaging to program developers and ultimately the success of students.

The major concerns documented in these reports included the misinterpretation of study findings, inclusion of studies where programs were not fully implemented, exclusion of relevant studies from review, inappropriate inclusion of studies, concerns over WWC policies and procedures, incorrect information about a program developer and/or publisher, and the classification of programs. Multiple inquirers documented how the WWC made conclusions about study findings that did not align with the authors' conclusions, and in some instances reported totally different conclusions. Over 80 percent of the requests for Quality Reviews involved concerns with misinterpretations of study findings. Misinterpretation of study findings appeared to result from both procedural errors of individual reviewers, but also from WWC policies, often including the WWC's refusal to consider fidelity of implementation when determining the effectiveness rating of an intervention.

Although many changes were made in response to these Quality Reviews, multiple errors remained. The WWC primarily corrected minor errors, but not the larger errors that misled readers and tarnished the reputation of program developers and study authors. The most blatant errors remaining involved the misinterpretation of study findings. These errors involved both the inclusion of inappropriate studies and the exclusion of appropriate studies.

One of the major concerns with the inclusion of inappropriate studies involved the issue of poor implementation fidelity in a study. This lack of attention to fidelity is especially disturbing given the key role of fidelity to internal validity of research designs.

The primary cause of these problems is the policies and standards established by the WWC and their focus on an exclusive approach to evaluating research. The WWC uses a "threshold," rule-based approach to examining studies, excluding those that do not meet a set list of criteria including, most prominently, a preference for randomized control trials (RCTs). Yet, empirical studies show that this approach results in very different results than would come from a more inclusive approach typical of the social sciences. In general, review of the FOIA documents provided makes it apparent that there is great concern on how WWC reports are conducted and reviewed. It is reasonable to predict additional errors may exist in other WWC reports, but these errors have not been identified and reported, and gone through the Quality Review process. The wide range of errors documented and the multitude of reports with errors create doubt in the ability of the WWC to accurately report on the effectiveness of education programs and be a trusted resource.

The WWC may provide valuable resources that determine what works and doesn't work in education, but the variety and multitude of errors documented in their reports tarnishes their reputation as a trusted and reliable resource. The actual number of errors in their published reports are unknown, and their negative

effect on the field of education is unclear, but troublesome. Educators and school boards rely on WWC reports to provide accurate information on what works and what doesn't, but these reports can't be trusted. With a halo of uncertainty surrounding the WWC and their publications, all future reports must be scrutinized to assess whether they accurately reflect the available research and can they be trusted as a useful tool in determining what works." (p. iii-iv)

Wood, T.W. (2017). *Does the What Works Clearinghouse really work?: Investigations into issues of policy, practice, and transparency.* Office of Research and Evaluation, NIFDI. Retrieved from http://nifdi.org/research/recent-research/whitepapers/1431-does-the-what-works-clearinghouse-really-work-investigations-into-issues-of-policy-practice-and-transparency/file

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"A further finding from the impact evaluation relates to the effectiveness of instructional coaching as a component of the combined intervention model. The study found that the effectiveness of one-on-one instructional coaching may be dependent on the personal and professional characteristics of individual coaches. This finding complements existing research on the importance of the quality of the institutions implementing programmes." (p.36)

Brahm Fleischa, B., Taylorb, S., Schöerc, V., & Mabogoaned, T. (2017). Failing to catch up in reading in the middle years: The findings of the impact evaluation of the Reading Catch-Up Programme in South Africa. *International Journal of Educational Development, 53*, 36-47

"We had expected that phonemic decoding and passage reading fluency would be better supported by the explicit phonics instruction and structured repeated reading practice students received in the EX group, but the finding that EX was associated with stronger effects on comprehension was unexpected, as GR students spent more time engaged in text reading and discussion of text. Because the comprehension instruction provided in the EX condition was both explicit and carefully sequenced, our findings align with recommendations by Shanahan et al. (2010) that primary-grade students be provided with explicit instruction in comprehension, beginning with listening comprehension." (p.287)

"A general implication of this study is that students beyond Grade 1 who have substantial reading difficulties likely need fairly intensive intervention. This intervention may be best provided using published programs supported by empirical research rather than instruction developed by teachers or others in the school without the guidance of a program. Even when using published programs, interventions can be individualized by determining the focus of instruction (e.g., decoding, fluency, comprehension), selection of programs that are appropriate for students' reading levels, and using mastery tests and other progress monitoring measures to determine how quickly students can proceed through a program or when a change of emphasis is warranted." (p.290)

Denton, C.A., Fletcher, J.M., Taylor, W.P., Barth, A.E., & Vaughn, S. (2014). An experimental evaluation of guided reading and explicit interventions for primary-grade students at-risk for reading difficulties. *Journal of Research on Educational Effectiveness, 7*(3), 268-293, DOI: 10.1080/19345747.2014.906010

"In recent years, major initiatives in the U. S. and U. K. have added greatly to the amount and quality of research on the effectiveness of secondary reading programs, especially targeted programs for struggling readers. This review of the experimental research on secondary reading programs focuses on 64 studies that used random assignment (n=55) or high-quality quasi-experiments (n=9) to evaluate outcomes of 49 programs on widely accepted measures of reading. Programs using one-to-one and small-group tutoring (ES=+0.23) and cooperative learning programs (mean ES=+0.16), showed positive outcomes, on average. Among technology programs, direct instruction, metacognitive approaches, mixed-model programs, and programs for English learners, there were individual examples of promising approaches. Except for tutoring, targeted extra-time programs were no more effective than programs provided to entire classes and schools without adding instructional time. The findings suggest that secondary readers benefit more from engaging and personalized instruction than from remedial services."

Baye, A., Lake, C., Inns, A. & Slavin, R. E. (2016, December). *Effective Reading Programs for Secondary Students*. Baltimore, MD: Johns Hopkins University, Center for Research and Reform in Education. Retrieved from http://www.bestevidence.org/reading/mhs/mhs_read.htm

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"Data were available for 5822 children, of whom 172 (3%) met the criteria for SRI. No association was found between SRI and strabismus, motor fusion, sensory fusion at a distance, refractive error, amblyopia, convergence, accommodation, or contrast sensitivity. Abnormalities in sensory fusion at near were mildly higher in children with SRI compared with their peers (1 in 6 vs 1 in 10, P = .08), as were children with stereoacuity worse than 60 seconds/arc (1 in 6 vs 1 in 10, P = .001). … Four of every 5 children with SRI had normal ophthalmic function in each test used. A small minority of children displayed minor anomalies in stereoacuity or fusion of near targets. The slight excess of these children among those with SRI may be a result of their reading impairment or may be unrelated. We found no evidence that vision-based treatments would be useful to help children with SRI." (p. 1057)

Creavin, A.L., Lingam, R., Steer, & Williams, C. (2015). Ophthalmic abnormalities and reading impairment. *Pediatrics, 135*(6), 1057-1065.

"Compared with previous studies, the current study was more robust in that children with reading impairment were compared with a general cohort population rather than with controls selected from schools and clinics. Pediatric clinicians should follow the American Academy of Pediatrics policy recommending instruction in phonics, word analysis, and reading fluency and comprehension as effective, evidence-based treatment for dyslexia. Also, unless results of routine vision screening are abnormal, a referral to an eye specialist is not indicated." (p.1)

Stein, M.T. (2015). Visual training methods are ineffective for dyslexia. *New England Journal of Medicine: Journal Watch*, June 2, 2015. Retrieved from http://www.jwatch.org/na38060/2015/06/02/visual-training-methods-are-ineffective-dyslexia

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"While explanations for the impacts of tutoring, cooperative learning, and other promising approaches are somewhat speculative, there is one conclusion from this review that seems welljustified. No program that showed positive effects in this review involved anything like traditional teaching. If secondary schools are to make real breakthroughs with struggling readers, they are going to have to do something much more motivating, more personalized, and more likely to give students a belief in their own capacity for learning. Most of the innovations tested in the studies that met the inclusion criteria may have been too much like what students had likely experienced for years before. A secondary student taking a course he or she perceives as remedial, no matter how small the class size, how much extra time is allocated, or how well designed the content and teaching, is likely to be watching the clock and wishing he or she were in the control group, which is usually taking band or art at that time. The research reviewed here provides evidence of what *not* to do to accelerate the learning of struggling secondary readers. It provides some promising avenues toward more effective approaches, but much remains to be done to understand how to create replicable, cost-effective strategies that can reliably and meaningfully improve reading outcomes for middle and high school students." (p.74-5)

Baye, A., Lake, C., Inns, A. & Slavin, R. E. (2016, December). *Effective Reading Programs for Secondary Students*. Baltimore, MD: Johns Hopkins University, Center for Research and Reform in Education. Retrieved from http://www.bestevidence.org/reading/mhs/mhs_read.htm

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"Several research studies suggest that differences in academic performance between socioeconomic as well as racial and ethnic groups trace back to the preschool years (Barnet et al., 2016; Friedman-Krauss et al., 2016; Nores & Barnett, 2014; Zill & Resnick, 2006)." (p.237)

Albritton, K., Anhalt, K., & Terry, N.P. (2016). Promoting equity for our nation's youngest students: School psychologists as agents of social justice in early childhood settings. *School Psychology Forum: Research in Practice, 10*(3), 237-250. Retrieved from http://scholar.google.com.au/scholar_url?url=https://www.researchgate.net/profile/Kizzy_Albritton/public

"Another early intervention meta-analysis focused on who benefits from such interventions. It is often assumed that the interventions work best with kids who possess (or lack) particular cognitive skills. However, in an analysis of 28 studies, early interventions seemed to be equally effective, no matter the children's initial levels of prior knowledge, phonemic awareness, or other cognitive abilities (Stuebing et al., 2015). Likewise, a meta-analysis of 82 studies of reading interventions (Scammacca, Roberts, Vaughn, & Stuebing, 2015) found larger learning effects with the older studies (pre-2004) and smaller ones with the more recent studies. The reason for this wasn't that the interventions are getting less effective or that today's students are less amenable to teaching; rather, that the studies themselves have become more rigorous and that control group kids appear to be getting better classroom instruction these days." (p.509)

Shanahan, T. (2017). Reading research: The importance of replication. *The Reading Teacher, 70*(4), 507–510.

"This paper demonstrates that the emphasis on students' socioeconomic status (SES) in research and policy circles in Australia is unwarranted. The bivariate relationships between SES and educational outcomes are only moderate and the effects of SES are quite small when taking into account cognitive ability or prior achievement. These two influences have much stronger relationships with students' outcomes than SES and their effects cannot be attributed to the influence of SES at earlier points of time. The theoretical explanations for socioeconomic inequalities in education (e.g. schools and cultural factors) are problematic and are not supported by empirical work. The much weaker than assumed effects of SES has implications for research and policy."

Marks, G.N. (2016). Is SES really that important for educational outcomes in Australia? A review and some recent evidence. *Australian Educational Researcher,* 1-21. First Online: 10 December 2016. doi:10.1007/s13384-016-0219-2.

"Written language differs in a number of important respects from spoken language. The vocabulary and syntax (Crystal and Davy, 1969), the larger structures (Tannen, 1982) and the use of cohesive devices (Halliday and Hassan, 1976), which knit it into a textured whole, combine to make written language markedly distinct from spoken. Even a story written for young children, such as Sendak's *Where the Wild Things Are* (Sendak, 1970) differs in all these respects from the language spoken between parent and child.

 Researchers have noted that the processes for making sense of these two forms of language also differ in some important ways (e.g. Kintsch, 1998). The continuing presence of the text on page or screen allows the reader to move around and to vary the reading pace. This makes it possible to repair error and uncertainty, relate what is being read to knowledge gained elsewhere, in a more measured and careful way than speech allows. Readers can apply comprehension strategies not available to listeners. But the SVR takes no account of these different procedures."

Henrietta Dombey from the United Kingdom Literacy Association (UKLA) The simple view of reading – explained. http://www.teachingtimes.com/news/the-simple.htm

"This study aimed to examine if specific skills that are developed during preschool years could predict the reading performance in the first and second grade of primary school. A series of regression analyses were undertaken to examine the contribution of measurements in kindergarten to students' reading performance in two first grades of primary school. Our results showed that PA is the strong predictor of reading achievement in Grade 1. This finding verifies our first hypothesis and is consistent with numerous studies that have reported that PA is a powerful predictor of future reading achievement in alphabetic (Manolitsis, 2000; Mouzaki et al., 2008; Schneider, Kuespert, Roth, & Vise, 1997) and non-alphabetic writing systems

(Hu & Catts, 1998; McBride-Chang & Kail, 2002). The second hypothesis, which attempted to relate rapid naming performance (RAN) and reading, was not supported from our results. Contrary to our hypothesis, we did not find a unique connection between RAN and reading although several researchers have argued that RAN is a strong predictor of reading in orthographically consistent languages (Georgiou et al., 2008; Mann & Wimmer, 2002) and in non-alphabetic writing systems (Chow, McBride-Chang, & Burgess, 2005). However, this finding is consistent with studies reporting that rapid naming when assessed in kindergarten does not predict reading achievement in first grade, but in later grades (Puolakanaho et al., 2008). … Overall, our findings indicate that not only the total reading performance, but the accuracy and the fluency of reading as well, are predicted in the first grade of primary school by the PA and the phonological memory scores during kindergarten." (p.1714, 1717)

Papadimitriou, A.M., & Vlachos, F.M. (2014). Which specific skills developing during preschool years predict the reading performance in the first and second grade of primary school? *Early Child Development and Care, 184*(11), 1706-1722.

"Reading research of the past few decades has indicated phonemic awareness (PA) and rapid automatized naming (RAN) as strong predictors of WR skill (Kirby, Desrochers, Roth, & Lai, 2008; Landerl et al., 2013; Wagner, Torgesen, Rashotte, & Pearson, 2013). An influential theoretical framework involving both processes is Wolf and Bowers's (1999) Double Deficit Hypothesis (DDH), which predicts that RAN and PA constitute more or less independent correlates of WR ability. Since the introduction of the DDH, this assumption has been affirmed on numerous occasions (e.g., Compton, DeFries, & Olson, 2001; Kirby et al., 2010; Papadopoulos, Georgiou, & Kendeou, 2009; Schatschneider, Carlson, Francis, Foorman, & Fletcher, 2002; Torppa, Georgiou, Salmi, Eklund, & Lyytinen, 2012; Torppa et al., 2013; Vukovic & Siegel, 2006). The DDH also predicts that a combination of deficient RAN and PA—a "double deficit"—is associated with the poorest level of WR performance (Wolf & Bowers, 1999, p. 424). However, as DDH studies have employed differing criteria for reading disability (RD) and have applied differing cutoffs to RAN and PA to indicate deficit levels, it remains unclear what should be considered as the poorest level of WR as well as what is meant with a double deficit." … These results are in line with the prediction that a "double deficit" is present among the poorest readers (Papadopoulos et al., 2009; Wolf & Bowers, 1999) and, what is more, suggest that the Double Deficit Hypothesis gains momentum if more severely impaired readers are considered. A further specification of these findings is that the effects for PA seem consistently larger than for RAN, with—conform the prediction (Hypothesis 2)—differences getting larger with the severity of RD. This finding, thus, suggests that PA is a more effective cognitive marker for the poorest readers." (p. 166, 167, 177)
de Groot, B., van den Bos, K., Minnaert, A., & van der Meulen, B. (2015). Phonological processing and word reading in typically developing and reading disabled children: Severity matters. *Scientific Studies of Reading*, *19*(2), 166-181.

"As a field, professionals hoped that RTI approaches would reduce current special education caseloads and allow for more individualized reading instruction for students demonstrating the most persistently or chronically inadequate response, who we assumed would form a class of those with true reading disabilities (Vaughn, Moody, & Schumm, 1998). In sum, it was hoped RTI innovations would focus special education services on students who in the past were termed *treatment-resistors* or *nonresponders* (Blachman, 1994; Torgesen, 2000). In 2000, Torgesen estimated that only 2% to 6% of the school population might be truly unresponsive to generally effective intervention efforts (note that he based this estimate on students having access to powerful preventive instruction and intervention, but who had not acquired word reading skills above the 30th percentile). At the time, his estimates were very similar to federal incidence figures for children with reading disabilities. … Now with the use of RTI models, more than ever, we understand how hard it may be to help schools develop and sustain sufficiently powerful interventions. We remain mindful that once students fall behind in reading, little evidence exists that even the most powerful remedial interventions make it possible to "close the gap," particularly in terms of fluency and comprehension, even in studies that have come close to doing so in terms of word reading. This is troubling because we have known for a long while about negative consequences for early difficulties in reading that include relatively weak vocabulary growth (Cunningham & Stanovich, 1997),

changes in attitude and motivation for reading (Wigfield & Guthrie, 1997), and loss of opportunities for developing increasingly sophisticated reading strategies (Brown, Palincsar, & Purcell, 1986)." (p.130-131)

Al Otaiba, S., Wagner, R.K., & Miller, B. (2014). *"Waiting to Fail"* redux*: Understanding inadequate response to intervention. Learning Disability Quarterly, 37*(3), 129-133.

"The salience of fluency is also underscored by study findings by Vaughn et al. (2009), who reported that second graders with ORF scores above 40 words per minute demonstrated stronger RTI than students with lower scores, and by O'Connor et al. (2005), who reported that all first graders who received intervention and reached a speed of 40 words per minute by the end of first grade remained on grade level for reading through third grade." (p.213-4)

Greulich, L. Al Otaiba, S., Schatschneider,C., Wanzek, J., Ortiz, M., & Wagner, R.K. (2014). Understanding inadequate response to first grade multi-tier intervention: Nomothetic and idiographic perspectives.*Learning Disability Quarterly, 37,* 204-217.

"Poor reading comprehension is not always accompanied with word recognition (i.e., decoding) difficulties. One such case is students with specific poor comprehension (SPC) whose reading difficulties are specific to the area of reading comprehension. Although the estimation of the population proportion in the previous studies has varied, studies substantiate that poor reading comprehenders, with good word recognition abilities, exist (Nation, Clarke, Marshall, & Durand, 2004; Yuill & Oakhill, 1988, 1991). Students with SPC could become more prevalent in the upper elementary grades with a well-known phenomenon of the ''fourth-grade slump'' in a literacy development (Chall & Jacobs, 2003). … their poor reading comprehension could be due to weak meaning-related spoken language abilities, poor metacognitive knowledge, and/or a lack of text structure knowledge." (p.)

Lee, S.H. & Tsai, SF. (2016). Experimental intervention research on students with specific poor comprehension: A systematic review of treatment outcomes. *Reading & Writing*, DOI 10.1007/s11145-016-9697-x

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"Thus, for early intervention purposes, preventative treatment can be tailored towards the individual needs of the child. For instance, a preschool child exhibiting weakness in orthography (e.g., letter knowledge) is at risk for later deficits in word recognition. A deficit in word recognition will also result in overall weakness with reading comprehension (at least in first grade). For this particular profile, treatment can intensively target letter knowledge skills, which is likely to support the primary area of need for that child. In providing early identification as well as targeted early intervention, we may prevent the ''snowball'' effect by which children with deficits in one or more domains of lexical quality become children with deficits in one or more components of reading comprehension." (p.1766)

Murphy, KA., & Farquharson, K. (2016). Investigating profiles of lexical quality in preschool and their contribution to first grade reading. *Reading and Writing, 29*(9), 1745-1770.

"Abstract In the present study, we examined patterns of code-focused emergent literacy skill growth for children from lower and higher socioeconomic (SES) families enrolled at a high-quality early childhood center. Measures of letter name knowledge, letter sound knowledge, alliteration, and rhyming were collected at three time points over the course of the year. Additionally, standardized measures of print knowledge and phonological awareness were collected at the end of the year. Growth curve analyses indicated SES-related differences in initial status, but no differences in rate of growth. Initial status predicted end-of-year print knowledge. Both initial status and SES predicted end-of-year phonological awareness. These results suggest that gaps in code-focused emergent literacy skills exist earlier than previously documented with no evidence of compensatory or Matthew effects (p.1337). … We found no differences in rates of growth on measures of AK [alphabet knowledge] and PA [phonological awareness] or in the extent to which growth predicted standardized outcomes. These results are incongruous with a compensatory effect (Sameroff & Chandler, 1975). Children from lower-SES families did not grow at a faster rate than their higher-SES peers such that early gaps in literacy skills were closed at the end of the year. However, the results are also incongruous with a Matthew effect (Stanovich, 1986). Rather, our

results show that initial differences did not increase but were maintained throughout the school year. This result suggests that the trajectories for reading skills have largely been established prior to preschool entry. This aligns with the literature showing SES-related differences in the language and literacy experiences of children prior to school (Merlo, Bowman, & Barnett, 2007; Weigel, Martin, & Bennett, 2006). This body of research has pointed to a number of home-related differences, including less access to print (Neuman & Celano, 2001), less experience with rhyming word play and nursery rhymes (Juel, Griffith, & Gough, 1986), fewer conversations about letters (Treiman et al., 2015), and less frequent storybook reading (Se´ne´chal, 2006) for children from lower-SES families. … These findings highlight the importance of addressing literacy skill gaps early in children's life. By preschool, children from lower-SES families are already behind their higher-SES peers in relevant code-focused emergent literacy skills. This finding aligns with calls to provide high-quality early instruction for these children as a means of potentially mitigating gaps. However, as alluded to above, these findings indicate that current early childhood programming, even when deemed of high quality, may not realize intended impacts on emergent literacy skill development and may not be sufficient to realize compensatory effects for children from lower-SES families. … Despite these limitations, this study's primary findings add to the extant research literature related to SES gaps in literacy skills in demonstrating that such gaps exist in code-focused emergent literacy skills prior to formal schooling and are not mitigated by enrollment in a high-quality early childhood program. Our findings suggest that stronger emphasis may be needed on code-focused skills in preschool programs, particularly in those preschool programs serving children from lower income families." (p. 1354, 5, 9)

Strang, T.M., & Piasta, S.B. (2016). Socioeconomic differences in code-focused emergent literacy skills. *Reading and Writing, 29*, 1337–1362

" … when writing by pen and by keyboard were compared on alphabet writing, sentence constructing, and text composing, children wrote more words and wrote words faster (Berninger, Abbott et al., 2008) and expressed more ideas (Hayes & Berninger, in press) when composing text by pen than by keyboard from second to sixth grade; but for letter writing and sentence constructing, the keyboard often showed advantages (Berninger, Abbott et al., 2008). Children with learning disabilities need explicit instruction in handwriting as well as keyboarding and both accommodations in the form of using a laptop and ongoing explicit instruction in all aspects of writing from planning to translating to reviewing and revising (Berninger, 2006a, 2008a; Berninger, Abbott et al., 2008)." (p.77)

Berninger, V.W. (2009). Highlights of programmatic, interdisciplinary research on writing. *Learning Disabilities Research and Practice, 24*(2), 69–80.

"The accumulated evidence also supports the proposition that handwriting and spelling play an important role in writing development (Graham, 2006b). First, handwriting and spelling are easier or less cognitively demanding for more skilled than less skilled writers. Second, there is a large body of research demonstrating that handwriting and spelling improve with age. For example, we found that children's handwriting fluency improves 10 letters or more per minute each year up to high school (Graham, Berninger, Weintraub, & Schafer, 1998). Third, individual differences in handwriting and spelling predict how well students write. In a study with 600 children, we found these two skills accounted for 25% and 42% of the variance in writing quality at the primary and intermediate grades, and 66% and 41% of the variance in writing output at these same grade levels, respectively (Graham, Berninger, Abbott, Abbott, & Whitaker, 1997). Fourth, eliminating these skills through dictation has a positive impact on the writing of specific groups of writers. For instance, MacArthur and Graham (1987) reported that students with LD produced qualitatively better text when dictating stories versus writing them by hand. Finally, there is a small body of studies showing that handwriting or spelling instruction can enhance writing performance. We found that providing extra instruction in these skills to young struggling writers increased how much they wrote and resulted in improved sentence construction skills (Graham, Harris,&Fink, 2000; Graham, Harris, & Fink-Chorzempa, 2002). Graham (2006b) also offered a tentative proposition that sentence construction skills shape writing development. There is some evidence that skilled writers produce more complex sentences than less skilled writers, although these findings do not hold for all comparisons (e.g., good versus poor readers). Developing writers' sentences become increasingly complex with age, although

this finding varies by writing task. Sentence skills are correlated with writing performance (at least in some studies), but this appears to vary by genre. Lastly, efforts to improve sentence construction skills of developing writers can enhance their writing performance, if the right type of instruction is provided. For example, Saddler and Graham (2005) reported that sentence combining instruction had a positive impact on the quality of text produced by struggling writers." (p.61)

Graham, S., & Harris, K.R. (2009). Almost 30 years of writing research: Making sense of it all with The Wrath of Khan. *Learning Disabilities Research and Practice, 24*(2), 58–68.

"I advance the idea that schools, like religion and the press, need the protection of something like a Constitutional amendment to keep education free of interference in matters of materials, methods, and curriculum from the winds of political change and the passing hysterias of public opinion" (Blau, 1998).

Blau, S. (1998). *Toward the separation of school and state. Revision* of an inaugural address by the NCTE president presented at the Annual Meeting of the National Council of Teachers. Retrieved from http://files.eric.ed.gov/fulltext/ED417405.pdf.

"Keith Rayner's studies of the perceptual span and eye movement control were predicated on the conviction that the experimental investigation of visual information extraction from text should provide the empirical foundation for building a theory of reading. This 'bottom-up' approach fit well with his belief that reading was fundamentally a matter of extracting information from the printed page. Such an approach conflicted sharply with the view that was widely accepted when he and his mentor, George McConkie, started to investigate the perceptual span and eye movement control (e.g., McConkie & Rayner, 1975). According to this view, skilled reading was a linguistic guessing game, primarily a function of effective top-down processing, and perceptual processing was cursory, contributing relatively little to reading (Goodman, 1970; Hochberg, 1970; Levin & Kaplan, 1970). Rayner's work with McConkie and their students and colleagues largely overturned this view with their demonstrations that experienced readers look at essentially every word in text, and that the ability to extract visual information quickly and efficiently is the foundation of skilled reading." (p.2)

"In Rayner's view, there are three properties of a word that most strongly influence how easily it can be processed: its frequency (e.g., Rayner & Duffy, 1986), length (e.g., Juhasz, White, Liversedge, & Rayner, 2008) and predictability in context (e.g., Ehrlich & Rayner, 1981). The importance of these properties led Rayner to refer to these as ''The Big Three'' of lexical processing. Beginning with the first of the Big Three, the basic word frequency effect is the finding that readers spend less time processing words that occur more frequently in the language than words that occur less frequently in the language. Early Rayner papers demonstrating these effects have been frequently and consistently cited in the literature (e.g., Inhoff & Rayner, 1986; Rayner & Duffy, 1986). Lexical frequency effects are pervasive, occurring not only in word spaced alphabetic languages, but also in unspaced non-alphabetic languages such as Chinese in which words are far less visually obvious units of language (Yan, Tian, Bai, & Rayner, 2006). Rayner was also instrumental in demonstrating that a word's length, the second of the Big Three, is also a fundamental characteristic that affects how long a reader spends processing that word. Longer words have more constituent letters, and thus the word's orthography provides more visual and linguistic information to process. The longer a word is, the longer it takes to process, although this effect is often reflected in refixations rather than extended single fixations. Word length affects not only when to move the eyes; it affects where to move them. In an interesting series of studies (e.g., Juhasz, Inhoff, & Rayner, 2005; Juhasz et al., 2008; White, Rayner, & Liversedge, 2005; see also Juhasz, 2008), the boundary paradigm (see previous section) was used to present either correct or incorrect information about the length of upcoming parafoveal words (e.g., backhand appeared as a preview for back and, and vice versa). The results of these experiments showed that saccades are targeted on the basis of the length of the word in the parafovea. Consequently, when a saccade is made to the parafoveal word, if word length information about that word turns out to be incorrect, reading is disrupted. The third variable of the ''Big Three'' is the predictability of a word in context (S. Ehrlich & Rayner, 1981). Words that are more predictable are skipped more, fixated for less time, and refixated after a regression less often than are less predictable words (Altarriba, Kroll, Sholl, & Rayner, 1996; Balota, Pollatsek, & Rayner, 1985; Rayner & Well, 1996; Schustack, Ehrlich, & Rayner, 1987). More recently, as with the research investigating frequency effects, these effects have been shown to hold for non-alphabetic unspaced languages (Rayner, Li, Juhasz, & Yan,

2005), and it has also been demonstrated that there are differential effects of predictability for readers of different levels of reading skill (Ashby, Rayner, & Clifton, 2005): less-skilled readers show particularly strong effects of discourse context when they fixate on a relatively rare word." (p.5)

"One of the central conclusions that emerged from the evaluation of the literature was that, in order for children to become proficient readers, it is necessary for them to master the alphabetic principle, the idea that in the written form of the language, different letters correspond to different sounds. A second important conclusion that the authors formed in the paper was that direct instruction in phonics is an effective technique to allow children to understand the alphabetic principle, while other techniques such as whole word, or whole language approaches that do not adopt this direct approach are less effective. Although they provoked reactions from many individuals with strong views on how reading should be taught, the Rayner et al. (2001, 2002) articles provide excellent examples of scientifically based, translational writing, and they provide a model of how researchers can use findings from basic science to inform discussion and motivate evidence based practice." (p.6)

Clifton, C. E., Ferreira, F., Henderson, J. M., Inhoff, A. W., Liversedge, S., Reichle, E. D., & Schotter, E. R. (2016). Eye movements in reading and information processing: Keith Rayner's 40 year legacy. *Journal of Memory and Language, 86*, 1-19.

"We have seen that reading is an elegantly choreographed dance among a number of visual and mental processes. Modern research has shown that, contrary to some earlier views (Goodman, 1967), reading is not a psycholinguistic guessing game in which we guess the identities of words and other linguistic units based on minimal visual input. Rather, we pick up detailed visual information from the text, moving our eyes so that we fixate most words once and going backward to reread if problems arise. The visual information that we obtain, combined with our knowledge of the language we are reading, allows us to identify the words in the text and to comprehend it." (p.20)

Rayner, K., Schotter, E. R., Masson, M. E. J., Potter, M. C., & Treiman, R. (2016). So much to read, so little time: How do we read, and can speed reading help? *Psychological Science in the Public Interest 17*(1), 4–34.

Steve (Stahl, 1994) observed that scholars in other disciplines tend to regard the internal debates in reading with amusement. While president of Harvard, Derek Bok commented that professors of education do not receive the respect to which they believe they are entitled because they lack an organized body of knowledge on which they all agree. Until we concur on what we know and on how we can add to that knowledge, our profession will continue to teeter and may eventually be toppled by those with the power to do so. I believe that Steve Stahl has nudged us away from this precipice through disciplined inquiry, reasoned interpretation, and fair-minded critical analysis. In his untimely passing we lose not only a friend and colleague but a powerful check on the excesses of what passes for research.

p.7

McKenna, M. (2006). How shall research inform reading instruction? In Stahl, K. A. D., & McKenna, M. C. (Eds.). *Reading research at work*: *Foundations of effective practice*, pp 1-35.

"Classroom management practices are clearly related to reading outcomes for boys with behavior problems, but not girls, and therefore, further investigations into more nuanced approaches to managing a classroom are warranted. Similar to previous research (Nelson et al., 2004; Rice & Yen, 2010), the current study found no significant differences in reading achievement between boys and girls with or at risk for EBD. This leads to the question of why boys, and not girls, benefited from classroom management quality in relation to reading achievement, especially when no significant differences were found in the quality of classroom management they had experienced. The girls in our study scored significantly higher on internalizing behaviors and lower on externalizing behaviors than boys. Although correlations do not allow for causal inferences, externalizing behaviors, but not internalizing behaviors, were negatively correlated

with classroom management quality, and classroom management quality was positively correlated with third-grade reading achievement. Internalizing behaviors may go unnoticed or, if identified, unaddressed because teachers are unsure how to intervene (Conley, Marchant, & Caldarella, 2014)." (p.14)

Garwood, J.D., Vernon-Feagans, L., and the Family Life Project Key Investigators. (2016). Classroom management affects literacy development of students with emotional and behavioral disorders. *Exceptional Children*, 1–20. DOI: 10.1177/0014402916651846

"There is a general consensus that writing is a challenging task for students with learning disabilities (LD). To identify more precisely the extent and depth of the challenges that these students experience with writing, the authors conducted a meta-analysis comparing the writing performance of students with LD to their typically achieving peers. From 53 studies that yielded 138 effect sizes, the authors calculated average weighted effect sizes, showing that students with LD obtained lower scores than their peers on the following writing outcomes: writing quality (–1.06); organization (–1.04); vocabulary (–0.89); sentence fluency (–0.81); conventions of spelling, grammar, and handwriting (–1.14); genre elements (–0.82); output (–0.87); and motivation (–0.42)." (p. 1)

Graham, S., Collins, A.A., & Rigby-Wills, H. (2016). (2016). Writing characteristics of students with learning disabilities and typically achieving peers: A meta-analysis. *Exceptional Children,* 1–20, DOI: 10.1177/0014402916664070

"Two professional development (PD) models for teachers were compared on teacher and student outcomes. Special education teachers participated in Literacy Learning Cohorts (LLC), a PD innovation designed to improve content and pedagogical knowledge for providing reading instruction to upper elementary students with learning disabilities. The LLC, based on Desimone's (2009) framework, included 2 days of initial PD with follow-up meetings, coaching, and video self-analysis. A comparison group received only 2 days of PD. Results of independent *t* tests and analyses of covariance indicated that LLC teachers demonstrated significant change in instructional time allotted to, and quality of, word study and fluency instruction. LLC teachers also made significantly greater gains on the fluency knowledge measure as compared with the comparison group, but they did not differ in word study knowledge. Hierarchical linear modeling analyses showed that students of LLC teachers made significantly greater gains on word attack skills and decoding efficiency than did students of teachers in the comparison group." (p. 1)

Brownell, M., Kiely, M.T., Haager, D., Boardman, A., Corbett, N., Algina, J., Dingle, M.P., & Urbach, J. (2016). Literacy learning cohorts: Content-focused approach to improving special education teachers' reading instruction. *Exceptional Children*, 1–22. November 4, 2016, doi: 10.1177/0014402916671517

"Teachers should consider explicitly teaching transcription skills for struggling beginning writers using research-based interventions. In this study, students received a research-based early writing intervention that comprised a variety of handwriting and spelling activities, which likely contributed to students' improved writing performance. However, research-based intervention may not be sufficient for all students all of the time. In this study, data indicated the need for multiple instructional decisions, about 90% of which were to either increase a student's goal or change instruction. We strongly recommend that teachers collect ongoing progress-monitoring data and use those data to make instructional decisions based on students' responsiveness to intervention." (p.14)

Jung, P-G., Kristen L. McMaster, K.L., & delMas, R.C. (2016). Effects of early writing intervention delivered within a data-based instruction framework. *Exceptional Children,* 1–17. DOI: 10.1177/0014402916667586

"Teachers should recognize that traditional text-leveling procedures do not fully account for all factors that affect the difficulty of a text. Even when controlling for text level, type, and structure, there are still naturally occurring topical variations between texts that will render one more difficult than another." (p.125)

Fawson, P.C., Ludlow, B.C., Reutzel, D.R., Sudweeks, R., & Smith, J.A. (2006) Examining the reliability of running records: Attaining generalizable result. *The Journal of Educational Research, 100*(2), 113-126.

"Running records have traditionally been viewed as producing accurate assessment results because they provide an approximation of authentic school and home reading. However, reliability data have not been conclusive regarding the use of running records (Ross, 2004). … Running records have traditionally been viewed as producing accurate assessment results because they provide an approximation of authentic school and home reading. However, reliability data have not been conclusive regarding the use of running records (Ross, 2004)." (p.114). … "Hoffman, Roser, and Salas (2001) found that teachers using the Fountas and Pennell leveling structure can reliably level text. However, when texts leveled in that manner assess student reading performance, they produce highly unreliable results. Running record scores that are acquired from a single-leveled text reading would not necessarily represent a student's true reading level. … Making absolute decisions with a running record requires the teacher to average student scores on at least three passages with at least two raters. Our results indicate that the most limiting factor in rendering students' running record scores reliable is the number of passages used. That finding supports the contention of Ross (2004) that passage might exhibit a sizable source of error variance when scoring running records. Using a single score obtained from reading a single passage to portray that student's universe score would be highly questionable." (p. 123)

Fawson, P.C., Ludlow, B.C., Reutzel, D.R., Sudweeks, R., & Smith, J.A. (2006) Examining the reliability of running records: Attaining generalizable result. *The Journal of Educational Research, 100*(2), 113-126. Retrieved from https://llmotivation.wikispaces.com/file/view/Running+records.pdf

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"This study revealed that children who were reading at or above grade expectations were more likely to make use of graphic and phonic cues when they approached an unfamiliar word in a text. As has been suggested (e.g. De Lemos, 2002; Adams, 1990) the ability to decode graphic and phonic information is a reliable determinant of higher reading ability. Therefore, these findings suggest that Goodman and colleagues may have underestimated the role of the grapho-phonic cueing system and overestimated the role of the semantic and syntactic cueing systems in relation to differentiating reading ability."

Beatty, L., & & Care, E. (2009). Learning from their miscues: Differences across reading ability and text difficulty. *Australian Journal of Language and Literacy, 32*(3), 226-234. Retrieved from http://www.thefreelibrary.com/Learning from their miscues: differences across reading ability and...-a0210520844

"The transparency of a language refers to the mapping of letters and sounds (phonology). In highly transparent languages such as Finnish, Italian and Spanish, there is an almost one-to-one mapping between letters and sounds, and such languages are said to have a shallow orthography. In contrast, English has a deep or opaque orthography since only 56% of its words can be predicted by phonological rules (Crystal, 2000). Therefore it is claimed that literacy acquisition may be easier with transparent languages because these languages only require children to learn one-to-one correspondences between spoken and written units (Wyse & Goswami, 2008). There is much evidence to support this view. Finnish children read with 90% accuracy after a very short period of formal instruction (approximately 10 weeks) whereas English children take four or five years to achieve the same level of accuracy (Goswami, 2005). Seymour, Aro, and Erskine (2003) compared reading development across 14 European languages. Their findings revealed striking differences between languages. At the end of grade one English-speaking children performed poorly (34% correct word reading). In contrast, children learning to read in transparent orthographies (Greek, Finnish, German, Italian, and Spanish), were close to ceiling performance. Furthermore, a recent study of Italian children by Desimoni, Scalisi and Orsolini (2012) also provides further evidence 'that the consistency of an orthography affects the characteristics of reading and spelling acquisition' (p12)." (p. 85)

Devonshire, V., Morris, P., & Fluck, M. (2013). Spelling and reading development: The effect of teaching children multiple levels of representation in their orthography. *Learning and Instruction, 25*, 85-94.

"Low proficiency levels in the Program for International Student Assessment (PISA) tests are deemed to be those at a level insufficient for students to perform the moderate reading tasks that are needed to meet real-life challenges and are below minimum Australian standards. Around **one-third of Australian 15**

year olds had low reading proficiency levels, with just over one half were in the medium proficiency group."

Polidano, C., & Ryan, C. (2016). Teenagers with low reading levels don't find it any harder to get work. The Conversation, October 21, 2016. Retrieved from https://theconversation.com/teenagers-with-low-reading-levels-dont-find-it-any-harder-to-get-work-67311

"Without background knowledge, there is little basis for meaningful reading comprehension; therefore, building background knowledge is at the center of Hirsch's education reform plan. He advocates the building of background knowledge through a slow, cumulative process (143) that develops the core knowledge required of anyone for participation in the public sphere. Hirsch wants a carefully sequenced core knowledge curriculum in place in K-8 public schools. He advocates direct instruction of the curriculum and of Standard English …. Reading comprehension scores started dropping in 1962, he argues, because students did not have enough shared knowledge to comprehend what they were reading. In order to improve reading scores, then, schools must teach shared knowledge so that students can achieve academic success. For comprehension, a student must know 90% of the Page | 11 words on a page (139). (In the professional development I have received and in my experience as a teacher of ELL students, this number is incorrect – students must know 95% of the words on the page in order to comprehend a text.) Semantic awareness, then, is the foundation of reading comprehension. The foundation of semantic awareness, in turn, is prior or background knowledge (143). … Hirsch says "Wide knowledge and a large vocabulary – the prerequisites to achievement in high school – are gradual accretions. You cannot gain them by sudden intensive incursions in the later grades. With a slow, tenacious buildup of knowledge and vocabulary in elementary school, high school will almost take care of itself" (167)." (p.10, 11, 12)

Vieux, V. (2016). A critical review of E. D. Hirsch's The Making of Americans. NEH Philosophers of Education Seminar, Boston University, Summer 2016. Retrieved from http://scholar.google.com.au/scholar_url?url=http://nehphilosophersofeducationseminar.org/POEMT_2016/PDFS/Vieux_Vanessa_PES.pdf&hl=en&sa=X&scisig=AAGBfm3NtQm5AABm9Ftv-nEVeSmNAFvfzQ&nossl=1&oi=scholaralrt

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" … an aggregation of at-risk adolescents can provoke negative influences between them, resulting in disadvantageous individual outcomes (Dishion & Tipsord, 2011)

Müller, C.M., & Hofmann, V. (2016). Does being assigned to a low school track negatively affect psychological adjustment? A longitudinal study in the first year of secondary school. *School Effectiveness and School Improvement, 27*(2), 95-115.
Dishion, T. J., & Tipsord, J. M. (2011). Peer contagion in child and adolescent social and emotional development. *Annual Review of Psychology*, 62, 189–214.

"Schanzenbach (2007) reviewed STAR studies and concluded that small classes improved student academic outcomes. Since her review, however, some research has challenged this conclusion. … Because Schanzenbach (2007) provided an excellent review of STAR studies before 2007, this paper reviews STAR studies that were published in 2007 and later. If these recent studies had supported the positive results, another review would not have been necessary. However, some of them have cast serious doubt on her conclusions. (p.116) … As Blatchford (2012) suggested, a more fruitful research topic would be the relations between class size and classroom processes – that is, what occurs in the classroom when class size is reduced." (p.130)

Sohn, K. (2016). A review of research on Project STAR and path ahead. *School Effectiveness and School Improvement, 27*(2), 116-134.
Schanzenbach, D. W. (2007). What have researchers learned from Project STAR? In T. Loveless & F. M. Hess (Eds.), *Brookings papers on education policy 2006/2007* (pp. 205–228). Washington, DC: Brookings Institution Press.)
Blatchford, P. (2012). Three generations of research on class-size effects. In K. R. Harris, S. Graham, & T. Urdan (Eds.), *APA educational psychology handbook, Volume 2. Individual differences and cultural and contextual factors* (pp. 529–554). Washington, DC: American Psychological Association.[CrossRef])

"The effectiveness of this [synthetic phonics] approach has been proven for the development of early reading skills (Dixon et al., 2011; Johnston, McGeown, & Watson, 2012) among struggling readers in the ESL context (Lesaux & Siegel, 2003; Vadasy & Sanders, 2011; Yeung, Siegel, & Chan, 2013). These studies employed experimental research designs for different age groups: kindergarten students (Lesaux & Siegel, 2003; Yeung et al., 2013) and primary school students (Dixon et al., 2011; Johnston et al., 2012; Vadasy & Sanders, 2011). These findings suggest that synthetic phonics may be effective for developing reading skills across gender and language capabilities." (p.458)

Jamaludin, K.A., Alias, N., Khir, R.J.M., DeWitt, D., & Kenayathula, H.B. (2016). The effectiveness of synthetic phonics in the development of early reading skills among struggling young ESL readers. *School Effectiveness and School Improvement, 27*(3), 455-470.

Point #3 describes the Michigan state's new instructional requirement in reading for the early school years. It specifies systematic, explicit, multi-sensory, sequential instruction in phonemic awareness, phonics, vocabulary, fluency, and comprehension with guided practice and focused error correction.

Michigan Department of Education (2016). Smart Promotion: 3rd grade reading proficiency, early literacy coaches, & reading assistance programs. Retrieved from www.ebli.us4.list-manage1.com/track/click?u=d87cdd578fcea9d2499649e72&id=c095b280dd&e=8a808caa97

"DRAFT RECOMMENDATION 2.1The national education evidence base should:
• meet the varied needs of decision makers at all levels of the education system
• provide high-quality data and evidence to inform decisions
• drive improved student achievement through four interconnected processes — monitoring of performance, evaluation of what works best, dissemination of evidence and application of that evidence by educators and policy makers."

"Notwithstanding substantial increases in expenditure on education over the past decade, national and international assessments of student achievement in Australia show little improvement and in some areas standards have dropped."

Productivity Commission report: *National Education Evidence Base Inquiry*, 2016

"Working-memory training as currently implemented does not work. One hundred years of research on basic memory phenomena has discovered many procedures that do!" (p.190)

McCabe1, J.A., Thomas S. Redick, T.S., & Engle, R.W. (2016). Brain-training pessimism, but applied-memory optimism. *Psychological Science in the Public Interest, 17*(3) 187–191. Retrieved from http://psi.sagepub.com/content/17/3/187.full.pdf+html

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"Practicing a cognitive task consistently improves performance on that task and closely related tasks, but the available evidence that such training generalizes to other tasks or to real-world performance is not compelling." (p.173).

Simons, D. J., Boot, W. R., Charness, N., Gathercole, S. E., Chabris, C. F., Hambrick, D. Z., & Stine-Morrow, E. A. L. (2016). Do "brain training" programs work? *Psychological Science in the Public Interest, 18*, xxx–xxx. Retrieved from http://psi.sagepub.com/content/17/3/187

Underpowered studies with small sample sizes are more likely to produce inflated effect sizes (Button et al., 2013).

Button, K. S., Ioannidis, J. P. A., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S. J., & Munafò, M. R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience, 14,* 365–376.

Me: Consider the cohort of people who need to be able to read well today, as compared to a hundred or more years ago – it is pretty much everyone. So, our methods to achieve this could begin with simply supplying books, and letting people figure out how the code works. This represents a zero guidance option. Apart from a few extremist whole language dinosaurs this option has been rejected. Some individuals can achieve this outcome – we all know or have heard of people who've achieved it. However, it happens that

relatively few people can successfully intuit the key to reading with this zero guidance. The second option is to provide minimal guidance – tossing a few cues to beginners who will then bootstrap themselves the rest of the way. This increases the proportion of students who learn to read, but it remains well below the desired universal achievement of reading skill. So, as we increase the explicitness of the instructional approach we begin to have an impact upon those remaining strugglers who haven't benefitted from the less structured methods. Basically, the better we explain the reading process and supply practice (massed, spaced, supervised, and independent) the more of the population we lead to become skilled readers. One of the components of explicitness is to provide text that is considerate of the degree of skill/knowledge that a student has reached. There is much evidence that indicates an initial focus on teaching the code reaches more children than do other alternatives. Enhancing the preparedness of children to practise and internalise this code-breaking approach is to match the code demands of text to the student's current code-breaking skills. That is the aim of decodable text.

" … practices that are supported by multiple, high-quality studies that utilize research designs from which causality can be inferred and that demonstrate meaningful effects on student outcomes" (Cook & Cook, 2011, p. 73).
Cook, B. G., & Cook, S. C. (2011). Unraveling evidence-based practices in special education. *The Journal of Special Education, 47*(2), 71-82.

"In three direct instruction studies, researchers investigated effects of a commercially available program, Expressive Writing (Engelmann & Silbert, 2005), on the written expression of high school–age students with disabilities (Viel-Ruma et al., 2010; Walker et al., 2005; White et al., 2014). In the studies, instruction began with constructing simple sentences to picture-word prompts before progressing to closely related writing skills, such as complex sentences and paragraph composition. Instruction included between 25 lessons to 50 lessons, lasting 30 min to 50 min each (i.e., a total duration of 750 min to 2,500 min). In two of the three Expressive Writing studies, a multiple baseline across participants design was used to investigate effects of direct instruction on students with learning disabilities (Walker et al., 2005) and English language learners with learning disabilities (Viel-Ruma et al., 2010). In both studies, students showed increases in correct word sequences (CWS) and the percentage of CWS on narrative writing probes. CWS is a curriculum-based measure that provides a global indicator of writing: It is the number of words written with correct capitalization, punctuation, spelling, and syntax (Ritchey et al., 2016). One study used a quasi-experimental design, comparing two Expressive Writing treatment groups of high school–age students with emotional behavioral disorders (White et al., 2014). Results suggest both treatment groups improved their percentage of CWS. Two studies investigated effects of a combined direct instruction and precision teaching intervention on the simple sentence construction of elementary and high school students with writing difficulties (Datchuk, 2016; Datchuk et al., 2015). The two studies were smaller in scope than the direct instruction only studies. The two studies only addressed skills specific to simple sentence construction, such as capitalization, punctuation, and simple sentence structure. Intervention lasted 13 to 18 lessons with a total duration of 135 min to 195 min." (p. 2-3)

Datchuk, S.M. (2016). A direct instruction and precision teaching intervention to improve the sentence construction of middle school students with writing difficulties. *The Journal of Special Education*, 1–10. Online First. DOI: 10.1177/0022466916665588

"Two researchers [Diane August and Timothy Shanahan] reviewed many of the same studies as the National Literacy Panel on Language-Minority Children and Youth and concluded that "the programs with the strongest evidence of effectiveness in this review are all programs that have also been found to be effective with students in general" and modified for ELs. … These programs include various versions of Success for All (a school-wide program that involves far more than classroom instruction), Direct Instruction, and phonics instruction programs." (p. 5-6)
Goldenberg, C. (2013). Unlocking the research on English learners: What we know—and don't yet know—about effective instruction. *American Educator, 37*(2), 4–11, 38.

Head, C. (2016). *The effects of Direct Instruction on reading comprehension for individuals with autism or intellectual disability.* A dissertation submitted to the Graduate Faculty of Auburn University in partial fulfilment of the requirements for the Degree of Doctor of Philosophy Auburn, Alabama August 6, 2016. Retrieved from
https://etd.auburn.edu/bitstream/handle/10415/5272/FINAL_DISS.pdf?sequence=2&isAllowed=y

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"Comaskey et al. (2009) found that analytic phonics taught children were better at articulating shared rimes within words, whereas synthetic phonics taught children were better at phoneme blending. The results of the present study also indicate that children can develop phoneme awareness indirectly as a product of their reading instruction, as children received no explicit phoneme awareness training but rather learnt about phonemes only in the context of printed words. The results are also consistent with research suggesting that rhyme awareness typically develops prior to an awareness of phonemes (Carroll, Snowling, Hulme, & Stevenson, 2003; Hulme et al., 2002). Nevertheless, phoneme level instruction did appear to be effective for this group of young readers, despite suggestions that rhyme level teaching may be developmentally more appropriate (Goswami, 1999)." (p.604)

McGeown, S.P., & Medford, E. (2014). Using method of instruction to predict the skills supporting initial reading development: Insight from a synthetic phonics approach. *Reading & Writing, 27*, 591–608.

"Hundreds of studies in cognitive and educational psychology have demonstrated that spacing out repeated encounters with the material over time produces superior long-term learning, compared with repetitions that are massed together. Also, incorporating tests into spaced practice amplifies the benefits. Spaced review or practice enhances diverse forms of learning, including memory, problem solving, and generalization to new situations. Spaced practice is a feasible and cost-effective way to improve the effectiveness and efficiency of learning, and has tremendous potential to improve educational outcomes." (p.12)

Kang, S.H.K. (2016). Spaced repetition promotes efficient and effective learning: Policy implications for instruction. *Policy Insights from the Behavioral and Brain Sciences, 3*(1), 12-19.

"On the positive side, teachers indicated that the vast majority of students with ASD participated in daily reading instruction and received more comprehensive instruction on the essential components of reading than the sight-word approach that has been used in the past. Of concern, though, were the findings that almost one third of students received primary instruction from a paraprofessional, a sizable percentage of teachers lacked confidence in their preparation and effectiveness in teaching reading to students with ASD, and a majority of students received less than the recommended instructional time for K-3 reading." (p.343)

Spector, J., & Cavanaugh, B. (2015). The conditions of beginning reading instruction for students with Autism Spectrum Disorder. Remedial and Special Education. *Remedial and Special Education, 36*(6) 337–346.

Stockard and Wood (2016) reported an effect size of 0.79 in a meta-analysis of 131 studies of Reading Mastery.

Stockard, J., & Wood, T.W. (2016). The threshold and inclusive approaches to determining ''best available evidence'': An empirical analysis. *American Journal of Evaluation,* 1-22. first published on August 19, 2016, 1098214016662338.

"In a typical Year 9 class, the top students can be more than seven years ahead of the bottom students, but NAPLAN's minimum standards dare set way too low to identify the stragglers. A Year 9 student meets the minimum standard even if they are reading below the level of a typical Year 5 student."

Goss, P., & Sonnemann, J. (2016). Widening gaps: What NAPLAN tells us about student progress. Grattan Institute. Retrieved from https://grattan.edu.au/report/widening-gaps/

"The finding of pronounced left vOT [left ventral occipitotemporal cortex] activation for the orthographic word spelling condition relative to the control condition speaks for the view that activation of left vOT during spelling can be attributed to the retrieval of orthographic whole-word representations. The position that the left vOT serves as memory store for the spellings of known words also finds support in recent neuroimaging studies of spelling showing that left vOT is sensitive to lexical factors such as word frequency [Rapp and Lipka, 2011; Rapp and Dufor, 2011].... The location of this orthographic spelling cluster corresponds to the left vOT region typically found to be engaged by visual word reading. These results support the position that left vOT may represent the neuronal equivalent of the cognitive orthographic word lexicon." (p.8, 13)

Ludersdorfer, P., Kronbichler, M., & Wimmer, H. (2015). Accessing orthographic representations from speech: the role of left ventral occipitotemporal cortex in spelling. *Human Brain Mapping, 36*(4), 1393-406.

"The current study aimed to examine teachers' reported spelling assessment and instruction practices. Analysis of the match between teachers' theoretical beliefs about spelling and their reported pedagogy was conducted to elucidate factors that may support or impede the use of evidence-based teaching strategies in the classroom. An electronic survey was completed by 405 randomly selected (stratified by region and socioeconomic status) elementary school teachers in New Zealand. The survey examined the following areas: spelling assessment, spelling instruction, beliefs about spelling, preparing teachers to teach spelling, and teachers' perceived strengths and weaknesses of their spelling program. There was large variability in spelling assessment and instructional practices across teachers. Most respondents reported implementing some aspects of a developmental approach to spelling instruction through analysis of children's spelling errors (64 %) and/or individualization of the spelling program (60 %). There was a large dissociation between teachers' beliefs about spelling and their frequency of use of specific instructional practices associated with those beliefs (e.g., phonological awareness, orthographic knowledge). The mismatch between beliefs and reported practice appeared to be due to lack of professional knowledge regarding implementing explicit spelling instruction and finding time to teach spelling within the curriculum. Increasing teachers' knowledge about language structure, practical implementation of key assessment and instruction activities, and the links between spelling and other areas of the curriculum are important factors in improving spelling pedagogical practices." (p.535)

McNeill, B., & Kirk, C. (2014). Theoretical beliefs and instructional practices used for teaching spelling in elementary classrooms. *Reading & Writing, 27*, 535–554

"The most effective spelling instruction teaches spelling as a linguistic (rather than visual) ability by directly facilitating key skills that underlie spelling development (Bourassa & Treiman, 2001). There are three metalinguistic skills that are strongly related to spelling acquisition. One metalinguistic skill that is essential to the acquisition of spelling is phonemic awareness, which refers to the ability to reflect on and manipulate single sounds within words (Gillon, 2004). A second important metalinguistic skill for learning spelling is orthographic awareness which includes (1) alphabetic knowledge, for example, 'sh' makes the= R =sound; (2) orthographic pattern knowledge, such as knowing that the grapheme 'ck' cannot be used in initial position in a syllable; and (3) storage of mental representations of spellings in longterm memory (Apel, Wolter, & Masterson, 2006; Apel, 2011). A third skill that is fundamental for learning to spell is morphological awareness which involves the ability to recognize the parts of words that convey meaning, such as identifying connections in words sharing the same root, such as heal-health (Berninger, Abbott, Nagy, & Carlisle, 2010)." (p. 536)

Kirk, C. (2014). Theoretical beliefs and instructional practices used for teaching spelling in elementary classrooms. *Reading & Writing, 27*, 535–554

"Both decoding and spelling rely on knowledge of the grapho-phonemic patterns of the language (Robbins, Hosp, Hosp, & Flynn, 2010). A review of research found that integrating decoding and spelling instruction in the lower elementary grades led to significant gains in phonemic awareness, alphabetic decoding, word reading, fluency, and comprehension (Weiser & Mathes, 2011). Moreover, the authors believed the spelling instruction might have fostered closer attention to the details of words' orthographic representations. This seems supported by the results of a longitudinal study of children from ages 8–9 to ages 12–13 in which independent contributions to reading comprehension were made by children's ability to use larger graphophonic units and morphemes to decode words (Nunes, Bryant, & Barros, 2012)." (p. 636)

Reed, D.K., Petscher, Y., & Foorman, B.R. (2016). The contribution of vocabulary knowledge and spelling to the reading comprehension of adolescents who are and are not English language learners. *Reading and Writing, 29*, 633–657.

"Some UK studies have examined the extent to which behavioural difficulties coexist with reading disability, but most, like the Isle of Wight study, were conducted some time ago (e.g. McGee, Williams, Share, Anderson, & Silva, 1986). Two more recent US studies have emphasized the phenomena of co-occurrence. Morgan, Farkas, Tufis, and Sperling (2008) found that US children with reading problems at age 7 years were more likely to display poor task engagement, poor self-control, externalizing and internalizing behaviour problems 2 years later. More recently, Dahle and colleagues (2010) examined behavioural problems in children with severe dyslexia. They found more behavioural problems in the group with severe dyslexia than in controls, in all areas measured. In addition, parents reported more children with dyslexia tobe anxious and depressed and have social problems and attention problems than teachers did. … Our unadjusted analysis suggests that there are elevated levels of behavioural difficulties in children with specific word reading difficulties. These findings encompassed a broad spectrum of behaviour captured by the SDQ. Clearly, children with SWRD had more difficulties with peer relationships, more emotional and conduct problems, displayed less prosocial behaviour and were rated as more hyperactive and inattentive. Our findings showing co-occurrence of behavioural and specific word reading difficulties correspond not only with older UK studies such as the Isle of Wight cohort, but also with recent US studies (Morgan et al., 2008; Dahle, Knivsberg, & Andreassen, 2011). … There have been several theories as to why developmental delays and specific word reading and other disorders co-occur. First, genetic pleiotropic effects have been implicated. One genetic anomaly may lead to atypical neurological development, in turn manifesting as multiple behavioural difficulties (Reiersen et al., 2008). Similarly, genetic predisposition combined with an early environmental insult or common environmental exposure may affect many developmental outcomes (Finlay & Miller, 1993; Porterfield, 1994; Richardson, 2006). There have also been models at later stages of childhood where one psychological impairment serves as a 'gateway' spawning another difficulty (Frith & Happé, 1998). So for example, if a child has a communication deficit, this might lead to social difficulties, or inattention/hyperactivity may lead to reading difficulties. Other theorists have suggested one underlying psychological deficit, such as slow naming/processing speed, may underlie a range of behavioural and cognitive difficulties, including reading difficulties commonly described as dyslexia (Bental & Tirosh, 2007)." (p.125, 135, 136)

Russell, G., Ryder, D., Norwich, B., & Ford, T. (2015). Behavioural difficulties that co-occur with specific word reading difficulties: A UK population- based cohort study. *Dyslexia, 21,* 123–141.

"Research has demonstrated a strong positive correlation between behavior problems and low academic achievement (Gest & Gest, 2005; Landrum, Tankersley, & Kauffman, 2003). Above and beyond being correlated, Payne, Marks, and Bogan (2007) report that behavioral and academic problems are reciprocal in nature. In other words, behavior problems may cause a disruption in academic engagement and, as a result, students may fail to master skills because of this lack of academic engagement. The opposite is also true—a classroom where there are high levels of academic achievement will be a classroom with low levels of behavior difficulties. This point is critical. Students do not generally come to school hating to be there. If students experience more failure than success, they frequently learn to hate school. As Scott,

Nelson, and Liaupsin (2001) note, "academics become aversive" (p. 313). Therefore, the more students find the classroom aversive, the more likely they will be to exhibit unwanted behaviors (Payne et al., 2007; Scott et al., 2001; Wehby, Lane, & Falk, 2003). Student success or failure are in large part determined by how well teachers provide effective instruction to their students." (p. 242)

Martella, R.C., & Marchand-Martella, N.E. (2015). Improving classroom behavior through effective instruction: An illustrative program example using SRA FLEX Literacy. *Education and Treatment of Children, 38*(2), 241–272.

"This paper has reported a systematic review to investigate the effectiveness of interventions designed to support the reading skills of secondary school students. It has focused only on studies which have used RCTs. The paucity of research is striking; only eight studies met our inclusion criteria. Five of the studies were conducted in the US, two in the UK and one in Australia. This is consistent with the findings of a review conducted by Slavin, Cheung, Groff, and Lake (2008) which argued that more large scale methodologically rigorous studies are needed in this area. With regards multiple component training, three of the four studies reviewed were evaluations of individualised CAI and in each case the findings did not support the use of this approach. Slavin, Lake, Davis, and Madden (2009) in reviewing approaches for struggling readers ingrades K-5, concluded that CIA generally had few effects on reading. Furthermore, Khan and Gorard (2012) reported that previous studies have failed to demonstrate the effectiveness of computer based instruction as a means of improving reading skills.Taken together the evidence suggests that CAI should not be relied on to produce gains in reading ability in secondary school aged students and that in some circumstances using these programmes may have a negative impact on student's progress (Gorard &Taylor, 2004). An avenue for future intervention design could be to combine computer administered tasks with face-to-face instruction. It is of note that these studies, which all included some focus on word recognition and decoding skills, were delivered to individual students via computer programmes. There is therefore no evidence from RCTs to show the possible effectiveness of tutor led one-to-one instruction in this essential component of reading at secondary school level." (p.124)

"There is therefore a significant gap in the evidence base from RCT's concerning the efficacy of language comprehension intervention. Clarke, Snowling, Truelove, and Hulme (2010) demonstrated using an RCT the effectiveness of an oral language intervention (comprising strategy use, vocabulary, figurative language and spoken narrative) in improving the reading comprehension skills of primary school students. To date such an approach has not been evaluated using an RCT in secondary schools." (p.125)

Paul, S-A.S., & Clarke, P.J. (2016). A systematic review of reading interventions for secondary school students. *International Journal of Educational Research, 79*, 116–127.

"Many factors contribute to individual differences in adolescent reading ability. For example, there is a correlation between behavioural and emotional difficulties and reading ability in adolescents (Arnold et al., 2005). … Poor reading ability amongst adolescents has negative implications for psycho-social and educational development. A study by Daniel et al. (2006) showed that fifteen-year old adolescents with poor reading ability were more likely to experience suicidal ideas or attempts, and dropout of school than typical readers, suggesting that adolescents with poor reading ability can be labelled as being at social risk." (p. 116)

Paul, S-A.S., & Clarke, P.J. (2016). A systematic review of reading interventions for secondary school students. *International Journal of Educational Research, 79*, 116–127.

"A growing body of evidence supports the relationship between the implementation of high quality behavior management and increased student engagement and prosocial behaviors (Oliver et al., 2011), while the relationship between behavior management and academic achievement is unclear (Algozzine et al., 2012; Benner et al., 2012). In this study, we examined differences in the effectiveness of small group reading intervention for students receiving that intervention from very good, good to fair, and poor behavior managers. Prior research suggests that the effectiveness of early literacy interventions may be moderated by student problem behaviors (Nelson et al., 2003); therefore implementation of high quality behavior management in targeted early literacy interventions could increase the overall effectiveness of the

intervention. The results provide some support for this assumption and initial empirical support that high quality behavior management can improve the effectiveness of targeted early literacy intervention." (p.534)

Gage, N. A**.**, MacSuga-Gage, A. S., Prykanowski, D. A., Coyne, M., & Scott, T. M. (2016). Investigating the collateral effects of behavior management on early literacy skills. *Education and Treatment of Children*, 38(4), 523-540

" … young urban children as young as second and third grade with reading difficulties exhibited elevated rates of problem behaviors, as compared to the nationally representative norm samples of the measures. In this study, a disproportionate percentage of the young urban sample already displayed clinically significant levels of anxiety (50%), social problems (40%), and oppositional behaviors (30%) in the classroom. These results thus support previous studies conducted mainly with older children showing that anxiety, social problems, and conduct problems were closely associated with literacy difficulties (Casey et al., 1992; Conners, 1997; Willcutt & Pennington, 2000). These finding are also consistent with research showing that kindergarten academic variables have been shown to predict problem behavior at the end of elementary school (McIntosh, Chard, Boland, & Horner, 2006), with an increasing relationship over years of schooling (see Algozzine, Wang, & Violette, 2011 for contradictory evidence). The significance of these findings for teachers is highlighted by arguments that "dual deficits of learning and behavior problems may make it difficult for practitioners to provide effective instruction" (Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008, p. 223)." (p. 199-200)

Pierce, M.E., Wechsler-Zimring, A., Noam, G., Wolf, M., & Tami Katzir, T. (2013). Behavioral problems and reading difficulties among language minority and monolingual urban elementary school students. *Reading Psychology, 34*(2), 182-205.

" … it is important to bear in mind that the role of vocabulary in academic success increases through the grades, and that early vocabulary knowledge predicts reading comprehension skill in later grades (S´en´echal, Ouellette, & Rodney, 2006). Moreover, the trajectories of reading development exhibited by LM and L1 students may diverge in the later grades. Thus, early vocabulary deficits should be monitored and remediated." (p.197)

Pierce, M.E., Wechsler-Zimring, A., Noam, G., Wolf, M., & Tami Katzir, T. (2013). Behavioral problems and reading difficulties among language minority and monolingual urban elementary school students. *Reading Psychology, 34*(2), 182-205.

"Educators and researchers have long acknowledged that reading disability status increases a child's risk for academic, emotional, and behavioral struggles (Heiervang, Stevenson, Lund, & Hugdahl, 2001; Horn & Packard, 1985; Kavale, 1988). Learning to read is directly linked to the young child's self-concept and mental well-being (Toppelberg, Munir, & Nieto-Casta˜non, 2006). Reading difficulties have been linked to externalizing behaviors, including classroom discipline problems, bullying, and aggression, as well as internalizing behaviors, including depression and anxiety (Catalano et al., 2003; Kellam, Mayer, Rebok, & Hawkins, 1998; Miller & Shinn, 2005). In severe cases, a child may perceive reading failure as a personal threat with harmful consequences (Herman & Ostrander, 2007). … language minority status does not appear to render young poor readers in urban elementary schools more vulnerable to academic, behavioral, or emotional problems beyond the vulnerability associated with being poor readers in urban schools." (p.183-4, 197)

Pierce, M.E., Wechsler-Zimring, A., Noam, G., Wolf, M., & Tami Katzir, T. (2013). Behavioral problems and reading difficulties among language minority and monolingual urban elementary school students. *Reading Psychology, 34*(2), 182-205.

"The findings from this study highlight the need for early intervention that targets not only the reading challenges but also the social, emotional, and behavioral challenges that affect many of these children. Because urban students' low academic skills are associated with problem behavior, improving students' academic skill levels might reduce the aversive impact of school and thus the likelihood of problem behaviors at school. This perspective could lead practitioners to consider current academic intervention as

a form of future behavior prevention (McIntosh et al., 2006. The reverse is also true; early positive behavior support might protect against future academic problems. In summary, reading and behavior experts must combine their expertise to form an integrated, three-tier model to reach students at risk for reading and behavior problems. Future research should identify the most effective practices for building these skills with these populations, and determine whether these practices are sufficient to maintain healthy academic self-concept and to preserve the behavioral health of LM students." (p. 200)

Pierce, M.E., Wechsler-Zimring, A., Noam, G., Wolf, M., & Tami Katzir, T. (2013). Behavioral problems and reading difficulties among language minority and monolingual urban elementary school students. *Reading Psychology, 34*(2), 182-205.

"Because direct spelling instruction outperforms spelling-is-caught approaches, we chose to investigate two common methods of direct instruction used in the classroom—rainbow writing and retrieval practice. Rainbow writing is a relatively new method that involves repeatedly copying spelling words in different colors, creating a rainbow effect. It is related to another commonly used and older technique, copying, in which spelling words are written without changing colors (Cronnell and Humes 1980; McNeill and Kirk 2014). Retrieval practice involves taking practice quizzes and then checking produced spellings against correct spellings. The selection of these two methods was not arbitrary. We selected retrieval practice because experimental studies conducted in the laboratory, involving undergraduate participants for the most part, provide strong evidence that it is an effective way to promote learning in other domains (for reviews of the retrieval practice literature, also known as the testing effect, see Dunlosky et al. 2013; Roediger and Butler 2011). Several hypotheses have been proposed to explain the benefits of retrieval practice, including that retrieval enhances semantic elaboration (Carpenter 2011), that it increases the likelihood learners will use better strategies to encode the correct responses (Pyc and Rawson 2010; 2012), and that it enhances memory for context that improves subsequent retrieval (Karpicke et al. 2014b)." (p.386-7)

Jones, A.C., Wardlow, L., C. Pan, S.C., Zepeda, C., Heyman, G.D., Dunlosky, J., & Rickard, T.C. (2016). Beyond the Rainbow: Retrieval practice leads to better spelling than does Rainbow Writing. *Educational Psychology Review, 28,* 385-400.

"This meta-analysis examined true- and quasi-experimental intervention studies conducted with K-12 students to determine if teaching handwriting enhanced legibility and fluency and resulted in better writing performance. When compared to no instruction or non-handwriting instructional conditions, teaching handwriting resulted in statistically greater legibility (ES = 0.59) and fluency (ES = 0.63). Motor instruction did not produce better handwriting skills (ES = 0.10 for legibility and −0.07 for fluency), but individualizing handwriting instruction (ES = 0.69) and teaching handwriting via technology (ES = 0.85) resulted in statistically significant improvements in legibility. Finally, handwriting instruction produced statistically significant gains in the quality (ES = 0.84), length (ES = 1.33), and fluency of students' writing (ES = 0.48). The findings from this meta-analysis provide support for one of the assumptions underlying the Simple View of Writing (Berninger et al., Journal of Educational Psychology, 94, 291–304, 2002): text transcription skills are an important ingredient in writing and writing development" (p. 225)

Santangelo, T., & Graham, S. (2016). A comprehensive meta-analysis of handwriting instruction. *Educational Psychology Review, 28,* 225–265.

"In their synthesis of early elementary (K-3) studies, Wanzek and Vaughn (2007) used interventions provided for 100 or more sessions (the equivalent of 20 weeks of daily intervention) as a proxy for intensiveness, explaining that it was the most reliable method of identifying and coding articles. The authors reported reading outcomes for study participants in the 18 studies identified, as well as the intensity features of these extensive interventions (i.e., duration of intervention, instructional group size, grade level, level of standardization) associated with high effect sizes. Findings revealed positive outcomes for students with reading difficulties and disabilities who participated in extensive interventions, with mean effect sizes ranging from 0.34 to 0.56 across various reading constructs. Effect sizes were larger if the intervention involved students in kindergarten or first grade and when the intervention was

administered in the smallest group sizes (Wanzek and Vaughn 2007). With its emphasis on extensive, Tier III type interventions, studies were also coded for the level of standardization in the intervention approach. Standardized interventions specified the elements of reading instruction with well-defined daily lessons and materials selection. Conversely, problem-solving (non-standardized) interventions were defined as more individualized, with daily lessons planned based on student needs. Studies examining the effects of non-standardized interventions were not available in the corpus of studies included in the synthesis; thus, all findings represented standardized studies. However, the authors reported no differences in effect between highly standardized interventions (i.e., few or no modifications to the curricula) and those with less standardization (i.e., opportunities for the teacher to respond to students' needs in the skills and strategies taught)." (p. 553)

Wanzek, J., Vaughn, S., Scammacca, N., Gatlin, B., Walker, M.A., & Capin, P. (2016). Meta-analyses of the effects of Tier 2 type reading interventions in Grades K-3. *Educational Psychology Review, 28,* 551–576.

"Reading can engender a highly active mental state, and there is increased evidence that sustained literacy practices, which are engendered by education, sculpt mind and brain. •• It is becoming increasingly apparent that education is the foundation for a strong public health policy, which calls for societal investment in (a) basic and applied science to understand the impact of literacy engagement on health, and (b) the development of life span models of education." (p.92)

Stine-Morrow, E.A.L., Hussey, E.K, & Ng, S. (2015). The potential for literacy to shape lifelong cognitive health. *Policy Insights from the Behavioral and Brain Sciences, 2*(1), 92– 100.

"In their domain of expertise, experts do know *more* facts than other people but more crucial is that the facts are connected and organized into patterns, or schemas, that are meaningful for the content domain (Ericsson, Charness, Feltovich, & Hoffman, 2006). Organization of the facts according to important domain principles and frameworks transforms factual information into "usable knowledge" and reflects deep understanding. These organizational patterns, frameworks, or schemas allow experts to see patterns, relationships, or discrepancies that are not apparent to novices. They play an important role in experts' abilities to plan a task, generate reasonable arguments and explanations, and draw analogies to other problems. Experts' schematized conceptual understanding allows them to extract a level of meaning from information that is not apparent to novices (Chi, Glaser, & Rees, 1982). This helps them select and remember relevant information. Experts are also able to fluently access relevant knowledge because their understanding of subject matter allows them to quickly identify what is relevant." (p. 35)

Goldman, S.R., & Pellegrino, J.W. (2015). Research on learning and instruction: Implications for curriculum, instruction, and assessment. Policy Insights from the Behavioral and Brain Sciences, 2(1), 33-41.

"When we take a test on which we are asked to retrieve and produce previously learned information, successfully recalling that information increases our ability to retrieve it again later.

… Testing also increases the effectiveness of the way in which we choose to access and organize the tested information. … When taken together, these results help us understand why students who take more tests in the classroom tend to perform better on later exams (Bangert-Drowns, Kulik, & Kulik, 1991). Most of the benefits come from the first few tests, indicating that it does not require much compromise in the allocation of class time to administer periodic tests. In addition, students of all abilities appear to benefit from the opportunity to take tests (Pan, Pashler, Potter, & Rickard, 2015).

… The cognitive benefits of testing are not like a single shot in the arm. Taking a test improves memory for the material, and it also *decreases* the rate at which we forget that material. What this means is that the benefits of testing are even greater when looking at longer-term retention.

… All of this is particularly noteworthy because, counterintuitively, there are not many cognitive interventions that appear to slow the rate of forgetting. Studying material more leads to a higher initial degree of learning but does not slow forgetting (Anderson & Schooler, 1991; Hellyer, 1962). Employing a **"deep" level of processing—in which the learner is encouraged to think about the meaning of the tobe- learned information—does not slow forgetting** (Nelson & Vining, 1978). Yet, testing slows forgetting (Carpenter, Pashler, Wixted, & Vul, 2008), sometimes considerably (Wheeler, Ewers, & Buonanno, 2003), which may make it an ideal technique for promoting long-term, durable learning.

… The effective organization of a series of tests on the same material can enhance the benefits of testing yet further. The fact that testing decreases the rate of forgetting can be leveraged to start thinking about how tests can be efficiently sequenced. Because the material will be forgotten a little more slowly after each test, then if all tests were equally difficult from an objective standpoint, each test would actually be subjectively a little easier than the last. To render each test more similar in difficulty from the test taker's perspective requires each test to be a little more objectively difficult than the last. One way in which this can be done is by using an *expanding* test schedule, in which each quiz is administered at a slightly longer interval than the last one. Expanding schedules have been shown to enhance memory for names (Landauer & Bjork, 1978) and text (Storm, Bjork, & Storm, 2010). It has been used to aid learning in young children (Fritz, Morris, Nolan, & Singleton, 2007), memory-impaired populations (Camp, 2006; Schacter, Rich, & Stampp, 1985), and even in rehabilitative regimens (Wilson, Baddeley, Evans, & Sheil, 1994). They may be particularly useful for maintaining high levels of retention over long periods (Kang, Lindsey, Mozer, & Pashler, 2014).

… Thus far, we have only considered how tests benefit a student's ability to remember material. Of course, remembering what is taught is only a small part of the process of becoming educated in a discipline. Being able to generalize and draw new inferences on the basis of the learned material is critically important if we want students to apply their learning to new situations. And there is evidence that quizzing facilitates the generalization and application of knowledge as well.

… So far we have seen that the carefully tailored use of tests can enhance memory for and generalization from previously learned materials. Amazingly, the benefits of tests extend even to materials that are only learned *after* the test! In this section, we review evidence that retrieving information from memory—that is, exactly what a test forces you to do— allows learners to more effectively *segregate* their learning and prevent confusions among topics.

… One concern that people have with testing is that test takers will make errors and that the process that leads to those errors will become engrained and will prevent the learner from acquiring the correct solution. Interestingly, this does not appear to be the case; in fact, making errors may even have tangible benefits for learners.

… Tests provide the opportunity for students to tune their confidence in their understanding and mastery of course materials to appropriate levels. Students who receive immediate feedback on the accuracy of their responses by a computerized testing system reveal much more enhanced calibration of confidence than students who do not receive feedback (Zakay, 1992)." (p. 15-18)

Benjamin, A.S., & Pashler, H. (2015). The value of standardized testing: A perspective from cognitive psychology. *Policy Insights from the Behavioral and Brain Sciences, 2*(1), 13–23.

"Vocabulary interventions in preschool and early elementary school can improve vocabulary skills. In a meta-analysis of vocabulary interventions in preschool and kindergarten settings (Marulis & Neuman, 2010), interventions for vocabulary skills improved vocabulary knowledge, especially those implemented by trained teachers or researchers (effects were largest for researchers), as opposed to child care providers or parents. In addition, intervention that used explicit (i.e., direct instruction) strategies or the combination of explicit and implicit strategies was more impactful, as opposed to implicit strategies alone. However, children from middle- or high-SES households benefited more than children from low-SES households, and the interventions were not powerful enough to close vocabulary gaps for children who needed it the

most. The amount of vocabulary learned in some interventions (e.g., 8-10 words per week) is not enough to close vocabulary knowledge gaps with peers (Nagy, 2007)." (p.4)

Clemens, N.H., Ragan, K., & Widales-Benitez, O. (2016). Reading difficulties in young children: Beyond basic early literacy skills. Online First. Policy Insights from the Behavioral and Brain Sciences, 1–8. DOI: 10.1177/2372732216656640

"Adult distaste for decodable books fails to respect the child's need to exercise a skill. Children want to be self-reliant readers and are delighted when they can apply what they know". (p.6)

Moats, L. (1998). Teaching decoding. *American Educator,* 1-9. Spring/Summer, 1998. American Federation of Teachers. Retrieved from www.aft.org/sites/default/files/ae_spring**1998**_teachingdecoding.pdf

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"I have long been an advocate for providing children with 120-180 minutes per day of literacy instruction. I divide that time roughly in quarters: 25% devoted to words and word parts (e.g., letters, sounds, decoding, PA); 25% to oral reading fluency; 25% to reading comprehension; and 25% to writing. That means that primary grade kids would receive about 60 to 90 minutes per day of foundational skills instruction (combining the word work with the fluency work). There are variants on this scheme. For example, Joe Torgesen touched it up by advocating 2 hours of daily literacy instruction, with up to a third hour dedicated to remediation in those foundational skills. Thus, your idea of giving some kids more foundational work beyond the amount that everyone receives in class makes great sense and can easily be accommodated in this plan. However, ignoring essential skills that can't easily be tested to focus on ones that can be, won't help kids much."

Shanahan, T. (2016). Why an overemphasis on foundational reading skills isn't healthy for kids. Reading Rockets. Retrieved from http://www.readingrockets.org/blogs/shanahan-literacy/why-overemphasis-foundational-reading-skills-isnt-healthy-kids

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" …when phonics instruction is introduced after students have already acquired some reading skill, it may be more difficult to step in and influence how they read, because it requires changing students' habits. For example, to improve their accuracy, students may need to suppress the habit of guessing words based on context and minimal letter cues, to slow down, and to examine spellings of words more fully when they read them. Findings suggest that using phonics instruction to remediate reading problems may be harder than using phonics at the earliest point to prevent reading difficulties." (p. 8)

Ehri, L.C. (2003). *Systematic phonics instruction: Findings of the National Reading Panel*. Paper presented at the invitational seminar organised by the Standards and Effectiveness Unit, Department for Education and Skills, British Government (London, England, March 17, 2003). Retrieved from https://archive.org/stream/ERIC_ED479646/ERIC_ED479646_djvu.txt

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"By learning to read, we learn to access our knowledge of spoken language through a novel modality, one that was never anticipated by evolution: vision. Writing is a remarkably clever encryption device by which we turn spoken language into a rich visual texture of marks on stone, clay or paper. Reading corresponds to the decryption of this texture. During reading acquisition, we transform some of the visual structures of our brain in order to turn them into a specialized interface between vision and language. Because reading is an extremely recent invention in evolutionary terms, and until recently concerned a small minority of humans, the human genome cannot contain any instructions for reading-specific brain circuits. Instead, we have to recycle existing brain systems for this novel use. … When a child first enters primary school, this spoken language system, with its subcomponents of lexical, morphological, prosodic, syntactic and semantic processing, is already in place. What this child has to acquire is the visual interface into the language system." (p. 20) …

"We now know that, with literacy, this region becomes functionally specialized for reading in a specific script. Not only does it activate more to written words than to other categories of visual knowledge, such as faces (Puce, Allison, Asgari, Gore, & McCarthy, 1996) or line drawings of objects (Szwed, et al., 2011), but it also activates more to a known script (e.g. Hebrew in Hebrew readers) than to other unknown scripts (Baker, et al., 2007). Indeed, it has become attuned to quite specific cultural properties of the learned

script, such as the relation between upper and lower-case letters of the Western alphabet: only this region recognizes the identity between, say, the words 'rage' and 'RAGE', which requires an internalization of arbitrary reading conventions (Dehaene, et al., 2004; Dehaene, et al., 2001). Recently, the VWFA has even been found to be invariant for printed versus handwritten words (Qiao, et al., 2010). Thus, the VWFA is the main region that allows us to recognize a word like radio, RADIO, or *radio,* regardless of its exact font, size, and location. Remarkably, these invariant processes are so automated that they are deployed non-consciously." (p. 21)

"The current thinking is that, during reading of a single word, millions of hierarchically organized neurons, each tuned to a specific local property (a letter, a bigram, or a morpheme), collectively contribute to visual recognition. This massively parallel architecture explains the speed and robustness of visual word recognition. Most importantly, for educators and teachers, it creates an *illusion* of whole-word reading. Because reading is so fast and takes about the same time for short and long words, some have assumed that the overall whole-word shape is being used for recognition, and that we should therefore teach whole-word reading rather than by letter-to sound decoding. This inference is wrong, however. All the evidence to date suggests that visual words are being analyzed into their elementary components (strokes, letters, bigrams, morphemes) before the whole word can be put back together and recognized. However, this decomposition is so fast, parallel, and efficient as to seem almost instantaneous (it actually takes about one fifth of a second). Educational evidence concurs in showing that teaching of grapheme-phoneme correspondences is the fastest, most efficient way of making children efficient readers, both for pronunciation and for comprehension purposes (Ehri, Nunes, Stahl, & Willows, 2001)." (p. 23)

"It should be clear that I am advocating here a strong 'phonics' approach to teaching, and against a whole-word or whole-language approach. Several converging elements support this conclusion (for a longer development, see Dehaene, 2009). First, analysis of how reading operates at the brain level provides no support for the notion that words are recognized globally by their overall shape or contour. Rather, letters and groups of letters such as bigrams and morphemes are the units of recognition. Second, experiments with adults taught to read the same novel script with a whole-word versus grapheme-phoneme approach show dramatic differences (Yoncheva, Blau, *et al.*, 2010): only the grapheme-phoneme group generalizes to novel word and trains the left-hemispheric VWFA. Adults whose attention was drawn to the global shape of words, by whole-word training, showed brain changes in the homolog region of the right hemisphere, clearly not the normal circuit for expert reading. Third, finally, these theoretical and laboratory-based arguments converge with school-based studies that prove the inferiority of the whole-word approach in bringing about fast improvements in reading acquisition. The whole-word approach will certainly not create dyslexia, which is a biological and partially genetic anomaly, but it does lead to avoidable delays in reading acquisition. Another important observation for education is that the speed of reading acquisition varies dramatically with the regularity of grapheme-phoneme relations, which changes across languages (Paulesu, *et al.*, 2000; Seymour, Aro, & Erskine, 2003; Ziegler & Goswami, 2006). In Italy and Germany, children acquire reading in a few months, simply because the writing is highly regular, such that knowledge of the grapheme-phoneme correspondences suffices to read essentially all words. English and French lie on the other end of the scale of alphabetic transparency: they are highly irregular systems in which exceptions abound (e.g. 'though' versus 'tough') and are disambiguated only by lexical context. Behavioral research shows that English learners have to dedicate at least two more years of training before they read at the same level as Italian children (Seymour, *et al.*, 2003). Neuroimaging experiments show that, to do so, they expand their brain activation in the VWFA and the precentral cortex relative to Italian readers (Paulesu, *et al.*, 2000). Thus, teachers should be aware of the spelling irregularities in the language that they are teaching. They should prepare a rational progression, starting with the more regular and more frequent grapheme-phoneme correspondence, and ending with the exceptions. They should also pay attention to the complexity of syllables and start with the simpler consonant-vowel structures before moving on to more complex multiconsonant clusters. Mute letters, irregular spellings, and spellings inherited from Greek and Roman etymologies (e.g. 'ph') should all be addressed across the years, with frequent repetition. A good reading course should not stop at the simplest grapheme-phoneme correspondences: morphology, the understanding of prefixes, suffixes, roots, and grammatical endings is equally important in the brain of expert readers (Devlin, Jamison, Matthews, & Gonnerman, 2004)." (p. 26-27)

"Recently, our growing understanding of how the brain is recycled for reading has led to a clarification of another mysterious phenomenon that occurs during childhood: mirror reading and mirror writing. Many young readers confuse mirror letters such as p and q or b and d. Furthermore, they occasionally write in mirror form, from right to left, quite competently and without seemingly noticing their error. This peculiar behavior can be explained by considering that the function of the ventral visual cortex, prior to reading, is the invariant recognition of objects, faces and scenes. In the natural world, very few objects have a distinct identity for left and right views. In most cases, the left and right views of a natural object are mirror images of each other, and it is useful to generalize across them and treat them as the same object. Single-cell recordings in monkeys show that this principle is deeply embedded in the visual system: many neurons in the occipito- temporal visual cortex fire identically to the left and right views of the same object or face (Freiwald & Tsao, 2010; Logothetis, Pauls, & Poggio, 1995; Rollenhagen & Olson, 2000). Using neuroimaging, my colleagues and I have shown that, in the human brain, it is precisely the VWFA which is the dominant site for this mirror-image invariance (Dehaene, Nakamura, *et al.*, 2010; Pegado, Nakamura, Cohen, & Dehaene, 2011). No wonder, then, that young children confuse b and d: they are trying to learn to read with precisely the brain area that confuses left and right of images! Mirror confusion is a normal property of the visual system, which is seen in all children and illiterate subjects, and which disappears for letters and geometric symbols when literacy sets in (Cornell, 1985; Kolinsky, *et al.*, 2010). Only its prolongation in late childhood is a sign of dyslexia (Lachmann & van Leeuwen, 2007; Schneps, Rose, & Fischer, 2007). Teachers should therefore be aware of the specific difficulty posed by mirror letters, and should take the time to explain why b and d are distinct letters corresponding to distinct phonemes (it is particularly unfortunate that these phonemes are quite similar and easily confused). Interestingly, teaching the gestures of writing can improve reading, perhaps because it helps store view-specific memories of the letters and their corresponding phonemes (Fredembach, de Boisferon, & Gentaz, 2009; Gentaz, Colé, & Bara, 2003)." (p.27-28)

Dehaene, S (2011). The massive impact of literacy on the brain and its consequences for education. *Human neuroplasticity and education. Pontifical Academy of Sciences, 117,* 19-32.

"The most advanced 10 per cent of students in any school grade are typically five to six years ahead of the least advanced 10 per cent of students in that grade. If teachers are to provide all students in a class with learning experiences that will stretch and challenge them, they must be able to differentiate their teaching to meet the needs of students who are at quite different points in their long-term progress."
Masters, G. (2016). Monitoring student growth. *Teacher Magazine*, ACER, July 25. Retrieved from https://www.teachermagazine.com.au/geoff-masters/article/monitoring-student-growth?utm_source=Campaign%20Monitor&utm_medium=bulletin&utm_campaign=August%202%2020 16

"When the focus of the analysis narrows to just weaker writers, the evidence from this meta-analysis does not support the claim that the process writing approach is an effective method for improving quality of writing. The average weighted ES in five studies was 0.29, and not statistically different than zero. … We are not suggesting that the process approach to writing as it was characterized in this review be abandoned. First, we think that this is unlikely to happen. Second, there is much to like about the process approach. This includes its emphasis on the critical role of process in writing, collaboration, personal responsibility, authentic writing tasks, and a supportive learning environment. Instead, we suggest that advocates of process writing instruction integrate other effective writing practices into this approach. There is some empirical evidence that this is a fruitful avenue to pursue. For example, impressive improvements in the writing of average and struggling writers were obtained when the amount of explicit and systematic instruction provided in process writing classrooms was increased (Curry, 1997; Danoff, Graham, & Harris, 1993; MacArthur, Schwartz, & Graham, 1991). These studies involved teaching strategies for planning and revising. Other studies are needed to determine if incorporating other evidence-based practices, such as sentence combining (Graham & Perin, 2007) or spelling and handwriting instruction (Graham, 2010), into the process writing instruction further enhances the power of this approach." (p.404-405)

Graham, S., & Sandmel, K. (2011). The process writing approach: A meta-analysis. *The Journal of Educational Research, 104*(6), 396-407.

"There have been no consistent findings that reveal the depression of esteem, social development, ethical development, critical thinking, cognitive ability, or cultural participation through Direct Instruction. Stein et al. (1998) argue that many of the assertions against Direct Instruction contain a fundamental confusion between rote instruction and explicit instruction. Scripted Direct Instruction lessons are not based on the mass memorization of arbitrary facts. Instead, a fundamental design principle within the Direct Instruction curriculum is the conveyance of generalizable strategies and concepts, though this is done in an explicit and sequenced manner with constant review and assessment to ensure mastery." (p.117)

Kim, T., & Axelrod, S. (2005). Direct Instruction: An educators' guide and a plea for action. *The Behavior Analyst Today, 6*(2), 111-120.

"Word frequency explains the largest part of variance in visual word processing, with words of high frequency being processed more rapidly (e.g., Balota et al., 2004; New et al., 2006; Yap & Balota, 2009). Over and above word frequency, other factors influence processing latencies. Orthographic typicality, as measured by neighbourhood density (i.e., number of words with an orthographic form similar to the target word) or bigram frequency (e.g., summed frequency of bigrams within words), usually facilitates word processing (e.g., Andrews, 1997; Massaro, Venezky, Taylor, 1979). Additionally, words with regular letter-to sound correspondences (i.e., feedforward consistency) or sound-to-letter correspondences (i.e., feedback consistency) are processed more rapidly than inconsistent words (e.g., Stone & Van Orden, 1994; Yap & Balota, 2009; but see Kessler, Treiman, & Mullennix, 2008, for questions about the role of feedback inconsistency). Finally, length of a word in number of letters or syllables has been reported to affect word processing (e.g., Balota et al., 2004; Ferrand & New, 2003; Muncer & Knight, 2012)." (p.1523)

Chetail, F., Balota, D., Treiman, R., & Content, A. (2014). What can megastudies tell us about the orthographic structure of English words? *The Quarterly Journal of Experimental Psychology, 68*, 1519-1540.

"The Department for Education and Skills (DfES) (2004) defines multi-sensory as: 'using visual, auditory and kinesthetic modalities, sometimes at the same time'. Kinesthetic refers to perceiving through touch and an awareness of body movements." (p. 75)

Obaid, M.A.S. (2013). The impact of using multi-sensory approach for teaching students with learning disabilities. *Journal of International Education Research, 9*(1), 75-82.

"Many of the same instructional programs found to work with native speakers were also found to be effective with ELLs (e.g., Reading Mastery, Early Interventions in Reading, Corrective Reading, Jolly Phonics, Peer-Assisted Learning Strategies, Reading Rescue, Fast ForWord Language, and Orton Gillingham). However, there were particularly strong outcomes for ELLs when the instruction was tailored to their language differences by doing things like devoting more time to those English sounds not in the students' home language (Giambo & McKinney, 2004; Kramer, Schell, & Rubison, 1983). Other instructional approaches well suited to the decoding needs of ELLs included grouping of students according to their instructional needs, mastery learning with frequent teacher modeling, opportunities for practice, and cumulative review (Gunn, Biglan, Smolkowski, & Ary, 2000; Kamps et al., 2007; Lovett et al., 2008)." (p.492)

August, D., McCardle, P., & Shanahan, T. (2014). Developing literacy in English Language Learners: Findings from a review of the experimental research. *School Psychology Review, 43*(4), 490–498.

"In conclusion, differential patterns of memory abilities are documented across different etiological groups of individuals with ID, and the irregularities in the memory profile may reflect discrepancies in the maturation of different cerebral networks linked to a specific genotype."

Vicari, S., Costanzo, F., & Menghini, D. (2016). Memory and learning in intellectual disability. *International Review of Research in Developmental Disabilities*. In Press, Corrected Proof, Available online 4 July 2016

"My prediction is that the new ORF norms won't change much from our 2006 norms (or our 1992 norms). My prediction is based on the fact that ORF is, outside of expected measurement error (which Christ & Coolong-Chaffin, 2007 suggest is in the range of 5 wcpm for grades 1 and 2 and 9 wcpm in grades 3-8+), fairly stable. You can see evidence of this on our 2006 norms when looking at the spring 50th %iles for grades 6 (150), grade 7 (150), and grade 8 (151). When you think that these three scores represent approximately 30,000 students reading a variety of grade level passages that pretty darn stable. Other studies of older readers (high school; college) also find that 150 wcpm is a common "average.""

Hasbrouck, J. (2016). Are oral reading norms accurate with complex text? Retrieved from http://www.shanahanonliteracy.com/search/label/text%20complexity

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" … the National Reading Panel (2000) report sparked considerable controversy when the panel reported a lack of research supporting independent, silent reading practice as an effective means for developing students' reading fluency (e.g., Silent Sustained Reading [SSR] or Drop Everything and Read [DEAR]; Allington, 2002; Coles, 2000; J. W. Cunningham, 2001; Edmondson & Shannon, 2002; Krashen, 2002)." (p. 404)

Reutzel, D.R., Spichtig, A.N. & Petscher, Y. (2012). Exploring the value added of a guided, silent reading intervention: Effects on struggling third-grade readers' achievement. *Journal of Educational Research, 105*(6), 404–415. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4557881/

"A persistent fear among classroom teachers is that some students may not keep their eyes on their text when they are assigned silent independent reading tasks (Donovan, Smolkin, & Lomax, 2000; Fresch, 1995; Hiebert, Wilson, & Trainin, 2010). Guidance within silent reading contexts is key, as students achieving in the bottom quartile of their class frequently attend less well when they read silently in an unguided context as compared to a guided context (Hiebert et al., 2010). … Although previous studies have shown silent reading to be an effective way to improve reading skills, more recent studies have shown that the conditions for silent reading practice in school often result in students acting like they are reading when they are not" (Hiebert & Reutzel, 2010). (p.123-4)

Hiebert, E.H. (2015). Teaching stamina & silent reading in the digital-global age. Reading Essentials Original Series, June 2015. Retrieved from http://textproject.org/assets/library/resources/Hiebert-2015-Teaching-Stamina-and-Silent-Reading-PRINT.pdf#page=124

"The purpose of this study was to examine the effects of reading skill and reading modality (oral versus silent) on reading comprehension. A normative sample of sixth-grade students (N = 74) read texts aloud and silently and then answered questions about what they read. Skill in word reading fluency was assessed by the Test of Word Reading Efficiency, Second Edition (Torgesen, Wagner, & Rashotte, 2012), and students were identified as either normal or at-risk readers based on those scores. A 2 (reading skill) X 2 (reading modality) mixed factorial ANOVA was conducted. Results revealed that both normal and at-risk readers demonstrated better comprehension of text read orally as compared to text read silently. The middle school curriculum requires independent silent reading, yet students may enter middle school without the literacy skills they need to be successful. These findings suggest that students transitioning to middle school may benefit from additional pedagogical support in silent reading comprehension." (p. 318)

Dickens, R.H., & Meisinger, E.B. (2016). Examining the effects of skill level and reading modality on reading comprehension. *Reading Psychology, 37*, 318–337.

"The Reading Mastery curriculum in particular has a powerful evidence base for its effectiveness with disadvantaged children, English Language Learners, and children with disabilities (Engelmann 1997;

Gersten et al.1987; Kamps and Greenwood 2005; Kamps et al. 2008), but limited studies specifically targeting children with ASD. … Findings support the use of explicit and Direct Instruction curricula for high risk children who are struggling academically (Kame'enui and Simmons 2001; Kamps et al. 2008); and more specifically children with ASD at risk for learning problems (El Zein et al. 2014; Flores and Ganz 2009; Ganz and Flores 2009; Plavnick et al. 2014, 2016). Findings also support the use of the Reading Mastery curriculum to teach children with ASD basic phonemic awareness, decoding skills and word reading (Plavnick et al., 2016; Spector & Cavanaugh, 2015)."

Kamps, D, Heitzman-Powell, L, Schwartz, I., Mason, R., Swinburne Romine, R., & Fleming, K. (2016). Effects of Reading Mastery as a small group intervention for young children with ASD. *Journal of Developmental Physical Disabilities*. DOI 10.1007/s10882-016-9503-3

"Published instructional programs that incorporate explicit and systematic procedures in a scripted manner allow consistent implementation across instructors of varying skill levels. Scripted programs control instructional delivery, increasing fidelity of implementation (Cooke et al. 2011). According to Watkins and Slocum (2004), scripts accomplish two goals: 1. To assure that students access instruction that is extremely well designed from the analysis of the content to the specific wording of explanations, and 2. To relieve teachers of the responsibility for designing, field-testing, and refining instruction in every subject that they teach. (p. 42) Importantly, Cooke et al. (2011) compared scripted to nonscripted explicit instruction and found increased rates of on-task instructional opportunities during scripted instruction. Additionally, students indicated they enjoyed answering together (i.e., in unison) and instructors shared positive outcomes including greater student attention, consistent routine, and reduced likelihood of leaving out crucial concepts." (p.56)

Plavnick, J., Marchand-Martella, N., Martella, R., Thompson, J., & Wood, A. L. (2015). A review of explicit and systematic scripted instructional programs for students with autism spectrum disorder. *Review Journal of Autism and Developmental Disorders, 2*, 55-66. doi:10.1007/s40489-014-0036-3.

"The best strategy for determining the identity of meaning of an unfamiliar word is to work out what it is from context. … A very poor strategy is to "sound it out."" (p.4)

Smith F. (2012). *Understanding reading: A psycholinguistic analysis of reading and learning.* London: Lawrence Erlbaum Associates

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"Peer-reviewed research reporting positive effects of CR (choral reading) on ASR (active student responding), learning outcomes, and deportment has been published since the late 1970s (e.g., McKenzie & Henry, 1979; Pratton & Hales, 1986; Sindelar, Bursuck, & Halle, 1986; and see Haydon, Marsicano, & Scott, 2013). CR has been used successfully with students from preschool through secondarygrades (Rose & Rose, 2001; Sainatoetal.,1987), with general education students (Kretlow, Cooke, & Wood, 2012; Maheady, Michielli-Pendl, Mallette, & Harper, 2002), and with special education students with various disabilities (Alberto, Waugh, Fredrick, & Davis, 2013; Cihak, Alberto, Taber-Doughty, & Gama, 2006; Flores & Ganz, 2009; Sterling, Barbetta, Heward, & Heron, 1997)."

Twyman, J. S., & Heward, W. L. (2016). How to improve student learning in every classroom now. *International Journal of Educational Research*. doi:10.1016/j.ijer.2016.05.007

" … one of the most consistent and important findings in recent educational research: Students who make frequent, relevant responses during a lesson(ASR) learn more than students who are passive observers." (p.6)

Twyman, J. S., & Heward, W. L. (2016). How to improve student learning in every classroom now. *International Journal of Educational Research*. doi:10.1016/j.ijer.2016.05.007

"English learners develop word-level skills in a similar manner to native English speakers, and they benefit from instructional features that have been found effective for native English-speaking children (Shanahan & Beck, 2006). Several early reading interventions for English learners with a strong phonics component

have reported benefits for word-level skills (Denton, Anthony, Parker, & Hasbrouck, 2004; Gunn, Biglan, Smolkowski, & Ary, 2000). This growing body of research suggests that young English learners benefit from the same instructional features and phonics components that support early reading development in their native English-speaking peers (Ehri et al., 2001)" (p. 2).

Vadasy, P. F., & Sanders, E. A. (2012). Two-year follow-up of a kindergarten phonics intervention for English learners and native English speakers: Contextualizing treatment impacts by classroom literacy instruction. *Journal of Educational Psychology, 104*(4), 987-1005.

Children who are behind at the end of third grade only have between a 1:5 to a 1:8 chance of catching up (Hall & Moats, 1999; Becker 1978).

Hall, S.T., & Moats, L.C. (1999). *Straight talk about reading: How parents can make a difference during the early years*. Chicago: Contemporary Books.

"More recently, a number of scholars have highlighted the use of the Internet as an important medium of transmission that retains many of the elements of orally transmitted myths (Fernback, 2003; Kibby, 2005). Moreover, although the transmission of myths may seem innocuous, some scholars have pointed out that constant recirculation of some myths can have serious consequences (Kibby, 2005), including causational roles in moral panics and unnecessary fear (Radford, 1999). … Our results also showed that belief in human-related myths was significantly associated with anti-scientific attitudes and the Big Five personality factor of Extraversion. The first association is perhaps unsurprising: in the view of Yates and Chandler (2000), anti-scientific attitudes are exemplified by an aversion to the rational rules of evidence generation and evaluation that are intrinsic to Western models of science. In this view, individuals who score higher on anti-scientific attitudes may be less able to evaluate knowledge claims and may be less skeptical of, and less likely to reject, inappropriate claims." (p.404, 407)

Swami V., Stieger S., Pietschnig J., Nader I., Voracek M. (2012). Using more than 10% of our brains: Examining belief in science-related myths from an individual differences perspective. *Learning & Individual Differences, 22*, 404–408.

"Teachers' professional development is "fragmented, occasional and insufficiently informed by research". These were the conclusions of a recent British Educational Research Association (BERA) and Royal Society of Arts inquiry into the issue in the UK. It also found that the most effective teachers were those who used research in their teaching."

Hayes, D. (2014). *Why important education research often gets ignored.* Retrieved from http://theconversation.com/why-important-education-research-often-gets-ignored-33040 See BERA reports at https://www.bera.ac.uk/project/research-and-teacher-education

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"It is our hope that finding substantial heritability for high *g* does not re-ignite controversies in relation to expert training (e.g., Howe et al., 1998). Heritability and expert training address different issues: 'what is' versus 'what could be.' Heritability describes the extent to which individual differences in *g* can be attributed to genetic differences between individuals given the genetic and environmental differences that exist in a particular population at a particular time. In contrast, training experiments are not concerned about describing the origins of individual differences; their focus is on the potential for change. That is, heritability of *g* could be 100% but a training regime or other environmental interventions could improve performance on tests that assess *g*. Conversely, showing that environmental interventions can improve performance says nothing about the genetic and environmental origins of individual differences. However, beyond this nature vs. nurture level of debate, there are interesting and largely unexplored issues at the interface between training and heritability. For example, are there genotype-environment interactions, differential sensitivity to the quantity or quality of training as a function of genotype? Or genotype-environment correlations, differential exposure to training as a function of genotype, in which children

seek, modify and create environments correlated with their genetic propensities? One interesting example of this interface is a study of performance on a motor task which showed that heritability was substantial before, during and after training (Fox, Hershberger, & Bouchard, Jr., 1996). Further analyses of gene-environment interaction and correlation are also needed. As one of many possible examples, these results for high *g* may be moderated by socioeconomic class as has been suggested for the full range of *g* (Turkheimer et al., 2003)." (p. 368)

Haworth, C. M. A., Wright, M. J., Martin, N. W., Martin, N. G., Boomsma, D. I., Bartels, M., ... Plomin, R. (2009). A twin study of the genetics of high cognitive ability selected from 11,000 twin pairs in six studies from four countries. *Behavior Genetics, 39*(4), 359–370. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2740717/

"Although genetic influence on cognitive functioning late in life appears to be substantial, these data also demonstrate considerable environmental influence. About 40% of the variance for general cognitive ability and even more of the variance for specific cognitive abilities is environmental in origin. Moreover, consistent with results from studies of younger adults, our results indicate that, for the most part, these environmental influences are not shared by twins growing up in the same family nor are they due to adult experiences shared by twins. In other words, environmental influences that contribute to individual differences in cognitive abilities are those that make family members, in this case twins, different (36). The most direct evidence for this conclusion is that identical twin correlations are considerably less than the reliability of the measures (usually given as 0.80 to 0.95), even though identical twins are genetically identical. Differences within pairs of identical twins provide a tool with great potential for identifying these non - shared environmental factors." (p.1563)

McClearn, G. E., Johansson, B., Berg, S., Pedersen, N. L., Ahern, F., Petrill, S. A., & Plomin, R. (1997). Substantial genetic influence on cognitive abilities in twins 80 or more years old. *Science*, *276*(5318), 1560-1563.

"Accordingly, we proposed that sensory/neural difficulties in recovering prosodic structure from speech input could lie at the heart of the phonological deficit in dyslexia, across languages. … If supported by future studies across languages, these mechanistic neural insights would support remediation for dyslexia based on musical, motor and language rhythms focused on delta-band rates [76,77]" (p. 94)

Goswami, U. (2016). Educational neuroscience: Neural structure-mapping and the promise of oscillations. *Current Opinion in Behavioral Sciences, 10*(8), 89–96.

"Good readers tend to be good spellers, and poor readers tend to be poor spellers. Several studies have documented that reading and spelling are strongly associated with each other in different languages and age groups (e.g., Babayiğit & Stainthorp, 2010; Cardoso-Martins & Pennington, 2004; Desimoni, Scalisi, & Orsolini, 2012; Furnes & Samuelsson, 2011; Georgiou, Torppa, Manolitsis, Lyytinen, & Parrila, 2012b; Landerl & Wimmer, 2008; Leppänen, Niemi, Aunola, & Nurmi, 2006; Vaessen & Blomert, 2013; Yeung et al., 2011). However, the imperfect correlation between the two (rs range from0.60 to 0.80; see meta-analysis by Swanson, Trainin, Necoechea,&Hammill, 2003) leaves open the window for a dissociation in which good readers can also be poor spellers (known as unexpected poor spellers) and poor readers can also be good spellers (known as unexpected poor readers). A few large-scale studies have indeed shown that these two performance profiles are not rare and may each affect 3–7%of school-age children (Fayol, Zorman, & Lété, 2009; Moll, Kunze, Neuhoff, Bruder, & Schulte-Körne, 2014; Moll & Landerl, 2009; Wimmer & Mayringer, 2002). … Research and clinical practitioners have mixed views whether reading and spelling difficulties should be combined or seen as separate. This study examined the following: (a) if double dissociation between reading and spelling can be identified in a transparent orthography (Finnish) and (b) the cognitive and noncognitive precursors of this phenomenon. Finnish speaking children (n = 1963) were assessed on reading fluency and spelling in grades 1, 2, 3, and 4. Dissociation groups in reading and spelling were formed based on stable difficulties in grades 1–4. The groups were compared in kindergarten phonological awareness, rapid automatized naming, letter knowledge, home literacy environment, and task-avoidant behavior. The results indicated that the double dissociation groups could be identified even in the context of a highly transparent orthography: 41 children were unexpected poor spellers (SD), 36 were unexpected poor readers (RD), and 59 were poor in both reading and spelling (RSD). The RSD group performed poorest on all cognitive skills and showed the most task-avoidant

behavior, the RD group performed poorly particularly on rapid automatized naming and letter knowledge, and the SD group had difficulties on phonological awareness and letter knowledge. Fathers' shared book reading was less frequent in the RD and RSD groups than in the other groups. The findings suggest that there are discernible double dissociation groups with distinct cognitive profiles. This further suggests that the identification of difficulties in Finnish and the planning of teaching and remediation practices should include both reading and spelling assessments."

Torppa1, M., Georgiou, G.K., Niemi, P., Lerkkanen, M.K., & Poikkeus, A-M. (2016). The precursors of double dissociation between reading and spelling in a transparent orthography. *Annals of Dyslexia*, First online: 10 June 2016, DOI 10.1007/s11881-016-0131-5

"Noel Pearson's "Good to Great" schools have made appreciable differences to the learning lives of Aboriginal students. This year, Coen and Hope Vale have recorded the highest attendance of remote-based indigenous Queensland schools. I analysed the data from 122 of his students. Learning growth effect-sizes were calculated for all students where they completed a NAPLAN test over two occasions (Year 3 and 5, or Year 5 and 7). The average effect-sizes are all substantial. For Years 3-5, there has been greater than the Australian average growth: 181% greater in Reading, 98% greater in Writing, and 181% greater in Numeracy. This is the good news; the program is truly making a difference; but the sobering news is that the students have to make 3+ years growth in a year to catch up. There is more to do, but the nay-sayers want to destroy an evidence based program because it has not performed magic. The performance is a function of the dedication, the hard work, the evidence based cycle of evaluation by the school leaders and teachers in these schools.' (p.8)

Hattie, J. (2016). *Shifting away from distractions to improve Australia's schools: Time for a reboot.* Jack Keating Memorial Lecture, University of Melbourne, June, 2016. Retrieved from http://education.unimelb.edu.au/__data/assets/pdf_file/0008/1993904/Deans-lecture-June-2016-Jack-Keating-lecture.pdf

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"The purpose of this study was to examine the effects of reading skill and reading modality (oral versus silent) on reading comprehension. A normative sample of sixth-grade students (N = 74) read texts aloud and silently and then answered questions about what they read. Skill in word reading fluency was assessed by the Test of Word Reading Efficiency, Second Edition (Torgesen, Wagner, & Rashotte, 2012), and students were identified as either normal or at-risk readers based on those scores. A 2 (reading skill) X 2 (reading modality) mixed factorial ANOVA was conducted. Results revealed that both normal and at-risk readers demonstrated better comprehension of text read orally as compared to text read silently. The middle school curriculum requires independent silent reading, yet students may enter middle school without the literacy skills they need to be successful. These findings suggest that students transitioning to middle school may benefit from additional pedagogical support in silent reading comprehension." (p. 318)

Dickens, R.H., & Meisinger, E.B. (2016). Examining the effects of skill level and reading modality on reading comprehension. *Reading Psychology, 37*, 318–337.

"The newly released results of the Study of Instructional Improvement (SII) document dramatic differences in the kinds of skills and content taught from classroom to classroom. For instance, the study showed that a fifth-grade teacher might teach reading comprehension anywhere from 52 days a year to as many as 140 days a year. Similarly, first-grade teachers spent as little as 15 percent to as much as 80 percent of their time on word analysis. Thus, the study found, students in some classrooms may spend the

majority of their classroom time on relatively low-level content and skills, while their peers in the class next door are spending much more time on higher-level content. … The data, released this year, confirmed that the overwhelming majority of the variation occurred within schools, rather than between schools, and that the variations were substantial. Teachers varied widely on the topics they chose to spend time on, such as word analysis, comprehension, or writing; on the materials they used; and on the types of instructional practices they employed. … the level of cognitive demand varied widely from classroom to classroom. In every other aspect, these schools were astonishingly coherent, but they were loose inside the 'black box' of instruction. … much of the reason for these wide differences in teaching practice is the lack of clear standards for instruction. Without guidelines for effective practice teachers have wide latitude to try what they believe is effective. … State accountability systems do not eliminate variations in practice because they generally set relatively low targets for instruction. … While few educators argue for eliminating variability in teacher practice altogether, many suggest that the profession needs to do more to make sure all teachers teach at least the core curriculum that all students should learn. … we ought to have strong, assertive statements about what is the core instructional program, and we ought to monitor it."

Rothman, R. (2009). Behind the classroom door. *Harvard Education Letter, 25*(6), 1-2. Retrieved from http://hepg.org/hel-home/issues/25_6/helarticle/behind-the-classroom-door_427

"In addition, the different behavioral manifestation of dyslexia across DO [deep orthographies] and SO [shallow orthographies] suggests different cognitive dysfunctions. That is, dyslexic readers in DO suffer from slow, effortful, and especially inaccurate reading [e.g., Landerl et al., 1997; Ziegler et al., 2003], whereas dyslexic readers in SO primarily suffer from slow and effortful reading [e.g., Wimmer, 1993; Zoccolotti et al., 1999]. This indicates an involvement of different cognitive components. Assuming further a differential weighing of cognitive processes (e.g., whole-word recognition or serial grapheme–phoneme conversion), and hence different brain activation between typical readers of DO and SO, different brain activation abnormalities in dyslexia are expected. … In line with the idea of a universal neurobiological origin of developmental dyslexia [e.g., Pugh, 2006], presumably associated with the common speed impairment in dyslexic readers across DO and SO, we found common underactivation in dyslexic compared with nonimpaired readers in left middle, inferior temporal, and occipitotemporal regions. Differences between DO and SO studies were evident with respect to the degree, spatial extent, and exact anatomical location of the under- and overactivation clusters. … In sum, the present meta-analysis synthesizes and quantifies universal and orthography-specific effects on dyslexic functional brain abnormalities during reading and reading-related tasks in alphabetic writing systems." (p.13, 20)

Martin, A., Kronbichler, M., & Richlan, F. (2016). Dyslexic brain activation abnormalities in deep and shallow orthographies: A meta-analysis of 28 functional neuroimaging studies. *Human Brain Mapping*. doi: 10.1002/hbm.23202

"In a typical Year 9 class, the top students can be more than seven years ahead of the bottom students, but NAPLAN's minimum standards are set way too low to identify the stragglers. A Year 9 student meets the minimum standard even if they are reading below the level of a typical Year 5 student."

Goss, P., & Sonnemann, J. (2016). *Widening gaps: What NAPLAN tells us about student progress.* Grattan Institute. Retrieved from https://grattan.edu.au/report/widening-gaps/


"These results indicate that although the late emerging poor comprehenders showed below average performance for the first time in Grade 4, they had consistently lower performance on measures of word reading, nonword reading, and spelling across time. … Our findings are supported by other research, which has shown LERD prevalence rates between 2.8% and 13.4% (Catts et al., 2012; Compton et al., 2008; Kieffer, 2010). Together, these results suggest that earlier reports may have overestimated the number of children with late emerging reading problems and that the fourth grade slump is just that—a slump. … the majority, or 67%, of children with newly identified reading comprehension problems in Grade 4 were able to recover by the end of Grade 7. … Longitudinal studies have shown that children with LERD may have poorer phonological awareness, decoding efficiency, listening comprehension, vocabulary, grammar, and sentence imitation on kindergarten or Grade 1 measures (Catts et al., 2012; Compton et al., 2008). Our results indicate that working memory skills may be another indicator of late emerging difficulties in reading comprehension." (p.33)

Etmanskie, J.M., Partanen, M., & Siegel, L.S. (2016). A longitudinal examination of the persistence of late emerging reading disabilities. *Journal of Learning Disabilities, 49*(1), 21–35.

"At its core, dyslexia is a problem with a component of spoken language, phonological processing: that is, getting to the elemental sounds of speech, affecting both spoken and written language. As dyslexic children progress in school, given good instruction, reading accuracy often improves; however, lack of fluency (the ability to read not only accurately, but rapidly and with good intonation) persists and remains a lifelong problem." (p. 1121)
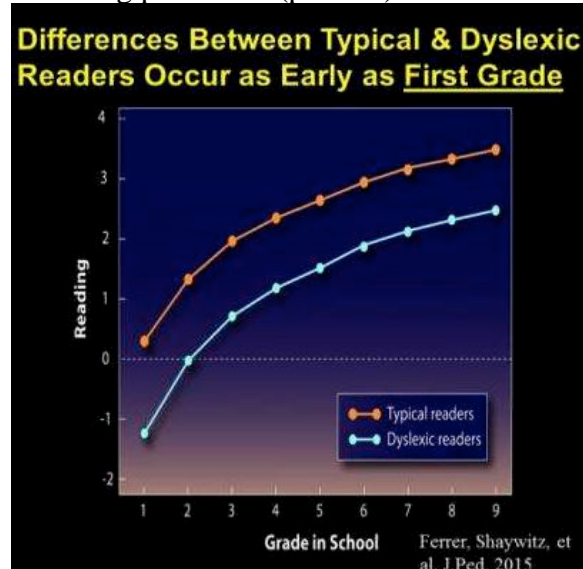
Differences Between Typical & Dyslexic Readers Occur as Early as First Grade

Ferrer, E., Shaywitz, B.A., Holahan, J.M., Marchione, K.E., Michaels, R., & Shaywitz, S.E. (2015). Achievement gap in reading is present as early as first grade and persists through adolescence. *Journal of Pediatrics, 167*(5), 1121-1125.

"When administrators and pre-service teachers underestimate the complexity of teaching scripted DI reading lessons as remediation for students with special needs, they are less likely to exert the necessary efforts needed to fully understand implementation of the curriculum, learning needs of targeted students and the dual roles in the process for learning/teaching of a new program. With the absence of these needed efforts, student learning gains can become less apparent and ineffective." (p.93)

Liu, K., Robinson, Q., & Braun-Monegan, J. (2016). Pre-service teachers identify connections between teaching-learning and literacy strategies. *Journal of Education and Training Studies, 4*(8), 93-98. Retrieved from http://redfame.com/journal/index.php/jets/article/viewFile/1538/1699

"Debunking myths is problematic. Unless great care is taken, any effort to debunk misinformation can inadvertently reinforce the very myths one seeks to correct. To avoid these "backfire effects", an effective debunking requires three major elements. First, the refutation must focus on core facts rather than the myth to avoid the misinformation becoming more familiar. Second, any mention of a myth should be preceded by explicit warnings to notify the reader that the upcoming information is false. Finally, the refutation should include an alternative explanation that accounts for important qualities in the original misinformation." (p.1)

Cook, J., & Lewandowsky, S. (2011). The debunking handbook. St. Lucia, Australia: University of Queensland. November 5. ISBN 978-0-646-56812-6. [http://sks.to/debunk]

"Plan to teach phonics
The information on instruction in phonics provided in the review shows that it is important at some stage in reading development for children to have knowledge of phonics. The research is divided on the form of phonics instruction and the timing of such instruction. However, teachers should be developing programs that incorporate sound and letter association from an early stage."
http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/english/proflearn/pages/litoview.aspx#2

"The most widely used experimenter administered tests for measuring children's vocabulary size in English are the Peabody Picture Vocabulary Test (PPVT-4; Dunn & Dunn, 2007), the Receptive and Expressive One-Word Picture Vocabulary Tests (EOWPVT-4; Martin & Brownell, 2011a, 2011b), the Expressive Vocabulary Test (EVT-2; Williams, 2007), and the Comprehensive Receptive and Expressive Vocabulary Test (Wallace & Hammill, 2002).
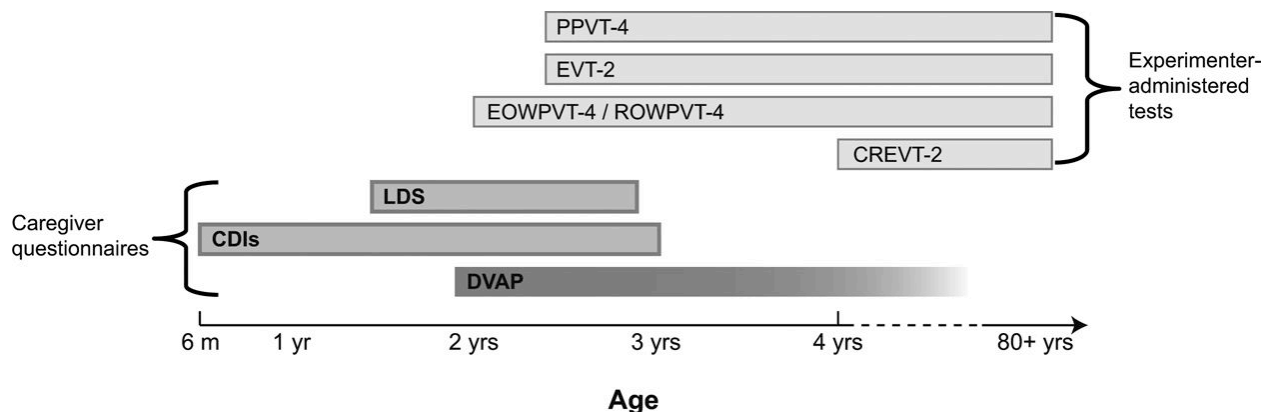

FIGURE 1 Overview of existing measures of expressive and receptive vocabulary, the current measure being investigated (DVAP), and the age ranges covered by each. Experimenter-administered tests are shown in light gray, caregiver questionnaires are shown in darker gray. The DVAP extends the age range of caregiver questionnaires to include preschool and early elementary school years (tested in the current samples) and may be relevant beyond these years as well (not tested here). PPVT-4¼Peabody Picture Vocabulary Test-Fourth Edition (Dunn & Dunn, 2007); EVT-2¼Expressive Vocabulary Test-Second Edition (Williams, 2007); EOWPVT-4¼Expressive One-Word Picture Vocabulary Test-Fourth Edition (Martin & Brownell, 2011a); ROWPVT-4¼Receptive One-Word Picture Vocabulary Test-Fourth Edition (Martin & Brownell, 2011b); CREVT-2¼Comprehensive Receptive and Expressive Vocabulary Test-Second Edition (Wallace & Hammill, 2002); LDS¼Language Development Survey (Rescorla, 1989); CDIs¼MacArthur-Bates Communicative Development Inventories (Fenson et al., 2007).

Libertus, M.E., Odic, D., Feigenson, L. & Halberda, J. (2015). A developmental vocabulary assessment for parents (DVAP): Validating parental report of vocabulary size in 2- to 7-year-old children. *Journal of Cognition and Development, 16*(3), 442-454.

"One quandary in vocabulary research is the best method of measurement. In this review, only two studies used standardized measures as both pretest and posttest measures. The measurement of vocabulary is a hurdle in vocabulary research. The depth of understanding may be just as important as the sheer number of words known. As evidenced in the varied effect sizes, measures that are sensitive to small increments in learning and that capture the multidimensional aspects of vocabulary knowledge are needed. A component of vocabulary that is often ignored is the retention of word knowledge. Few studies utilized delayed posttesting—thus, knowledge of which strategies support long-term learning of words is mostly unknown. Therefore, measures must be sensitive to the breadth and depth of word knowledge, while also determining the difference in short-term learning and long-term maintenance." (p.266)
Hairrell, A., Rupley, W., & Simmons, D. (2011). The state of vocabulary research. *Literacy Research and Instruction, 50*(4), 253-271.

"One skill that is vital in the process of learning to read is the ability to sound out letters and blend these sounds together to produce a word. According to Dual Route models of reading (e.g., Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001), these skills comprise the sublexical route to reading. … The successful functioning of this sublexical route is usually assessed by testing a child's ability to sound out nonwords (for example pofe and bep, sometimes called pseudowords). Nonwords provide the best test of this sublexical route as they cannot be read using the 'mental dictionary' of sight words and therefore successful reading of the nonword will always reflect the use of grapheme-phoneme correspondences (Jackson & Coltheart, 2001)." (p.137, 139)

Colenbrander, D., Nickels, L., & Kohnen, S. (2011). Nonword reading tests: A review of the available resources. *Australasian Journal of Special Education, 35*, 137–172.

"A reasonable question is why so few tests of the specific interventions are considered in this section, relative to the number of existing tests of phonemic awareness and phonics instruction. One answer is that it is hard to do well-controlled true experiments or quasi-experiments on the provision of high-quality preschool, exposure to educational television, and reduction of class size. Testing such interventions definitely is harder than manipulating whether children receive phonemic awareness or phonics instruction. Moreover, many scholars interested in childrens' literacy development were not trained as experimenters, but rather in literary traditions that favor other methodologies. As a result, they do not hold epistemological beliefs that favor experimentation (see Stanovich, 2003, for a discussion of this last point)." (p. 45)

Pressley, M., Duke, N.K., & Boling, E.C. (2004). The educational science and scientifically based instruction we need*:* Lessons from reading research and policy making. *Harvard Educational Review, 74*(1), 30–61.

"Background. Identifying reading comprehension difficulties is challenging. There are many comprehension tests to choose from, and a child's diagnosis can be influenced by various factors such as a test's format and content and the choice of diagnostic criteria. We investigate these issues with reference to the Neale Analysis of Reading Ability (NARA) and the York Assessment of Reading for Comprehension (YARC). Methods. Ninety-five children were assessed on both tests. Test characteristics were compared using Principal Components and Regression analyses as well as an analysis of passage content. Results. NARA comprehension scores were more dependent on decoding skills than YARC scores, but children answered more comprehension questions on the NARA and passages spanned a wider range of difficulty. Consequently, 15–34% of children received different diagnoses across tests, depending on diagnostic criteria. Conclusion. Knowledge of the strengths and weaknesses of comprehension tests is essential when attempting to diagnose reading comprehension. difficulties." (p

Colenbrander, C., NIckels, L. & Kohnen, S. (2016). Similar but different: Differences in comprehension diagnosis on the Neale Analysis of Reading Ability and the York Assessment of Reading for Comprehension. Journal of Research in Reading, ISSN 0141-0423 DOI:10.1111/1467-9817.12075

"The most effective spelling instruction teaches spelling as a linguistic (rather than visual) ability by directly facilitating key skills that underlie spelling development (Bourassa & Treiman, 2001). There are three metalinguistic skills that are strongly related to spelling acquisition. One metalinguistic skill that is essential to the acquisition of spelling is phonemic awareness, which refers to the ability to reflect on and manipulate single sounds within words (Gillon, 2004). A second important metalinguistic skill for learning spelling is orthographic awareness which includes (1) alphabetic knowledge, for example, 'sh' makes the /ʃ/ sound; (2) orthographic pattern knowledge, such as knowing that the grapheme 'ck' cannot be used in initial position in a syllable; and (3) storage of mental representations of spellings in longterm memory (Apel, Wolter, & Masterson, 2006; Apel, 2011). A third skill that is fundamental for learning to spell is morphological awareness which involves the ability to recognize the parts of words that convey meaning, such as identifying connections in words sharing the same root, such as heal-health (Berninger, Abbott, Nagy, & Carlisle, 2010)." (p.536)

McNeill, B., & Kirk, C. (2014). Theoretical beliefs and instructional practices used for teaching spelling in elementary classrooms. *Reading & Writing, 27*, 535–554.

"The analysis of the TOWRE performances indicated that students in the 90th and 75th percentiles can recognize a sample of words from the 1,000 most-frequent words automatically at grade 1. However, students in the bottom 40th percentile are not automatic with this corpus of words until grade 4 (and those in the 25th percentile, until grade 5). The gap between current texts and the proficiency of students in the bottom 40th percentiles is particularly large in grade 1. This gap decreases over the elementary grades as students gain proficiency with the 1,000 most-frequent words. This proficiency allows students to attend to

the approximately one-fifth of new words in texts that, typically, contain complex vowels and/or multiple syllables." (p.13)

Hiebert, E.H. (2008). The (mis)match between texts and students who depend on schools to become literate. In E.H. Hiebert & M. Sailors (Eds.), *Finding the right texts: What works for beginning and struggling readers*. NY: Guilford. page 1–20. Retrieved from http://textproject.org/assets/library/papers/Hiebert%20-%20The%20%28Mis%29Match%20between%20Texts%20and%20Students.pdf

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"From our analysis of their word-sentence-, and discourse-level demands, we conclude that Reading Recovery books, as a category of texts for early reading instruction, provide some support for an instructional emphasis on the recognition of high-frequency words, but inadequate support for an instructional emphasis on decoding words using on-sets and rimes.… However, T-unit length in both words and morphemes did significantly and positively correlate with Reading Recovery level, indicating that increased syntactic demands are associated with Reading Recovery leveling. Although not related to our research question, this finding lends some support to the claim that Reading Recovery levelling supports instruction in the three main cueing systems." (p.423)

"Moreover, the way Reading Recovery books are leveled provides no support for instruction in recognizing words by their orthography or decoding them by their phonology. We recommend that advocates of word recognition or decoding instruction either seek other kinds of materials or select and relevel a subset of Reading Recovery books that will provide increasing word-level demands as the assigned levels of the books increase. … The results of this study warn us about the practice of schools and school districts where primary-grade children's oral reading is assessed using Reading Recovery books or passages. Because thoseassessments typically yield a reading level based on the Reading Recovery level of the books or passages used, they may not be valid for students whose teachers have emphasized word recognition or decoding rather than or more than the use of the three main cueing systems." (p.425)

Cunningham, J.W., Spadorcia, S.A., Erickson, K.A., Koppenhaver, D.A., Sturm, J.M., & Yoder, D.E. (2005). Investigating the instructional supportiveness of leveled texts. *Reading Research Quarterly, 40*(4), 410-427.

"Thus, the ability to decode unknown words using sound–symbol correspondences appears to be best supported through explicit instruction. This is not trivial and may become increasingly important as students encounter more challenging multisyllable words in the intermediate grades." (p. 19)

Denton, C.A., Fletcher, J.M., Taylor, W.P., Barth, A.E., & Vaughn, S. (2014). An experimental evaluation of guided reading and explicit interventions for primary-grade students at-risk for reading difficulties. *Journal of Research on Educational Effectiveness*, 7(3), 268-293. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4712689/pdf/nihms723846.pdf

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"Over the past decade in the United States, levelled texts, or 'little books' with finely graduated levelling of text difficulty, have regained their status as a literacy staple for beginning readers. Despite their resurgence, questions remain regarding the reliability and quality of these books. In this study, we conducted a detailed analysis of 20 sample texts at levels 5, 10, 15 and 20, from one series of levelled books published in the United States. We found that the levelling system used in this series is not a particularly reliable indicator of text difficulty and that the quality of these books varies considerably between and within levels. We suggest that close attention to text levels could be detrimental in the reader–text matching process. We further recommend that in order to judge and select quality books that answer the needs of their students, teachers become more aware of the various factors influencing text comprehensibility and quality." (p. 43)

Picher, B., & Fang, Z. (2007). Can we trust levelled texts? An examination of their reliability and quality from a linguistic perspective. *Literacy, 41*(1), 43-51.

"Although several studies have documented strengths in word recognition for some students with autism spectrum disorder (ASD; for example, Newman et al., 2007), most investigators have concluded that a disproportionate number of students with ASD do not meet grade-level expectations in word recognition or comprehension (Asberg, Dahlgren, & Sandberg, 2008; Brown, Oram-Cardy, & Johnson, 2013; Estes, Rivera, Bryan, Cali, & Dawson, 2011; Huemer & Mann, 2010; Nation, Clarke, Wright, & Williams, 2006; Norbury & Nation, 2011; Ricketts, Jones, Happé, & Charman, 2013). …Findings of concern included frequency of use of paraprofessionals to provide primary instruction, teachers' relatively low self-efficacy for teaching reading to students with ASD, and provision of less than the recommended instructional time for K-3 reading. … A second condition relates to instructional time and intensity. Beginning readers should be engaged in instruction for a sufficient amount of time to support progress. A common recommendation for K-3 programs is a dedicated instructional block of 90 to 120 min for all students (Allington, 2009; Foorman & Connor, 2010). In addition, students who are reading below grade level should receive more intensive instruction than other students (Allington, 2009, 2013; Griffiths & Stuart, 2013; Vaughn, Denton, & Fletcher, 2010). Instructional intensity may be enhanced by increasing instructional time and reducing group size (e.g., Mellard, McKnight, & Jordan, 2010; Vaughn et al., 2010)." (p. 337-8)

Spector, J.E., & Cavanaugh, B.J. (2015). The conditions of beginning reading instruction for students with autism spectrum disorder. *Remedial and Special Education, 36*(6) 337–346.

"Previous studies of teacher knowledge have examined teachers from a range of backgrounds, at preservice and inservice levels; in differing content areas, including math, reading, and writing; and with diverse student populations. These studies find that teachers—preservice and inservice teachers as well as teacher educators-tend to display inadequate knowledge in critical reading topics that would serve their students in literacy development (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012b; Bos et al., 2001; Cunningham, Perry, Stanovich, & Stanovich, 2004; Moats, 1994; Phelps & Schilling, 2004; Joshi et al., 2009; Washburn, Joshi, & Binks- Cantrell, 2011b). For example, Moats (1994) used an Informal Survey of Linguistic Knowledge (ISLK), which assesses knowledge of linguistic terms, phonics, syllables, and morphology. The ISLK revealed scant knowledge of these concepts among 89 reading teachers, classroom teachers, special education teachers, speechlanguage pathologists, classroom teaching assistants, and graduate students who were participating in a university-level reading course. Similarly to Moats (1994) and Bos et al. (2001) found that both preservice and inservice teachers demonstrate a mismatch in their knowledge of effective early reading instruction. Furthermore, on average both groups felt only ''somewhat prepared'' (p. 112) to teach early reading to struggling readers, indicating that teachers are aware of the gaps in their knowledge and preparation. In contrast, Cunningham et al. (2004) found that teachers actually overestimated their knowledge of children's literature, phonological awareness and phonics. The authors contend that this lack of calibration can have effects on teachers' receptiveness to learning opportunities such as professional development. These findings about teacher knowledge are particularly important given the connections between teacher knowledge and instructional effectiveness found by a number of research teams (Foorman et al., 2006; Hill et al., 2005; Lane et al., 2009; McCutchen et al. 2002b; Moats & Foorman, 2003). This limited knowledge extends to the misunderstanding of reading skill development of specific student populations, such as those with dyslexia (Washburn, Binks, & Joshi, 2013; Washburn, Joshi, & Binks, 2011a; Washburn, Joshi, & Binks-Cantrell, 2011b), which is why the present study includes items on the reading development and instruction of English learners. (p. Duguay, A., Kenyon, D., Haynes, E., August, D., & Yanosky, T. (2016). Measuring teachers' knowledge of vocabulary development and instruction. *Reading and Writing, 29*, 321–347.

"More than one-half of the teachers reported applying 15 or more writing to learn strategies at least once a month or more often. The most commonly used writing to learn strategies were writing short answers to

questions, note taking for reading, note taking while listening, and completing worksheets. While teachers reported using a variety of writing to learn strategies, most of them indicated they received minimal or no formal preparation in college on how to use writing to learn strategies to support student learning, less than one-half of teachers directly taught students how to use the writing to learn strategies commonly assigned, and the most commonly used writing to learn strategies did not require students to think deeply about the material they were learning." (p. 1039)

Ray, A.B., Graham, S., Houston, J.D., & Harris, K.R. (2016). Teachers' use of writing to support students' learning in middle school: A national survey in the United States. *Reading and Writing, 29*, 1039–1068.

"Survey responses (N = 118) came from, on average, moderately experienced teachers who reported a relatively high level of confidence regarding aspects of teaching writing. Results suggest that surveyed teachers reflected the themes identified in the New Zealand teacher based and intervention research, which in turn reflected policy initiatives. The combined evidence indicates the influence of the 'teaching as inquiry' approach on writing pedagogy."

Parr, J.M., & Jesson, R. (2016). Mapping the landscape of writing instruction in New Zealand primary school classrooms. *Reading and Writing, 29*, 981–1011.

"The teachers' responses raised some concerns about the quality of writing instruction third- and fourth-grade students receive, as teachers reported spending only 15 min a day teaching writing and students spend only 25 min a day at school writing. While teachers indicated they used a variety of evidence based writing practices in their classroom, a majority of these were applied infrequently. Further, three out of every four teachers reported that their college teacher preparation programs provided no or minimal instruction on how to teach writing." (p. 929)

Brindle, M., Graham, S., Harris, K., Hebert, M. (2016). Third and fourth grade teacher's classroom practices in writing: A national survey. *Reading and Writing, 29*, 929–954

"There was a large dissociation between teachers' beliefs about spelling and their frequency of use of specific instructional practices associated with those beliefs (e.g., phonological awareness, orthographic knowledge). The mismatch between beliefs and reported practice appeared to be due to lack of professional knowledge regarding implementing explicit spelling instruction and finding time to teach spelling within the curriculum. Increasing teachers' knowledge about language structure, practical implementation of key assessment and instruction activities, and the links between spelling and other areas of the curriculum are important factors in improving spelling pedagogical practices." (p.535)

McNeill, B., & Kirk, C. (2014). Theoretical beliefs and instructional practices used for teaching spelling in elementary classrooms. *Reading and Writing, 27*(3), 535-554.

"Children with special literacy needs have been shown to benefit as much or more from morphological training than their normal reading peers (Bowers et al., 2010; Nagy, Carlisle, & Goodwin, 2014). The instruction and creation of strong morphological skills could provide a possible tool for adults or children with dyslexia to bypass their poor phonological skills and utilize the morphological structure and larger lexical units of morphemes, which can then be generalized across a word and which contain added value of semantic and syntactic information compared with syllables and phonemes." (p.268)

Law, J.M., Wouters, J., & Ghesquière, P. (2015). Morphological awareness and its role in compensation in adults with dyslexia. *Dyslexia, 21*, 254–272.

"Overall, the results indicate that dyslexic reading and spelling problems are not generally associated with lower levels of metacognitive knowledge, metacognitive strategies or sensitivity to metacognitive experiences in reading situations." (p.273)

Furnes, B., & Norman, E. (2015). Metacognition and reading: Comparing three forms of metacognition in normally developing readers and readers with dyslexia. *Dyslexia, 21*, 273–284.

"More recent, researchers noted that the left dorsal posterior component demonstrated greater activation when reading pseudowords rather than when reading real words (Pugh et al., 2001), suggesting this region

is potentially an integrative region linking phonology to orthography (Schlaggar & McCandliss, 2007). More specifically, the left angular gyrus is considered a critical structure for reading. Historically, Starr (1889) described lesions to the left angular gyrus, which resulted in alexia (the inability to name words) and agraphia (the inability to write). Similar historical findings from lesion studies (Dejerine, 1891, 1892) suggested the role of the left angular gyrus to be a multimodal convergence zone, linking visual processes with auditory processes (Poldrack, 2001). Damage to this area potentially results in difficulties in reading and writing. The left anterior component is thought to be responsible for the production of speech and tactive analysis of phonological components of words. This area includes the inferior frontal gyrus and extends into the dorsal premotor cortex (Fiez & Petersen, 1998; Poldrack, Wagner, Prull, Desmond, & Glover, 1999)." (p.289)   Franceschini et al. (2013) examined reading, phonological and attentional skills in two matched groups of dyslexic children before and after playing action or non-action video games for 12 h over the course of 2 weeks. The action video games consisted of games from a Wii product called Rayman Raving Rabbids, and they did not involve any direct phonological or orthographic training. The researchers found that not only did the children's reading speed improve for the group who participated in playing action video games but results demonstrated an improvement equivalent to or more than 1 year of typical reading development and more than 1 year of specific and intensive traditional reading interventions. This underscores the implications that spatial and temporal attentional engagement opportunities potentially have for the improvement of reading abilities." (p.298)

"Therefore, individuals with developmental dyslexia lack the spatial and temporal attentional engagement, or the multisensory mechanisms designed to regulate perception of a world of complex sensory stimuli (Franceschini et al., 2013). Franceschini et al. (2013) highlighted multisensory sluggish attentional engagement as a mechanism that can potentially mimic a primary rapid signal processing deficit. This is because the inefficient functioning of the attentional window potentially exposes object perception to interference from noisy distractors (Franceschini et al., 2013). The MTM model provides an intriguing starting point for understanding the complexities of attentional engagement. The 'mimicking' that takes place explains the common approach of looking at developmental dyslexia as a phonological deficit, rather than an issue of attentional engagement and shifting between multiple modes. Current research demonstrates children who are at risk of developing developmental dyslexia can be identified early (Facoetti et al., 2010). Looking toward biological markers, familial history and language development as cues, it is possible to conceive early identification of individuals who will likely develop reading disorders and provide interventions, which target multisensory spatial orienting and attention. Development of efficient attention is crucial because it improves the perception of stimuli and potentially increases the development of neural connectivity between orthographic and phonological stimuli (e.g. letters and speech sound). Traditional approaches for remediating developmental dyslexia include explicit, systematic phonological training of letter to speech-sound integration (Gabrieli, 2009; Goswami, 2011). While this approach demonstrates some effectiveness, it potentially fails to address the core deficit many individuals who struggle with the multifaceted disorder face in their desire to read. Additionally, traditional approaches, which focus only on phonological training, might have reduced success if attentional deficits are at play (Franceschini et al., 2013). Therefore, treatment of multisensory attentional deficits could provide a strong foundation for the basis of remediation in developmental dyslexia." (p.297-8)

Krause, M.B. (2015). Pay attention!: Sluggish multisensory attentional shifting as a core deficit in developmental dyslexia. *Dyslexia, 21*, 285–303.

"A two-group latent variable path model shows that early language skills predict code-related skills, which in turn predict literacy skills. … ongoing weaknesses in morpheme awareness tapped by our grammar task may impact literacy development more when reading and spelling material increasingly incorporates morphologically complex words. (p.133) … In addition, the findings are consistent with research showing that RAN plays a more important role in reading fluency than in spelling (e.g. Furnes & Samuelsson, 2011; Moll, Fussenegger, Willburger, & Landerl, 2009; Moll et al., 2014). … The study also extends the evidence showing that difficulties in oral language development presage deficits in code-related processes that are proximal causes of dyslexia." (p. 120, 133-4)

Moll, K., Thompson, P.A., Mikulajova, M., Jagercikova, Z., Kucharska, A., Franke, H., Hulme, C., & Snowling, M.J. (2016). Precursors of reading difficulties in Czech and Slovak children at-risk of dyslexia. *Dyslexia 22*, 120–136.

"Results showed that low-progress readers performed better (i.e., read 7% more words per minute) in Dyslexie font than in standardly spaced Arial font. However, when within-word spacing and between-word spacing of Arial font was matched to that of Dyslexie font, the difference in reading speed was no longer significant. We concluded that the efficacy of Dyslexie font is not because of its specially designed letter shapes, but because of its particular spacing settings."

Marinus, E., Mostard, M., Segers, E., Schubert, T.M., Madelaine, A., & Wheldall, K. (2016). A special font for people with dyslexia: Does it work and, if so, why? *Dyslexia.* Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/dys.1527

"Our students are academically engaged anywhere from 40% to 80% of the time they are in class. Even our most attentive student could be expected to be engaged only 80% of the time at best. On the other hand, even the most inattentive students could be expected to be engaged at least 40% of the time. The effective engagement index of 70% lies relatively close to 80%, indicating that the students who are disengaged at any particular time are usually relatively small in number." (p. 7)

Walkup, J. R., Farbman, D. & McGaugh, K. (2009). *Bell to bell: Measuring classroom time usage.* Retrieved from http://eric.ed.gov/?id=ED519030

"Students engaged in learning for as little as 38% of a typical school day. Observed distractions were inefficient classroom management, time spent in maintaining discipline, ineffective instructional techniques, and inappropriate curriculum." (p. 63-4)

Mulholland, R., & Cepello, M. (2006). What teacher candidates need to know about academic learning time. *International Journal of Special Education, 21*(2), 63-73.

"Neurocognitive processes: Interleaving topics can increase the efficiency with which learned material is remembered and also the effectiveness of some other learning processes. Interleaving may operate by reducing the suppression of neural activity in memory regions that occurs when similar stimuli are repeatedly presented." (p. 31)

Howard-Jones, P. (2014). *Neuroscience and education: A review of educational interventions and approaches informed by neuroscience.* London: Education Endowment Foundation (p. 1-62). Retrieved from https://educationendowmentfoundation.org.uk/public/files/Publications/EEF_Lit_Review_NeuroscienceAndEducation.pdf

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"Implementation refers to the process by which an intervention is put into practice. Research studies across multiple disciplines, including education, have consistently demonstrated that interventions are rarely implemented as designed and, crucially, that variability in implementation is related to variability in the achievement of expected outcomes." (p. 635)

Lendrum, A., & Humphrey, N. (2012). The importance of studying the implementation of interventions in school settings. *Oxford Review of Education, 38*(5), 635-652.

" … although existing research suggests that the average effect of CSR [comprehensive school reform] programs on student achievement is small, variability in effectiveness from CSR program to CSR program is substantial. (p. 300)… If innovative programs produce only very few differences in instruction (in comparison to normative practice), we should not expect them to produce large effects on student achievement. For these reasons, we urge researchers interested in studying innovative instructional programs to venture inside the black box not only by explicitly measuring rates of faithful program implementation but also by looking closely at the nature of instruction being implemented. Both factors are needed if we are to explain why some programs have more effects on student achievement than others." (p. 332) … we conclude that well-defined and well-specified instructional improvement programs that are

strongly supported by on-site facilitators and local leaders who demand fidelity to program designs can produce large changes in teachers' instructional practices." (p.298)

Correnti, R., & Rowan, B. (2007). Opening up the black box: Literacy instruction in schools participating in three comprehensive school reform programs. *American Educational Research Journal 44*(2) 298–338.

"In summary, we found modest and asymmetric support for the validity of the phonological/surface dyslexia distinction. The phonological subtype showed moderate longitudinal stability and was associated with differentially poor PA. The surface dyslexia subtype was fairly rare in this sample. Its longitudinal stability was not very good, and we found no evidence for a distinct cognitive profile. Furthermore, subtype was irrelevant to prognosis. Taken together, we think these results question whether that the subtype distinction is clinically meaningful or important, though further research is needed to more definitively answer this question. Key unanswered questions include whether the subtypes are associated with differing responses to specialized treatments and, most critically, whether those responses transfer to real-world literacy tasks. … Current results, in combination with previous literature, do not provide sufficient evidence for using this distinction to guide educational or clinical practice at present, although it is possible that future research will support a different conclusion." (p. 359-360)

Peterson, R.L., Pennington, B.F., Olson, R.K., & Wadsworth, S.J. (2014). Longitudinal stability of phonological and surface subtypes of developmental dyslexia. *Scientific Studies of Reading, 18*(5), 347-362.

"Attempting to **recall information from memory (ie, retrieval practice) has been shown to enhance learning across a wide variety of materials, learners, and experimental conditions.** We examine the moderating effects of what is arguably the most fundamental distinction to be made about retrieval: whether a retrieval attempt results in success or failure. After reviewing research on this topic, we conclude that retrieval practice is beneficial even when the retrieval attempt is unsuccessful. This finding appears to hold true in a variety of laboratory and real-world contexts and applies to learners across the lifespan. Based on these findings we outline a two-stage model in which learning from retrieval involves (1) a retrieval attempt and then (2) processing the answer. We then turn to a second issue: Does retrieval success even matter for learning? Recent findings suggest that retrieval failure followed by feedback leads to the same amount of learning as retrieval success. In light of these findings, we propose that separate mechanisms are not needed to explain the effect of retrieval success and retrieval failure on learning. We then review existing theories of retrieval and comment on their compatibility with extant data, and end with theoretical conclusions for researchers as well as practical advice for learners and teachers."

Kornell, N., & Vaughn, K.E. (2016). How retrieval attempts affect learning: A review and synthesis. *Psychology of Learning and Motivation*, Available online 9 May 2016.

Six central findings regarding reading instruction were documented. **First,** minimal opportunities to apply skills to connected text were observed. This finding is consistent with previous research (Swanson, 2008; Vaughn et al., 2002) that reported an absence of sustained text reading during reading instructional periods despite it being a recommended practice (Chard & Kame'enui, 2000; Kent et al., 2012) as well as a prominent component of the NGAC/CCSSO (2010a). The absence of purposeful reading practice is also consistent with previous syntheses of reading instruction (Swanson, 2008; Vaughn et al., 2002). **Second,** findings from reading observation studies in this review suggest **that teachers may not be utilizing the most effective strategies when providing phonics instruction.** This finding is consistent with previous syntheses (Swanson, 2008; Vaughn et al., 2002). Although there are no global recommendations regarding the amount of time that this instruction should occur in the lower elementary grades, according to the NRP (2000), instruction should occur daily and be explicit (Swanson, 2008). **Third**, three of five studies that included information related vocabulary instruction reported encouraging findings. Vocabulary instructional practices considered effective are explicit and direct, key word and mnemonics, and includes frequent practice and multiple exposures to instructed words (Jitendra, Edwards, Sacks, & Jacobson, 2004; Wanzek, 2014). To illustrate its necessity, a recent review of reading interventions reported that multi-component interventions that included vocabulary instruction were associated with higher effect sizes (Kim, Linan- Thompson, & Misquitta, 2012). **Fourth,** observation studies in this review reported

encouraging findings regarding fluency. Students were observed engaging in repeated reading of texts and were more engaged during instructional activities that were teacher supported. During instruction, teachers should provide a model of fluent reading, provide students with opportunities to practice reading and reread text, and teacher feedback should be included (Chard, Vaughn, & Tyler, 2002). **Fifth**, comprehension strategy instruction (i.e., summarization, question generation, self-monitoring) was rarely reported despite the prevalence of comprehension difficulties for students with LD (Jitendra & Gajria, 2011). This suggests that a research-to-practice gap for reading comprehension is present. To remediate these difficulties, it is important that students be provided instruction in a variety of comprehension strategies and for reading instruction to be explicit (Faggella-Luby & Deshler, 2008). Cognitive strategies that should be considered for professional development and school implementation include questioning strategies, self-monitoring, identifying the main idea, and summarization (Gajria, Jitendra, Sacks, & Sood, 2007). However, instruction reported in observation studies focused on assessment and monitoring student comprehension rather than strategy use. **Last**, coding indicated scant evidence of individualized instruction, particularly in secondary settings. Group instruction for which all students are engaged in the same activity was commonly reported, which is consistent with previous syntheses (Swanson, 2008; Vaughn et al., 2002). Considering that students with LD must meet complex academic demands as well as keep up with the accelerated pace of instruction (Kennedy & Deshler, 2010), this is an area of concern. Students in secondary settings are expected to have sufficient reading skills to learn new content and skills via text (Kim et al., 2012), making individualized instruction an important component of remediation (Connor et al., 2013)." (p.203-4)

McKenna, J.W., Shin, M., & Ciullo, S. (2015). Evaluating reading and mathematics instruction for students with learning disabilities: A synthesis of observation research. *Learning Disability Quarterly, 38*(4) 195–207.

"When we analyzed group size as a moderating variable, we found there was **no significant difference between individualized intervention and small-group interventions**. It stands to reason that small-group interventions of three to five students might be more effective than either individually delivered interventions or interventions delivered to six or more students, because English learners have more opportunities to practice the skill they are working on as well as their English language proficiency with their peers and the teacher, and the small-group settings provide more opportunities for this than they would get if they were in a large group (D. Baker & Kosty, 2012; Gersten & Jiménez, 1998). However, the results of this research synthesis do not demonstrate consistent, significant positive impacts or even consistently positive effects." (p. 162-3)

Richards, C., Baker, D.L., Gersten, R., Baker, S.C., & Mercier Smith, J. (2016). The effectiveness of reading interventions for English learners: A research synthesis. *Exceptional Children, 82*(2), 144–169.

"The findings indicated that more than 12% of time was devoted to logistical and non-academic activities, and evidence-based interventions including explicit instruction, cognitive strategy instruction, content enhancements, and independent practice opportunities were reported infrequently, although instructional differences across sites were demonstrated" (p.44)

Finally, universities, school districts, and educational service centers are encouraged to provide sustained professional development in strategies that contribute to independent learning and RTI to reduce the research to practice gap in special education. According to Joyce and Showers (2002), effective professional development includes provision of new information, explicit demonstration, practice opportunities, performance feedback, and coaching. Other factors include the duration of support (Guskey & Yoon, 2009) and supporting teacher perceptions of the feasibility and applicability of the intervention (McLeskey & Waldron, 2004). However, variance in teacher response to professional development exists with some requiring more support to influence adoption and development (Thomas et al., 2012). Kratochwill, Volpiansky, Clements, and Ball (2007) examined professional development specific to RTI

and suggested that factors such as organizational readiness and staff support also influenced adoption and fidelity (Kratochwill et al., 2007)." (p. 54-55)

Ciullo, S., Lembke, E.S., Carlisle, A., Newman Thomas, C., Goodwin, M., & Judd, L. (2016). Implementation of evidence-based literacy practices in middle school Response to Intervention: An observation study. *Learning Disability Quarterly, 39*(1), 44–57.

"This study draws upon survey and administrative data on over 9,000 teachers in 336 Miami-Dade County public schools over 2 years to investigate the kinds of collaborations that exist in instructional teams across the district and whether these collaborations predict student achievement. While different kinds of teachers and schools report different collaboration quality, we find average collaboration quality is related to student achievement. Teachers and schools that engage in better quality collaboration have better achievement gains in math and reading. Moreover, teachers improve at greater rates when they work in schools with better collaboration quality. These results support policy efforts to improve student achievement by promoting teacher collaboration about instruction in teams." (p. 475)

Ronfeldt, M., Owens Farmer, S., McQueen, K., Grissom, J.A. (2015). Teacher collaboration in instructional teams and student achievement. *American Educational Research Journal, 52*(3), 475–514.

"Efficacy studies such as the one described in this article are urgently needed (Hmelo-Silver et al., 2007). For example, there is an ongoing debate about whether students are better served by direct instruction or constructivist approaches to learning (Kirschner, Sweller, & Clark, 2006; Tobias & Duffy, 2009). Klahr (2010) asserts ''the burden of proof is on constructivists to define a set of instructional goals, an unambiguous description of instructional processes, a clear way to ensure implementation fidelity, and then to perform a rigorous assessment of effects'' (p. 4). Some constructivists have expressed resistance to direct rigorous comparisons of these different instructional approaches, arguing that due to fundamental differences between constructivist pedagogies and direct instruction, no common research method can evaluate the two (Jonassen, 2009). Alternatively, Klahr states, ''Constructivists cannot use complexity of treatments or assessments as an excuse to avoid rigorous evaluations of the effectiveness of an instructional process'' (p. 3). Similarly, Mayer (2004) recommends that we ''move educational reform efforts from the fuzzy and unproductive world of ideology—which sometimes hides under the various banners of constructivism—to the sharp and productive world of theory-based research on how people learn'' (p. 18)." (p.1011)

Taylor, J., Getty, S., Kowalski, S., Wilson, C., Carlson, J., & Van Scotter, P. (2015). An efficacy trial of research-based curriculum materials with curriculum-based professional development. *American Educational Research Journal*, *52,* 984-1017.

Key Findings regarding teacher educators' views on education
— They are far more likely to believe that the proper role of teacher is to be a "facilitator of learning" (84 percent) not a "conveyor of knowledge" (11 percent).
— Asked to choose between two competing philosophies of the role of teacher educator, 68 percent believe preparing students "to be change agents who will reshape education by bringing new ideas and approach to the public schools" is most important; just 26 percent advocate preparing students "to work effectively within the realities of today's public schools."
 — Only 24 percent believe it is absolutely essential to produce "teachers who understand how to work with the state's standards, tests, and accountability systems."
— Just 39 percent found it absolutely essential "to create teachers who are trained to address the challenges of high-needs students in urban districts." Just 37 percent say it is absolutely essential to focus on developing "teachers who maintain discipline and order in the classroom."
— The vast majority of education professors (83 percent) believe it is absolutely essential for public school teachers to teach 21st century skills, but just 36 percent say the same about teaching math facts, and 44 percent about teaching phonics in the younger grades. (p. 8-9)

Farkas, S., & Duffett, A. (2011). *Cracks in the ivory tower? The views of education professors circa 2010.* Thomas B. Fordham Institute. Retrieved from http://edex.s3-us-west-

"The purpose of this study was to compare 1st-grade teachers' responses to professional development (PD) programs in reading that differed in means and degree of support for teachers' learning and efforts to improve their reading instruction. We compared 3 models of PD: the 1st model provided only seminars for the teachers, the 2nd model provided seminars and support for teachers' evaluations of their instruction, and the 3rd model included these 2 components as well as a literacy coach to support teachers' integration of new methods into their teaching. We used surveys and observations of practices to assess teachers' views of the PD program, their knowledge about reading, and their instructional practices. Results showed that the teachers in the most intensive 3-component model were distinguished from the teachers in the other 2 conditions primarily in the **changes in their instructional practices** across the year. Results suggest that extensive support for teachers in their schools and classrooms is most likely to lead to changes in their practices that are responsive to current research on effective reading instruction for 1st graders." (p. 212)

Carlisle, J.F., Schnabel Cortina, K., & Katz, L.A. (2011). First-grade teachers' response to three models of professional development in reading. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 27*(3), 212-238.

"Teaching quality accounts for 30 per cent of the variance in student performance, therefore focusing on reforms such as mandating literacy/numeracy as a specialisation for primary teacher training and requiring teachers to use explicit literacy and numeracy instruction in schools will help reverse Australia's current decline in international assessments. Research has shown that more explicit teaching of literacy and numeracy will result in improved student outcomes. This includes a greater focus on ensuring students achieve mastery of skills." (p.7)
Australian Government. (2016). *Quality Schools, Quality Outcomes.* Retrieved from
https://docs.education.gov.au/system/files/doc/other/quality_schools_acc.pdf

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What I take from the report is that the phonics rollout has been markedly successful initially, and for those least likely to succeed its effects are enduring. It doesn't appear to have disadvantaged other students, and is cheap to run as a basal program.

See below:

"Most children learn to read eventually and we do not find evidence of average effects at this age [11]for reading, a broader measure of English attainment or maths. However, we explore whether there is heterogeneity in the estimated effect of the treatment for those with a high probability of being struggling readers on school entry (i.e. those from disadvantaged backgrounds and/or those who are non-native speakers of English). Effects persist at age 11 for young people in this category (even though the treatment stopped 4 years earlier). The effect sizes for the most disadvantaged group seem high enough to justify the costs of the policy. This study therefore shows that good teaching can indeed be taught and this is an example of a 'technology' which his helpful in closing the gap between students who start out with disadvantages (whether economically or in terms of language proficiency) compared to others." (p.3)

"5. Conclusion
The economics of education literature has well established that good teachers matter. But a critical, yet much less studied question, is whether 'good teaching' can be taught? Our empirical analysis shows that intensive training in the use of a 'new pedagogy' or technology produced strong effects for early literacy acquisition amongst young students. We are able to provide convincing evidence of causal effects because of the way in which training was staggered across different Local Authorities (and hence different schools). The initial effects are large and comparable to the early effects of project STAR in reducing class size

Furthermore, the costs were very modest because they only involved employing a literacy consultant to work with a school for a year. If effects only reflected the active involvement of the literacy consultant, one would not expect effects to persist for young students. The fact that effects are observed for younger students in years after the literacy consultant had been at the school (at least up until the control group enter the programme) suggests that the training and not the presence of the trainer explains the treatment effect. Effects are stronger for those exposed to the programme earlier (and for longer). It appears that the training really benefits measures of reading attainment (as well as writing) for young people

However, most students learn to read eventually. This is the simplest explanation for why we do not see any overall effect of the intervention by age 11. There may of course be (unmeasured) benefits of learning to read well at an earlier age. However, these are not reflected in tests that we can observe at age 11 (in English and maths). Most interestingly, there are long-term effects at age 11 for those with a high probability of starting their school education as struggling readers. The results for our study suggests that there is a persistent effect for those classified as non-native English speakers and economically disadvantaged (as measured by free school meal status). The effect persists for these children who enter school with significant literacy deficits and is at least 0.10 of a standard deviation on the reading test at age 11. This is impressive given that the phonics approach is only actively taught up to the age of 7. Without a doubt it is high enough to justify the fixed cost of a year's intensive training support to teachers. Furthermore, it contributes to closing gaps based on disadvantage and (initial) language proficiency by family background

Finally, and to conclude, that a relatively inexpensive policy introduced to primary schools administered by local authorities reduced literacy inequalities in such a way takes on an added significance given the radical and far-reaching schools policies underway in England. All schools are set to become academy schools which operate entirely outside of local authority control by the end of 2022." (p.20-21)

Machin, S., McNally, S., & Viarengo, M. (2016). CEP Discussion Paper No 1425: *'Teaching to Teach' Literacy.*Centre for Economic Performance, London School of Economics and Political Science. Retrieved from http://cep.lse.ac.uk/pubs/download/dp1425.pdf

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"Vocabulary acquisition is an essential part of language learning, enabling the child to build a lexicon that can be used by other processes such as sentence production. Vocabulary size can be indexed by performance on nonword repetition (NWR), a simple task whereby children repeat aloud nonwords that are spoken to them. Although children's NWR performance has very strong links with vocabulary learning in particular (e.g., Baddeley, Gathercole, & Papagno, 1998; Gathercole, 2006; Hoff, Core, & Bridges, 2008), it is also predictive of general language ability (e.g., Marton & Schwartz, 2003; Thal, Miller, Carlson, & Vega, 2005), reading success (e.g., Hansen & Bowey, 1994; Kamhi & Catts, 1986) and difficulties with language or reading (e.g., Bishop, North, & Donlan, 1996; Montgomery, 1995; Snowling, Goulandris, Bowlby, & Howell, 1986). Performance on NWR tests therefore capture key mechanisms that are involved in the child's vocabulary learning that ultimately influence language acquisition more generally." (p. 79)
Jones, G. (2016). The influence of children's exposure to language from two to six years: The case of nonword repetition. *Cognition, 153*, 79–88.

"This article addressed the question of whether intelligence differences may be caused, in part, by nonshared environmentally driven differences in reading, which accumulate across time and transfer to more general cognitive abilities. In a longitudinal analysis of cognitive development in monozygotic twins, assessed in five waves from ages 7 to 16, we found support for this hypothesis. Twins with better earlier reading ability compared to their identical co-twin tended not only to have better reading at subsequent measurements but also higher scores on general intelligence tests. No associations of reading exposure with intelligence were found beyond those of reading ability. We also found that the associations are not restricted to possible effects of reading on the verbal domain—mainly affecting vocabulary and general knowledge—but extend to associations of reading with nonverbal intelligence." (p. 31)

"The present study provided compelling evidence that improvements in reading ability, themselves caused purely by the nonshared environment, may result in improvements in both verbal and nonverbal cognitive

ability, and may thus be a factor increasing cognitive diversity within families (Plomin, 2011). These associations are present at least as early as age 7, and are not—to the extent we were able to test this possibility—driven by differences in reading exposure. Since reading is a potentially remediable ability, these findings have implications for reading instruction: Early remediation of reading problems might not only aid in the growth of literacy, but may also improve more general cognitive abilities that are of critical importance across the life span." (p. 33)

Ritchie, S. J., Bates, T. C., & Plomin, R. (2015). Does learning to read improve intelligence? A longitudinal multivariate analysis in identical twins from age 7 to 16. *Child Development, 86*(1), 23-36.

"Everything that we are currently learning about cognitive science and memory suggests that textbooks are a good thing for pupils: the need to sequence instruction so not to overburden working memory, the need for prior knowledge to contextualise future teaching, the benefits of testing as a means of improving recall, and the importance of spaced practice and revisiting topics. These aspects of pupil understanding are all well served by clear and well designed school resources."

Gibb, N. (2015). How to get more high quality textbooks into classrooms. Speech to the Publisher's Association EPC/BESA Conference 2015, The King's Fund, London. Retrieved from https://www.gov.uk/government/speeches/how-to-get-more-high-quality-textbooks-into-classrooms

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"Science is a process. It's how we acquire better approximations to the truth. All evidence is evidence at that moment. And we are not supposed to simple surrender our knowledge, intelligence, or common sense based on any given study and its p values, much less what media sources have to say about it. Science requires that we live in a state of constant doubt, not certainty." Michael Gerber (2016) Spedpro List 1/5/2016

Stanford professor John Ioannidis, pointed out recently in the Journal of Clinical Epidemiology, "Science is not about vote counting and signing petitions, it is (or should be) about evidence and its cautious interpretation."

"This report uses data from different studies and settings to examine two general factors that make DI implementations more effective: 1) administrative decisions and practices and 2) experience with the program. The data show that DI students make significantly more progress at mastery and have significantly higher achievement when:

- teachers implement the programs with greater fidelity

- teachers have been trained for the specific programs they are teaching

- teachers are given time and support to prepare lessons

- teachers have more experience in teaching the programs

- DI has been implemented for a longer period of time

- students are taught for the recommended time each week

- at-risk students are given extra instructional time ("double dosing")

- students start learning with DI in kindergarten

Cupit, A. (2016). Technical Report 2016-1: *Effective Direct Instruction implementations: The impact of administrative decisions and time*. Retrieved from http://www.nifdi.org/research/recent-research/technical-reports/1386-2016-1-effective-direct-instruction-implementations-the-impact-of-administrative-decisions-and-time

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"Recent research suggests that approximately 46% to 88% of struggling middle-grade readers (Grades 6‑9) present significant ORF deficits (Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011; Cirino et

al., 2013; Hock et al., 2009). As a consequence, ongoing assessment of ORF is increasingly used to identify students with word reading accuracy/fluency difficulties and monitor reading progress in the middle grades (Crawford, Tindal, & Stieber, 2001; Hintze & Silberglitt, 2005; McGlinchey & Hixson, 2004; Nolet & McLaughlin, 2000; Silberglitt & Hintze, 2005; Wallace, Espin, McMaster, Deno, & Foegen, 2007)." (p.53)

"A substantial body of literature reports high reliability and validity coefficients for ORF probes among elementary grade readers and middle-grade readers (Reschly, Busch, Betts, Deno, & Long, 2009; Ticha et al., 2009; Wayman, Wallace, Wiley, Ticha, & Espin, 2007). Despite this research, gaps are present in the literature base. There is growing interest in the use of ORF probes among middle grade struggling readers and students in special education for the purpose of monitoring reading progress and instructional decision making (Ticha et al., 2009; Vaughn, Cirino, et al., 2010). For example, in the state of Texas, middle school teachers are advised to administer this particular measure 3 times a year (i.e., beginning of year, middle of year, and end of year) to more accurately place students in Tier 2 interventions that focus on word reading, fluency, and comprehension, fluency and comprehension, or comprehension only. The need for progress monitoring tools is also essential for students with learning disabilities, whose reading progress can be slow and incremental without implementation of highly effective interventions and whose reading progress may not be captured by end of year final status assessments (Deno, Fuchs, Marston, & Shin, 2001; Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993; Ticha et al., 2009). This study attempted to fill this gap in the literature by demonstrating that ORF probes for the first minute of reading or for the full passage are reliable and valid measures of indexing reading ability among struggling middle-grade readers and may be used as part of a secondary-school teachers' intervention design to measure reading abilities and inform instructional decisions." (p. 62)

Barth, A. E., Stuebing, K. K., Fletcher, J. M., Denton, C. A., Vaughn, S., & Francis, D. (2014). The effect of reading duration on the reliability and validity of middle school students' ORF performance. *Assessment for Effective Intervention*, *40*(1), 53–64.

"One component of RtI models is the universal screening of all students three or four times per year. Purposes of universal screening include identifying those who are at risk for failing to meet academic goals (Mellard, McKnight, & Woods, 2009) and predicting which students are likely to pass high-stakes achievement tests (Hintze & Silberglitt, 2005). By identifying students early within RtI models, schools are able to intervene quickly, thus maximizing the likelihood that students will benefit from intervention and reducing the referral rates for special education services (VanDerHeyden, Witt, & Gilbertson, 2007). Two measurement procedures often employed for conducting screenings are curriculum-based measurement (CBM) and computer adaptive tests (CATs).

CBM in Reading (CBM-R)
The most common CBM instrument used in schools and examined within the research literature is CBM-R (Ball & Christ, 2012). CBM-R is a timed, individually administered assessment of oral reading rate with accuracy. Students read a passage aloud for 1 min while an examiner records errors, utilizing the number of words read correctly per minute (WRCM) as the outcome score. Although researchers originally developed CBM-R more than 30 years ago to assist special education teachers in establishing individual education goals and evaluating individual students' progress toward their goals (Deno, 2003), it is now widely used in universal screening within RtI models (Ball & Christ, 2012). A primary benefit of CBM-R is that it is a general outcome measure; as such, it assesses global proficiency within a curriculum across the year, instead of assessing mastery of a set of hierarchically organized subskills (Fuchs & Deno, 1991). In fact, research suggests that CBM-R requires the integration of the component skills of reading (Fuchs, Fuchs, Hosp, & Jenkins, 2001).

Furthermore, a meta-analysis of the literature indicated that **CBM-R has a strong relation with norm-referenced measures of global reading achievement and component reading skills (Reschly, Busch, Betts, Deno, & Long, 2009), further supporting its evidence as a general outcome measure.** Despite a long history of support demonstrating its technical adequacy and its wide use within schools for universal screening and progress monitoring purposes, one potential limitation associated with CBM-R is that teachers may perceive it simply as an indicator of word reading skills (Hamilton & Shinn, 2003).

However, research suggests that CBM-R is more than merely a measure of students' word reading rates. For example, previous research indicated that fourth-grade students' rate of reading words in context (CBM-R) far exceeds their rate of reading words presented in lists and that their reading comprehension skills explained variance in CBM-R performance beyond that of word lists (Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003b)." (p. 3, 4)

January, S-A.A., & Ardoin, S.P. (2015). Technical adequacy and acceptability of curriculum-based measurement and the measures of academic progress. *Assessment for Effective Intervention, 41*(1), 3–15.

"Associated with teaching to the test, critics warn that students may experience anxiety and low reading self-perception. Our student data, *in general*, do not support either high anxiety over timed reading tests or low reading self perception. The relatively high ratings of self-perception correspond to other research suggesting that younger students have high beliefs regarding their academic ability (Archambault et al., 2010). … Critics agree, warning against making instructional decisions based on limited data, both because ORF measures cannot suggest what, specifically, students need for instruction (Valencia et al., 2010), and because of the high examiner variability in scoring ORF measures (Cummings, Biancarosa, Schaper, & Reed, 2014). … most teachers in our sample reported that they monitor progress frequently for students below grade level. Problematic was the level of text used. The DIBELS manual directs that instructional-level text be used for progress monitoring; yet, the vast majority of teachers who used DIBELS in our sample monitored student progress using grade-level text. … Frequent monitoring is also recommended by test developers (Dynamic Measurement Group, 2012; NCS Pearson Inc., 2012; Shapiro, 2008), and most teachers in our sample reported that they monitor progress frequently for students below grade level. Problematic was the level of text used. The DIBELS manual directs that instructional-level text be used for progress monitoring; yet, the vast majority of teachers who used DIBELS in our sample monitored student progress using grade-level text. aimsweb recommends a process to determine appropriate text level; in general, students with a severe discrepancy (2 years) between grade placement and reading level would receive monitoring at their reading level. Teachers in our sample who use aimsweb did vary with respect to text level used for progress monitoring, which may indicate that they choose text based on students' reading ability. However, our data do prompt us to consider that confusion over progress monitoring may exist. Grade-level tests will not provide an accurate gauge of progress for teachers to assess the effectiveness of instruction for students reading below grade level (Shanahan, 2009). In addition, grade-level tests will not help teachers choose an appropriate level of text for group instruction. Teachers may have particular difficulty judging student reading level from grade-level DIBELS scores (Begeny, Krouse, Brown, & Mann, 2011), as DIBELS graded passages have been shown more difficult than those of other ORF measures (Duesbury, Braun-Monegan, Werblow, & Braun, 2012)

Their responses seem to indicate that ORF measures, although valuable, are too narrow. Nearly all reported that, in addition to ORF measures, they use broader measures, suggesting that they recognize the need to assess fluency, but view fluency as one piece of what they seek to understand about their students. In addition, although the majority of teachers agreed that ORF measures provide important information, when asked their opinion of the measures, the majority provided negative comments. Teacher beliefs relate to practices (Richardson & Placier, 2001). Given the low opinion many teachers in our sample expressed toward ORF measures, it is not surprising that approximately one quarter reported not using ORF results for any purpose. Although we investigated consequential validity, our teachers' perceptions of ORF measures raise questions of face validity—subjective opinions of what a measure does/does not do (E. L. Baker, 2013). Although teachers agreed that they gain information from ORF measures, they did not feel that the measures adequately captured students' reading ability. … Their low opinion of ORF usefulness then may be tied more to what they believe the measures do not provide them than to validity/reliability statistics (cf. Yell, Deno, & Marston, 1992)." … (p. 119)

Deeney, T.A., & Shim, M.K. (2016). Teachers' and students' views of reading fluency: Issues of consequential validity in adopting one-minute reading fluency assessments. *Assessment for Effective Intervention, 41*(2), 109–126.

"Siegel has argued: In an alphabetic language such as English, the best measure of phonological processing skill is the reading of pseudowords; that is, pronounceable combinations of letters that can be read by the application of grapheme–phoneme conversion rules, but they are, by definition, not real words in English…. Pseudowords can be read by application of grapheme–phoneme conversion rules even though the words are not real and have not been encountered in print or in spoken language. (Siegel, 2008) Her argument is that 'the ability to decode pseudowords indicates to what extent a child has mastered alphabetic mapping, a skill considered critically important for learning to read' (Tal & Siegel, 1996, p. 224). Although pseudowords may be thought to be read in part by analogy to real words, Siegel argues that grapheme– phoneme conversion rules and segmentation skills are still required to read them correctly: 'For example, for a correct reading of the pseudoword dake, it must be segmented into an initial letter d and a rime or word body ake; the latter could be read by analogy to cake, but the sound of d and the segmentation itself are, in fact, phonological processing skills' (Siegel, 2008, p.142; see also Tal & Sigel, 1996). Similarly, in an extensive review of literature on beginning reading, Stanovich notes that 'for adults as well as children, the speed of naming pronounceable nonwords words is one of the tasks that most clearly differentiates good from poor readers' (Stanovich, 2000, p. 40) and of the 'incredible potency of pseudoword reading as a predictor of reading difficulties' (ibid., p. 207, 100).
More recently Lloyd-Jones has likewise argued: Research has shown that the early ability to read pseudo-words is strongly associated with later success in reading. The reason for this is simple. Children who can decode a wide range of pseudo-words are clearly demonstrating that they have cracked, or are well on the way to cracking, the phonic code. (Lloyd-Jones, 2012; emphasis added)   For these commentators pseudowords should be included in the Check in so far as they help to provide a clear and unambiguous picture of children's reading development: 'If a child can decode one of these pseudo-words their success cannot be explained away as just a word they happened to recognise or remember' (Lloyd-Jones, 2012, p. 1). It underpins the DfE rationale for the Check, that it 'will identify the children who need extra help so they are given support by their school to improve their reading skills' (DfE, 2013a) (p. 8, 9)

Gibson, H., & England, J. (2015). The inclusion of pseudowords within the year one phonics 'Screening Check' in English primary schools. *Cambridge Journal of Education,* p.1

"Designing early reading screening instruments is complicated, as the age at which they are administered may influence significantly their predictive value, even within a short time frame or within the same school year (O'Connor & Jenkins, 1999). The appropriate age to begin screening young children has been debated. In some cases, the literature argues that for young children screening of early literacy skills should occur before formal literacy instruction begins (Badian, 1982, 2000; Invernizzi, Justice, Landrum, & Booker, 2004; Justice, Invernizzi, & Meier, 2002)." (p. 176)

"Speed and accuracy are two orthogonal latent factors of decoding skill." (p.193)
Morlini, I., Stella, G., & Scorza, M. (2013). Assessing decoding ability: The role of speed and accuracy and a new composite indicator to measure decoding skill in elementary grades. *Journal of Learning Disabilities, 48*(2), 176-195.

The results of the National Assessment of Educational Progress, or NAEP, also show a longer-term stagnation in 12th-grade performance in U.S. public and private schools: Scores on the 2015 reading test have dropped five points since 1992, the earliest year with comparable scores, and are unchanged in math during the past decade.

Eighty-two percent of high school seniors graduated on time in 2014, but the 2015 test results suggest that just 37 percent of seniors are academically prepared for college coursework in math and reading — meaning many seniors would have to take remedial classes if going on to college.

Reading performance dropped for eighth-graders and was flat for fourth-graders. In reading, the scores of top students improved in 2015 while the scores of low-performing students declined.
Washington Post 28/4/2016

"On the other hand, English spelling–sound correspondences are notoriously complex and inconsistent. Beyond schwas, there are long and short vowels (both unreliably signaled), digraphs, unruly letter doubling (pepper vs. paper, common vs. comic, demon vs. lemon), silent letters (comb, knit, gauge), and irregular words (colonel, island). The same letter or spelling may map to several different phonemes (e.g., cow, low; get, gem; read, read) and, worst of all, the same phoneme can be spelled in many, many different ways. For example, Edward Rondthaler, longtime spelling reformer and chairman of the American Literacy Council, lists 18 different spellings for the long /oo/ phoneme: oo (moon), ou (group), ui (fruit), ue (glue), ew (drew), wo (two), u (flu), oe (canoe), ough (through), u…e (rule), ieu (lieu), oo…e (loose), o…e (lose), oup (coup), ui…e (bruise), eu…e (deuce), eu (sleuth), ous (rendezvous), and ou…e (mousse) (See American Literacy Council, 2008). Further, whereas the permissible syllables of most languages are limited to CV, CVC, and VC structures, English syllables can (and often do) sport multiple consonant sounds on either side of the vowels (e.g., sprints) with the result that, relative to other languages, the permissible syllables in English are far greater in number and phonologically far more complex." (p. 13)

Adams, M.J. (2011). The relation between alphabetic basics, word recognition, and reading. In S.J. Samuels & A.E. Farstrup (Eds.), What research has to say about reading instruction (pp. 4-24). Newark, DE: International Reading Association.
https://www.researchgate.net/publication/294428324_Adams_MJ_2011_The_relation_between_alphabetic _basics_word_recognition_and_reading_In_SJ_Samuels_AE_Farstrup_Eds_What_Research_Has_to_Say _About_Reading_Instruction_pp_424_Newark_DE_International_Readin

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"We have no tradition of insisting on anything approaching reasonable validation of proposed reforms before we rush to implementation." (Pogrow, 1996).
Pogrow, S. (1996, June). Reforming the wannabe reformers: Why education reforms almost always end up making things worse. *Phi Delta Kappan,* 656-663.

" … policy makers, university scholars and the media have variously raised concerns about flagging levels of literacy proficiency amongst graduates of teacher education programs (Bantick, 2010; Chilcott,2009; Department of Education Science and Training [DEST], 2005; DET, 2009; McInerney, 2008; Milburn, 2010). … A report entitled, "Prepared to teach" was commissioned in 2005 by the Department of Education, Science and Training (Louden, Rohl, Gore, Greaves, Mcintosh, Wright, Siemon, & House, 2005). … Data from the report noted that "most primary beginning teachers were confident about their personal literacy and numeracy skills, their conceptual understandings of literacy and numeracy, their understanding of curriculum documents and assessment strategies and their broad preparation to teach" (Louden et al., 2005, p.vi). However, this confidence was not shared by senior staff, with less than one third of those surveyed stating that beginning teachers "were well prepared to teach literacy" (Louden et al., 2005, p.vi). This report clearly shows a discrepancy between the beginning teachers" self beliefs and senior staff's confidence levels about the graduates' literacy skills." (p.21)

"The results of the research suggest a number of issues. First the literacy self-efficacy of participants does not appear to rely on a high level of competence, as the two are not highly correlated. This would suggest that pre-service teachers in this study gained their level of self-efficacy from other sources." (p.34)

Bostock, L., & Boon, H. (2012). Pre-service teachers' literacy self-efficacy and literacy competence. *Australian and International Journal of Rural Education, 22*(1), 19-37.

"A synergistic relation between these skills is evidenced by gains that are observed when instruction integrates spelling within reading instruction (Santoro, Coyne, & Simmons, 2006; Treiman, 1998; Uhry & Shepherd, 1993; Weiser & Mathes, 2011). The assessment of beginning spelling skills can serve as a window into students' early reading development (Ouellette & Sénéchal, 2008b; Treiman, 1998) and may provide information on students' knowledge and ability to apply foundational reading skills in ways that conventional reading assessments may not (Apel, Thomas-Tate, Wilson-Fowler, & Brimo, 2012). As part of a more comprehensive approach to reading assessment, spellingmay help identify specific skill deficits and inform intervention strategies for struggling students (Al Otaiba & Hosp, 2010; Masterson & Apel, 2010a; Moats, 1993; Robbins, Hosp, Hosp, & Flynn, 2010). … Although close interrelations between

spelling and reading development are well established, this knowledge is not often extended to the application of spelling assessment with beginning readers. Consistent with prior work, this study demonstrated that **kindergarten spelling skills are highly associated with reading subskills, both on a concurrent and a predictive basis, and may provide unique information on students' early literacy functioning and in the prediction of subsequent reading skills** over that provided by traditional reading assessments alone. Scoring metrics designed to be sensitive to partial or invented spelling afford some advantages over simply tallying the number of words spelled correctly and are more sensitive to students' phonological awareness skills. Although scoring metrics were relatively similar in their relations to early reading, practitioners should consider their alignment with the goals and purpose of the assessment when selecting a metric for scoring spelling responses. Like scholars who have called for the integration of spelling and reading instruction (e.g., Moats, 2005; Santoro et al., 2006; Treiman, 1998), we advocate for greater utilization of spelling assessment to inform more comprehensive reading evaluations." (p. 50, 59)

Clemens, N. H., Oslund, E. L., Simmons, L. E., & Simmons, D. C. (2014). Assessing spelling in kindergarten: Further comparison of scoring metrics and their relation to reading skills. *Journal of School Psychology, 52*, 49-61.

"Although IRIs are frequently used in schools to identify student instructional level, the current study questions how well IRIs identify students' reading instructional level. Moreover, IRIs are used to drive reading instruction, even though the current research suggests that instruction based on IRI identified instructional level may not be matched to student need. Research shows that instructional match results in improved student outcomes (Burns, 2007; Gickling & Armstrong, 1978; Treptow et al., 2007); thus it is necessary to use assessment measures that result in reliable data and valid decisions regarding student performance. Given the importance of developing reading skills, additional research concerning the use of IRIs for determining instructional level is warranted." (p.444)

"Finally, although there are certainly children with poor comprehension who are accurate readers (Cain & Oakhill, 2006), there are very few who read with low accuracy and high comprehension (Meisinger, Bradley, Schwanenflugel, & Kuhn, 2010)." (p. 443)

Burns, M.K., Pulles, S.M., Maki, K.E., Kanive, R., Hodgson, J., Helman, L.A., McComas, J.J., & Preast, J.L. (2015). Accuracy of student performance while reading leveled books rated at their instructional level by a reading inventory. *Journal of School Psychology, 53*(6), 437-45.

Simmons, D. C., Kim, M., Kwok, O., Coyne, M. D., Simmons, L. E., Oslund, E., Fogarty, M., Hagan-Burke, S., Little, M. E., & Rawlinson, D. (2015). Examining the effects of linking student performance and progression in a tier 2 kindergarten reading intervention. *Journal of Learning Disabilities, 48*(3), 255-270.

"Reading comprehension instruction was included in nearly all of the multicomponent interventions. The research base continues to show that teaching reading comprehension strategies to struggling readers in Grades 4 to 12 is beneficial. In addition, the most current research affirms that teachers can provide effective reading interventions. The mean effect sizes for teacher- and researcher-provided interventions in the 2005-2011 group of studies were nearly identical, both on all measures and on standardized measures. A greater proportion of the studies in the 2005-2011 group used teachers to implement the intervention (26 of 50, 52.0%, compared to 12 of 32, 37.5%, in the 1980-2004 group of studies). The largest and most rigorous studies relied on teachers to implement the intervention (e.g., Lang et al., 2009, with $N = 1,197$; Somers et al., 2010, with $N = 5,595$). Therefore, it appears that teachers increasingly are being trained as interventionists and are proving to be as effective as researchers at providing interventions. Finally, the most current data show that reading interventions are effective both for struggling readers with LD and those not identified as having LD. No differences based on LD status were found when looking only at the

2005-2011 group of studies. Notably, most of the studies in the 2005-2011 group included both students with and without LD. Therefore, the most recent research suggests that all struggling readers benefit from intervention regardless of their diagnosed LD status." (p. 386-7)

Scammacca, N., Roberts, G. Vaughn, S., & Stuebing, K. K. A. (2015). A metaanalysis of interventions for struggling readers in Grades 4–12: 1980–2011. *Journal of Learning Disabilities, 48*(4) 369–390.

"When interpreting the effect size for reading interventions, it is important to compare them to typical yearly gains in reading ability for students in these grades. Bloom, Hill, Black, and Lipsey (2008) computed average gains by students over one academic year on seven nationally normed measures of reading achievement. They report annual growth effect sizes ranging from 0.40 for students in Grade 4 to 0.06 for students in Grade 11, with effects decreasing in a linear fashion as grade level increases. … In judging the effect sizes for standardized measures, it is important to note that scores on these measures are based on norms that take expected academic growth into account. Therefore, the smaller effect sizes observed for these measures represent gains in addition to what would be expected due to typical instruction and developmental growth." (p.384)

"Findings indicated that more recent studies yielded substantially smaller mean effect sizes than the older studies. Results of meta-regression analyses indicated that year of publication predicted effect size when analyzing effect sizes from all types of outcome measures and all types of reading comprehension measures, but not when effect sizes from standardized measures were analyzed. These results indicate that the increased use of standardized measures in more recent studies is one important factor in the decrease seen in effect size over time. This interpretation is based on consistent reporting that the use of standardized measures in intervention research is associated with smaller effect sizes (Swanson, Hoskyn, & Lee, 1999; Willingham, 2007). Willingham (2007) suggests that experimenter-designed measures of reading comprehension tend to use reading passages that are amenable to the strategies that were taught in the intervention, whereas standardized measures use a variety of passages that may require students to apply strategies not taught in the intervention or to apply strategies that were taught in new ways.

Another possible cause of shifts in effect size over time is the changing nature of the instruction provided to the comparison group. When a study compares multiple treatments or compares treatment to a business-as-usual comparison group that is receiving an intervention provided by the school, the study-wise effect size reflects the added benefit of one intervention over another, not the benefit of intervention over no intervention. It was difficult to nail down the exact nature of the instruction provided in **business- as-usual comparison groups** in most of the studies that used them because the research reports tended not to describe the comparison group's instruction in sufficient detail. We attempted to evaluate the business-as-usual conditions in the 1980–2004 and 2005–2011 groups of studies by comparing scores on standardized measures in each group. This effort proved fruitless due to differences in how scores were reported, differences in measures used, and differences in forms between older and current versions of measures. Nevertheless, the similarity in effect sizes between studies that used a multiple-treatment design and those that used a treatment-comparison design suggests that the comparison conditions likely involved some type of instruction. With the increasing implementation of RTI models, these comparison-group interventions may be more intensive than in the past. The 1980–2004 and 2005–2011 groups of studies also differ in the populations of students who participated in them. Identification of students in need of intervention based in part on RTI criteria has led to fewer studies that focus exclusively on students with LD and more that include struggling readers who have not been classified as having LD. In more recent studies, students who are designated as having LD based on criteria other than the IQ–achievement discrepancy may have lower IQs than students with LD who were included in earlier studies based on IQ– achievement discrepancies. In addition, a larger percentage of the more recent studies used teachers to deliver the intervention. Teachers were shown to be effective at delivering interventions in Scammacca et al. (2007), but researcher led interventions had significantly larger effects. The studies that have been conducted more recently depend on teachers to deliver the interventions because lengthy interventions and large sample sizes make it cost-prohibitive to employ researchers to deliver the interventions.

Another key difference between the 1980–2004 and 2005–2011 groups of studies is the length of the interventions. More than three out of four of the studies published between 2005 and 2011 provided at least 16 hr of intervention, compared to less than 20% of studies published between 1980 and 2004. On the surface, it seems counterintuitive to state that longer interventions are associated with smaller effects. A possible explanation for the negative relationship found between effect size and hours of intervention is posited by Willingham (2007, 2012). He claimed that brief reading comprehension interventions (5 hr or less) can produce a large immediate effect for students who are adequate decoders because reading comprehension strategies are easy to learn. He asserted that maintaining the gain seen in a brief intervention requires that students remember to use the strategies over a longer period of time with new texts that are not similar to the passages used to practice the strategies (such as those on standardized measures of reading comprehension). Although not a completely satisfying explanation for the phenomenon noted in the present metaanalysis, Willingham's theory provides an avenue for future research on the relative effects of brief and extensive interventions.

It is important to note that other features of more recent interventions may be confounded with the length of intervention and explain the reduction in observed effect sizes over time. These features include more precise measurement, research designs that compared multiple groups, the use of multiple indicators of effectiveness that included proximal and distal measures, increased implementation of randomized controlled trials, changes in the types of students targeted for intervention, and improvements to business-as-usual instruction provided to comparison groups, among others. The finding that longer interventions were associated with smaller effect sizes should not be taken to mean that briefer interventions are more beneficial to students than more extensive interventions. Rather, additional research is needed that measures students' progress at multiple points along the course of a long intervention to determine how estimates of the effect of intervention change over time." (p.384-5)

Scammacca, N., Roberts, G. Vaughn, S., & Stuebing, K. K. A. (2015). A metaanalysis of interventions for struggling readers in Grades 4–12: 1980–2011. *Journal of Learning Disabilities, 48*(4) 369–390.

"The [What Works Clearinghouse] practice guide includes two recommendations for Tier 1. The first is to screen all students for potential reading problems at the beginning and middle of the year and in between these assessments, and following the middle of the year assessments, to regularly monitor the progress of students at elevated risk for reading difficulty. In the early grades (K–2), appropriate target areas are letter naming fluency, phoneme segmentation, pseudoword reading, word identification, and oral reading fluency. … The second practice guide recommendation is to provide time for differentiated instruction within Tier 1 based on assessment data. … Correlational results indicated that there was an association between fidelity and outcomes. Student growth was higher in classrooms where teachers implemented the program with greater fidelity (Gersten et al., 2009).

The major conclusion of this [Tier 2] research is that approximately 30 min of small group instruction each day (3 to 5 days per week) is highly effective for students who are struggling with learning to read. The way instruction is provided is carefully described in these studies, which demonstrate consistency in how instruction should be delivered by the teacher (Gersten et al., 2009). Virtually all recommendations of Tier 2 instruction focus on the fundamental and foundational importance of explicit instruction (Gersten et al., 2009). A number of components define explicit instruction across these Tier 2 interventions. Essential components are (a) teachers model the skills and knowledge they expect students to use and apply (Mathes et al., 2005), (b) teachers provide multiple practice opportunities for students during the lesson (Gunn, Smolkowski, Biglan, Black, & Blair, 2005; Vadasy, Sanders, & Peyton, 2005), (c) teachers correct and/or address student errors and misunderstandings immediately and systematically (Gunn et al., 2005), and (d) teachers pace lessons in a brisk manner so that student engagement is high and so that multiple areas of reading development (e.g., phonemic awareness, vocabulary, and word reading) can be addressed in the 30-min lesson." (p.603, 604)

Fien, H., Smith, J. L. M., Smolkowski, K., Baker, S. K., Nelson, N. J., & Chaparro, E. A. (2015). An examination of the efficacy of a multitiered intervention on early reading outcomes for first grade students at risk for reading difficulties. *Journal of Learning Disabilities*, 48(6) 602–621.

"Increasing the likelihood of teachers implementing research-based strategies in authentic school settings is a major goal of education leaders. Likewise, **decreasing the variability of instruction practices and increasing fidelity of implementation to models of instruction and intervention is particularly difficult** (Gersten, Chard, & Baker, 2000; Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). To address these issues in the context of ECRI, we developed highly specified lesson plans and teaching routines to support standard implementation of instruction and intervention materials. Our goal was to increase the level of specificity to ensure that teachers provided students with explicit and, when appropriate, intensive instructional supports (i.e., in the context of both Tier 1 and Tier 2). These routines provided clear expectations to teachers for what content to cover during instruction and intervention lessons and highly specified guidance for explicit and engaging teacher- student interactions. Akin to the Checklist Manifesto (Gawande, 2009), **the goal of the specified routines was to increase the degree to which practitioners implement evidence- based practices with fidelity and integrity**. The approach of using highly specified instruction and intervention routines can also be used as a tool for coaches and school leaders to define and measure implementation fidelity and to provide subsequent implementation goals for teachers. It is important to note that school based personnel (rather than researchers) delivered both the Tier 1 portion and the Tier 2 portions of the model. Having school personnel as implementers, notably a unique feature of this study, increases the external validity of the study's results. The study findings also have potential implications for publishers and developers of core reading programs and tier 2 interventions**. First, in our opinion, the degree of specificity and guidance provided to teachers for delivering explicit instruction in current reading programs is lacking**. Many programs do not provide enough explicit, scaffolded instruction or practice opportunities for learners at risk of reading difficulty (Gersten, 1999). Second, core program and intervention developers and publishers should strive to align instruction and intervention materials to ensure struggling students are delivered a robust and coherent tiered support plan." (p.617)

Fien, H., Smith, J. L. M., Smolkowski, K., Baker, S. K., Nelson, N. J., & Chaparro, E. A. (2015). An examination of the efficacy of a multitiered intervention on early reading outcomes for first grade students at risk for reading difficulties. *Journal of Learning Disabilities*, *48*(6), 602–621.

"The results presented here are in line with those reported by Wimmer (Wimmer & Mayringer, 2002; Wimmer & Schurz, 2010), who demonstrated that SD [spelling disability] is associated with a reduced efficiency of the storage component of the phonological loop as indicated by low nonword repetition scores. The importance of phonological storage for spelling skills seems plausible since in spelling all phonemes of a word have to be segmented and identified correctly, so that the corresponding graphemes can be derived. It is evident that children may experience severe difficulties in these segmentation demands, when they have specific impairments in retaining spoken language accurately within the phonological store. … Although children with combined literacy difficulties had generally lower working memory scores than children with isolated disabilities, none of the tested interaction terms were significant. The working memory profile of children with a combined RD+SD is therefore best described as an additive combination of the isolated disabilities rather than a distinct disorder: These children exhibit phonological loop impairments that are merely due to their spelling problems, and they also exhibit central-executive deficits that are reflective of their reading problems. … we would suggest that children with SD who exhibit comprehensive deficits in the phonological loop are likely to benefit from teaching principles that aim to compensate for poor phonological storage. For example, keeping instructions short and linguistically simple is an effective way of preventing phonological overload (Alloway, 2006; Gathercole & Alloway, 2008). Also, using visual memory aids that tap their unaffected visuospatial memory skills may be useful in helping children with SD to compensate for their phonological loop impairments. Children with RD exhibiting deficits in the central executive should especially benefit from teaching principles that reduce processing demands in working memory. According to Gathercole and Alloway (2008), this includes restructuring complex tasks in a step-by-step manner as well as increasing the meaningfulness of the reading material." (p.629, 630, 631)

Brandenburg, J., Klesczewski, J., Fischbach, A., Schuchardt, K., Büttner, G. & Hasselhorn, M. (2015). Working memory in children with learning disabilities in reading versus spelling: Searching for overlapping and specific cognitive factors. *Journal of Learning Disabilities, 48*(6) 622–634.

"To acquire representations of printed words, children must attend to the written form of a word and link this form with the word's pronunciation. When words are read in context, they may be read with less attention to these features, and this can lead to poorer word form retention. Two experiments with young children (ages 5–8 years) confirmed this hypothesis. … We believe that the benefit of learning a new word form in isolation is caused by increased attention to the word's orthographic and phonological representations that is necessary for encoding. When beginning readers read words in context, they may fail to attend sufficiently to orthographic and phonological features of the words and instead rely on context to bolster their reading of unfamiliar words. Less skilled readers benefited from learning in the isolated condition to a greater extent than did more skilled readers. … young readers, while they are in the early stages of learning to read many new words, can benefit from reading that draws attention to word form and word decoding (e.g., the **fingerpoint** reading technique used by Ehri & Sweet, 1991). We do not, however, suggest that isolated word learning should replace learning words in stories; rather, we suggest that it should complement such learning, especially for less skilled and beginning readers".

Landi, N., Perfetti, C.A., Bolger, D.G., Dunlap, S. & Foorman, B.R. (2006). The role of discourse context in developing word form representations: A paradoxical relation between reading and learning. *Journal of Experimental Child Psychology, 94*(2), 114-133.

"To summarize, the conclusions of this article are twofold. First, the methodological and empirical arguments discussed here clearly indicate that no empirical evidence from the Stroop task currently contradicts the widespread automatic view of word reading. Word reading can therefore be conceptualized as a process that can be neither prevented nor controlled." (p.347)
Augustinova, M., & Ferrand, L. (2014). Automaticity of word reading: Evidence From the semantic Stroop paradigm. *Current Directions in Psychological Science, 23*(5) 343–348.

"There is clear evidence that phonics-based instruction (with a focus on print-to-sound mappings) is highly effective in the teaching of early reading (McArthur et al., 2012). Going beyond this, our review of the evidence from multiple research traditions leads us to propose that learners who possess knowledge of the semantics of words will fare better when they come to the task of learning to read them. Practically, this suggests that explicit teaching of oral vocabulary (sound-to-meaning mappings) should precede and accompany phonics instruction. This proposal needs to be rigorously tested in educationally realistic studies." (p.326)
Taylor, J. S. H., Duff, F.J., Woollams, A.M., Monaghan, P., & Ricketts, J. (2015). How word meaning influences word reading. *Current Directions in Psychological Science, 24*(4), 322–328.

"The extant evidence indicates that reading books to infants is common across large segments of the parent population, but is by no means universal (Bradley, Corwyn, McAdoo, & García Coll, 2001; Raikes et al., 2006; Yarosz & Barnett, 2001; Young et al., 1998). Further, the likelihood of reading to infants and preschool children varies systematically with socioeconomic status (SES; Bradley et al., 2001). Therefore, variability in the frequency with which caregivers read to young children may be an important source of individual differences in language ability. It is well established that the variability in the amount of spoken language that children hear contributes to individual differences in language abilities, with lexical diversity in the input strongly linked to more rapid early vocabulary growth and persisting benefits to vocabulary size (Hart & Risley, 1995; Hoff, 2003; Hoff & Naigles, 2002; Hoff-Ginsberg, 1991; Huttenlocher et al., 2010; Pan et al., 2005; Rowe, 2012; Weisleder & Fernald, 2014; Weizman & Snow, 2001). Hence, parents' speech that is generated in the context of shared book reading may be a key factor contributing to observed individual differences in language ability among young children, and shared book reading may have potential as an intervention for increasing lexical diversity in the learning environments of children (Sharif, Rieber, & Ozuah, 2002)." (p. 1494)
Montag, J.L., Jones, M.N., & Smith, L.B. (2015). The words children hear: Picture books and the statistics for language learning. *Psychological Science, 26*(9), 1489–1496

"The development of reading skills is underpinned by oral language abilities: Phonological skills appear to have a causal influence on the development of early word-level literacy skills, and reading-comprehension ability depends, in addition to word-level literacy skills, on broader (semantic and syntactic) language skills. Here, we report a longitudinal study of children at familial risk of dyslexia, children with preschool language difficulties, and typically developing control children. Preschool measures of oral language predicted phoneme awareness and grapheme phoneme knowledge just before school entry, which in turn predicted word-level literacy skills shortly after school entry. Reading comprehension at 8½ years was predicted by word-level literacy skills at 5½ years and by language skills at 3½ years. These patterns of predictive relationships were similar in both typically developing children and those at risk of literacy difficulties. Our findings underline the importance of oral language skills for the development of both word-level literacy and reading comprehension." (p. 1877)
Hulme, C., Nash, H.M., Gooch, D., Lervåg, A., & Snowling, M.J. (2015). The foundations of literacy development in children at familial risk of dyslexia. *Psychological Science, 26*(12), 1877–1886.

"Becoming a skilled reader requires building a functional neurocircuitry for printed-language processing that integrates with spoken-language-processing networks. In this longitudinal study, functional MRI (fMRI) was used to examine convergent activation for printed and spoken language (print-speech coactivation) in selected regions implicated in printed-language processing (the reading network). We found that print-speech coactivation across the left-hemisphere reading network in beginning readers predicted reading achievement 2 years later beyond the effects of brain activity for either modality alone; moreover, coactivation effects accounted for variance in later reading after controlling for initial reading performance. Within the reading network, effects of coactivation were significant in bilateral inferior frontal gyrus (IFG) and left inferior parietal cortex and fusiform gyrus. The contribution of left and right IFG differed, with more coactivation in left IFG predicting better achievement but more coactivation in right IFG predicting poorer achievement. Findings point to the centrality of print-speech convergence in building an efficient reading circuitry in children." (p. 75)
Preston, J.L., Molfese, P.J., Frost, S.J., Mencl, W.E., Fulbright, R.K., Hoeft, F., Landi, N., Shankweiler, D., & Pugh, K.R. (2016). Print-speech convergence predicts future reading outcomes in early readers. *Psychological Science, 27*(1), 75-84.

"Memory tests do not merely assess memory. The retrieval practice promoted by testing acts as a "memory modifier" (Bjork, 1975) by rendering successfully retrieved information more recallable in the future than if that same information had not been tested or had been merely restudied (i.e., *the testing effect*). Testing can also potentiate, or enhance, the effectiveness of subsequent study sessions (for a review of the direct and indirect benefits of testing, see Roediger, Putnam, & Smith, 2011). … Overall, then, repeated testing appeared to act as a powerful learning tool, whereas repeated studying seemed to produce no additional benefits for learning." (p.223-4)
Soderstrom, N.C., Kerr, T.K., & Bjork, R.A. (2016). The critical importance of retrieval and spacing for learning. *Psychological Science, 27*(2) 223–230.

"A widely accepted claim in the science- and mathematics-education community is the constructivist idea that discovery learning, as opposed to direct instruction, is the best way to get deep and lasting understanding of scientific phenomena and procedures, particularly for young children. ''The premise of constructivism implies that the knowledge students construct on their own, for example, is more valuable than the knowledge modeled for them; told to them; or shown, demonstrated, or explained to them by a teacher'' (Loveless, 1998, p. 285). Advocates of discovery learning concur with Piaget's assertion that ''each time one prematurely teaches a child something he could have discovered for himself, that child is kept from inventing it and consequently from understanding it completely'' (Piaget, 1970, p. 715). Moreover, they argue that children who acquire knowledge on their own are more likely to apply and extend that knowledge than those who receive direct instruction (Bredderman, 1983; McDaniel & Schlager, 1990; Schauble, 1996; Stohr-Hunt, 1996). There are pragmatic, empirical, and theoretical grounds for questioning this position. Pragmatically, it is clear that most of what students (and teachers and scientists) know about science was taught to them, rather than discovered by them. Empirical challenges come from studies demonstrating that teacher-centered methods using direct instruction are highly

effective (cf. Brophy & Good, 1986; Rosenshine & Stevens, 1986), particularly for teaching multistep procedures that students are unlikely to discover on their own, such as those involved in geometry, algebra, and computer programming (Anderson, Corbett, Koedinger, & Pelletier, 1995; Klahr & Carver, 1988). Finally, most developmental and cognitive theories predict that many of the phenomena associated with discovery learning would make it a relatively ineffective instructional method (Mayer, 2004). For example, children in discovery situations are more likely than those receiving direct instruction to encounter inconsistent or misleading feedback, to make encoding errors and causal misattributions, and to experience inadequate practice and elaboration. These impediments to learning may overwhelm benefits commonly attributed to discovery learning—such as ''ownership'' and ''authenticity.'' (p. 661

Klahrl, D., & Nigam, M. (2004). The equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning. *Psychological Science, 15*(10), 661-667.

"We found not only that many more children learned from direct instruction than from discovery learning, but also that when asked to make broader, richer scientific judgments, the many children who learned about experimental design from direct instruction performed as well as those few children who discovered the method on their own. These results challenge predictions derived from the presumed superiority of discovery approaches in teaching young children basic procedures for early scientific investigations." (p. 661)

Klahrl, D., & Nigam, M. (2004). The equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning. *Psychological Science, 15*(10), 661-667.

"Finally, publishers of early-grades texts should account for multiple text characteristics when creating and/or leveling earlygrades texts. Some current-day leveling systems that are commonly used by publishers and/or classroom teachers, such as Fountas and Pinnell's (2012) system, do take into account text characteristics at multiple linguistic levels, but many publishers rely solely on measurement of word frequency and sentence length. While the latter two factors can be useful for many reasons, creation of optimal texts that ease young students' reading growth and use of optimal leveling systems likely requires consideration of a wider gamut of early-grades text characteristics." (p.26)

Fitzgerald, J., Elmore, J., Koons, H., Hiebert, E.H., Bowen, K., Sanford-Moore, E.E., & Stenner, A.J. (2015). Important text characteristics for early-grades text complexity. *Journal of Educational Psychology, 107* (1), 4-29.

"This meta-analysis provides convincing evidence for a significant and persistent relation between RAN and reading ability. It is suggested that RAN performance reflects, from very early on, underlying cognitive processes that are relevant for learning to read and, consequently, reflects the usefulness of these measures in predicting reading competence and its failure. Correlations were higher for reading fluency than for accuracy measures, and also when alphanumeric RAN stimulus material was used. Thus, these measures should be critical in predictive studies, especially at more advanced school grades, as they seem to be more sensitive to individual differences in reading ability than are other measures. But **whatever RAN taps into, it is beyond letter knowledge and speed of processing.** In turn, the association of RAN with reading accuracy seems to depend greatly on the grade level of the sample under study, with somewhat larger effects in early grades. Later on in development, we recommend that researchers ensure the discriminative power of the accuracy measures, due to possible ceiling effects. Moreover, we also observed that correlations tend to be stronger for impaired readers than for average readers. Previous studies had already shown that children with dyslexia perform poorly on RAN (e.g., Araújo et al., 2011, 2010). Taken together, we argue that understanding the processes subserving impaired visual naming speed in dyslexia may offer promising clues to the causes of dyslexia and deepen our knowledge of the cognitive basis of this disorder." (p. 881)

Araújo, S., Reis, A., Petersson, K. M., & Faísca, L. (2015). Rapid automatized naming and reading performance: A meta-analysis. *Journal of Educational Psychology, 107*(3), 868-883. doi:10.1037/edu0000006

"The current study utilized hierarchical linear modeling to better understand the role of teacher perceptions in the language and pre-literacy and mathematics skill development of ethnically diverse, low-income preschoolers. We found support for the hypothesis that teachers both under- and overestimate the academic

abilities of their preschoolers compared with objective assessments of skills, using widely accepted tools in the field. Several child characteristics were predictive of these discrepancies, including child age, inattentive behavior, and social skills. Child gender and race/ethnicity were not associated with differential teacher perceptions of pre-academic skill, and behavior problems were associated with teacher overestimation of skills, rather than teacher underestimation as predicted. Strong support was also found for the importance of ecological covariates, or teacher and classroom variables, in predicting teacher ratings of preschoolers' skills. … We also found that preschoolers who were severely underestimated by their teachers had considerably weaker relationships between their fall and spring academic skills compared with their peers, suggesting perhaps that their academic growth was dampened by their teachers' misperceptions." (p.816)

Baker, C. N., Tichovolsky, M., Kupersmidt, J. B., Voegler - Lee, M. E., & Arnold, D. H. (2015). Teacher (mis)perceptions of preschoolers' academic skills: Predictors and associations with longitudinal outcomes. *Journal of Educational Psychology, 107*(3), 805-820.

"Structural equation model results showed that prosodic sensitivity was not directly related to word reading. Instead, its relation was completely mediated by phonological awareness and morphological awareness. Furthermore, once word reading, listening comprehension, and working memory were accounted for, prosodic sensitivity was not related to reading comprehension. Therefore, it appears that prosodic sensitivity makes a contribution to word reading primarily via phonological awareness and morphological awareness, and its influence on reading comprehension is via word reading and listening comprehension. These results suggest that explicit attention to prosodic sensitivity might be beneficial for developing phonological awareness and morphological awareness, which, in turn, improve reading skills." (p.1)

Kim, Y.-S. G., & Petscher, Y. (2015, September 21). Prosodic sensitivity and reading: An investigation of pathways of relations using a latent variable approach. *Journal of Educational Psychology*. Advance online publication. http://dx.doi.org/10.1037/edu0000078

"This study found little evidence that the identification of PSW (processing strengths and weaknesses) profile or proposed inclusionary criteria are associated with differential treatment response. Given that much of the literature in support of PSW methods recommends these methods based on an assumption of differential treatment response for different cognitive profiles, these null results are particularly problematic. Additionally, the present study replicates previous investigations that find that the XBA and C/DM methods for LD identification are not interchangeable. Agreement for LD identification decisions between the two models did not improve upon that which would be expected by chance. Until such time as PSW methods for LD identification are demonstrated to improve the effectiveness of treatment, the results of this and previous empirical research suggest that the proposed methods are at best superfluous, and may be detrimental to the goal of ensuring the availability of high-quality academic instruction for all struggling students." (p.10)

Miciak, J., Williams, J. L., Taylor, W. P., Cirino, P. T., Fletcher, J. M., & Vaughn, S. (2015, December 14). Do processing patterns of strengths and weaknesses predict differential treatment response?. *Journal of Educational Psychology*. Advance online publication. http://dx.doi.org/10.1037/edu0000096

"Overall, the results of these studies likely signifies that expected gains as a result of a Tier II intervention in preschool will be difficult to achieve, limited in scope, largest for proximal outcomes, and require intervention of longer duration with explicit focus on multiple targets to achieve broad effects on distal outcomes. In both Study 1 and even in Study 2 despite impacts on all targeted skill areas, average end-of-year standard scores for treatment and control students remained in the low-average to below average range in both code-related and language domains (i.e., posttest standard scores _ 84–91 across both studies). Consequently, even effective Tier II interventions do not result in complete "catch-up" or normalization of children's skills. Of course, the effect of intervention on children's skills from the current studies was the result of only 11 weeks of Tier II intervention; however, studies of substantially longer supplemental interventions with at-risk students also report positive effects that do not result in attainment of "average" scores (e.g., Mathes et al., 2005). Therefore, it is unlikely that an RTI approach that is limited

in scope or duration will provide lasting benefit to preschool children who make limited progress despite exposure to high-quality, evidence-based Tier I instruction and effective Tier II interventions. Broad and sustained interventions are likely what will be needed. Such a conclusion also highlights the importance of providing Tier I instruction that is actually of high quality, and the need for substantial improvements in many preschool settings. These improvements likely will require both the adoption of evidence-based curricula and high quality, equally robust professional development to support effective implementation." (p.126-7)

Lonigan, C.J., & Phillips, B.M. (2016). Response to instruction in preschool: Results of two randomized studies with children at significant risk of reading difficulties. *Journal of Educational Psychology, 108*(1), 114–129.

"The results support the notion that statistically distinct and stable latent classes emerge under the umbrella of reading proficiency, and that children at risk for RD can be separated among a heterogeneous sample of children who are English language learners." (p. 1)

Swanson, H. L., Kudo, M., & Guzman-Orth, D. (2016, January 11). Cognition and literacy in English language learners at risk for reading disabilities: A latent transition analysis. Journal of Educational Psychology. Advance online publication. http://dx.doi.org/10.1037/edu0000102

"When integration aides are trained and prepared to support students in specific curricular interventions (this happens mostly for literacy), student learning outcomes can be influenced in a positive direction (Webster, et al., 2010). A number of studies have found positive outcomes when integration aides are using evidence-based reading approaches, are trained in the particular approach, and have ongoing monitoring and feedback from teachers (Alborz, Pearson, Farrell, & Howes, 2009; Causton-Theoharis, Giangreco, Doyle, & Vadasy, 2007; Farrell, Alborz, Howes, & Pearson, 2010; Lane, Fletcher, Carter, Dejuc, & DeLorenzo, 2007; Vadasy, Sanders, & Tudor, 2007). Most of the studies involved primary school children, some of whom did not have identified disabilities but were considered at risk of literacy failure." (p.15)

Punch, R. (2015). *Use and efficacy of paraprofessionals in special education.* An internal report commissioned by the Program for Students with Disabilities Review Unit, Department of Education and Training, Victoria, Australia. Retrieved from http://www.education.vic.gov.au/Documents/about/department/psdlitreview_IntegrationAides.docx

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"Understanding a written text requires some higher cognitive abilities that not all children have. Some children have these abilities, since they understand oral texts; however, they have difficulties with written texts, probably due to problems in reading fluency. The aim of this study was to determine which aspects of reading fluency are related to reading comprehension. … These results confirm that reading comprehension problems in children are related to a lack in the development of a good reading fluency".

Álvarez-Cañizo, M., Suárez-Coalla, P., & Cuetos, F. (2015). The role of reading fluency in children's text comprehension. *Frontiers of Psychology,* 6(1810), 1-8.

"RAN made a significant unique contribution to spelling performance. Further analyses showed that participants with low naming performance were significantly poorer spellers overall and had a specific difficulty in spelling irregular words. The findings support the view that RAN may be indexing processes that are implicated in the establishment of fully specified orthographic representations." (p.371)

Stainthorp, R., Powell, D., & Stuart, M. (2013). The relationship between rapid naming and word spelling in English. *Journal of Research in Reading 36*(4), 371-388.

"Importantly, the present study showed that text reading fluency is a differentiated construct from word reading fluency, and is an additional factor that influences reading comprehension over and above word reading fluency and listening comprehension after children have developed a certain level of word reading proficiency – Grade 2 in the present study. We hypothesized that text reading fluency largely develops from word reading fluency (Ehri, 2002; NICHD, 2000), but it also involves meaning-related processes

associated with context, and thus involves children's oral language comprehension. This hypothesis was confirmed such that initially, text reading fluency was highly related to word reading fluency (r = .96 in Grade 1), but with further reading development, text reading became more influenced by listening comprehension (γ = .08 in Grade 1 to γ = .30 in Grade 4) and increasingly dissociated from word reading fluency. This finding is in line with the hypothesis that word reading constrains reading to a large extent in the beginning phase, and as children develop word reading skill, more cognitive resources are available for meaning- related processes (Jenkins et al., 2003 ; Stanovich, 1980). Coupled with recent studies with English-speaking and Korean-speaking children (Kim et al., 2011 , 2012 , 2014), the present study provides empirical support that text reading fluency is a separate construct from word reading fluency because it is a function of not only word reading fluency but also listening comprehension. Thus, text reading fluency acts as a bridge not only between word reading fluency and reading comprehension as hypothesized (Pikulski & Chard, 2005), but also between listening comprehension and reading comprehension" (p. 9)

"The present findings offer some practical implications, albeit preliminary due to correlational nature of the present study. First, the finding that text reading fluency is an important skill for reading comprehension in addition to word reading and listening comprehension suggests that instructional attention is warranted to text reading fluency. Previous studies have shown that instruction on text reading fluency (e.g., repeated reading) improved reading comprehension (Vadasy & Sanders, 2008). Furthermore, the finding that listening comprehension was consistently related to text reading fluency indicates text reading fluency is not just a function of word reading, but oral language comprehension. Previous studies of text reading fluency focused on word reading skill such as repeated reading to improve text reading fluency (see NICHD, 2000), but the present finding suggests that oral language comprehension skill merits instructional attention not only for reading comprehension but also for text reading fluency." (p.11)

"In contrast to word reading fluency and text reading fluency, listening comprehension and reading comprehension were measured by various types of tasks. This is partly due to nature of the constructs of listening comprehension and reading comprehension. That is, there is relatively less consensus about how to best measure reading comprehension than word reading fluency and text reading fluency (oral reading fluency in particular), and studies have shown that reading comprehension tasks vary in the extent to which they measure various component skills (Cutting & Scarborough, 2006 ; Keenan et al., 2008)." (p.12)

Kim, Y.S., & Wagner, R.K. (2015). Text (oral) reading fluency as a construct in reading development: An investigation of its mediating role for children from Grades 1 to 4. *Scientific Studies in Reading, 19*(3), 224-242.

"A series of multilevel analyses showed that student and text characteristics contributed uniquely to oral reading fluency rates. Student characteristics involving sight word reading efficiency and level of decoding ability accounted for more variability than reader type and verbal knowledge." (p.162)

Barth, A.E., Tolar, T.D., Fletcher, J.M., & Francis, D. (2014). The effects of student and text characteristics on the oral reading fluency of middle-grade students. *Journal of Educational Psychology, 106*(1), 162–180.

"And so to completely analyze what we do when we read would almost be the acme of a psychologist's achievements, for it would be to describe very many of the most intricate workings of the human mind, as well as to unravel the tangled story of the most remarkable specific performance that civilization has learned in all its history". (p. 6).

Huey, E. B. (1908/1968). *The psychology and pedagogy of reading.* Cambridge: MIT Press.

"As early as first grade, compared with typical readers, dyslexic readers had lower reading scores and verbal IQ, and their trajectories over time never converge with those of typical readers. These data demonstrate that such differences are not so much a function of increasing disparities over time but instead because of differences already present in first grade between typical and dyslexic readers. The achievement gap between typical and dyslexic readers is evident as early as first grade, and this gap persists into

adolescence. These findings provide strong evidence and impetus for early identification of and intervention for young children at risk for dyslexia. Implementing effective reading programs as early as kindergarten or even preschool offers the potential to close the achievement gap". (p. 1121).
Ferrer, E., Shaywitz, B.A., Holahan, J.M., Marchione, K.E., Michaels, R., Shaywitz, S.E. (2015). Achievement gap in reading is present as early as first grade and persists through adolescence. *The Journal of Pediatrics*, 167(5), 1121-1125.

"We evaluated the technical adequacy of oral reading fluency (ORF) probes in which 1,472 middle school students with and without reading difficulties read fluency probes for 60 s versus reading the full passage. Results suggested that the reliability of 60-s probes ($rs \geq .75$) was not substantively different than full passage probes ($rs \geq .77$) among struggling readers and typically developing readers in Grades 6 to 8. " (p. 53).
Barth, A.E., Stuebing, K.K., Fletcher, J.M., Denton, C.A., Vaughn, S., & Francis, D. (2014). The effect of reading duration on the reliability and validity of middle school students' ORF performance. *Assessment for Effective Intervention, 40*(1), 53–64.

"That direct instruction in alphabetic coding facilitates early reading acquisition is one of the most well established conclusions in all of behavioural science." (p.415)
Stanovich, K.E. (2000). *Progress in understanding reading*: Scientific foundations and new frontiers. New York: Guilford Press.
"That direct instruction in alphabetic coding facilitates early reading acquisition is one of the most well established conclusions in all of behavioural science." (p.285)
Stanovich, K.E. (1994). Romance and reality. *The Reading Teacher*, 47(4), 280-291.

"Advocates of whole-language instruction have argued forcefully for more than 20 years that people often derive meanings directly from print without ever determining the sound of the word. Some psychologists today accept this view, but most believe that reading is typically a process of rapidly sounding out words mentally, even for the highly skilled. The most compelling evidence for this last contention comes from clever experiments by Guy Van Orden of Arizona State University wherein a subject is first asked a question, such as "Is it a flower?" He or she is then presented with a target word (for example, "rose") and asked whether the word fits the category. Sometimes the subject is offered a word that sounds the same as a correct answer (called a homophone – say, "rows"). Subjects often mistakenly identify such words as fitting the category, and these incorrect responses show that readers routinely convert strings of letters to sounds (or rather, to their unvoiced mental equivalents), which they then use to ascertain meanings. Some eye-movement studies have used homophones to demonstrate that the process of sounding out words mentally begins very rapidly after a reader's gaze first fixes on a particular word. And recent brain studies show that the primary motor cortex is active during reading, presumably because it is involved with mouth movements used in reading aloud. Consequently, psychologists now know that the process of mentally sounding out words is an integral part of silent reading, even for the highly skilled. This understanding suggests that learning the correspondences between letters and sounds – that is to say, phonics – is keenly important for beginners. Further support for phonics instruction comes from experiments designed to mimic the way people learn to read".
Rayner, K., Foorman, B.R., Perfetti, C.A.; Pesetsky, D., & Seidenberg, M.S. (2002). How should reading be taught? *Scientific American, 286*(3), 84-92.

"The bulk of education research activity occurs through university research. In 2012, universities spent about $350 million on education research (Australian Bureau of Statistics 2014). University research is supported by two major funding sources: 'general university funds ', including student fees, and competitive grants and research block grants funded by the Australian Government (box 8). In 2012, the Australian Research Council — which administers competitive grants in non- medical fields of research — provided competitive grants worth $25 million to education research projects (Australian Research Council 2015)". "University research is supported by two major funding sources: • 'General university funds ', including international student fees and income from Australian students (both fees, and funds from the Commonwealth Grant Scheme, through which the Government provides funding for many Australian students). In 2012, general university funds accounted for 55 per cent of total spending on research. •

Australian Government funding for university research delivered through the dual funding system of competitive grants and research block grants. Competitive grants fund only the direct costs of individual research projects. Research block grants are not tied to specific projects, allowing universities to make strategic decisions on their research investments. In 2012, competitive grants accounted for 17 per cent of total spending on research and research block grants accounted for 15 per cent. Source: (Australian Department of Education and Training 2015, pp. 10 – 12)" (p.30)

Productivity Commission. (2016). National Education Evidence Base, Issues Paper, April 11, 2016. Retrieved from http://www.pc.gov.au/inquiries/current/education-evidence/issues/education-evidence-issues.pdf

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"Effective instruction is dependent on both teacher behavior and the instructional program that is being used. The effective teaching literature has shown what excellent instruction is. Excellent instruction comes from having appropriate curriculum pacing, lesson pacing, and transition management (Hofmeister & Lubke, 1990; Marchand- Martella, Blakely, & Schaefer, 2004; Martella et al., 2012). According to Slavin (2009), "Students who are participating in well-structured activities that engage their interests, who are highly motivated to learn, and who are working on tasks that are challenging yet within their capabilities rarely pose any serious management problems" (p. 329). Therefore, the goal for educators is to help students become successful in the classroom both academically and behaviourally" (p.242-3)

Martella, R.C., & Marchand-Martella, N.E. (2015). Improving classroom behavior through effective instruction: An illustrative program example using SRA FLEX Literacy. *Education and Treatment of Children 38*(2), 241–272.

"For the lower-starting students (i.e., decelerated repetitions to standard progression) there were very clear benefits; there were many significant differences and some of those showed effect sizes greater than 0.45 appeared on letter-sound knowledge, segmentation fluency, blending, word identification, and oral reading fluency. The results for the other two groups were mixed and difficult to characterize. None of the differences were significant, so it is difficult to interpret the effect sizes. Part of this is because of the small number of children (n=9) in, at least, the standard progression group. What's the take-away? Here's another illustration of the benefits of monitoring children's performance and adjusting instruction on the basis of those data. Monitor progress. Use the data to guide instruction". From John Lloyd

Simmons, D. C., Kim, M., Kwok, O.-M., Coyne, M. D., Simmons, L. E., Oslund, E., . . . Rawlinson, D'A. (2015). Examining the effects of linking student performance and progression in a Tier 2 kindergarten reading intervention. *Journal of Learning Disabilities, 48*(3), 255-270. DOI:10.1177/0022219413497097

"In a world without DAP, effective, research-based approaches to preK-3 teaching would be welcomed—especially those that have been used for decades by special educators and teachers in high poverty schools.52 Englemann's Direct Instruction (DI) and Slavin's Success for All (SFA) are two well established, empirically documented examples. Both are comfortably able to produce the 1.5 to 2.0 years of achievement growth per school year needed to bring delayed students to grade level by third grade and yet both have been widely defamed as "drill and kill" and "push-down curricula. 53 In truth, both are highly engaging and well received by students and teachers who are trained and supported. The Engelmann program, in particular, was found to be the most effective teaching model in the massive federal Follow Through project of the 1960s and 1970s.54 Direct instruction was shown to be both the most effective approach to teaching basic skills and the most effective in boosting student selfesteem. Children taught by DI like going to school.55 Despite their documented success with children, the use of both DI and SFA by schools has suffered because they are systematic, results-focused, and teacher-led; and therefore considered "developmentally inappropriate"" *(p.9).*

Stone, J.E. (2015). *Misdirected teacher training has crippled education reform.* Education Consumers Foundation. Retrieved from http://education-consumers.org/pdf/Misdirected-teacher-training.pdf

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"Explicit instruction Special educational intervention techniques may not always refer to speci c learning strategies. We (Mastropieri & Scruggs, 2002; 2014) described many of the effective teacher presentation techniques as the SCREAM variables (structure, clarity, redundancy, enthusiasm, appropriate rate,

maximized engagement). Collectively, these presentation techniques address many commonly observed characteristics of students with disabilities, such as sustained attention, distractibility, memory, cognitive organization, social behavior, affect, and motivation (e.g., Mastropieri & Scruggs, 2014). And although such techniques have been shown to facilitate learning in more typical learners (Mastropieri & Scruggs, 2004), these variables may be mandatory for learning to take place for students with disabilities" (p.30).

"In a recent investigation, we implemented an intervention to improve the persuasive writing skills of students with significant learning and behavioral disorders using a Self Regulated Strategy Development (SRSD) strategy (Harris, Graham, Mason, & Friedlander, 2008). This intervention was successful, in that students greatly improved their persuasive writing skills. However, a very extensive amount of instruction was necessary, dramatically different from students in the general education curriculum. That is, the general education curriculum in that state allowed three–five days for instruction of persuasive writing—in our case, students required 55 days of instruction to master these same skills. The amount of needed instructional time in this instance might fairly raise the issue of how much time *can* be appropriately allocated to specific learning skills, and whether decisions must be made regarding which skills or content may be reduced in order to allow for the extra time necessary to teach content considered more important" (p. 27).

"Disordinal interactions refer to those differential outcomes in which different treatments benefit some groups of learners, but inhibit learning of others. Although disordinal aptitude-treatment interactions were rarely identified over the years (although ordinal interactions have frequently been observed), the concept of disordinal interactions suggested that special education treatments must be qualitatively different in order to be valid. This has not proven to be the case—disordinal interactions have rarely been reported in education" (p.28).

"Over the past decade or so, we and our colleagues conducted 10 investigations of particular relevance to the "differential facilitation" issue. These studies, which included 1128 students, 283 of whom had special needs, employed multiple specialized intervention techniques, including peer tutoring with self-monitoring, explicit teaching, tiered activities with peer mediation, and mnemonic instruction, with and without peer mediation. In these studies, which were carried out in inclusive settings, effects were calculated for both general education and special education students. Most of these investigations were conducted over a period between 8 and 18 weeks duration. Although these are not exhaustive of inclusive content-area investigations, they nevertheless comprise a consistent and coherent subset of available research literature in this area. Across all studies, effect sizes were a substantial .63 for general education students, but a much larger 1.40 for students with special needs (Scruggs, 2012). Students with disabilities scored 1.03 standard deviations lower than general education students in control conditions, but in the experimental conditions, scored overall only .26 standard deviations lower.

Implementation issues These findings of differential effectiveness support the notion that, when students can profitably be included with general education classrooms, specialized instructional techniques, at least in some cases, can be expected to narrow the achievement gap between general education students and students with disabilities. Unfortunately, however, it is less likely that these techniques will be implemented in today's inclusive classrooms. In 1996, and more recently in 2011, we (Scruggs & Mastropieri, 1996; Scruggs, Leins, & Mastropieri, 2011) summarized all available survey research on teacher attitudes toward inclusion, and noted that teacher attitudes seemed to have changed very little over the years. While a majority of teachers supported at least some form of inclusion of students with disabilities, only small minorities agreed they had the time, training, or support needed to implement inclusion effectively. These findings suggest that teachers believe they lack the means to teach students with disabilities effectively in inclusive classes

Another discouraging finding on contemporary practice was reported by Scruggs, Mastropieri, and McDuffi e (2007). We integrated and summarized 32 qualitative investigations of co-teaching in inclusive classrooms. These studies included a total of 453 coteachers, 142 students, and 42 administrators, and employed procedures such as extended classroom observations with field notes, interviews, and examination of classroom products. **Although teachers reported generally favorable attitudes toward**

co-teaching, specialized instructional or learning strategies were almost never observed. Zigmond and Matta (2004) reported in their investigation of co-teachers: "none of what we saw would make it more likely that the students with disabilities in the class would master the material . . . We virtually never saw the special education teacher provide explicit strategic instruction to facilitate learning or memory of the content material" (p. 73)

Reviewing the findings of all 32 investigations, we concluded: Classroom instruction has generally continued as whole class and lecture driven, and special education co-teachers have generally attempted to fit within this model to deliver assistance to students in need. Practices known to be effective and frequently recommended—such as peer mediation, strategy instruction, mnemonics, study skills training, organizational skills training, hands-on curriculum materials, test-taking skills training, comprehension training, self-advocacy skills training, self-monitoring, or even general principles of effective instruction— were only rarely observed. (Scruggs, Mastropieri, & McDuffi e, 2007, p. 412)

Overall, it can be concluded that many specialized treatments exist that are particularly appropriate—and, at least in some cases, differentially effective—for students with disabilities. However, survey and observational data suggest reluctance on the part of general education teachers to implement these treatments. The reason for this is not known, but perhaps has to do with limited time, training, or support for general education teachers; or because of teacher reluctance to implement strategies perceived to be of particular utility for only a small number of students in the class. In either case, it will be important to increase the implementation of these techniques in general education classes in order to promote success in inclusive classrooms" (p.30-31)

Scruggs, T.E., & Mastropieri, M.A. (2015). What makes special education special? In B. Bateman, J.W. Lloyd, W., & M. Tankersley (Eds.). *Enduring issues in special education: Personal perspectives* (pp. 22-36). New York: Routledge.

"Attrition rates for Australian teachers are high, Many graduates leave the profession within the first five years. … While 97% of Australian teachers participate in professional development activities, they have an average of nine days of professional development activities each year. That is just over half of the number reported by teachers in other countries (15 days).

Dabrowski, A. (2016). Australian teachers get fewer training days than in other countries and turn to online courses for support. The Conversation, 14/3/2016. Retrieved from http://theconversation.com/australian-teachers-get-fewer-training-days-than-in-other-countries-and-turn-to-online-courses-for-support-55510
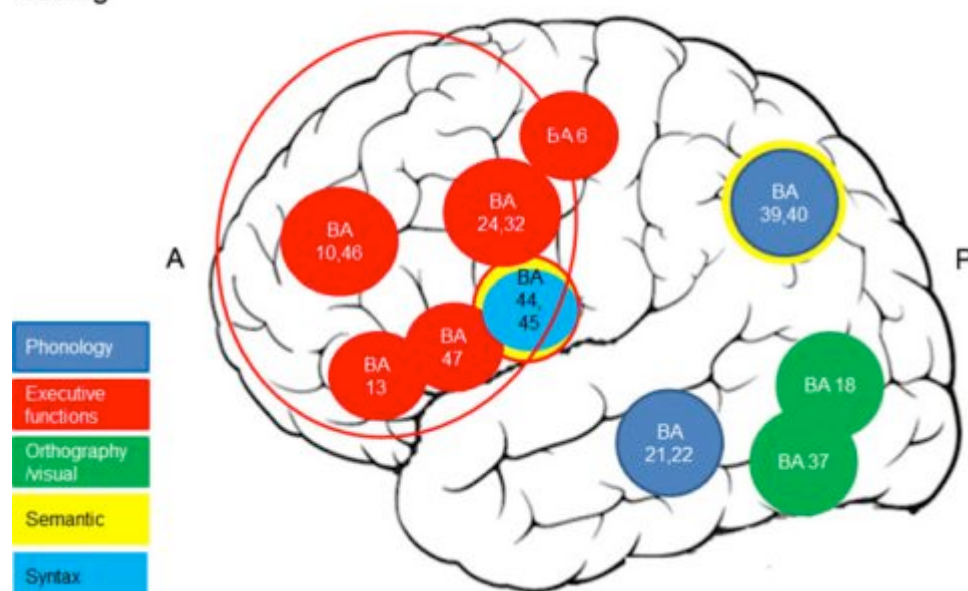

"The success of the Finnish educational system among the OECD countries is well-known. Besides top scorers, another indication of Finland's success in education is the small amount of variation across these high scores, both for students and for schools. For example, in the 2000 PISA study involving over 30 countries which emphasized reading, Finnish 15-year old students not only scored the highest scores in reading, but also the variation among their scores was the smallest" (p.158). … What is less known is that the performance of its low-achieving students (among them special education students and immigrants) is much higher than that in other OECD countries. The Finnish comprehensive basic education is one of the factors that may have played a role in the egalitarian and qualitative nature of Finnish education. An extended, multifaceted special education system, especially what is called part-time special education, functions as a mechanism of early intervention to play a key role in the comparatively high achievements of weak students (Finnish National Board of Education, 2008, Kivirauma & Ruoho, 2007). Teacher education and special teacher training also seem to fit effectively into the aims of excellence and equity (Sahlberg, 2006)" (p.164).

Anastasiou, D., & Keller, C. (2010). Special education in Finland: A system beyond the uniformity of a globalized ideal. Part of : *Επιστήμες Αγωγής, 3*, 155-167.

"Neuroimaging support for the PDP model is increasing, illustrating synchronous activation of brain regions related to phonology, orthography and semantics during reading (56). Major brain regions identified in the Shaywitz model of reading include the angular, fusiform and inferior frontal gyri for phonological, orthographic and semantic processing, respectively. The Shaywitz model echoed the PDP model by suggesting that there is no 'single' brain region dedicated for reading, but rather synchronisation of regions evolved for other functions, specifically in the left hemisphere (56). Broadly, 'reading areas' in the brain have been divided into a ventral pathway for orthographic processing (57) and a dorsal pathway for phonological processing (58)

Neural-circuits supporting reading

BA 6
BA 24,32
BA 10,46
BA 44, 45
BA 13
BA 47
BA 39,40
BA 21,22
BA 18
BA 37
A
P

Phonology
Executive functions
Orthography /Visual
Semantic
Syntax

A principal subregion of the ventral pathway shown to be active upon presentation of written words is a left occipitotemporal region including the fusiform gyrus (BA 37), often referred to as the 'visual word-form area' (59). The visual word-form area has been found to be active for words, more so for adults (59) than for children (46), raising the question of whether there are subgroups of neurons in this region that specialise in word recognition (46). Likely, a consequence of the greater effort required of beginning readers, children also recruit a wider array of brain areas to decode words, including the superior–medial frontal gyrus [BA 6; (57)], medial, superior and middle temporal gyri (BA 39, 22, 21, respectively), supramarginal gyrus (BA 39) and angular gyrus (BA 40) (60)

Reading longer passages – for example, aloud in a classroom – is more complex than single word reading and relies not only on neural circuits already described, but also additional cognitive mechanisms to achieve coherent understanding of the written material. This must be done rapidly and fairly automatically (i.e. fluently), focusing attention from decoding to comprehension and context (53). Reading fluency, a currently under-investigated domain in reading research, relies not only on technical elements of reading (phonology, orthography and semantics), but also on executive function (7,61). Maturing relatively late, executive function facilitates the decision to begin the reading process (initiation), pay attention to written stimuli and track it left to right (visual attention), process this information in a timely manner (speed of processing) and retain words in memory until the end of the sentence when meaning is extracted (i.e. working memory) (62). In their reading model, Laberge and Samuels suggested that if reading is not automatised (fluent) and attentional resources remain focused on decoding rather than understanding, then reading becomes slow (63)

Neuroanatomical data now supports this model. Utilising a functional magnetic resonance imaging (fMRI) task involving accelerated presentation of sentences compared to letters, fluent reading was found to be supported by executive function areas, including several key-brain regions in the frontal lobe [left inferior frontal (BA 44, 45) and superior frontal/sensorimotor gyri (BA 6)] in both adults (61) and 8–12-year-old children (64). Increased need for cognitive control and working memory via activation of frontal regions [dorsolateral prefrontal cortex (BA 10, 46)] attributed to resources required to search for meaning have also been observed during a phonological judgement task in children (65). Reading comprehension has

been shown to involve executive function, with increased activation in frontal cortices [inferior and superior frontal gyri (BA 45, 47)] contrasting meaningful versus nonmeaningful sentence reading in 9–14-year-old children (66). Interestingly, the authors demonstrated that nonmeaningful sentences induced greater frontal (inferior frontal gyrus) activation than did meaningful sentences, which may paradoxically indicate greater effort expended trying to understand sentences that do not make sense. Recently, we demonstrated that proficient reading in 17-year-olds is predicted by the activation of another region located in the frontal lobe [anterior cingulate cortex (BA 24)] at age 6 during a verbal fluency task (7). This may help explain the finding in children of greater utilisation of frontal lobe circuits [e.g. superior frontal gyrus (BA 10), medial frontal gyrus (BA 9), anterior cingulate gyrus (BA24)] during word reading compared to adults (57)

Reading comprehension assumes greater importance as children advance through school, where knowledge is regularly assessed by testing. The 'Construction–Integration' model was proposed to explain cognitive processing underlying contextual reading comprehension (67). The construction phase focuses on single-word decoding, during which semantic meaning occurs in a bottom-up, additive process. The integration phase entails the integration of words into sentences, paragraphs and stories, building on previous knowledge. Beginning readers are more prone to errors during the construction stage, while skilled readers are more prone to errors in the integration phase due to the more complex processes involved (68). Makuuchi and Friederici demonstrated neurobiological correlates to this, with complex syntactic processing associated with increased activation in the inferior frontal sulcus, which they described as a core region for syntactic working memory (69)

The inferior frontal gyrus has multiple roles in language processing, particularly in reading as demonstrated in Figure 3, and is part of the cingulo-opercular, top-down control network thought to be involved with task maintenance (see Fig. 4) (70). Fair et al (15) demonstrated the developmental trend in maturation of dual-control networks from 7 years of age to adulthood, concluding that the strength of functional connectivity between components increases with age. For the cingulo-opercular network, these components include the dorsal anterior cingulate cortex (BA 24, 32), anterior insula (BA 13) and inferior frontal gyrus (BA 44, 45). Considering the importance of the inferior frontal gyrus in reading, its integration into executive function networks, and the incomplete maturity of these networks during early grade school, a question arises as to the degree of reading comprehension accessible to 8-year-old third graders who are expected to read fluently

This problem is also highlighted by studies examining activation of the anterior cingulate cortex, another part of the cingulo-opercular network essential for error detection. Likely due to incomplete maturation of this part of the control network, children demonstrate decreased activation of the anterior cingulate cortex for word-reading errors compared to adults (71). These findings highlight the relatively higher demands of reading and lower capacity of executive function networks in children. Therefore, exposure to narrative comprehension at a younger age may help engage the cognitive control networks and keybrain regions in the frontal lobe, facilitating them for future reading as suggested by a recent study showing a positive association between activation in the superior frontal gyrus (BA 9) and measures of executive function in 3–6-year-old children during a narrative comprehension task (3)

Emergent literacy and reading are complex, nonintuitive processes, especially for young children with immature cognitive control networks. Not all children manage the transition and neurobiological adaptation that is required. **For those suffering from reading difficulties, literacy exposure, explicit instruction and special interventions as early as possible are crucial"** (p. 652-4).

Horowitz-Kraus, T., & Hutton, J.S. (2015). From emergent literacy to reading: How learning to read changes a child's brain. *Acta Pædiatrica, 104*, 648–656.

"In another line of research from our group we have been investigating the shift from a predominantly dorsal reading circuit to a predominantly ventral reading circuit associated with increased reading skill (B.

A. Shaywitz et al., 2002). For example, Katz et al. (2005) found evidence that this shift can happen on a relatively short time scale as skilled readers acquire greater familiarity for words via repetition. In this study, words that were repeated three times over the course of a scanning session were compared to unrepeated words in terms of both lexical decision and overt naming. Along with improved behavioral performance, many sites, including the LH IFG and SMG, supplementary motor area, and cerebellum, showed reduced activation for repeated relative to unrepeated tokens across tasks" (p.148).

"Altered Circuits in Impaired Word Reading
Studies of impaired word reading have also helped to refine understanding of the neurocircuitry for reading. Converging evidence from functional neuroimaging studies of single-word reading indicates that a primary neurobiological marker of reading disability (RD) is reduced activation of LH posterior regions, particularly the temporoparietal and OT regions, relative to nonimpaired readers during tasks that make demands on language and printed word processing (B. A. Shaywitz et al., 2002; Temple et al., 2003). In fact, research has shown a linear relationship between reading skill and activation of LH reading sites (B. A. Shaywitz et al., 2002; Turkeltaub, Gareau, Flowers, Zeffiro, & Eden, 2003)**.** Together with this failure to reliably engage LH temporoparietal and occipitotemporal regions, RD readers also tend to show heightened activation of right hemisphere (RH) posterior and bilateral frontal regions (see Pugh et al., 2000; Sarkari et al., 2002, for reviews). A number of explanations have been proposed for how the tendency to hyperengage these regions may serve to compensate for deficient linguistic processing in the LH including greater reliance on sight-word reading and/or increased involvement of higher level control processing" (p.149-150).

Landi, N., Frost, S.J., Mencl, W.E., Sandak, R., & Pugh, K.R. (2013). Neurobiological bases of reading comprehension: Insights from neuroimaging studies of word-level and text-level processing in skilled and impaired readers. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 29*(2), 145-167.

"It should be noted that besides reflecting a decreasing importance of serial sublexical word processing in favour of more parallel lexical processing, the developmental decrease in length effect could merely reflect an increase in efficiency of serial sublexical processing (Whitney & Cornelissen, 2005). There was indeed evidence in the data supportive of this idea: The length effect for nonwords was comparable for readers of all groups in the analysis using standardized processing times—the clear decrease in length effect for nonwords in the analysis using raw processing times is thus likely to be caused by such an increase in efficiency of serial sublexical processing. However, it is important to note that the two processes are not mutually exclusive: The increase in efficiency of serial sublexical recoding and the transition from predominant use of this sublexical reading strategy to predominant use of lexical word recognition are likely to develop in parallel" (p.232).
Rau, A.K., Moeller, K., & Landerl, K. (2014). The transition from sublexical to lexical processing in a consistent orthography: An eye-tracking study. *Scientific Studies of Reading, 18*(3), 224-233.

"In sum then, although the present study was not longitudinal, it nevertheless draws a clear picture about the development of orthographic and phonological marker effects in silent reading. The data show that phonological information not only plays an important role in early reading development (Bosman & de Groot, 1996) but continues to exert a stable effect throughout reading development. At the same time, orthographic development takes place, which manifests itself as an increase in the size of TL priming effects, which, in turn, is in line with the hypothesized development of coarse-grained orthographic coding as children become more skilled readers (Grainger, Lété, et al., 2012; Grainger & Ziegler, 2011). Finally, from a purely methodological perspective, the present work highlights how important it is to consider issues of measurement sensitivity, data normalization, and number of age groups when evaluating developmental trajectories" p.1033).

Ziegler, J.C., Bertrand, D., Bernard Lété, B., & Grainger, J. (2014). Orthographic and phonological contributions to reading development: Tracking developmental trajectories using masked priming. *Developmental Psychology, 50*(4), 1026–1036.

"We "hear" written words in our head. Sound may have been the original vehicle for language, but writing allows us to create and understand words without it. Yet new research shows that sound remains a critical element of reading. When people listen to speech, neural activity is correlated with each word's "sound envelope"—the fluctuation of the audio signal over time corresponds to the fluctuation of neural activity over time. In the new study, Lorenzo Magrassi, a neurosurgeon at the University of Pavia in Italy, and his colleagues made electrocorticographic (ECoG) recordings from 16 individuals. The researchers measured neural activity directly from the surface of the language-generating structure known as Broca's area as subjects read text silently or aloud. (This measurement was made possible by the fact that participants were undergoing brain surgery while awake.). Their neural activity was correlated with the sound envelope of the text they read, which was generated well before they spoke and even when they were not planning to speak, according to the report published in February in the Proceedings of the National Academy of Sciences USA. In other words, Broca's area responded to silent reading much in the same way auditory neurons respond to text spoken aloud—as if Broca's area was generating the sound of the words so the readers heard them internally. The finding speaks to a debate about whether words are encoded in the brain by a neural pattern symbolic of their meaning or if they are encoded via simpler attributes, such as how they sound. **The results add to mounting evidence that words are fundamentally processed and catalogued by their basic sounds and shapes.**
Sutherland, S. (2015). When we read, we recognize words as pictures and hear them spoken aloud. Scientific American: Mind, July 1, 2015. Retrieved from http://www.scientificamerican.com/article/when-we-read-we-recognize-words-as-pictures-and-hear-them-spoken-aloud/
Original study by Glezer, L.S., Kim, J., Rule, J., Jiang, X., & Riesenhuber, M. (2015). Adding words to the brain's visual dictionary: Novel word learning selectively sharpens orthographic representations in the VWFA. *Journal of Neuroscience. 35*(12), 4965-72.

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"We "hear" written words in our head. Sound may have been the original vehicle for language, but writing allows us to create and understand words without it. Yet new research shows that sound remains a critical element of reading. When people listen to speech, neural activity is correlated with each word's "sound envelope"—the fluctuation of the audio signal over time corresponds to the fluctuation of neural activity over time. In the new study, Lorenzo Magrassi, a neurosurgeon at the University of Pavia in Italy, and his colleagues made electrocorticographic (ECoG) recordings from 16 individuals. The researchers measured neural activity directly from the surface of the language-generating structure known as Broca's area as subjects read text silently or aloud. (This measurement was made possible by the fact that participants were undergoing brain surgery while awake.). Their neural activity was correlated with the sound envelope of the text they read, which was generated well before they spoke and even when they were not planning to speak, according to the report published in February in the Proceedings of the National Academy of Sciences USA. In other words, Broca's area responded to silent reading much in the same way auditory neurons respond to text spoken aloud—as if Broca's area was generating the sound of the words so the readers heard them internally. The finding speaks to a debate about whether words are encoded in the brain by a neural pattern symbolic of their meaning or if they are encoded via simpler attributes, such as how they sound. **The results add to mounting evidence that words are fundamentally processed and catalogued by their basic sounds and shapes.**
Sutherland, S. (2015). When we read, we recognize words as pictures and hear them spoken aloud. Scientific American: Mind, July 1, 2015. Retrieved from http://www.scientificamerican.com/article/when-we-read-we-recognize-words-as-pictures-and-hear-them-spoken-aloud/
Original study by Glezer, L.S., Kim, J., Rule, J., Jiang, X., & Riesenhuber, M. (2015). Adding words to the brain's visual dictionary: Novel word learning selectively sharpens orthographic representations in the VWFA. *Journal of Neuroscience. 35*(12), 4965-72.

"Good spelling and phonological skills interact to promote word learning (Ehri); good vocabulary knowledge promotes text comprehension and good text comprehension promotes vocabulary expansion (Perfetti & Stafura); prior knowledge enables good text comprehension and good text comprehension promotes learning from text (Compton et al.); our genes influence the environmental input that is necessary for successful learning of spelling, phonological, word reading, and comprehension skills (Olson et al.)" (p. 3).
Cain, K., & & Parilla, R. (2014). Introduction to the special issue. Theories of reading: What we have learned from two decades of scientific research. *Scientific Studies of Reading, 18*, 1

"Scholin and Burns (2012) found no links between preintervention level and postintervention growth on various reading tests, suggesting that risk status determined at pretest might not relate to responsiveness to intervention. In summary, **evidence indicates that reading interventions generally benefit all readers**, although research is needed investigating effects at a more long-term followup to test whether and how different readers respond to reading intervention" (p.78).

"Typical activities in reading comprehension interventions, involve reflection, prior knowledge, question generation, pictorial cues, identifying themes, inferential thinking, summarization, and story structure (Suggate, 2010)" (p.78).

"In conclusion, this meta-analysis extends our understanding of the effectiveness of reading interventions by providing a detailed analysis of the long-term effects. Indeed, in doing so, some surprising findings emerged, namely that phonemic awareness interventions appeared better than phonics, which is inconsistent with the phonological linkage hypothesis (Hatcher et al., 2004). Comprehension interventions, on the other hand, appeared particularly effective, as did **those given to older pupils**" (p.90).

"A key and unique finding from this meta-analysis is the **greater retention of intervention effect to follow-up for at-risk, low, and disabled readers in comparison to normal readers.** This finding is certainly encouraging for interventionists targeting struggling readers, suggesting that promising long-term effects are attainable. There was **no reliable indication that one-to-one interventions were associated with greater effect sizes**, perhaps calling into question whether Tier III students (similar to the reading

disabled category used here) are always best treated by one-to-one interventions (see also Scholin & Burns, 2012). Based on the current study, it would appear more important that students in need receive the appropriate services, with it being **less important if these are offered in individual or small-group settings"** (p.90).

Suggate, S.P. (2016). A meta-analysis of the long-term effects of phonemic awareness, phonics, fluency, and reading comprehension interventions. *Journal of Learning Disabilities, 49*(1) 77–96.

Dehaene (2009) makes a similar point "Every child is unique…but when it comes to reading, all have roughly the same brain that imposes the same constraints and the same learning sequence. Thus we cannot avoid a careful examination of the conclusions – not prescriptions – that cognitive neuroscience can bring to the field of education" (p. 218).

Dehaene, S. (2009). *Reading in the brain: The science and evolution of a human invention*. New York: Viking/Penguin.

"Given that only 4% of English words are totally irregular, there is tremendous value in teaching students to use a phonemic approach to spelling. At least 50% of English words can be encoded exactly as they sound, while another 34% have only one unpredictable letter (Moats, 2005). Even this high percentage increases if attention is given not only to single and double letters, but also to groups of letters that represent larger pronounceable units within the word. As indicated in the first section of this paper, these letter groups represent higher-order regularities within words that help with rapid word recognition and spelling (Dehaene, 2009). Murray and Steinen (2011) acknowledge the importance of identifying larger sound units than single phonemes within words, and have devised a system they call 'Word-Map-Ping'. It teaches children to break spoken words into their component sound units before looking at the spelling pattern in print. The children then map the sound units to the relevant letter groups" (p.6).

Westwood, P. (2015). Spelling: Do the eyes have it? *Australian Journal of Learning Difficulties, 20*(1), 3-13.

"Furthermore, the percentage of children with impaired reading comprehension skills was higher in the group of poor decoders (55%) than in the two other groups (average decoders: 7%; good decoders: 0%) and only 6 children (1.5%) had impaired reading comprehension skills with unimpaired decoding skills, listening comprehension or vocabulary. These results challenge the outcomes of studies on "poor comprehenders" by showing that, at least in first grade, poor reading comprehension is strongly linked to the level of decoding skills".

Gentaz, E., Sprenger-Charolles, L., & Theurel, A. (2015). Differences in the predictors of reading comprehension in first graders from low socio- economic status families with either good or poor decoding skills. PLoS ONE 10(3). e0119581. doi:10.1371/journal.pone.0119581

"Cognitive theory provides insights and methods to examine the ways that struggling readers process text and the extent to which they are able to create a coherent mental representation of the text. Drawing on these insights, we have undertaken a program of research to systematically identify these processes and determine how reader characteristics interact with text properties and instructional contexts, with the ultimate goal of identifying conditions under which struggling comprehenders are likely to benefit from intervention" (p.23). … "First, we have observed that many students who struggle with comprehension are able to make connections needed to generate coherent representations of text, but often require support to do so. Second, not all struggling readers experience comprehension difficulties in the same ways, and these differences may have instructional implications. Teachers should be aware of possible differences and be responsive to the needs of individual students. To address these two issues, teachers can provide support by explicitly directing students to attend to important, highly connected parts of the text they are reading, and by providing explicit feedback that is responsive to individual students' ways of processing text. We have conceptualized such support as a causal questioning approach that includes:
1 Brief preteaching of vocabulary and concepts that are critical to understanding the text.
2 Questions embedded in text that prompt the reader to make connections to the most important parts of what they have read so far, and explicit modeling of how to look back at the text to make good

connections. We use very specific "Why" or "How" questions; for example, "Why did Sammy decide to earn some money?"

3 Explicit feedback that is responsive to individual students. For example, a student who tends to paraphrase might say, "Because he needed some money," to which the teacher might respond, "You're on the right track, but why did Sammy need some money?" Or, a student who tends to elaborate might say, "Because he wanted to be really, really rich and then he'd be really, really happy," to which the teacher might respond, "That may be true, but what does the text say about why Sammy decided to earn some money?" (p.23-24).

McMaster, K.L., Espin, C.A., & van den Broek, P. (2014). Making connections: Linking cognitive psychology and intervention research to improve comprehension of struggling readers. *Learning Disabilities Research & Practice, 29*(1), 17–24.

"By definition, cohesive texts explicitly connect the text ideas for readers, while less cohesive texts require readers to form the connections on their own (Britton, Gulgoz, & Glynn, 1993). Other passage-level factors, such as decodability (Compton, Appleton, & Hosp, 2004), syntactic complexity (Gibson & Warren, 2004), and vocabulary (Freebody & Anderson, 1983) influence comprehension question accuracy and/or passage fluency, but relative to cohesion these constructs have received less attention in the literature" (p.25).

Amanda C. Miller, A.C., Davis, N., Gilbert, J.K, Cho, S-J., Toste, J.R., Street, J., & Cutting, L.E. (2014). Novel approaches to examine passage, student, and question effects on reading comprehension. *Learning Disabilities Research & Practice, 29*(1), 25–35.

"Test takers are provided with a specific purpose for reading (e.g., studying for a test, preparing for a class presentation, etc.) and a set of materials (e.g., websites, blogs, newspaper articles, Op Ed pieces, authoritative texts, etc.). Test takers progress through the materials in a structured, scaffolded way that enables them to: demonstrate different dimensions of comprehension (e.g., conceptual and social); learn, remember, and organize what they read; manage their learning through strategy use; and apply, synthesize, and extrapolate what they have learned to satisfy their original purpose for reading. The benefits of properly designed and implemented innovative task designs such as those used in GISA include increased construct relevant sources of variance, decreased construct irrelevant variance, alignment to theories and effective instruction, and improved examinee motivation and engagement (Mislevy & Sabatini, 2012)" (p.38).

Sabatini, J.P., O'Reilly, T., Halderman, L.K., & Bruce, K. (2014). Integrating scenario-based and component reading skill measures to understand the reading behavior of struggling readers. Learning Disabilities Research & Practice, 29(1), 36–43.

"This review suggests that teachers can have increased confidence in using computer-based concept maps to support social studies learning. Providing explicit instruction in using these tools to expand on concepts from reading, or as a study guide before quizzes (Boon et al., 2006b) may improve learning. Informational text comprehension is an essential component of the Common Core, and these enhancements could be a vehicle for comprehending content area text and locating textual evidence to complete a concept map for students with LD. Second, teachers served as interventionists for the majority of investigations for which promising effects were found. This variable suggests that using computer-based graphic organizers for high school social studies, and to assist students with planning ideas before writing in Grades 4–8, is feasible for classroom use. Finally, this systematic review identified **no evidence to suggest that students can use these tools to comprehend, improve writing, or acquire content without explicit instruction, guided practice, feedback to support learning,** and to use the software proficiently. These components of effective instruction for students with LD continue to maintain a prominent role in LD intervention research" (p.208).

Ciullo, S., & Reutebuch, C. (2013). Computer-based graphic organizers for students with LD: A systematic review of literature. *Learning Disabilities Research & Practice, 28*(4), 196–210.

"Abstract: The capacity of secondary school teachers to support general literacy and to teach discipline-specific literacy skills depends upon their personal literacy competence. Diagnostic testing of 203 secondary teaching undergraduates at one Australian university revealed deficiencies in personal literacy

competence that could affect their future teaching effectiveness. The sample of undergraduates was tested in spelling, vocabulary, and punctuation. Analysis of the results showed high rates of error on general spelling and vocabulary tasks. The degree of error in many cases was severe. For some undergraduates, the prospect of successful remediation so late in their academic career appeared poor. It is suggested that universities need to monitor admission standards and continue to invest in ongoing remediation" (p.111) … The teacher must display wide vocabulary knowledge, perceive and explain connections between words, spell correctly without notice, and compose clear sentences. There is enough evidence in the test results to suggest that many undergraduates in this Bachelor of Education course lack the personal literacy competence to perform those tasks to a professional standard. This is a concern, given the evident importance of language and literacy competence in ensuring effective teaching (p.126). … the raw evidence of student performance on spelling, vocabulary and writing tasks still suggests that some graduating teachers have literacy skills below the ability level of the students they will be hired to teach" (p.127).

Moon, B. (2014). The literacy skills of secondary teaching undergraduates: Results of diagnostic testing and a discussion of findings. *Australian Journal of Teacher Education, 39*(12), 111-130.

"In another line of research from our group we have been investigating the shift from a predominantly dorsal reading circuit to a predominantly ventral reading circuit associated with increased reading skill (B. A. Shaywitz et al., 2002). For example, Katz et al. (2005) found evidence that this shift can happen on a relatively short time scale as skilled readers acquire greater familiarity for words via repetition. In this study, words that were repeated three times over the course of a scanning session were compared to unrepeated words in terms of both lexical decision and overt naming. Along with improved behavioral performance, many sites, including the LH IFG and SMG, supplementary motor area, and cerebellum, showed reduced activation for repeated relative to unrepeated tokens across tasks" (p.148).

"Altered Circuits in Impaired Word Reading
Studies of impaired word reading have also helped to refine understanding of the neurocircuitry for reading. Converging evidence from functional neuroimaging studies of single-word reading indicates that a primary neurobiological marker of reading disability (RD) is reduced activation of LH posterior regions, particularly the temporoparietal and OT regions, relative to nonimpaired readers during tasks that make demands on language and printed word processing (B. A. Shaywitz et al., 2002; Temple et al., 2003). In fact, research has shown a linear relationship between reading skill and activation of LH reading sites (B. A. Shaywitz et al., 2002; Turkeltaub, Gareau, Flowers, Zeffiro, & Eden, 2003**). Together with this failure to reliably engage LH temporoparietal and occipitotemporal regions, RD readers also tend to show heightened activation of right hemisphere (RH) posterior and bilateral frontal regions (see Pugh et al., 2000; Sarkari et al., 2002, for reviews). A number of explanations have been proposed for how the tendency to hyperengage these regions may serve to compensate for deficient linguistic processing in the LH including greater reliance on sight-word reading and/or increased involvement of higher level control processing" (p.149-150**).

Landi, N., Frost, S.J., Mencl, W.E., Sandak, R., & Pugh, K.R. (2013). Neurobiological bases of reading comprehension: Insights From neuroimaging studies of word-level and text-level processing in skilled and impaired readers. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 29*(2), 145-167.

"Similarly, existing measures of reading comprehension differ considerably in the mix of skills that they assess (Cutting & Scarborough, 2006; Keenan, Betjemann, & Olson, 2008)."
Cutting, L.E., & Scarborough, H.S. (2006). Prediction of reading comprehension: Relative contributions of word recognition, language proficiency, and other cognitive skills can depend on how comprehension is measured. *Scientific Studies of Reading, 10*, 277–299.
Keenan, J.M., Betjemann, R.S., & Olson, R.K. (2008). Reading comprehension tests vary in the skills they assess: Differential dependence on decoding and oral comprehension. *Scientific Studies of Reading, 12*, 281–300.

Wagner, R. K., & Meros, D. (2010). Vocabulary and reading comprehension: Direct, indirect, and reciprocal influences. *Focus on Exceptional Children, 43*, 1-12.

"Beginning with the first grade sample, 4.73 of the sample, or 1669 students, were identified as being poor at reading comprehension. Of the 1669 students who were poor at reading comprehension, only 0.24% or 85, met the criterion of being adequate at decoding. This result supports the idea that that decoding is the primary stumbling block for beginning readers." (p.3)

Possible causes of comprehension difficulties include the following:
1. Decoding difficulties
2. Difficulties with meaning (vocabulary)
3. Difficulties with syntax
4. Limitations in working memory
5. Poor inference making
6. Inadequate comprehension monitoring
7. Limited prior domain knowledge
8. Insensitivity to text structure

Wagner, R. K., & Meros, D. (2010). Vocabulary and reading comprehension: Direct, indirect, and reciprocal influences. *Focus on Exceptional Children, 43*(1), 1-12.

"Participants in the study were first, second, and third graders, totaling nine cohorts and over 425,000 participants in all. The pattern of resultswas consistent across all cohorts: Less than 1 percent of first-through third-grade students who scored as poor in reading comprehension were adequate in both decoding and vocabulary. Although poor reading comprehension certainly qualifies as a major problem rather than a myth, the term specific reading comprehension disability is a misnomer: Individuals with problems in reading comprehension that are not attributable to poor word recognition have comprehension problems that are general to language comprehension rather than specific to reading" (p.3).
Spencer, M., Quinn, J.M., & Wagner, R.K. (2014). Specific reading comprehension disability: Major problem, myth, or misnomer? *Learning Disabilities Research & Practice*, *29*(1), 3–9.

"To summarize, reading instruction that includes explicit and systematic attention to phonics generally works better than instruction that does not. However, there is room for improvement in phonics programs. Improvement can occur by better preparing children to benefit from phonics instruction and by better preparing teachers to teach it" (p.15).
Treiman, R. (in press). Linguistics and reading. In Mark Aronoff and Janie Rees-Miller (eds.), *Blackwell handbook of linguistics*, (2nd ed). Oxford, England: Blackwell

" … lower level language mastery is as essential for the literacy teacher as anatomy is for the physician. It is our obligation to enable teachers to acquire it."
Moats, L.C. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of Dyslexia 44*, 81-102.

"Therefore, high genetic influence does not necessarily deny the potential for the success of intensive interventions focused directly on word recognition accuracy and fluency, be they school-wide or on reading disabilities (Byrne et al., 2010; Olson, Byrne, & Samuelson, 2009). On the other hand, the high shared-environment influence on vocabulary does not necessarily imply that it will be easy to broadly raise vocabulary in school-wide or targeted intervention programs. Vocabulary reflects the broad linguistic knowledge base that children have accumulated thus far, so short-term interventions that focus on learning specific words may have little effect on broad vocabulary against this background, though they may have a strong influence on reading comprehension within specific targeted domains. Still, the relatively strong influence of shared environment on vocabulary and its high shared environment correlation with reading comprehension suggest that vocabulary should be an important focus of environmental interventions for deficits in reading comprehension" (p.11).

Olson, R. K., Keenan, J. M., Byrne, B., Samuelsson, S., Coventry, W. L., Corley, R., Wadsworth, S.J., Willcutt, S.G., DeFries, J.C., Pennington, B.F., & Hulslander, J. (2007). Genetic and environmental influences on vocabulary and reading development. *Scientific Studies of Reading : The Official Journal of the Society for the Scientific Study of Reading*, 20(1-2), 51–75. NIH Public Access version (2012) retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3019615/

"Many people wish to read faster by finding a special form of reading in which they go more quickly with excellent comprehension, ideally without much effort or training. In this article, we have seen that there is no such magic bullet. There is a trade-off between speed and accuracy in reading, as there is in all forms of behavior. Increasing the speed with which you encounter words, therefore, has consequences for how well you understand and remember the text. In some scenarios, it is tolerable and even advisable to accept a decrease in comprehension in exchange for an increase in speed. This may occur, for example if you already know a lot about the material and you are skimming through it to seek a specific piece of information. In many other situations, however, it will be necessary slow down to a normal pace in order to achieve good comprehension. Moreover, you may need to reread parts of the text to ensure a proper understanding of what was written. Bear in mind, however, that a normal pace for most readers is 200 to 400 words per minute. This is faster than we normally gain information through listening, and pretty good for most purposes (p.66).

Rayner, K., Schotter, E. R., Masson, M. E. J., Potter, M. C., & Treiman, R. (2016). So much to read, so little time: How do we read, and can speed reading help? *Psychological Science in the Public Interest* 17(1), 4–34.

On average, by age 18, children and youth have spent about 10 percent of their lives in what we call schools, while spending around 90 percent of their lives in family and neighborhood.

Berliner, D. (2012). Effects of inequality and poverty vs. teachers and schooling on America's youth. *Teachers College Record, 116*(1), Retrieved from http://www.schoolsmatter.info/2012/10/david-berliner-on-inequality-poverty.html

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"Finally, we investigated the influence of the type of measurement instrument used to evaluate the interventions' effectiveness. We examined the differences between tests developed by the researcher himself, especially designed to estimate the intervention effect, and intervention-independent tests (including unstandardized as well as standardized tests), and also the difference in effect measured using standardized and unstandardized tests (including the self-developed tests). Both distinctions were relevant, but the latter explained by far the most variance in effect. In accordance with the findings of Chiu (1998), we found that standardized tests yielded a lower effect than unstandardized ones. This attribute explained the most variance of all attributes examined in this meta-analysis. The difference in effect supports Rosenshine's (1994) suggestion that **standardized tests are less sensitive in measuring intervention effects than other types of tests.** Standardized tests probably measure student performance in a broad sense and are not focused on task-specific student performances. The interventions included in this meta-analysis may have been focused on a relatively small domain and, therefore, did not improve student performance as much on standardized tests as on other tests" (p.535-6).

de Boer, H., Donker, A.S.,van der Werf, M.P.C. (2014). Effects of the attributes of educational interventions on students' academic performance: A meta-analysis. *Review of Educational Research, 84(4), 509–545.*

In a recent review based on 97 studies, Slavin, Lake, Davis, and Madden (2011) noted that very few long-term evaluations of phonics-based training have been carried out.

Slavin, R., Lake, C., Davis, S., & Madden, N. (2011). Effective programs for struggling readers: A best-evidence synthesis. *Educational Research Review*, 6, 1–26.

"Perfetti and Stafura (2014) extended the argument by stating that **word knowledge** based on good phonological quality plays a pivotal role in the development of reading comprehension. This view

highlights **the importance of vocabulary for reading development** as also suggested by an extensive longitudinal study (Verhoeven & van Leeuwe, 2011)" (p.453).

Perfetti, C., & Stafura, J. (2014). Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading*, *18*, 22–37.

Verhoeven, L., & van Leeuwe, J. (2011). Vocabulary growth and reading development across the elementary school years. *Scientific Studies of Reading, 15*, 8–25.

Kjeldsen, A-C., Kärnä, A., Niemi, P., Olofsson, Å., & Witting, K. (2014). Gains from training in phonological awareness in kindergarten predict reading comprehension in grade 9. *Scientific Studies of Reading, 18*(6), 452-467.

"The problem statement is significant in view of the evidence suggesting that, in the absence of proper intervention, those children who occupy the lowest ranks in terms of reading ability by the end of Grade 1 tend to remain in this relative position for the whole school career (de Jong & van der Leij, 2003; Juel, 1988; Landerl & Wimmer, 2008; Lundberg, 1994)" (p.453).

Kjeldsen, A-C., Kärnä, A., Niemi, P., Olofsson, Å., & Witting, K. (2014). Gains from training in phonological awareness in kindergarten predict reading comprehension in grade 9. *Scientific Studies of Reading, 18*(6), 452-467.

"The second hypothesis, which attempted to relate rapid naming performance (RAN) and reading, was not supported from our results. Contrary to our hypothesis, we did not find a unique connection between RAN and reading although several researchers have argued that RAN is a strong predictor of reading in orthographically consistent languages (Georgiou et al., 2008; Mann & Wimmer, 2002) and in non-alphabetic writing systems (Chow, McBride-Chang, & Burgess, 2005). However, this finding is consistent with studies reporting that rapid naming when assessed in kindergarten does not predict reading achievement in first grade, but in later grades (Puolakanaho et al., 2008)" (p.1714).

Papadimitriou, A.M., & Vlachos, F.M. (2014). Which specific skills developing during preschool years predict the reading performance in the first and second grade of primary school? *Early Child Development and Care, 184*(11), 1706-1722.

"Recent work documenting the classification accuracy of early literacy screening measures has shown that these measures have a tendency toward overprediction of at-risk readers, also known as false-positive risk classifications (Catts, Fey, Zhang, & Tomblin, 2001; Hintze et al., 2003; Jenkins & O'Connor, 2002; O'Connor & Jenkins, 1999; Torgesen, 2002). A false-positive risk classification indicates that a student has met the criteria for risk status but does not develop reading difficulties. These are students who would make adequate progress in the general curriculum. Assessments used to identify students for intensified instruction often have liberal cut-off scores for risk status (Catts et al., 2001; Johnson et al., 2009; O'Connor & Jenkins, 1999) in the hope of capturing every student who might develop difficulties, limiting false-negative risk classifications (309-310). … even the best balance between sensitivity and specificity in DIBELS subtests has shown less than ideal false-positive error rates. Waiting to screen children until later in kindergarten or first grade appears to more accurately identify students truly at risk, although valuable instructional time is lost when students could potentially be making gains on important reading skills. The addition of progress monitoring data after initial screening has shown promise in reducing false-positive rates; however, intervention is further delayed by waiting additional weeks for student response to the general curriculum (p.318).

McAlenney, A.L., & Coyne, M.D. (2011). Identifying at-risk students for early reading intervention: challenges and possible solutions. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 27*(4), 306-323.

"We compared 3 models of PD: the 1st model provided only seminars for the teachers, the 2nd model provided seminars and support for teachers' evaluations of their instruction, and the 3rd model included these 2 components as well as a literacy coach to support teachers' integration of new methods into their teaching. We used surveys and observations of practices to assess teachers' views of the PD program, their

knowledge about reading, and their instructional practices. **Results showed that the teachers in the most intensive 3-component model were distinguished from the teachers in the other 2 conditions primarily in the changes in their instructional practices across the year.** Results suggest that extensive support for teachers in their schools and classrooms is most likely to lead to changes in their practices that are responsive to current research on effective reading instruction for 1st graders" (p.212).

Carlisle, J.F, Cortina, K.S., & Katz, L.A. (2011). First-grade teachers' response to three models of professional development in reading. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 27*(3), 212-238.

"The teachers in this study who adhered more closely to the PD materials had a greater impact on student achievement than those who did not. The PD focused on evidence-based practices for vocabulary and comprehension instruction, as well as general effective instructional practices. Fidelity in our study was not exceptionally high, with an average of 4.7 on a scale of 1 to 10. The role of fidelity in the interpretation of findings and the importance of the teacher in maintaining fidelity to the treatment are critical in research (Hulleman & Cordray, 2009)" (p.254).

Hairrell, A., Rupley, W.H., Edmonds, M., Larsen, R., Simmons, D., Willson, V., Byrns, G., & Vaughn, S. (2011). Examining the impact of teacher quality on fourth-grade students' comprehension and content-area achievement. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 27*(3), 239-260.

Hulleman, C., & Cordray, D. S. (2009). Moving from the lab to the field: The role of **fidelity** and achieved relative intervention strength. *Journal of Research on Educational Effectiveness, 2*(1), 88–110.

"As Jimerson (2001) and others have found, when schools and districts try to improve student outcomes by using retention as an intervention for academic failure, academic performance does not improve. Results suggest that the intensity and duration of instruction received during the year in which a student is retained is too low to boost student outcomes into average ranges or accelerate learning"… Before kindergarten retention is considered, a plan needs to be created to massively strengthen literacy instruction in terms of both intensity and length of instruction. An instructional recommendation with regard to the kindergarten cohort is that 541 hr of quality research-based instruction over the kindergarten and first-grade school years appears to be less than sufficient to bring students at risk for retention into the average outcome range. Over an average of 360 days for two school years (180 days a year), that is 1.5 hr of daily literacy instruction" (p.22).

"Reaching 80 CWPM is commonly referred to as reaching automaticity, a reading stage that indicates that the student has moved well beyond the beginning reading stage into an independent reading stage" (p.21).

" … it appears that first-grade students who are at risk for retention need a minimum of 930 hr of quality research-based instruction over their first- and second-grade school years to bring their oral reading fluency scores within the average range. Over an average of 360 days for two school years (180 days a year), that is 2.58 hr of daily literacy instruction (mix of general education and SGI [systematic small-group intervention])".

Abbott, M., Wills, H., Greenwood, C.R., Kamps, D., Heitzman-Powell, L., & Selig, J. (2010). The combined effects of grade retention and targeted small-group intervention on students' literacy outcomes. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 4-25.

"The retention rate of 1st-grade students decreased by 47% after RTI was implemented. Data suggest student behavior, oral reading rates, and other individual school variables (as identified by principals) as possible factors contributing to the retention of students" (.

Murray, C.S., Woodruff, A.L., & Vaughn, S. (2010). First-grade student retention within a 3-tier reading framework. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 26-50.

"Stanovich's (1986) concept of Matthew effects in reading helps to explain both the results of the current study and Juel's findings. He explained that good readers continue to read and improve their reading skills

with repeated practice, whereas poor readers often read less and consequently have less practice and fewer opportunities for improvement" (p.61-2).

"This study's findings of higher eighth-grade reading achievement scores for the matched not-retained students compared to retained peers support the findings of Jimerson's (2001) meta-analysis. The majority of the studies reviewed found no significant differences in the academic achievement effect sizes of retained students and their comparable promoted peers, and the studies that did find significant differences found higher academic achievement in the matched comparison groups, not in the retained groups. In addition, Hong and Raudenbush (2005) found lower reading achievement in retained kindergartners than in the promoted comparison group 1 year after retention. Consequently, the current study's result is expected based on the results of previous studies" (p.60-61).

Griffith, C., Lloyd, J.W., Lane, K.L., & Tankersley, M. (2010). Grade retention of students during grades k–8 predicts reading achievement and progress during secondary schooling. *Reading & Writing Quarterly: Overcoming Learning Difficulties,26*(1), 51-66.

"There is some uncertainty in the literature regarding the timing, amount, and long-term effects of interventions implemented with birth-to-3 (Wasik & Karweit, 1993) and preschool (Karweit, 1993) age groups and in early elementary school settings (Coyne et al., 2004). Coyne and colleagues characterized the debate over lasting effects as a question of whether the interventions act as ''inoculation'' or ''insulin.'' **Do students who receive intensive early reading intervention indeed attain normal levels of reading competence and maintain these levels over time without continued intervention? Or do students who are at risk for poor academic outcomes require sustained support to maintain gains made during interventions**? A number of factors may contribute to students' progress following an intervention, including student variables (e.g., how students were identified as being at risk, their responses to the intervention) and instructional variables (e.g., timing, postintervention instruction; Coyne, 2001, as cited in Coyne et al., 2004) and the subsequent level of risk and support experienced by the student in family, school, and community contexts (Pianta & Walsh, 1996)" (p.73).

"Difficulty learning to read in the first few years of school sets students up to fail. These students are more likely to be retained and placed in special education, which are for many precursors or stop-offs on a path to premature departure from school. Furthermore, the effects of these early difficulties are magnified over time, with students falling further and further behind their peers academically and concomitantly experiencing reductions in motivation and engagement" (p.84).

Reschly, A.L. (2010). Reading and school completion: Critical connections and Matthew Effects. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 67-90.

"Post hoc analyses indicated that students in the treatment group who entered the study with higher decoding skills (TOWRE > 93) achieved larger gains in comprehension than those with lower decoding skills. The extent to which deficits in word reading interfere with reading comprehension for adolescent readers has been documented in a previous study conducted by Hock et al. (2009). These findings support the notion that secondary students with reading comprehension difficulties and lower decoding skills (TOWRE < 92) will continue to need instruction with word-study as component of intensive interventions" (p.111).

Solis, M., Vaughn, S., & Scammacca, N. (2015). The effects of an intensive reading intervention for ninth graders with very low reading comprehension. *Learning Disabilities Research & Practice, 30*(3), 104–113.

Fluency defined as ". . .development of automaticity in underlying sublexical processes, lexical processes, and their integration into single-word reading and connected text" (p. 219).

Wolf, M., & Katzir-Cohen, T. (2001). Reading fluency and its intervention. *Scientific Studies of Reading, 5*, 211–239.

"Participants in the study were first, second, and third graders, totaling nine cohorts and over 425,000 participants in all. The pattern of resultswas consistent across all cohorts: Less than 1 percent of first-through third-grade students who scored as poor in reading comprehension were adequate in both decoding and vocabulary. Although poor reading comprehension certainly qualifies as a major problem rather than a myth, the term specific reading comprehension disability is a misnomer: Individuals with problems in reading comprehension that are not attributable to poor word recognition have comprehension problems that are general to language comprehension rather than specific to reading" (p.3).

Spencer, M., Quinn, J.M., & Wagner, R.K. (2014). Specific reading comprehension disability: Major problem, myth, or misnomer? *Learning Disabilities Research & Practice*, *29*(1), 3–9.

Reading comprehension: "understanding, using, reflecting on and engaging with written texts, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society" (OECD, 1999, p. 22).

Organization for Economic Cooperation and Development (OECD). (1999). *Measuring student knowledge and skills: A new framework for assessment*. Paris: Author.

"Those students who fall behind in meeting grade level expectations, however, often fail to achieve proficiency in the underlying skills needed to read fluently. They may have localized pockets of expertise that enable them to perform some relatively advanced literacy tasks, but they cannot do so consistently (e.g., Walczyk, Marsiglia, Johns, & Bryan, 2004). At the same time, the complexity of text and task demands increases grade by grade, exacerbating the impact of underlying weaknesses. From an assessment perspective, it would be helpful to understand what kinds of complex literacy tasks a student can perform accurately and consistently, and those where performance breaks down. Those breakdowns may arise from at least two sources: lack of strategies or skills that may have been the target of the comprehension item design (e.g., analytic or evaluation skills) or inadequate component skills that facilitate performance (e.g., poor word recognition)." (p.37)

Sabatini, J.P., O'Reilly, T., Halderman, L.K., & Bruce, K. (2014). Integrating scenario-based and component reading skill measures to understand the reading behavior of struggling readers. *Learning Disabilities Research & Practice, 29*(1), 36–43.

"Although the kindergarten intervention was equally effective for both high-risk and low-risk students in the short term, itwas only for the high-risk students that end-of-kindergarten gains turned out to be of practical consequence. Because of these gains, high-risk students were able to benefit from the first-grade intervention and to have acquired, by the end of first grade, decoding skills comparable on average to those of their low-risk peers (see Table 1). By contrast, high-risk students who did not participate in the kindergarten intervention and began first grade with a limited knowledge of the alphabet struggled to master decoding, even when research-based instruction was provided in first grade. There were notably a much larger proportion of students who were not reading at the end of first grade (i.e., nonresponders) among those who had not participated in the kindergarten intervention" (p.93)

"Overall, our results support the relevance of introducing evidence-based reading instruction in kindergarten so that students start receiving it earlier than they traditionally have and for a longer period of time (by design, timing and length of intervention were confounded in this study). These results have import for the ongoing debate on what kindergarten is and should be (Vecchiotti, 2003)" (p.94)

Dion, E., Brodeur, M., Gosselin, C., Campeau, M-E., & Fuchs, D. (2010). Implementing research-based instruction to prevent reading problems among low-income students: Is earlier better? *Learning Disabilities Research & Practice, 25*, 87–96. doi:10.1111/j.1540-5826.2010.00306.x

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"In the 2005–2011 group of studies, the mean effect size for reading comprehension interventions reflected an average gain of nearly half a standard deviation when looking at all measures and about one fourth of a standard deviation on standardized measures. Reading comprehension instruction was included in nearly all of the multicomponent interventions. The research base continues to show that teaching reading

comprehension strategies to struggling readers in Grades 4 to 12 is beneficial" (p.386) " … the most current data show that reading interventions are effective both for struggling readers with LD and those not identified as having LD. No differences based on LD status were found when looking only at the 2005–2011 group of studies. Notably, most of the studies in the 2005–2011 group included both students with and without LD. Therefore, the most recent research suggests that all struggling readers benefit from intervention regardless of their diagnosed LD status" (p.386-7).

"The results presented in this report support the efficacy of reading interventions for struggling readers in Grades 4 to 12, though the magnitude of the effects obtained may be less than originally thought based on the results of Scammacca et al. (2007). More recent research on these interventions have included more rigorous measures of results that capture the extent to which the skills gained through the interventions generalize beyond the immediate context of the intervention. In addition, studies are providing more hours of intervention and increasingly these interventions are compared to an alternative intervention instead of a true no-intervention control group. As a result, smaller effects are observed. Despite these smaller effects, the more recently published interventions likely are more representative of the kind of intervention that struggling readers need. Reading difficulties that have perseverated past the primary school years likely do require many hours of intervention to remediate. Progress is likely to be slow but steady. Teachers are better positioned than researchers to provide longer term interventions" (p.387).

Scammacca, N., Roberts, G., Vaughn, S., & Stuebing, K. (2015). A meta-analysis of interventions for struggling readers in grades 4-12: 1980-2011. *Journal of Learning Disabilities, 48*(4), 369–390.

" … our findings are consistent with those of Bowers et al. (1999), who reported a deficit in orthographic pattern learning in their RAN deficit group. Bowers et al. (1999) interpreted their finding as supportive of the mechanistic account of the RAN–reading association provided by double deficit theory (e.g.,Wolf & Bowers, 1999), which predicts a specific difficulty in learning commonly occurring letter clusters" (p.203). "This study provided evidence of the enduring nature of RAN difficulties and the reading difficulties that accompany them, even in children with age-appropriate PA. Furthermore, there was evidence of a deficit in both word and subword-level orthographic knowledge in the low RAN group, at an age where, with transition to secondary school, independent reading skills become crucial for success across the curriculum, and where orthographic processes should come to dominate children's maturing reading systems" (p.204-5).

Powell, D., Stainthorp, R., & Stuart, M. (2014). Deficits in orthographic knowledge in children poor at rapid automatized naming (RAN) tasks? *Scientific Studies of Reading, 18*(3), 192-207.

"Successful intervention for reading disabilities depends on accurate assessment of a child's profile in terms of both accuracy and speed across all levels of reading, from the subword to connected text. Multicomponential intervention programs that target phonology as well as multiple levels of language show the greatest promise in improving reading fluency" (p.448).

Norton, E.S., & Wolf, M. (2012). Rapid automatized naming *(*RAN) and reading fluency*: Implications for understanding and treatment of reading disabilities. *Annual Review of Psychology, 63*, 427-52.

"Thus, contrary to one of the common claims for the superiority of discovery learning, their study demonstrated that far transfer did not depend on how children learned something, only that they learned it. Further investigations by Strand-Cary & Klahr (2008) have also bolstered the effectiveness of direct instruction compared with the discovery learning approach. These studies are particularly noteworthy because they show the superiority of direct instruction in a more complex domain and on transfer tasks, which differs from commonly held beliefs that direct instruction is only effective for rote skills and direct tests of knowledge" (p.451).

Lee, H. S., & Anderson, J. R. (2013). Student learning: What has instruction got to do with it? *Annual Review of Psychology, 64*, 445-469.

Duff et al. (2014) reported that in a range of studies " … interventions for children at family risk of dyslexia that are delivered before the onset of formal reading instruction tend to show short-term effects on phoneme awareness and letter knowledge. Though there are exceptions, these initial benefits seem not to transfer to higher level literacy skills" (p. 1235).

Duff, F. J., Hulme, C., Grainger, K., Hardwick, S.J., Miles, J., & Snowling, M. J. (2014). Reading and language intervention for children at risk of dyslexia: A randomised controlled trial. *Journal of Child Psychology and Psychiatry, 55*(11), 1234-43.

"This analysis showed that the intervention effect was lower when a standardized test was used for evaluation instead of an unstandardized test. Interventions implemented by assistants or researchers were more effective than those implemented by teachers or using computers. Cooperation had a negative, and session duration a positive, contribution. Together, these attributes explained 63.2% of the variance in effect, which stresses the importance of emphasizing not only the instructional focus of an intervention but also its other attributes" (p. 509).

de Boer, H., Donker, A.S., & van der Werf, M.P.C. (2014). Effects of the attributes of educational interventions on students' academic performance: A meta-analysis. *Review of Educational Research, 84*(4) 509–545.

"The results showed that letter naming was a unique predictor of word reading fluency, whereas picture naming was not. Conversely, picture naming speed contributed unique variance to reading comprehension, whereas letter naming did not" (p.303).

Poulsen, M., & Elbro, C. (2013). What's in a name depends on the type of name: The relationships between semantic and phonological access, reading fluency, and reading comprehension. *Scientific Studies of Reading, 17*, 303–314.

"In summary, we found modest and asymmetric support for the validity of the phonological/surface dyslexia distinction. The phonological subtype showed moderate longitudinal stability and was associated with differentially poor PA. The surface dyslexia subtype was fairly rare in this sample. Its longitudinal stability was not very good, and we found no evidence for a distinct cognitive profile. Furthermore, subtype was irrelevant to prognosis. Taken together, we think these results question whether that the subtype distinction is clinically meaningful or important, though further research is needed to more definitively answer this question. Key unanswered questions include whether the subtypes are associated with differing responses to specialized treatments and, most critically, whether those responses transfer to real-world literacy tasks" (p. 359-360).

Peterson, R.L., Pennington, B.F., Olson, R.K., & Wadsworth, S.J. (2014). Longitudinal stability of phonological and surface subtypes of developmental dyslexia. *Scientific Studies of Reading, 18*(5), 347-362.

"Examination of DDH subtypes did not support the core assumption of the DDH that the double-deficit subtype would have more impaired reading skills than both of the single-deficit subtypes. The NS deficit subtype was found to be more prevalent than the double-deficit and PA deficit subtypes within the subgroup of dyslexics with impairment in reading fluency" (.

Nelson, J.M. (2015). Examination of the double-deficit hypothesis with adolescents and young adults with dyslexia. *Annals of Dyslexia,* DOI 10.1007/s11881-015-0105-z

"Abstract There is growing interest in how perceptual factors such as the spacing between letters within words modulate performance in visual word recognition and reading aloud. Extra-large letter spacing can strongly improve the reading performance of dyslexic children, and a small increase with respect to the standard spacing seems beneficial even for skilled word recognition in adult readers. In the present study we examined the effect of decreased letter spacing on perceptual identification and lexical decision tasks.

Identification in the decreased spacing condition was slower than identification of normally spaced strings, thereby confirming that the reciprocal interference among letters located in close proximity (crowding) poses critical constraints on visual word processing. Importantly, the effect of spacing was not modulated by string length, suggesting that the locus of the spacing effect is at the level of letter detectors. Moreover, the processing of crowded letters was facilitated by top-down support from orthographic lexical representation as indicated by the fact that decreased spacing affected pseudowords significantly more than words. Conversely, in the lexical decision task only word responses were affected by the spacing manipulation. Overall, our findings support the hypothesis that increased crowding is particularly harmful for phonological decoding, thereby adversely affecting reading development in dyslexic children" (p.824).

Montani, V., Facoetti, A., & Zorzi, M. (2015). The effect of decreased interletter spacing on orthographic processing. *Psychonomic Bulletin & Review, 22*(3), 824-832. Retrieved from http://search.proquest.com/docview/1680765863?accountid=13552

"Our findings have general implications for educational policy, as they inform the debate about whether to include reading-related cognitive skills in the diagnosis of dyslexia (see Tannock, 2013). In dyslexia assessments it is common practice to review PA and RAN levels alongside literacy achievements. A group of 58 American scholars advocate the use of "processing weaknesses" in diagnosing dyslexia (Hale et al., 2010). In the Netherlands impairments in PA, RAN, or letter-sound integration is even a requirement for a diagnosis and government-funded treatment (Blomert, 2006). However, deficits in say PA or RAN are neither necessary nor sufficient for dyslexia (Pennington et al., 2012). The current study adds that familial reading difficulties are not totally accounted for by these underlying cognitive skills. The direct familial effect is not large at the group level but may be large for a particular child, who may well exhibit deficiencies in unmeasured cognitive processes. **Our results therefore challenge the notion that deficits in PA and/or RAN should be** *requirements* **for a dyslexia diagnosis**. This is not to say that specifying a child's cognitive profile serves no purpose.
First, in prereading children it can help identify children at high risk of developing dyslexia, especially if combined with letter knowledge and family-risk status (Heath et al., 2014; van Bergen, de Jong, et al., 2014). Second, deficits in cognitive correlates of reading give a diagnostician more confidence in a dyslexia diagnosis (Pennington et al., 2012). Lack of such deficits combined with very poor reading might request further investigation but ought not to prevent a diagnosis and access to treatment (de Jong, 2014). Third, cognitive profiles would be useful if we would have evidence that profile-specific treatments are most effective. Strong evidence for this is currently lacking; most interventions combine training of several components of the reading system (de Jong, 2014)" (p.12).

van Bergen, E., Bishop, D., van Zuijen, T., & de Jong, P.F. (2015). How does parental reading influence children's reading? A study of cognitive mediation. *Scientific Studies of Reading*, Published online: 03 Jun 2015. DOI: 10.1080/10888438.2015.1050103

"This paper reports a survey of primary school teachers' beliefs about working with poor readers. The primary research question was 'does the way difficulties with reading are labelled affect the teachers' beliefs about their ability to intervene effectively?' An opportunity sample of teachers was surveyed using 2 questionnaires. One examined teachers' efficacy beliefs. The second questionnaire assessed the extent to which teachers considered that difficulties with reading formed a clearly defined category with essentialist characteristics. There were two variants of both questionnaires. In variant A, the word 'dyslexia' was used. In variant B that term was replaced by the phrase 'reading difficulties'. The findings indicated that labels were associated with differences in teachers' efficacy beliefs. Responses to the 'dyslexia' variants suggested that teachers' sense of efficacy was associated with beliefs that dyslexia was an immutable phenomenon that yields viable inferences and that efficacy beliefs were not uniformly associated with experience. In contrast, the 'reading difficulty' items evoked responses that indicated that all aspects of teachers' efficacy beliefs about intervening were related to greater experience and only marginally related to essentialist beliefs about reading difficulties" (p.323).

Gibbs, S., & Elliott, J. (2015). The differential effects of labelling: How do 'dyslexia' and 'reading difficulties' affect teachers' beliefs. *European Journal of Special Needs Education, 30*(3), 323-337. DOI: 10.1080/08856257.2015.1022999

"These findings call for a need to combine biomarkers from genetic and neural domains to optimize potential diagnostic tools for developmental dyslexia. Future work will have to show if such a multimodal neurogenetic biomarker can be applied to predict the risk to be affected by dyslexia before school entry so that existing preschool intervention tools can be used more efficiently" (p.420).

Skeide, M.A., Kirsten, H., Kraft, I., Schaadt, G., Müller, B., Neef, N., Brauer, J., Wilcke, A., Emmrich, F., Boltze, J., & Friederici, A.D. (2015). Genetic dyslexia risk variant is related to neural connectivity patterns underlying phonological awareness in children. *Neuroimage, 118,* 414-421. doi: 10.1016/j.neuroimage [Epub ahead of print]

There is a gap between "w..aa..sss" and "woz" (*was*). This is a gap between the output from a phonological recoding of a word and its lexical pronunciation. We suggest that ease of recognition of words from spelling pronunciations (like "w..aa..sss") contributes independent variance to word decoding ability with both regularly and irregularly spelled words (p.341).

Elbro, C., de Jong, P.F., Houter, H., & Nielsen, A-M. (2012). From spelling pronunciation to lexical access: A second step in word decoding?,*Scientific Studies of Reading, 16*(4), 341-359.

"An approach that focuses on cognitive processes would involve assessment of actions of perception, memory, judgment, and reasoning (i.e., learning). As such, an approach to educational assessment and intervention that is purported to be based on cognitive processing is inherently appealing. Feifer's (2008) recommended measures all encompass cognition, as does all learning, but in their application, some are more proximal measures of achievement than others. Measures of cognitive functioning share a great degree of construct representation with measures of achievement (Naglieri & Rojahn, 2004; Rindermann, 2007), but are more distal measures of learning than are achievement tests which typically directly measure performance of the skill of interest

Some of the cognitive behaviors measured in neuropsychology tests are academic standards that are routinely taught in schools, which could suggest a fundamental distinction. phonemic/ phonological awareness and reading fluency, in addition to being core components of reading (National Institute of Child Health & Human Development, 2000), are foundations of the Common Core State Standards: English/ Language Arts (CCSS:ELA) standards for achievement and instruction at each grade level (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). Moreover, phonological/ phonemic awareness are different from other cognitive skills in that they require conscious awareness (Gillon, 2004), instruction and practice to establish the skill, and can respond well to direct intervention (National Institute of Child Health & Human Development, 2000). The rest of the categories are skills outside standards or curriculum (i.e., distal skills) and might be considered cognitive correlates of learning (Fletcher et al., 2011) or skills that may facilitate, inhibit, or mediate the intended learning, but are not the actual focus of instruction or learning

Another way of framing the proximal and distal nature of the various measures is by the degree of inference between the skill of interest (i.e., the intended target of instruction such as reading) and the skill measured. Indirect or distal measures contain a greater degree of inference between the individual's performance and the conclusions one can make about the skill of interest. This greater inference is associated with a greater amount of error in the measurement (Christ, 2008). A more distal nature for interventions has the effect of diluting effects or response, typically resulting in lower effect sizes (Bus, van IJzendoorn, & Pellegrini, 1995; Kim, Vaughn, Wanzek, & Wei, 2004)" (p. 8)

Burns, M. K., Petersen-Brown, S., Haegele, K., Rodriguez, M., Schmitt, B., Cooper, M. (2015). Meta-analysis of academic interventions derived from neuropsychological data. *School Psychology Quarterly.* Advance online publication. http://dx.doi.org/10.1037/spq0000117

"Many intervention researchers use direct skill-based measures of student performance such as curriculum-based measurement (CBM) to identify students who need assistance and to modify instruction (Burns, Christ, Boice, & Szadokierski, 2010). Some have suggested that psychometrically sound measures of cognitive abilities would predict student outcomes better than CBM (Hale, Kaufman, Naglieri, & Kavale, 2006), and that measures of cognitive functions can provide data useful for designing individualized interventions (Fiorello, Hale, & Snyder, 2006; Floyd, Evans, & McGrew, 2003; Hale, Fiorello, Bertin, & Sherman, 2003; Hale, Fiorello, Kavanagh, Hoeppner, & Gaither, 2001). The notion that cognitive function data are uniquely informative to an intervention process is not a new idea (Cronbach, 1957) and is reflected in past efforts to measure and demonstrate the unique benefit of cognitive function-aligned interventions, which largely showed no special benefit (Cronbach & Snow, 1977; Gresham & Witt, 1997). In fact, **one seminal meta-analysis reported weaker effect sizes on academic achievement outcomes for cognitive function-based strategies of intervention when compared to standard best-practice instructional strategies that could be applied without special cognitive assessment (Kavale & Forness, 2000).**

Recently, scholars have raised the notion that cognitive assessment might bring a previously undetected value-added to the development of individualized intensive interventions (Feifer, 2008; Fiorello et al., 2006; Hale et al., 2006). In 1987, Swanson suggested that new intervention models that used cognitive assessments were more likely to result in valid decisions because of the availability of more sophisticated and comprehensive models of cognition and corresponding measures than those used in previous intervention research. Others have suggested that recent advances in theories of intelligence may result in different findings than in previous research (Vanderwood, McGrew, Flanagan, & Keith, 2001)" (p. 2).

"The data resulted in a small effect ($g = 0.17$) for measures of cognitive functioning, but moderate effects of $g = 0.43$ and $g = 0.48$ for measures of reading fluency and phonemic/phonological awareness. There were few studies that examined measures of cognitive functioning within the intervention process. **Taken together with previous research, the data do not support the use of cognitive measures to develop interventions but instead favor more direct measures of academic skills (e.g., reading fluency) in a skill-by-treatment interaction. Implications for practice and future research are discussed" (p.1).**

Burns, M. K., Petersen-Brown, S., Haegele, K., Rodriguez, M., Schmitt, B., Cooper, M. (2015). Meta-analysis of academic interventions derived from neuropsychological data. *School Psychology Quarterly*. Advance online publication. http://dx.doi.org/10.1037/spq0000117

"The present synthesis extends the literature on the assessment of children with RD in three major ways. First, this meta-analysis showed that RD students have numerous cognitive lags in several areas compared to average reading students, and specifically identifies the areas in need of intervention. Those areas found specifically that contributed to understanding the differences between RD children and average readers were in phonological processing skills, including word attack, as well as cognitive and academic areas including spelling and vocabulary, verbal working memory, visual–spatial memory, executive processing, and short-term memory. Furthermore, while this and previous studies (e.g., Johnson, Humphrey, Mellard, Woods, & Swanson, 2010) found large ESs for processing speed (i.e., rapid naming) and math ability, our HLM analysis did not find processing speed or math ability to be predictors of the ES between children with and without RD. It should be noted, however, that processing speed and math ability are predictors of effect size between adults without and without RD (Swanson, 2012; Swanson & Hsieh, 2009). **These results suggest that understanding the differences between children with and without RD among children should not include processing speed or math ability, but that these areas should be included**

when studying adult populations. Future research is needed to examine the differential effects of processing speed and math ability on reading ability among children and adult populations.

Second, direct comparisons were made across studies in terms of variations in IQ and reading level. We found support for the notion that IQ was a valid component in the assessment of RD. Several researchers have suggested eliminating IQ from the classification of RD. Our results found that general IQ significantly moderated ES differences across a broad array of measures. That is, the HLM analysis showed that variations in reading did not partial out the influence of general IQ in predicting ES differences between children with and without RD. Further, we found variables in the cognitive and academic domains that there were significant moderators and independently predicted ESs between RD and NRD children after the influence of all other variables had been entered into the analysis. These results are consistent with assessment models emphasizing both IQ and various cognitive measures (i.e., verbal working memory, visual–spatial memory, executive processing, short-term memory, and perceptual motor skills) in the assessment of RD.

Finally, we found support for the notion that **problems in RD extend beyond a phonological core deficit.** Although initially the analyses found clear indications of weaknesses in comparative processing between RD and skilled readers on measures of phonological awareness (as well as pseudoword reading and spelling), our results did not maintain this significance upon closer examination. Instead the outcomes were also more in line with those studies indicating that other cognitive processes, independent of phonological awareness, are related to differences between RD and NRD children, such as those on memory span (Swanson & Jerman, 2007) that indicate cognitive processes contribute significant amounts of variance toward reading capability.

No doubt, the above finding creates a conceptual problem when one attempts to link RD in children to a specific or core phonological processing deficit. Perhaps one obvious means of reconciling this conceptual problem is to suggest that relationships among cognitive processes reflect ''bootstrapping effects'' (see Stanovich, 1986, p. 364, for an earlier discussion of this concept). As stated by Stanovich (1986), ''Many things that facilitate further growth in reading. . .general knowledge, vocabulary. . .are developed by reading itself'' (p. 364). Thus, due to the mutual facilitation between reading and cognitive processing, such interrelationships would be expected to increase with skill improvement. The implicit assumption is that the deficits in word recognition skills (e.g., phonological skills) underlie such bootstrapping effects. Another means of reconciling the phonological core issue is to suggest that high-order cognitive processing problems can exist in children with RD, independent of their specific problems in low-order processes, such as phonological processing. Children with RD may be viewed as having difficulty accessing high-level information (as reflected in their reading comprehension and vocabulary scores) and/or lower-order skills (phonological codes), or switching between the two levels of processing. Thus, one may speculate that the processing problems in children with RD reflect a system that fails to compensate for (or effectively coordinate) deficiencies in lower-order specialized processes. This lack of compensatory processing may be characterized by a processing system either not contributing enough information to a specialized system or failing to provide an adequate capacity of processing resources (i.e., because of verbal memory deficiencies), given that there are problems in a specialized system. Future research will have to focus on the interaction between higher and lower order processing during the act of reading to disentangle these issues'' (p.59).

Kudo, M., Lussier, C., & Swanson, H.L. (2015). Reading disabilities in children: A selective meta-analysis of the cognitive literature. *Research in Developmental Disabilities, 40*, 51–62.

[Humans have] an instinctive tendency to speak, [but no human] has an instinctive tendency to write. More than a century ago, Charles Darwin got it right: Language is a human instinct, but written language is not. Language is found in all societies, present and past. All languages are intricately complicated. Although languages change, they do not improve: English is no more complex than the languages of stone age tribes; Modern English is not an advance over Old English. All healthy children master their language without lessons or corrections. When children are thrown together without a usable language, they invent one of

their own. Compare all this with writing. Writing systems have been invented a small number of times in history. They originated only in a few complex civilizations, and they started off crude and slowly improved over the millennia. Until recently, most children never learned to read or write; even with today's universal education, many children struggle and fail. A group of children is no more likely to invent an alphabet than it is to invent the internal combustion engine. Children are wired for sound, but print is an optional accessory that must be painstakingly bolted on.

Pinker, S. (1997). Foreword to D. McGuinness, *Why our children can't read: And what we can do about it*. New York, Free Press.

"Together, these results are important, as they show that RAN– reading and RAN–spelling associations do **not simply reflect a general processing speed deficit** across stimulus types but, rather, reflect a more specific deficit. … This analysis provides some support for Pennington et al.'s hypothesis that **RAN is relatively less important than phonological factors in reading. In spelling, however, a somewhat different pattern was evident** for both digit RAN and pseudoword decoding, with strong effect sizes in both cases ($d' > 1$). These results suggest that alphanumeric RAN may be particularly strongly associated with attainment in spelling and, potentially, of comparable importance to phonological processing. Stronger associations between spelling and RAN than between reading and RAN have been reported by other teams (Bowers, 2001; Bowers, Sunseth, & Golden, 1999; Manis et al., 2000; Savage et al., 2005). Why might this be? One focus of current interest is the idea that the **additional impact of RAN on literacy may reflect its more specific role in orthographic processing** (Bowers et al., 1999; Manis et al., 2000). It may well be that the strong RAN– spelling link found here reflects such a process. Before drawing strong conclusions about the specificity of strong digit RAN effects in spelling, however, it may be necessary to explore the unique predictive validity of RAN for spelling after the variability associated with pseudoword *spelling* rather than pseudoword *reading* is considered. … Our third research question examined whether effects of short-term memory and working memory were evident for below-average readers and spellers compared to average readers and spellers. In the present study, **we were unable to find any reliable differences between average and below average readers on measures of short term memory (digit span forward) and working memory (digit span backward).** Much previous evidence has pointed to verbal memory limitations as a predictor of reading problems (e.g., Brady, 1991; Gathercole & Baddeley, 1993; Jorm, 1983). Notwithstanding this evidence, failure to find independent effects of verbal short-term memory and working memory span on the performance of older readers has also been reported in the literature (e.g., Cornwall, 1992; Pennington et al., 2001; Savage et al., 2005), and sometimes only weak effects have been found even in younger poor readers (e.g., Pennington et al., 2001). (p.409-410).

Savage, R.S., & Frederickson, N. (2006). Beyond phonology: What else is needed to describe the problems of below-average readers and spellers? *Journal of Learning Disabilities, 39*(5), 399-413.

"Explicit instruction that directs children's attention to the sound structure of oral language and to the connections between speech sounds and spellings assists children who have not grasped the alphabetic principle or who do not apply it productively when they encounter unfamiliar printed words" (p.6).

"Unless and until children have a basic awareness of the phonemic structure of language, asking them for the first sound in the word *boy*, or expecting them to understand that *cap* has three sounds while *camp* has four, is to little avail" (p.54).

"In conventional phonics programs, however, such awareness was generally taken for granted, and therein lies the force of the research on phonemic awareness" (p.55).

Snow, C.E., Burns, S., & Griffin, P. (Eds) (1998). *Preventing reading difficulties in young children.*
  Report of the National Research Council. pp 1-432. Washington, DC: National Academy Press.
  Retrieved from http://www.nap.edu/catalog/6023/preventing-reading-difficulties-in-young-children

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"Despite these potential contributions to reading assessment and instruction, there is controversy and uncertainty surrounding the nature and utility of different cognitive skills as predictors of reading growth or intervention response. In studies of reading intervention, there is disagreement on the unique contribution of cognitive skills and the utility of cognitive assessment, especially in relation to predicting or treating inadequate responders. Some argue that assessment of cognitive skills is critical in children who have not responded to intervention because such assessments permit instruction tailored to individual student needs (Decker, Hale, & Flanagan, 2013; Hale, Fiorello, & Thompson, 2010). For example, Decker et al. (2013) argued that the inclusion of cognitive assessments facilitates understanding of individual learning differences that directly affect the efficacy of academic interventions. In contrast, others observe the general lack of evidence that patterns of strengths and weaknesses in cognitive attributes interact with treatment outcomes (Fuchs, Hale, & Kearns, 2011; Kearns & Fuchs, 2013; Pashler, McDaniel, Rohrer, & Bjork, 2009). Kearns and Fuchs (2013) reported that although cognitively focused instruction is more effective than Tier I delivered by general education teachers, cognitively focused instruction was not more effective than rigorous academically focused instruction. Less controversial is the evidence that specific cognitive skills can serve as precursors and predict those at risk for reading failure (Scarborough, 1998) although there is disagreement and uncertainty about what variables are most predictive. The available evidence suggests that four cognitive constructs best predict at-risk status as well as intervention response (Fletcher, Lyon, Fuchs, & Barnes, 2007): phonological awareness, isolated or rapid letter naming, verbal working memory, and oral language/vocabulary. There is also emerging evidence that these same four skills best differentiate adequate and inadequate responders to instruction (Denton et al., 2013; Fletcher et al., 2011; Vellutino, Scanlon, Small, & Fanuele, 2006). However, there are conflicting data on which of these correlated language-based measures are the strongest predictors and under what circumstances inclusion of them in an assessment battery might be useful. These are important questions for designing parsimonious assessments and understanding underlying relations (p. 396-7).

Stuebing, K.K., Barth, A.E., Trahan, L.H., Reddy, R.R., Miciak, J., & Fletcher, J.M. (2015). Are child cognitive characteristics strong predictors of responses to intervention? A meta-analysis *Review of Educational Research,* September 1, 85, 395-429. Published online before print November 12, 2014, doi: 10.3102/0034654314555996.

"Abstract
The difficulties experienced by below-average readers in phonological decoding tasks are well documented. Recent research has suggested that additional deficits in perceptual–motor fluency, handedness, and memory may also exist among below-average readers. To evaluate these claims, average and below-average readers and spellers were compared on a range of phonological processing, verbal short-term and working memory, rapid naming, handedness, and perceptual–motor fluency tasks. Average and below-average readers were sampled in a comparable manner and were also comparable on age, gender, nonverbal ability, socioeconomic status, and ethnicity. Below-average readers and spellers performed lower than average readers and spellers on rhyme detection, pseudoword decoding, and rapid digit (but not picture) naming tasks, but showed **no differences in handedness tasks or on a range of other perceptual–motor tasks**" (p.399).
Savage, R.S., & Frederickson, N. (2006). Beyond phonology: What else is needed to describe the problems of below average readers and spellers? *Journal of Learning Disabilities, 39*, 5, 399–413.

" … some surprising findings emerged, namely that phonemic awareness interventions appeared better than phonics, which is inconsistent with the phonological linkage hypothesis (Hatcher et al., 2004). Comprehension interventions, on the other hand, appeared particularly effective, as did those given to older pupils… A key and unique finding from this meta-analysis is the greater retention of intervention effect to follow-up for at-risk, low, and disabled readers in comparison to normal readers. This findings is certainly encouraging for interventionists targeting struggling readers, suggesting that promising long-term effects are attainable. There was no reliable indication that one-to-one interventions were associated with greater effect sizes, perhaps calling into question whether Tier III students (similar to the reading disabled category used here) are always best treated by one-to-one interventions (see also Scholin & Burns, 2012). **Based on the current study, it would appear more important that students in need receive the**

appropriate services, with it being less important if these are offered in individual or small-group settings" (p.14).

Suggate, S. P. (2014). A meta-analysis of the long-term effects of phonemic awareness, phonics, fluency, and reading comprehension interventions. *Journal of Learning Disabilities*. doi:10.1177/0022219414528540

Abstract: Tools for assessing decoding skill in students attending elementary grades are of fundamental importance for guaranteeing an early identification of reading disabled students and reducing both the primary negative effects (on learning) and the secondary negative effects (on the development of the personality) of this disability. … Finally, it is found that speed and accuracy act as complementary effects in the measurement of decoding ability. On the basis of this last finding, the study introduces a new composite indicator aimed at determining the student's performance, which combines speed and accuracy in the measurement of decoding ability (p.176).

Morlini, I., Stella, G., & Scorza, M. (2015). Assessing decoding ability: The role of speed and accuracy and a new composite indicator to measure decoding skill in elementary grades. *Journal of Learning Disabilities, 48*(2) 176–195.

"The Good Behavior Game (GBG) is a classroom management strategy that uses an interdependent group-oriented contingency to promote prosocial behavior and decrease problem behavior. This meta-analysis synthesized single-case research (SCR) on the GBG across 21 studies, representing 1,580 students in pre-kindergarten through Grade 12. The TauU effect size across 137 phase contrasts was .82 with a confidence interval 95% CI = [0.78, 0.87], indicating a substantial reduction in problem behavior and an increase in prosocial behavior for participating students. Five potential moderators were examined: emotional and behavioral disorder (EBD) risk status, reinforcement frequency, target behaviors, GBG format, and grade level. Findings suggest that the GBG is most effective in reducing disruptive and off-task behaviors, and that students with or at risk for EBD benefit most from the intervention. Implications for research and practice are discussed".

Bowman-Perrott, L., Burke, M.D., Zaini, S., Zhang, N., & Vannest, K. (2015). Promoting Positive Behavior Using the Good Behavior Game: A Meta-Analysis of Single-Case Research *Journal of Positive Behavior Interventions, June 30, 2015 0: 1098300715592355v1-1098300715592355*

"Challenging behavior at school remains a concern for teachers and administrators. Thus classroom management practices to prevent challenging behavior are sorely needed. The Good Behavior Game (GBG) has been found to be useful to positively change student behavior. However, previous reviews of the GBG have not quantified effects, have not focused solely on school and classroom behaviors, and have not examined study features that facilitate greater outcomes. Twenty-two peer-reviewed journal articles were reviewed. Study data were analyzed using effect sizes, percent of nonoverlapping data, percent of all nonoverlapping data, and hierarchical linear modeling to determine intervention effectiveness as well as study features that facilitated greater outcomes. Findings suggested that (a) moderate to large effects were found on challenging behaviors and these effects were immediate; (b) the GBG was most commonly used for disruptive behavior, off-task behavior, aggression, talking out, and out-of-seat behaviors; (c) the GBG has been implemented primarily in general education elementary school settings; and (d) correct application of reward procedures are important for intervention effectiveness. Study limitations, implications for practice, and areas for future research are presented".

Flower, A., McKenna, J. W., Bunuan, R L., Muething, C.S., & Vega, R. (2014). Effects of the Good Behavior Game on challenging behaviors in school settings, *Review of Educational Research*, 84(4), 546-71. Retrieved from https://www.researchgate.net/publication/262919561_Effects_of_the_Good_Behavior_Game_on_Challenging_Behaviors_in_School_Settings

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"We conducted a meta-analysis of 28 studies comprising 39 samples to ask the question, "What is the magnitude of the association between various baseline child cognitive characteristics and response to

reading intervention?" Studies were located via literature searches, contact with researchers in the field, and review of references from the National Reading Panel Report. Eligible participant populations included at-risk elementary school children enrolled in the third grade or below. Effects were analyzed using a shifting unit of analysis approach within three statistical models: cognitive characteristics predicting growth curve slope (Model 1, mean r = .31), gain (Model 2, mean r = .21), or postintervention reading controlling for preintervention reading (Model 3, mean r = .15). Effects were homogeneous within each model when effects were aggregated within study. **The small size of the effects calls into question the practical significance and utility of using cognitive characteristics for prediction of response when baseline reading is available".**

Stuebing, K.K., Barth, A.E., Trahan, L.H., Reddy, R.R., Miciak, J., & Fletcher, J.M. Are child cognitive characteristics strong predictors of Responses to Intervention? A meta-analysis. *Review of Educational Research, November 12, 2014. DOI 0034654314555996*

"This article systematically reviews what is known empirically about the association between executive function and student achievement in both reading and math and critically assesses the evidence for a causal association between the two. Using meta-analytic techniques, the review finds that there is a moderate unconditional association between executive function and achievement that does not differ by executive function construct, age, or measurement type but finds no compelling evidence that a causal association between the two exists" (p..

Jacob, R., & Parkinson, J. (2015). The potential for school-based interventions that target executive function to improve academic achievement: A review. *Review of Educational Research, March 4, 2015,* DOI 0034654314561338.

"Estimates of value-added models that condition on school specific linear time trends and a variety of teacher-by-school, student, and school-by-year fixed effects suggest that, **on average, there is no causal relationship between school size and academic performance.** However, two subgroups of interest are significantly harmed by school size: socioeconomically disadvantaged students and students with learning disabilities. The largest effects are observed among students with learning disabilities: A 10-student increase in grade size is found to decrease their math and reading achievement by about 0.015 test-score standard deviations" (p.135).

Gershenson, S., & Langbein. L. (2015). The effect of primary school size on academic achievement. *Educational Evaluation and Policy Analysis*, 37(1S): 135S-155S. DOI:10.3102/0162373715576075. Retrieved from http://epa.sagepub.com/content/37/1_suppl/135S.full.pdf+html

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"Mortimore and Sammons (1987) found that teaching had 6 to 10 times as much impact on achievement as all other factors combined. Robert Marzano (2003) points to numerous studies demonstrating that **two teachers working with the same socioeconomic population can achieve starkly different results on the same test: in one class, 27 percent of students will pass; in another, 72 percent—a life-changing difference.** William Sanders, known for his "value-added" studies, found that just three years of effective teaching accounts on average for an improvement of 35 to 50 percentile points. That's in only three years. And the effects are enduring (Sanders & Horn, 1994). Eric Hanushek has found that five years of instruction from an above-average teacher could eliminate the achievement gap on some state assessments (Haycock, 2005). Indeed it has, and in entire districts (see Chapter 5 of Schmoker, 2001b). One recent study shows that the best teachers in a school have *six times as much impact* as the bottom third of teachers (Haycock & Huang, 2001). Researcher Allen Odden and his colleague conclude that "improved classroom instruction is the prime factor to produce student achievement gains" (Odden & Wallace, 2003, p. 64)".

Schmoker, M. (2006). *Results now: How we can achieve unprecedented improvements in teaching and learning*. Association for Supervision and Curriculum Development, Alexandria, VA.

"McCandliss's team used a brain mapping technique that allowed them to capture brain responses to the newly learned words that are literally faster than the blink of an eye. Remarkably, the researchers said, these very rapid brain responses to the newly learned words were influenced by how they were learned. Words learned through the letter-sound instruction elicited neural activity biased toward the left side of the

brain, which encompasses visual and language regions. In contrast, words learned via whole-word association showed activity biased toward right hemisphere processing" (p.1).

Wong, M. (2015). Stanford study on brain waves shows how different teaching methods affect reading development. Stanford Report, May 28, 2015. Retrieved from
http://news.stanford.edu/news/2015/may/reading-brain-phonics-052815.html

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"Overall, relative to approaches that promote memorization of the spelling patterns of entire words, sublexical phonics-based strategies yield superior reading acquisition outcomes according to behavioral cognitive psychology meta-analyses (e.g., Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001) and systematic investigations of curriculum effects (e.g., Ehri, Nunes, Stahl, & Willows, 2001)" (p.23). …
"Notably, we show that the footprints of instruction are evident well beyond training. The present findings underscore the role of selective attention to grapheme–phoneme mappings during training in reading expertise acquisition with implications not only for recognizing trained visual words but also for self-teaching of unfamiliar but decodable words" (p.32).

Yoncheva, Y.N., Wise, J., & McCandliss, B. (2015, June-July). Hemispheric specialization for visual words is shaped by attention to sublexical units during initial learning. *Brain and Language, 145-146*, 23-33.

"In 1847, Ignaz Semmelweis introduced a policy of handwashing at the Vienna Maternity Hospital to prevent medical students transferring disease from bodies in the morgue to patients on the wards. Although this policy considerably reduced mortality, it was not adopted in other hospitals. Semmelweis was an uncharismatic champion of progress, but there was also resistance from physicians who rejected the idea that diseases could be transmitted in such a way and concluded—in the face of the evidence—that handwashing could not possibly have any effect."

http://jama.jamanetwork.com/Mobile/article.aspx?articleID=2320322&utm_source=Silverchair%20Information%20Systems&utm_medium=email&utm_campaign=MASTER%3AJAMALatestIssueTOCNotification06%2F16%2F2015

"These results show that guided instruction is much more effective than unguided, facilitative instruction… the rejection of direct instruction is a classic case of an immature profession, one that lacks a solid scientific base and has less respect for evidence than for opinion and ideology" (p.258).
Hattie, J. (2011). Visible learning for teachers: Maximizing Impact on learning. Retrieved from
https://pragmaticreform.wordpress.com/2013/03/02/hattie/

"Direct Instruction has a bad name for the wrong reasons, especially when it is confused with didactic teaching, as the underlying principles of Direct Instruction place it among the most successful outcomes." (Attachment E, p.2)

"The messages of these meta-analyses on Direction Instruction underline the power of stating the learning intentions and success criteria, and then engaging students in moving towards these. The teacher needs to invite the students to learn, provide much deliberative practice and modeling, and provide appropriate feedback and multiple opportunities to learn. Students need opportunities for independent practice, and then there need to be opportunities to learn the skill or knowledge implicit in the learning intention in contexts other than those directly taught." (Hattie, 2009, p. 207)

Hattie, J. A.C. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London and New York: Routledge.

"For example, Direct Instruction (D I), a behaviorally oriented teaching procedure based on an explicit step-by-step strategy (ES=.93) is 6 ½ times more effective than the intuitively appealing modality - matched instruction that attempts to enhance learning by capitalizing on learning style differences (ES=.14). Students in special education taught with DI would be better off than 87% of students not receiving DI and would gain over 11 months credit on an achievement measure compared to about one month for modality-matched instruction." (p. 212)

Kavale, K.M. (2007). Quantitative research synthesis: Meta-analysis of research on meeting special education needs. In L. Florian (ed.), *The Sage handbook of special education* (pp. 207-221). London: Sage Publications. Retrieved from http://www.regent.edu/acad/schedu/pdfs/kavale_qualitative.pdf

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"Torgerson, Brooks, and Hall (2006), for example, agree that the key feature of analytic phonics approaches is the use of words sharing letters or letter clusters but without explicit reference to their sounds" (p.70).

Stasio, M., Savage, R., & Abrami, P.C. (2012). A followup study of the ABRACADABRA webbased literacy intervention in Grade 1. *Journal of Research in Reading, 35*(1), 69–86.

" … there has been a wide gap between research and practice in the field of education (Broekkamp & van Hout-Wolters, 2007; Hemsley-Brown & Sharp, 2003; Kennedy, 1997; Vanderlinde & van Braak, 2010). More than a decade ago, Mitchell (1999), among others, observed that most published research had little or no influence on classroom practices. Although a variety of initiatives have been taken in the past decade to disseminate educational research (e.g., Levin, 2011), empirical studies indicate that "school practitioners continue to make little use of research" (Dagenais et al., 2012, p. 285)" (p.2).

"Kennedy (1997) identified four hypotheses that were put forward as reasons for this failure:
'(a) The research itself is not sufficiently persuasive or authoritative; the quality of educational studies has not been high enough to provide compelling, unambiguous, or authoritative results to practitioners.
(b) The research has not been relevant to practice. It has not been sufficiently practical, it has not addressed teachers' questions, nor has it adequately acknowledged their constraints.
(c) Ideas from research have not been accessible to teachers. Findings have not been expressed in ways that are comprehensible to teachers.
(d) The education system itself is intractable and unable to change, or it is conversely inherently unstable, overly susceptible to fads, and consequently unable to engage in systematic change'. (p. 4)

"More than a decade later, most of these reasons still hinder the use of research in the field of education (Dagenais et al., 2012). For example, Ball (2012) has identified some similar reasons for the research-practice gap. First, research reports are inaccessible to many practitioners. Second, there is a lack of professional norms for practitioners to engage with research. Third, very few practitioners and policy makers carry out research. Fourth, educational researchers, policy makers, and practitioners seldom work in collaborative forums. Finally, research findings are rarely used to formulate new policies; they are rather used to support political decisions already made. These points raise serious concerns about the practical value of educational research. If this existing gap between research and practice continues to widen, critics such as Ball (2012) suspect that students will perish while educational researchers publish their findings" (p.3-4).

Anwaruddin, S. M. (2015). Teachers' engagement with educational research: Toward a conceptual framework for locally-based interpretive communities. *Education Policy Analysis Archives, 23*(40). Retrieved from http://dx.doi.org/10.14507/epaa.v23.1776

"The purpose of this study was to examine the trustworthiness of web sites claiming to disseminate evidence-based practices in the area of special education or related services. Of the 47 web sites identified, approximately 57% met the criteria for trust or trust with caution, and 43% were labeled do not trust. Implications for practice and future research are discussed" (p.).

Test, D.W., Kemp-Inman, A., Diegelmann, K., Hitt, S.B., & Bethune, L. (2015). Are online sources for identifying evidence-based practices trustworthy? An evaluation. *Exceptional Children, May 14, 2015* 0014402915585477

"Behavior-genetic research examines what is, not what could be. Although we did not find classroom effects as large as many expect, there is nothing in our data that is incompatible with the proposition that better instruction and better-prepared teaching staff will lead to higherlevels of literacy. But the data are

incompatible with the strident claims sometimes seen from journalists and echoed by politicians that much of the blame for poor literacy levels in some young children can be largely attributed to defective teaching. Not only do such claims fly in the face of evidence for substantial genetic influence on literacy development, but they are contradicted by the relatively modest classroom effect sizes that we have reported. To the degree that classroom effects are not due to teachers, the case for basing high-stakes decisions about teacher accountability on them must remain less secure. Future research should find ways to identify the components of classroom-based variance" (p.13-14).

Byrne, B., Coventry, W.L., Olson, R.K., Wadsworth, S.J., Samuelsson, S., Petrill, S.A., Willcutt, E.G., & Corley, R. (2010). "Teacher effects" in early literacy development: Evidence from a study of twins. *Journal of Educational Psychology, 102*(1), 32–42.

" … the substantial variability in children's reading and spelling skills is partly a product of variability in genetic endowment, which, for example, accounts for between 50 and 80% of individual differences at the end of first grade in the U.S., Australia, and Scandinavia (Byrne et al., 2006; Byrne et al., 2007; Petrill, Deater-Deckard, Thompson, DeThorne, & Schatschneider, 2006; Petrill et al., 2007). Other influences include practices in the home (Petrill, Deater-Deckard, Schatschneider, & Davis, 2005), socio-economic level and ethnicity (McCoach, O'Connell, Reis, & Levitt, 2006), and, in the case of reading fluency at least, peer influences within the classroom (Foorman, York, Santi, & Francis, 2008: see Papaioannou, Marsh, & Theodorakis, 2004 and Ryan, 2000, for a broader discussion of peer influences)" (p.2-3).

Byrne, B., Coventry, W.L., Olson, R.K., Wadsworth, S.J., Samuelsson, S., Petrill, S.A., Willcutt, E.G., & Corley, R. (2010). "Teacher effects" in early literacy development: Evidence from a study of twins. *Journal of Educational Psychology, 102*(1), 32–42.

"The long-entertained theory that LD could be measured psychometrically via an aptitude–achievement discrepancy has been soundly disputed as inadequate theory (Büttner & Hasselhorn, 2011) as well as empirically discredited (Aaron, 1997; Fletcher et al., 2002; cf. Johnson et al., 2010; Swanson, 2008)" (p.27).

Scanlon, D. (2013). Specific learning disability and its newest definition: Which is comprehensive? And which is insufficient? *Journal of Learning Disabilities, 46*(1) 26–33.

" … the idea that cognitive processes make SLD "qualitatively and functionally different from low achievement only " (Hale et al., 2010, p. 3) has not been established and would seem particularly challenging given the dimensional nature of the attributes of SLD and the lack of evidence for qualitative cognitive processing differences between adequate and inadequate responders (Fletcher et al., 2011; Vellutino et al., 2006). These present simulations suggest that a great deal of expense could be needed just to determine who is eligible for certain interventions and that much of that expense would be for naught as the methods yield far too many false positive cases to be cost effective" (p.20).

Stuebing, K.K., Fletcher, J.M., Branum-Martin, L., & Francis, D.J. (2012). Evaluation of the technical adequacy of three methods for identifying specific learning disabilities based on cognitive discrepancies. *School Psychology Review, 41*(1), 3–22.

"In the medical sphere there are well-established protocols that need to be adhered to prior to the introduction of any new drug or treatment. No such protocols apply in education, an area in which lives are also at stake (Dinham, 2014b)" (p.14).

Dinham, S. (2015). The worst of both worlds: How the U.S. and U.K. are influencing education in Australia. *Education Policy Analysis Archives, 23*(49). Retrieved from http://dx.doi.org/10.14507/epaa.v23.1865

"Piasta and colleagues (in press) compared the relationship between teacher knowledge of the abstract principles with student achievement growth in reading for two sets of teachers— those engaged in a year-long professional development effort and those in the control group. They found significant relationships between the abstract measures of knowledge of linguistic structures and principles of reading acquisition and gains in student achievement for teachers in the professional development group. These relationships were not significant for those in the control group. Findings from the Piasta et al. study suggest that when

teachers are able to situate their linguistic knowledge in the context of teaching, their engaged knowledge for teaching reading improves" (p 393).

Brownell, M.T.; Bishop, A.G.; Gersten, R.; Klinger, J. K.; Penfield, R. D.; Dimino, J.; Haager, D.; Menon, S.; Sindelar, P. T. (2009). The role of domain expertise in special education teacher quality. *Exceptional Children, 75*(4), 391–411.

Piasta, S. B., Connor, C. M., Fishman, B., & Morrison, F. J. (2009). Teachers' knowledge of literacy, classroom practices, and student reading growth. *Scientific Studies of Reading, 13*(3), 224–248.

"The aim of improving ITE is to give beginning teachers better skills to increase student learning. Currently, teachers feel underprepared for the realities of teaching because they often do not graduate with the necessary content knowledge and pedagogical skills. The challenge is to develop the mix of reforms so all actors in the system are working together to achieve this objective" (p.4).

Roberts-Hull, K., Jensen, B., & Cooper, S. (2015). *A new approach: Teacher education reform*. Learning First, Melbourne, Australia. Retrieved from www.learningfirst.org.au/s/A-new-approach.pdf

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"Taken together, the above studies show that writing is an active encoding mechanism that can accelerate the process of establishing and refining the representation of orthographic patterns. Writing strengthens the connection between orthography and phonology due to the extra attention and memory resources involved during writing. Writing also boosts the understanding of phonological structure because it forces the breakdown of a word into smaller phonological units" (p.1-2).

Frenck-Mestre, C., & Longcamp, M. (2014). *The neural network of reading: Does writing help the brain accommodate for linguistic diversity?* Brain and Language Research Institute Research Grant, France-Canada Research Fund. Retrieved from http://www.blri.fr/pages/Projets/The%20neural%20network%20of%20readingMLCFM%20(2).pdf.

"Good ideas are not adopted automatically. They must be driven into practice with courageous patience."--Hyman Rickover

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"Leveraging What Works is deceptively simple. It offers grants totaling $100 million nationwide to school districts willing to use the grant, along with a portion of its formula funds -- such as Title I and IDEA -- to adopt proven programs that meet the "strong" or "moderate" level of evidence of effectiveness as defined in EDGAR".

Slavin, R. (2015). Leveraging What Works. Huffington Post. http://www.huffingtonpost.com/robert-e-slavin/leveraging-what-works_b_6712132.html

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"Our findings show that universal screening at the beginning of kindergarten can identify children at risk for RD with an acceptable level of accuracy. … Results indicated that a screening battery containing measures of letter naming fluency, phonological awareness, rapid naming or nonword repetition accurately identified good and poor readers at the end of first grade. Findings also showed that children's response to supplemental and/or classroom instruction measured in terms of growth in letter naming fluency added significantly to the prediction of reading outcomes".

Catts, H.W., Nielsen, D.C., Bridges, M.S., Liu, Y.S., &Bontempo, D.E. (2015). Early identification of reading disabilities within an RTI framework. *Journal of Learning Disabilities, 48*(3), 281-97.

" … according to the Matthew Effects theory, literacy skills build upon each other in a snowballing fashion and children who start out with stronger initial foundational reading skills will build their abilities at a faster rate. This underscores the importance of providing young children with high-quality early literacy experiences and offering early identification and intervention services to children who may be at-risk of later reading failure. Indeed, early intervention programs such as Head Start were designed to narrow the achievement gap by exposing very young children from disadvantaged communities to high-quality early literacy and language experiences in order to help them develop the foundational skills necessary to their future reading achievement" (p. 2).

Cunningham, A.E. & Chen, Y. (2014). Matthew Effects: the rich get richer in literacy. *Encyclopedia of Language Development*, Thousand Oaks, CA SAGE Publications, Inc.

The Santiago Declaration https://www.jsmf.org/santiagodeclaration/

The principles enunciated are based primarily on findings from social and behavioral research, not brain research. Neuroscientific research, at this stage in its development, does not offer scientific guidelines for policy, practice, or parenting.

•As internationally recognized scientists in child development, we applaud the attention now directed to the world's youngest citizens, but we also urge that policies, standards, curricula, and to the extent possible, commercial ventures be based on the best scientific research and be sensitive to evidence-based practice.

The present study used a variant of masked priming to track the development of 2 marker effects of orthographic and phonological processing from Grade 1 through Grade 5 in a cross-sectional study. Pseudohomophone (PsH) priming served as a marker for phonological processing, whereas transposed letter (TL) priming was a marker for coarse-grained orthographic processing. The results revealed a clear developmental picture. First, the PsH priming effect was significant and remained stable across development, suggesting that **phonology not only plays an important role in early reading development but continues to exert a robust influence throughout reading development.** This finding challenges the view that more advanced readers should rely less on phonological information than younger readers. Second, the TL priming effect increased monotonically with grade level and reading age, which suggests greater reliance on coarse-grained orthographic coding as children become better readers. Thus, TL priming effects seem to be a good marker effect for children's ability to use coarse-grained orthographic coding to speed up direct lexical access in alphabetic languages. The results were predicted by the dual-route model of orthographic processing, which suggests that **direct orthographic access is achieved through coarse-grained orthographic coding that tolerates some degree of flexibility in letter order.**

Ziegler, J. C., Bertrand, D., Lété, B., & Grainger, J. (2014). Orthographic and phonological contributions to reading development: Tracking developmental trajectories using masked priming. *Developmental Psychology, 50*(4), 1026-1036.

Abstract This study examined, in 180 children aged from 6 to 9 years, to what extent irregular word reading and spelling were predicted by vocabulary knowledge, reading frequency, orthographic processing and nonword reading skill. Consistent with models of reading highlighting the quasi-regular nature of irregular words, it was found that nonword reading was a large and significant predictor of irregular word reading even when entered into a regression analysis after all of the other variables. However, irregular word spelling was equally well predicted by orthographic and nonword reading skills. The results are discussed in relation tomodels of word reading and reading development.

Conclusions In conclusion, this study has shown that of the measures that have been identified in previous research as contributing towards irregular word reading, nonword reading and orthographic processing skills were more powerful predictors than vocabulary knowledge and reading frequency. Phonological reading skill (i.e., nonword reading ability) was found to be a particularly powerful predictor of irregular word reading, accounting for a substantial amount of variance over and above that accounted for by orthographic processing skill. The important role found for phonological recoding skill in this study is consistent with models of reading, which highlight the quasi-regular nature of irregular words (e.g., connectionist models of word reading). However, irregular word spelling was well predicted by both orthographic processing skills and nonword reading skill, suggesting that higher-quality lexical representations, in addition to phonological recoding skills, are important for spelling irregular words.

McGeown, S. P., Johnston, R. S., & Moxon, G. E. (2014). Towards an understanding of how children read and spell irregular words: The role of nonword and orthographic processing skills. *Journal of Research in Reading, 37*, 51-64. doi:10.1111/jrir.12007.

"This longitudinal randomized-control trial investigated the effectiveness of scientifically based reading instruction for students with IQs ranging from 40 to 80, including students with intellectual disability (ID). Students were randomly assigned into treatment (n - 76) and contrast (n = 65) groups. Students in the treatment group received intervention instruction daily in small groups of 1 to 4 for approximately 40 to 50

min for 1 to 4 academic years. On average, students in the treatment group made significantly greater progress than students in the contrast condition on nearly all language and literacy measures. Results demonstrate the ability of students with low IQs, including students with mild to moderate ID, to learn basic reading skills when provided appropriate, comprehensive reading instruction for an extended period of time" (p.287).

Allor, J. H., Mathes, P. G., Roberts, J. K., Cheatham, J. P., & Al Otaiba, S. (2014). Is scientifically based reading instruction effective for students with below-average IQs? *Exceptional Children, 80*(3), 287-306.

Curriculum-based measures (CBMs) represent one approach in widespread use to teachers' need for time-efficient reading assessment that is technically adequate and provides information useful for formative decision making. CBMs are quick and easily administered and have been shown to be a valid and reliable indicator of overall reading ability (Deno, 1985; Reschly, Busch, Betts, Deno, & Long, 2009; Wayman, Wallace, Wiley, Ticha, & Espin, 2007). The original CBM for reading has developed several pseudonyms, including CBM-R, Passage Reading Fluency (PRF), and Oral Reading Fluency (ORF). It consists of the student reading aloud from a passage of connected text for 1 minute while the examiner records the number of words read correctly in 1 minute (Hosp, Hosp, & Howell, 2007) (p.60)

Thornblad and Christ (this issue) collected daily OPR performance from 40 second- grade students for 6 weeks to examine the quality of trend estimates. Consistent with prior research, they found that the trend estimates were more reliable, valid, and precise as the number of data points increased. However, even after 6 weeks of monitoring, the quality of the estimates was only marginal. This reinforces the notion that for higher-stakes decisions, an increased number of data points are necessary to provide increasingly reliable, valid, and precise estimates of trend.61 First, fluency is defined as accurate and automatic word reading. A student being fluid with word reading has been argued as vital to skilled reading because rather than having to expend cognitive effort or resources on the mechanics of accessing the text, the reader can focus his or her resources on constructing meaning from the text and relating it to his or her corpus of prior knowledge (LaBerge & Samuels, 1974). This definition is largely represented in the research and development of OPR (and other approaches to CBM that are all based on the premise of automatic production of basic skills as an indicator of general ability). In part, this is because accuracy and rate (representing automaticity) are readily observable and measurable. Facility of measurement provides an instrument with greater utility and social validity because it will be transparent to teachers and not take much time from instruction. Second, fluency is defined as prosody. Prosody is considered the "expression" with which a student reads text and generally includes pacing, phrasing, inflection, and intonation (Hudson, Pullen, Lane, & Torgesen, 2009). This is best represented by the definition incorporated by the National Assessment of Educational Progress operationalized as a four-point fluency rating (Daane, Campbell, Grigg, Goodman, & Oranje, 2005). Third, fluency is defined as skilled reading. This might be considered the broadest definition because it encompasses being able to decode and comprehend simultaneously, as well as using proper expression, while reading with accuracy and sufficient speed (Samuels, 2006). Given all these components, it would require a multiconstruct focus in assessment, whether that was included within an omnibus reading measure with many specific subtests or an aggregation of multiple measures of the different subskills into a composite score. Fourth, fluency is defined as the bridge from word reading to comprehension. In a sense, it represents LaBerge and Samuels' (1974) concept of automaticity as a means to facilitating comprehension through shifting effort and attention. However, it also includes the reciprocal nature of the relation between word reading and comprehension by recognizing that comprehension can also facilitate word reading (Klauda & Guthrie, 2008). 62-3 The oldest and most common way to differentiate levels of understanding of comprehension is through the terms *literal* and *inferential* (Davis, 1944, 1968). The most basic definition of *literal comprehension* refers to readers' ability to understand information explicitly stated in the text, whereas *inferential comprehension* refers to the reader's ability to understand information that is not stated explicitly in the text but requires some level of reasoning and thinking (Davis, 1968). 64 Mitchell and Begeny illustrate that an intervention designed to increase fluent reading does so but also has ancillary effects on word-level reading and passage comprehension while not improving phonetic decoding (a subword-level skill)".(P.66)

Hosp, J. L., & Suchey, N. (2014). Reading assessment: Reading fluency, reading fluently, and comprehension-commentary on the special topic. *School Psychology Review, 43*(1), 59-68.

Lemons, C. J., Kearns, D. M., & Davidson, K. A. (2014). Data-based individualization in reading: Intensifying interventions for students with significant reading disabilities. *Teaching Exceptional Children, 46*(4), 20-29

The problem that current English teachers have with attaining the level of grammatical subject knowledge outlined above has arisen for two reasons: first, the fall from favour of grammar teaching in Anglophone countries following the Dartmouth Conference in the USA in 1966, due to the widespread view that the formal teaching of grammar had no beneficial impact on students' linguistic facility (Hudson and Walmsley, 2005); second, the tendency in the UK for teachers to follow a literature degree route into teaching, along with is a shortage of applicants from a linguistics route (Shortis and Blake, 2010). As a result, many current English teachers were not taught grammar at school or university, a point also noted in the US context by Kolln and Hancock (2005), and by Gordon in New Zealand (2005). Of course, teachers who have literature degrees and are keen readers themselves do have a lot of knowledge about texts that they can draw on in language teaching, and they also have a substantial amount of implicit grammatical knowledge about texts. However, as Andrews (2005) points out, it is likely that 'a teacher with a rich knowledge of grammatical constructions and a more general awareness of the forms and varieties of the language will be in a better position to help young writers' (2005: 75)

This subject knowledge problem extends into initial teacher training courses, with Kolln and Hancock (2005) complaining that most pre-service programs for English teachers in the USA do not address grammatical knowledge, and a number of UK studies reporting weaknesses in grammatical knowledge (Andrews, 1994, 1999; Bloor, 1986; Burgess et al., 2000; Chandler et al., 1988; Hislam and Cajkler, 2006; Williamson and Hardman, 1995; Wray, 1993). In Australia, Louden et al. (2005) conducted a survey which indicated that teachers do not feel confident about teaching grammar when they complete their training, and Harper and Rennie's pre-service teachers (2009) 'showed limited understandings in their ability to analyse the parts and structure of sentences, and their knowledge of metalinguistic terms did not seem to extend past the basic concepts of "noun", "verb" and "adjective" ' (2009: 27). However, studies in the UK and Australia have indicated that some teachers may be over-critical or over-anxious in their self-evaluations, with Cajkler and Hislam (2002) finding that primary trainee teachers in the UK had reasonable knowledge of grammar despite being anxious about their subject knowledge, and Hammond and Macken-Horarik finding that primary teachers in Australia were confident in their knowledge of genres and text types despite expressing a lack of confidence in their own knowledge of 'rules of traditional grammar' (2001: 125). At the same time, in England, there has been criticism of the accuracy or appropriacy of curriculum materials prepared to support teaching grammar (Cajkler, 1999, 2002, 2004; Cameron, 1997).51-2

Myhill, D., & Watson, A. (2014). The role of grammar in the writing curriculum: A review of the literature. *Child Language Teaching and Therapy, 30*(1), 41-62.

"Despite data supporting the benefits of early reading interventions, there has been little evaluation of the long-term educational impact of these interventions, with most follow-up studies lasting less than 2 years (Suggate, 2010). This study evaluated reading outcomes more than a decade after the completion of an 8-month reading intervention using a randomized design with 2nd and 3rd graders selected on the basis of poor word-level skills (Blachman et al., 2004). Fifty-eight (84%) of the original 69 participants took part in the study. The treatment group demonstrated a moderate to small effect size advantage on reading and spelling measures over the comparison group. There were statistically significant differences with moderate effect sizes between treatment and comparison groups on standardized measures of word recognition (i.e., Woodcock Basic Skills Cluster, $d = 0.53$; Woodcock Word Identification, d _ 0.62), the primary, but not exclusive, focus of the intervention. Statistical tests on other reading and spelling measures did not reach thresholds for statistical significance. Patterns in the data related to other educational outcomes, such as high school completion, favored the treatment participants, although differences were not significant" (p.46).

Blachman, B. A., Schatschneider, C., Fletcher, J. M., Murray, M. S., Munger, K. A., & Vaughn, M. G. (2014). Intensive reading remediation in grade 2 or 3: Are there effects a decade later? *Journal of Educational Psychology, 106*(1), 46-57.

"This qualitative study assessed overall parent and teacher satisfaction with Direct Instruction reading for students having low incidence disabilities at an approved, private-licensed school for exceptional children in the Commonwealth of Pennsylvania. Results of four parent and four teacher interviews coupled with document analysis disclosed inadequate teacher training in Direct Instruction methodologies, an incomplete understanding of Direct Instruction on the part of the parents interviewed, and high rates of teacher and parent satisfaction with Direct Instruction methodology for teaching reading. Secondary findings included teacher infidelity to the Direct Instruction methodology and inadequate communication concerning reading instruction between school and parents. Recommendations for enhancing the teachers' and parents' experience of Direct Instruction are offered based upon the findings."

Kanfush, P. M. (2014). Dishing direct instruction: Teachers and parents tell all! *The Qualitative Report, 19*(1), 1-13

Messier, J., & Jackson, C. W. (2014). A comparison of phonemic and phonological awareness in educators working with children who are d/deaf or hard of hearing. *American Annals of the Deaf, 158*(5), 522-38.

Abstract (summary) "This experimental study evaluated a model in which the delivery of a supplemental beginning reading intervention was adjusted based on student performance. Kindergarten students identified as at risk for reading difficulties were assigned to one of two versions of the Early Reading Intervention (ERI; Pearson/Scott Foresman, 2004). Students assigned to the experimental condition received the intervention with systematic adjustments based on student performance. Students in the comparison condition received the same intervention without instructional modifications. The experimental group outperformed the comparison group on all posttest measures at the end of kindergarten. Follow-up analyses at the end of first grade revealed a continued advantage for the experimental group. Findings suggest that systematically adjusting intervention support in response to student performance may be feasible and efficacious" (p.25).
Coyne, M. D., Simmons, D. C., Hagan-Burke, S., Simmons, L. E., Kwok, O., Kim, M., . . . Rawlinson, D. (2013). Adjusting beginning reading intervention based on student performance: An experimental evaluation. *Exceptional Children, 80*(1), 25-44.

"Little is known about the relationships between phonological processing, language, and reading in children with intellectual disability (ID). We examined the structure of phonological processing in 294 school-age children with mild ID and the relationships between its components and expressive and receptive language and reading skills using structural equation modeling. Phonological processing consisted of two distinct but correlated latent abilities: phonological awareness and naming speed. Phonological awareness had strong relationships with expressive and receptive language and reading skills. Naming speed had moderate relationships with these variables. Results suggest that children with ID bring the same skills to the task of learning to read as children with typical development, highlighting the fact that phonologically based reading instruction should be considered a viable approach" (p.365).

Barker, R. M., Sevcik, R. A., Morris, R. D., & Romski, M. (2013). A model of phonological processing, language, and reading for students with mild intellectual disability. *American Journal on Intellectual and Developmental Disabilities, 118*(5), 365-80.

Abstract: "Reading is a complex process, drawing on a variety of brain functions in order to link symbols to words and concepts. The three major brain areas linked to reading and phonological analysis include the left temporoparietal region, the left occipitotemporal region and the inferior frontal gyrus. Decreased activation of the left posterior language system in dyslexia is well documented but there is relatively limited attention given to the role of the right hemisphere. The current study investigated differences in right and left hemisphere activation between individuals with dyslexia and non-impaired readers in lexical decision tasks (regular words, irregular words, pseudowords) during functional Magnetic Resonance Imaging (fMRI). Results revealed the expected hypo-activation in the left posterior areas in those with dyslexia but also areas of overactivation in the right hemisphere. During pseudoword decisions, for

example, adults with dyslexia showed more right inferior occipital gyrus activation than controls. In general the increased activation of left-hemisphere language areas found in response to both regular and pseudowords was absent in dyslexics. Laterality indices showed that while controls showed left lateralised activation of the temporal lobe during lexical decision making, dyslexic readers showed right activation. Findings will inform theories of reading and will have implications for the design of reading interventions" (p.1060).

Waldie, K. E., Haigh, C. E., Badzakova-Trajkov, G., Buckley, J., & Kirk, I. J. (2013). Reading the wrong way with the right hemisphere. *Brain Sciences, 3*(3), 1060-1075.

First, we believe that DI is a viable, time-tested instructional model that plays an important role in a comprehensive educational program. The research indicates its usefulness in maintaining time on task, the learning of skilled performance, and high rates of success when designed correctly (e.g., Fisher et al., 1980; Slavin, Madden, Dolan, & Wasik, 1996)

Magliaro, S. G., Lockee, B. B., & Burton, J. K. (2005). Direct instruction revisited: A key model for instructional technology. *Educational Technology, Research and Development, 53*(4), 41-55.

" … when the research is taken as a whole - when the pertinent studies and the interventions they describe are considered with regard to their content, quality, and results - we conclude that it does not support the use of cognitively focused instruction at this time" (p.263).
"A belief in the efficacy of skills-based instruction seems well founded. When implemented with fidelity, carefully scripted programs in reading, writing, and math - often involving learning strategies similar to DI - have been shown to benefit numerous at-risk students (e.g., Graham ÒC Perin, 2007; Kroesbergen & Van Luit, 2003; Stuebing, Barth, Cirino, Francis, & Fletcher, 2008)" (p.263).

Kearns, D. M., & Fuchs, D. (2013). Does cognitively focused instruction improve the academic performance of low-achieving students? *Exceptional Children, 79*(3), 263-290.

"There are currently few studies exploring prevalence rates of different specific learning difficulties in young offenders. However, specific reading difficulties, such as dyslexia, appear significantly more common in young people who offend, with research studies suggesting a prevalence of between 43 and 57%, compared to around 10% of the general population" (p. 9).

Hughes, N., Williams, H., Chitsabesan, P., Davies, R., & Mounce, L. (2012). *Nobody made the connection: The prevalence of neurodisability in young people who offend.* The Office of the Children's Commissioner. Retrieved from www.childrenscommissioner.gov.uk

"The multisensory principle that is so valued by experienced clinicians has not yet been isolated in controlled, comparison studies of reading instruction, but most programs that work do include multisensory practice for symbol learning. Instructional approaches that are effective use direct, explicit teaching of letter-sound relationships, syllable patterns, and meaningful word parts, and provide a great deal of successful practice of skills that have been taught" (p.2).

Henry, M. (no date). Multisensory structured language teaching. International Dyslexia Association (IDA). Retrieved from http://www.interdys.org/FactSheets.htm

First, *it is difficult to use one assessment system to create both educator performance metrics and measures of student achievement.* To mitigate incentives for coaching, incentive systems should employ assessments that vary in both format and item content. Separate no-stakes assessments provide more reliable information about student achievement because they create no incentives for educators to take hidden actions that contaminate student test scores.

Neal, D. (2011). *The design of performance pay in education.* Working Paper 16710. Cambridge, MA: National Bureau of Economic Research. Retrievable from http://www.nber.org/papers/w16710

"The results revealed that phonics instruction is not only the most frequently investigated treatment approach, but also the only approach whose efficacy on reading and spelling performance in children and adolescents with reading disabilities is statistically confirmed. The mean effect sizes of the remaining treatment approaches did not reach statistical significance" (p.1).

Galuschka, K., Ise, E., Krick, K., & Schulte-Korne, G. (2014) Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials. *PLoS ONE 9*(2), 1-12. e89900. doi:10.1371/journal.pone.0089900

"The idea that neuroscience research might provide guidance for teachers sounds promising. However, as with any new and aspiring research field, educational neuroscience has suffered to some extent from over-optimism and wishful thinking. A huge demand for improving educational practice has been a fertile ground for misconceptions around the question of how neuroscience can be applied to education. Speculative educational applications have emerged in the name of neuroscience (p.136) … In contrast with some of the ideas behind the whole language approach, reading is therefore not innate; brain regions that have evolved for tasks such as object (not letter) recognition, or understanding spoken (not printed) language, need to be combined to form a new skill. Reading is, after all, an acquired human ability that emerged only after the cultural invention of the alphabet" (p.138).

Weigmann, K. (2013). Educating the brain. *EMBO Reports, 14*(2), 136-9. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3566840/

"Three complementary sources of evidence suggest that words are the units of reading. First, eye movements during fluent reading are made mostly by making saccades from one word to the next. Second, the reading time of a single word is relatively independent of the number of letters. Third, a single letter may be more easily detected in brief presentations when embedded in a word. A possible inference of these findings is that education should be organized to teach children to read entire words instead of focusing in letter-by-letter identification. This procedure, usually termed holistic reading, led to concrete implementations that turned out to be a major pedagogical fiasco. As it turns out, the neuroscience of visual learning could actually have predicted this failure. The development of literacy is a case of pop-out learning, a process by which, after extensive practice, one can identify a specific set of shapes in cluttered fields very rapidly and with a subjective feeling of automaticity and lack of effort. For non-readers, reading is a slow, effortful and serial process that becomes automatic after many hours of training. What sort of transformation elicits this type of learning in the brain and what material is optimal for this learning process?

Constitutive elements of shapes are represented by pools of neurons encoding basic traits (strokes) that recombine to form new elements of intermediate complexity, which are subsequently recombined to encode more complex objects69. This notion was incorporated into a model of neural codes for written words, based on a hierarchy of increasingly complex neuronal detectors, from individual letters to bigrams and morphemes. Only specific patterns that conform cer¬tain letters from strokes (as opposed to other patterns with similar regularities, but which do not occur in the alphabet) are trained by visual experience64. The hypothesis was that this process relies on the same learning mechanisms that carve a cortical circuitry for grouping contours and segmenting textures, namely the assembling of object statistical regularities in the visual world62. This hypothesis was tested by measuring brain responses to visual strings that pro¬gressively disrupt the 'natural statistics' of the alphabet at different scales: JZWYZK (infrequent letters), QOADTM (frequent letters), QUMBST (frequent bigrams) and AVONIL (frequent quadrigrams). Results showed a gradient of selectivity spanning the left occipito-temporal cortex, with increasing selectivity for higher level stimuli toward the anterior fusiform region70.

The importance of this finding for education is that even after extensive practice with reading, words are still represented by their constitutive components. This process goes all the way to what appears to be the constitutive elements of all alphabets, that is, oriented elements or strokes. For this reason, one aspect that may impair fluent reading is the inability to parse words into letters. In agreement with this prediction, the remarkably simple intervention of increasing letter spacing substantially improves text reading in some kinds of dyslexic children71. An additional piece of evidence required to bring these data together is that visual crowding, the inability to identify objects in clutter, is more severe in dyslexic children, making it hard to parse letters from continuous words" (p.500).

Sigman, M., Peña, M., Goldin, A.P., & Ribeiro, S. (2014). Neuroscience and education: Prime time to build the bridge. *Nature Neuroscience, 17*(4), 497-502.

"The findings indicate that students with a greater number of classmates with disabilities have higher externalizing and internalizing behavioral problems and lower frequencies of self-control, approaches to learning, and interpersonal skills." (p.20).

Gottfried, M. A. (2014). Classmates with disabilities and students' noncognitive outcomes. *Educational Evaluation and Policy Analysis*, *36*, 20-43. (available online here: http://epa.sagepub.com/content/36/1/20.full.pdf+html)

" … (TOWRE) US norms overestimate reading performance in the early years" (p. 5).

Marinus, E., Kohnen, K., & McArthur, G. (2013). Australian comparison data for the test of word reading efficiency (TOWRE). *Australian Journal of Learning Difficulties*, DOI: 10.1080/19404158.2013.852981

"The countries that are the strongest performers in PISA are not the wealthiest, nor do they allocate more money to education."

OECD. (2013). PISA 2012 Results in Focus. Retrieved from www.oecd.org/pisa/keyfindings/pisa-2012-results-overview.pdf

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"The researchers followed the children to ages 7 and 11, when children take further national tests. The estimated impacts of the free education at age 7 were very small, and by age 11 they had disappeared entirely. … The authors suggest a couple of reasons why their research finds differently. Free child classes are now often in private, voluntary and independent settings, which may be of poorer quality. Alternatively, primary schools have changed and improved since the late 1990s, and so preschool experience may now matter."

Best Evidence in Brief. (2014). Johns Hopkins School of Education's Center for Research and Reform in Education. Retrieved from http://campaign.r20.constantcontact.com/render?ca=1c14509e-7bf6-43ee-a380-63a835316596&c=642d58b0-438d-11e3-ab5e-d4ae52733bf0&ch=65ef2cf0-438d-11e3-ac12-d4ae52733bf0

"With regard to reading classical print media, time spent reading **narrative texts or books** was the most influential predictor for the development of **reading comprehension and vocabulary**. Furthermore, the relationship between time spent reading narrative texts and reading comprehension as well as vocabulary remained significantly positive even after controlling for several covariates or third variables, including prior achievement level. Therefore, although any statements on causality are only preliminary, it seems highly plausible that reading fiction books positively influences the development of reading achievement. This result is consistent with the prevalent literature, especially the meta-analytic findings reported by Mol and Bus (2011) who found relatively strong correlations between measures of print exposure (ART, TRT) and reading achievement. Contrary to reading narrative texts, however, the amount of reading of **newspapers and magazines, comics, and nonfiction books** was of only minor importance for the development of reading comprehension and vocabulary. It seems that narrative texts, possibly due to their language specifics (Gehrer & Artelt, 2013; Graesser, McNamara, & Louwerse, 2003), provide different, unique learning conditions not found in reading newspaper, comics, and nonfiction books. Therefore, our results once more confirm the exceptional status narrative texts have for the development of students' reading competencies (cf., Anderson et al., 1988; Spear-Swerling et al., 2010). Nevertheless, the effects of online media consumption on the development of reading comprehension and vocabulary reveal quite a different story. In addition, effects seem to differ within online media. We found that the **amount of time spent reading e-mails, weblogs, online forums, and chats had a negative influence** on the development of reading comprehension and, at least partially, of vocabulary. The use of online encyclopedias was not related to either reading comprehension or vocabulary. These results are, nevertheless, consistent with the PISA 2009 findings: Whereas online reading activities in general were associated with better reading performance in all PISA participating countries (OECD, 2010), analyses focusing on the relationship of online social activities and digital reading performance report an inverted U-shaped dose-effect curve: Students who frequently read e-mails and chatted online performed worse than students who engaged only moderately in these online social activities (OECD, 2011)" (p.99).

Pfost, M., Dörfler, T. & Artelt, C. (2013). Students' extracurricular reading behavior and the development of vocabulary and reading comprehension. *Learning and Individual Differences, 26*, 89-102.

"The main question of this literature review was whether there is an empirical foundation for the assumption of a widening achievement gap in reading for primary school students. Although our results revealed no simple answer to this question, we were able to clearly describe conditions under which (relative) Matthew effects for reading are likely to occur and conditions under which a compensatory developmental model seems more appropriate. First, when describing the development of inter individual differences for highly constrained skills, a stable or compensatory developmental model seems most appropriate. Second, with regard to less constrained measures of decoding efficiency, a Matthew effect pattern or a pattern of stable achievement differences seems to best describe the development of these skills for primary school students. A widening achievement gap seems appropriate for describing the development of students' composite reading scores, although composite reading scores are not easy to interpret because they combine measures of higher and lower level reading skills. Furthermore, to detect Matthew effects in reading, it is necessary that scores of the applied measures have a high reliability and lack any floor or ceiling effects" (p. 236)

Pfost M., Hattie, J., Dörfler T., & Artelt C. (2014). Individual differences in reading development: A review of 25 years of empirical research on Matthew Effects in reading. *Review of Educational Research, 84*(2), 203-244.

"Phonics programs such as DISTAR were found to be effective in helping children with moderate mental retardation sound out words and blend sounds (Bracey, Maggs, &Morath, 1975; Gersten & Maggs, 1982)" (p.88). "Methodological problems aside, all the studies, to some degree, indicated that children with mental retardation can learn and use phonetic-analysis strategies and or can benefit from some form of phonics instruction" (p.92) … "Individuals with mental retardation have been seriously underrepresented in empirical investigations that explore the effectiveness of phonetic-analysis instruction" (p.93). "The findings from this review of studies suggest that individuals with mental retardation have the capabilities to grasp and generalize phonetic analysis skills from one context to another context. Given these findings, teachers of individuals with mental retardation might want to consider incorporating explicit teaching of letter–sound relationships, as well as prerequisite skills such as phonemic awareness, in their literacy programs" (p.93-4).

Joseph, L.M., & Seery, M-E. (2004). Where is the phonics?: A review of the literature on the use of phonetic analysis with students with mental retardation. *Remedial and Special Education, 25,* 88-94.

"Unfortunately in education there is a tendency to formulate and advocate false dichotomies and the result in this instance was that content knowledge was seen by many as counter to the learning process. In primary education especially, this resulted in many cases in a largely 'content free' curriculum, particularly in the humanities where teachers had wide choice and little guidance. Learning processes, issues and activities tended to be privileged over knowledge and formal testing declined" (p.2).

"Subject content knowledge has been portrayed by some as rote learning and recitation of facts, names, dates and places, and is seen as less worthy than critical thinking and the acknowledgement of multiple social realities. Learning to learn is seen as preferable to learning. Teacher-directed learning is seen as old-fashioned, even harmful, while student activity and choice is championed, regardless of what that activity or choice might entail (Dinham, 2008a: 95-96)" (p.3).

"Authentic achievement, no matter how small, is thus the best way to engender self-concept and self-esteem. This can then serve as a foundation for further achievement. When students have their self-esteem boosted artificially in inauthentic ways, on the other hand, the air quickly comes out of the balloon when they hit the wide world and meet real-life challenges (Dinham, 2010). Thus unwarranted self-esteem boosting works against building perseverance and resilience in primary age children, qualities necessary to meet later challenges in schooling and life (see Stewart, et al., 2004)" (p.8).

Dinham, S. (2014). Primary schooling in Australia: Pseudo-science plus extras times growing inequality equals decline. Keynote Address, Australian College of Educators National Conference, Adelaide, 11th September 2014. Retrieved from http://austcolled.com.au/article/primary-schooling-australia-pseudo-science-plus-extras-times-growing-inequity-equals-decline

"First, as the article notes, most of the summer school children are far behind, and six weeks of summer school will not bring them to grade level. Every educator knows that the struggling children needed help from pre-kindergarten to grade 3, not just summer school at the end of three years of failure. Other than Florida, the original mandatory retention state, other states have provided few resources to help children meet the standards for promotion.

Second, retention is rarely an effective or necessary policy. It looks good for a while because the retained children are a year older than their (new) classmates. For example, a ten-year-old in fourth grade immediately gains in apparent performance if transferred to the third grade -- the score doesn't change, but the reference group does. However, these apparent benefits wear off in a few years. This result has been found in many studies over the years, and the article reported that Florida, which has had a mandatory retention policy since 2002, reported retained children performing better than similar (but younger) non-retained children for several years, but by eighth grade the differences had faded away.

Third, both summer school and retention are incredibly expensive solutions. Retention means giving children one more year of elementary school, at a cost of roughly $10,000 per child, using national average per-pupil costs. Summer school is also an expensive solution, as it requires six more weeks to employ teachers and keep schools open. Further, the evidence for the effectiveness of summer school is weak".

Slavin, R.E. (2014). Reading by third grade - or else. The Blog, 15/8/2014. Retrieved from http://www.huffingtonpost.com/robert-e-slavin/reading-by-third-grade_b_5677958.html

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Australian Council for Educational Research chief executive Geoff Masters:

"There are methods that people promote and sometimes they're pre-packaged solutions you just take off the shelf and implement but some of them are the equivalent of snake oil remedies promoted as the answer to all education ills," he says.

"People often say it's grounded in research but they cherrypick the research to support their preferred option. We need to get away from that approach to one based on what we know from the research about the principles that underpin effective teaching. Too often in education we have not followed the knowledge base that we have as a profession. We do know a lot about what works, particularly when it comes to the principles underpinning effective teaching.

"How do we get all teachers doing what's best in their classrooms? That's the challenge.""

Ferrari, J. (2014). Schools cool to direct instruction as teachers 'choose their own adventure' The Australian, July 05, 2014. Retrieved from http://www.theaustralian.com.au/national-affairs/opinion/schools-cool-to-direct-instruction-as-teachers-choose-their-own-adventure/story-e6frgd0x-1226978127875

"If your brain doesn't have to work as hard on simple maths, it has more working memory free to process the teacher's brand-new lesson on more complex math. The study provides new evidence that this experience with math actually changes the hippocampal patterns, or the connections. They become more stable with skill development, she said. So learning your addition and multiplication tables and having them in rote memory helps."
Watson, L. (2014). Now it all adds up! Scientists take a peek into the human brain and discover how children learn mathematics skills. Daily Mail, 18 August 2014. Retrieved from http://www.dailymail.co.uk/sciencetech/article-2727268/Peek-brain-shows-kids-learn-math-skills.html#ixzz3AuPNovX6

"In duplicating a research study, administrators need to read carefully the details of the program they are hoping to implement. Dynarski (2010) states that "**knowledge drawn from science doesn't come with instructions on how to put it into practice" (p. 61)**. The administrator as researcher will need to ask

many questions: How was the intervention implemented? Who administered it? Under what conditions? For what duration of time? Principals sometimes "tweak" programs to suit their particular school setting, but a lack of implementation fidelity or a failure to adhere to the study's implementation protocol may affect the outcomes. **Significantly higher outcomes are achieved when programs are implemented as intended by the developer (O'Donnell, 2008)" (p. 124).**

Bair, M. A., & Enomoto, E. K. (2013). Demystifying research: What's necessary and why administrators need to understand it. *National Association of Secondary School Principals. NASSP Bulletin, 97*(2), 124-138.

"Teachers of children with DS and ID need to incorporate more than sight-word only approaches in their reading instruction. The small but growing research base indicates that classroom teachers should no longer be asking: "Should I use a sightword program or a phonics program?" Instead, teachers should be providing comprehensive reading interventions that extend beyond the reading of sight words to include phonological awareness and phonics instruction. Even early proponents of sight-word approaches have suggested that reading instruction needs to include additional components if higher levels of reading are to be attained (Buckley, Bird, & Byrne, 1996).

Evidence-based programs hold some promise for children with DS and ID. However, as our results indicate, the programs may need to be modified in important ways for meaningful improvements to be seen. There are several areas in which potential modifications could enhance the effectiveness of the interventions for children with DS and ID. First, due to the relatively low rates of retention for learned items, an additional focus on review and practice may be needed. Second, increasing the amount of time students spend applying newly acquired reading skills with novel words and reading connected text will likely increase generalization" (p. 88).

Lemons, C. J., Mrachko, A. A., Kostewicz, D. E., & Paterra, M. F. (2012). Effectiveness of decoding and phonological awareness interventions for children with Down Syndrome. *Exceptional Children, 79*(1), 67-90.

"In a research update on reading instruction for English learners that included 20 studies published since 2002, August and Shanahan (2010) reviewed 12 additional studies on phonological awareness and phonics instruction. Similar to the Shanahan and Beck review, theirs found that systematic and explicit instruction has a positive impact on a range of student reading outcomes. English learners develop word-level skills in a similar manner to native English speakers, and they benefit from instructional features that have been found effective for native English-speaking children (Shanahan & Beck, 2006). Several early reading interventions for English learners with a strong phonics component have reported benefits for word-level skills (Denton, Anthony, Parker, & Hasbrouck, 2004; Gunn, Biglan, Smolkowski, & Ary, 2000). This growing body of research suggests that young English learners benefit from the same instructional features and phonics components that support early reading development in their native English-speaking peers (Ehri et al., 2001)" (p. 2).

Vadasy, P. F., & Sanders, E. A. (2012). Two-year follow-up of a kindergarten phonics intervention for English learners and native English speakers: Contextualizing treatment impacts by classroom literacy instruction. *Journal of Educational Psychology, 104*(4), 987-1005.

"The Need for Explicit Instruction. When academic literacy skills are taught, explicit instruction should be provided. Explicit instruction involves direct teaching including teacher modeling, guided student practice with feedback, and independent student practice (Hock, Deshler, & Schumaker, 2000; Marchand-Martella & Martella, 2013; National Institute for Literacy [NIFL], 2007). Biancarosa and Snow (2006) and Kosanovich et al. (2010) list explicit instruction as the chief way to promote student learning. This systematic instructional process provides a framework for the gradual transfer of responsibility for student learning from the teacher to the student as the student becomes increasingly successful (Marchand-Martella & Martella, 2013). Each step of comprehension (i.e. strategies, monitoring and metacognition, teacher modeling, scaffolding, and apprenticeship) requires the use of explicit instruction by teachers in order to be successfully implemented by readers (Biancarosa & Snow, 2006). The key to explicit

instruction is ongoing interaction and communication between the students and the teacher (Rupley, Blair, & Nichols, 2009). Only then can students learn to comprehend, understand, and interact with written text (Rupley et al., 2009).

Research almost universally supports explicit instructional practices (Archer & Hughes, 2011; Kirschner, Sweller, & Clark, 2006; Klahr & Nigam, 2004; Marchand-Martella, Slocum, & Martella, 2004). Explicit instructional approaches are considered more effective and efficient as compared to discovery-based approaches (Alfieri, Brooks, Aldrich, & Tenenbaum, 2010; Ryder, Tunmer, & Greaney, 2008), particularly when students are naïve or struggling learners.

Vaughn and Linan-Thompson (2003) answered the question, "So what is special about special education for students with LD?" Their answer, again based on a thorough review of the research literature, noted "students with LD benefit from explicit and systematic instruction that is closely related to their area of instructional need" (p. 145). Burns and Ysseldyke (2009) examined the frequency with which evidence-based practices were used with students with disabilities. They found explicit instruction was the most frequently used instructional methodology in their survey of special education teachers and school psychologists. No matter what research synthesis was reviewed, "the conclusions were clear: Explicit instruction should be a consistent mainstay of working with students both with and without learning difficulties" (Archer & Hughes, 2011, p. 17)" (p. 166-7).

Marchand-Martella, N., Martella, R. C., Modderman, S. L., Petersen, H. M., & Pan, S. (2013). Key areas of effective adolescent literacy programs. *Education & Treatment of Children, 36*(1), 161-184.

"Browder, Wakeman, Spooner, Ahlgrim-Delzell, and Algozzine (2006) reported that almost 90% of published research studies examining reading instruction for students with moderate to severe disabilities (MSD) focused on acquisition of functional sight words. Sight-word instruction has been and remains the dominant form of literacy instruction to increase the functional independence of students with MoID. … A small body of research over the last 3 decades suggests that with effective instruction, students with MoID can learn generalizable word-analysis skills (Allor, Mathes, Roberts, Jones, & Champlin, 2010; Bracey, Maggs, & Morath, 1975; Browder, Ahlgrim- Delzell, Courtade, Gibbs, & Flowers, 2008; Cossu, Rossini, & Marshall, 1993; Davis, Fredrick, Alberto, & Gagné, 2010; Davis et al., 2013; Hoogeveen, Smeets, & Lancioni, 1989; Katims, 1996; Nietupski, Williams, & York, 1979; Waugh, Fredrick, & Alberto, 2009)." (p.49).

Fredrick, L. D., Davis, D. H., Alberto, P. A., & Waugh, R. E. (2013). From initial phonics to functional phonics: Teaching word-analysis skills to students with moderate intellectual disability. *Education and Training in Autism and Developmental Disabilities, 48*(1), 49-66.

"Most compelling from the current analyses are results directly investigating the differences between three modalities (Alternating, Integrated, Additive) of instruction. Outcomes showed clearly that modality of instruction can matter considerably for these older struggling readers. The differences in gains clearly demonstrate that the Additive modality, with its sequential addition of each component (isolated phonological decoding instruction, followed by addition of spelling instruction, followed by addition of fluency instruction, and finally the addition of comprehension instruction [see Table 1]) is potentially the best modality for remediating reading skills (decoding, spelling, fluency, comprehension) in older struggling readers, of the three approaches that were compared in this research. These students show that they are highly sensitivity to the scheduling of the components and the amounts of instructional time per component; this is an important finding for the development and refinement of reading programs for struggling adolescent readers. While more research still needs to be conducted in this area, this study lends credence to the different requirements this unique population of students may need in order to close the achievement gap in acquiring adequate reading skills" (p.588-9).

Calhoon, M. B., & Petscher, Y. (2013). Individual and group sensitivity to remedial reading program design: Examining reading gains across three middle school reading projects. *Reading and Writing, 26*(4), 565-592.

"This study further demonstrates that students with ASD and DD can benefit from group instruction. One-on-one instruction in the form of discrete trial teaching represents the largest body of intervention research for this population (National Research Council, 2001). However, students in the current study successfully participated in DI which required sustained attention, frequent responding, and choral responses in a group format. This is significant since group instruction may provide for greater efficiency in meeting students' needs in diverse classrooms. In addition, providing instruction to students with ASD and DD in a group format may also better prepare them for participation in group situations within general education classrooms" (p.46-7).

Flores, M. M., Nelson, C., Hinton, V., Franklin, T. M., Strozier, S. D., Terry, L., & Franklin, S. (2013). Teaching reading comprehension and language skills to students with autism spectrum disorders and developmental disabilities using direct instruction. *Education and Training in Autism and Developmental Disabilities, 48*(1), 41-48.

"There has been a surge in research with young deaf children using Visual Phonics and Direct Instruction. The results to date have been promising, but with the caution that most of the work has been done with children who are second graders or younger" (p.101).

Moores, D. F. (2013). One size does not fit all: Individualized instruction in a standardized educational system. *American Annals of the Deaf, 158*(1), 98-103.

"Thus, this article supplements the growing body of scholarship that suggests that there has been an over-emphasis on randomized control trials in educational research, as well as other field settings" (p. 2242).

Stockard, J. (2013). Merging the accountability and scientific research requirements of the No Child Left Behind Act: Using cohort control groups. *Quality and Quantity, 47*(4), 2225-2257.

"It appears that, in making decisions about school programs, educators "do not often use scientific reasoning and proof to make sense of their world" (Berliner, 2008, p. 309). For example, Levin (2010) reports that administrators were found to rank "personal experience and colleagues as a more powerful influence on their beliefs than either professional development or research" (p. 309). They also tend to rely on war stories and anecdotes rather than drawing on the latest research studies (Hattie, 2009; Labaree, 2008; Stanovich & Stanovich, 2003). Like teachers who prefer research that is personal and experiential (Landrum, Cook, Tankersley, & Fitzgerald, 2007), school administrators may turn to their peers for information and advice (Levin, 2010; Miller, Drill, & Behrstock, 2010). The problem with this approach is that decisions based on individual experiences or anecdotal information can lead to biased conclusions. It is easy to select cases that support one's arguments and ignore those that do not (Davis, 2007). Moreover, popular practices might be flawed even if they are applied extensively" (p. 124).

Bair, M. A., & Enomoto, E. K. (2013). Demystifying research: What's necessary and why administrators need to understand it. *National Association of Secondary School Principals.NASSP Bulletin, 97*(2), 124-138.

"It is encouraging that many students with significant cognitive disabilities (SCD) demonstrated an initial level of skill in word and passage reading. Another positive finding is that the percentage of students obtaining benchmarks increased as grade level increased. This mirrors recent longitudinal findings (Wei, Blackorby, & Schiller, 2011) demonstrating that students with ID continue to make gains in reading skill (i.e., letter-word identification and passage comprehension) throughout the high school years. In other words, children with SCD do not appear to reach a plateau in their early school years. This finding, coupled with the overall low level of reading observed, appears to indicate that schools need to continue focusing efforts on improving reading instruction for children with SCD throughout high school. When our results (which could be characterized as the status quo) are compared to the results of targeted intervention studies, it is apparent that improvements could be made. For example, over 50% of children with ID in Grades 1 through 4 were able to reach the first-grade oral reading fluency benchmark (40 words correct in 1 min) after receiving 2 to 3 years of intensive reading instruction provided by Allor and colleagues (Allor, Mathes, Roberts, Cheatham et al., 2010). In the current sample, only 14.97% and 24.67% of children with ID in Grades 3 and 4, respectively, met this mark" (p. 419). … Additionally, as students with SCD are learning to read, "their instructional programs need to provide them more direct instruction of these skills

and our measurement systems need to reflect performance and progress in their learning" (Tindal et al., 2003, p. 491)" (p. 421). … If students with SCD are to improve their reading skills, their teachers will have to embrace the role of being a prescriptive teacher. In this role, teachers select practices that hold promise (e.g., interventions that have been empirically validated to work for struggling readers without SCD), implement them, and use individual student data to evaluate responsiveness to the interventions (p. 423).

Lemons, C. J., Zigmond, N., Kloo, A. M., Hill, D. R., Mrachko, A. A., Paterra, M. F., Bost, T., & Davis, S. M. (2013). Performance of students with significant cognitive disabilities on early-grade curriculum-based measures of word and passage reading fluency. *Exceptional Children, 79*(4), 408-426.

"Explicit Instruction: Essential to Close the Gap. Being an effective teacher requires use of instructional momentum techniques and the functions of explicit instructional lessons. The functions of explicit instruction should be used whether staff are teaching tier 1, tier 2, or tier 3 prevention within the MTSS model. Based on our experience, with few exceptions (e.g., Direct Instruction programs from SRA/McGraw-Hill; http://www.sra.com/), lessons in most core curriculum programs used by schools do not incorporate directly and consistently the functions of explicit instruction. In contrast, most evidence-based supplemental interventions designed to be delivered at the tier 2 and/or 3 levels include the functions of explicit instruction" (p.23).

Benner, G. J., Kutash, K., Nelson, J. R., & Fisher, M. B. (2013). Closing the achievement gap of youth with emotional and behavioral disorders through multi-tiered systems of support. *Education & Treatment of Children, 36*(3), 15-29.

"Tier 3 requires unique application of content and pedagogical structures beyond repeating identical curriculum from Tiers 1 and 2 (e.g., Wanzek & Vaughn, 2008). That is, repeating the identical curriculum with just additional time in Tier 3 amounts to an educational form of "rinse and repeat": doing the same thing without reason to expect further effect" (p.26).
Wilson, J. A., Faggella-Luby, M., & Wei, Y. (2013). Planning for adolescent tier 3 reading instruction. *Teaching Exceptional Children, 46*(1), 26-34.

From David Elkind: "In fact, my sense is that DISTAR is even worse for young disadvantaged children because it imprints them with a rote-learning style that could be damaging later on. As Piaget pointed out, children learn by manipulating their environment, and a healthy early education program structures the child's environment to make the most of that. [Direct Instruction], on the other hand, structures the child and constrains his learning style". (Shell, 1989, p. 56)
Shell, E. R. (1989). Now, which kind of preschool? *Psychology Today, 23*(12), 52-53+.

" … when the research is taken as a whole - when the pertinent studies and the interventions they describe are considered with regard to their content, quality, and results - we conclude that it does not support the use of cognitively focused instruction at this time" (p.263).

"Skills-based instruction here means instruction reflecting an intent to strengthen academic skills (e.g., letter-sound correspondence and math problem solving) and to enhance knowledge in areas such as social studies and science. We also use the term to signify an approach inspired by Direct Instruction (DI; e.g., Becker, Englemann, Carnine, & Rhine, 1981). According to Gersten, Woodward, and Darch (1986), the key to DI is that "materials and teacher presentation of [these] materials must be clear and unambiguous" (p. 18), "much more detailed and precisely crafted" (p. 19) than the norm, for successful use with students with academic challenges. Moreover, wrote Gersten et al. (1986), this instruction "must contain clearly articulated [learning] strategies" (p. 19): a step-bystep process involving teaching to mastery, a procedure for error correction, a deliberate progression from teacher-directed to student-directed work, systematic practice, and cumulative review (cf. Gersten et al., 1986). A belief in the efficacy of skills-based instruction seems well founded. When implemented with fidelity, carefully scripted programs in reading, writing, and math - often involving learning strategies similar to DI - have been shown to benefit numerous at-risk students (e.g., Graham ÒC Perin, 2007; Kroesbergen & Van Luit, 2003; Stuebing, Barth, Cirino, Francis, & Fletcher, 2008)" (p.263).

"Few cognitively focused programs have been explored by researchers in sufficient numbers and with appropriate experimental control to warrant an endorsement as evidence-based practices. … there is indisputable need for alternative methods of instruction for the 2% to 6% (cf. Wanzek & Vaughn, 2009) of the general student population for whom academic instruction - including DI-inspired skills-based instruction - is ineffective" (p.285).

Kearns, D. M., & Fuchs, D. (2013). Does cognitively focused instruction improve the academic performance of low-achieving students? *Exceptional Children, 79*(3), 263-290.

"The prevalence estimate of previously unidentified language deficits in children with EBD was distributed around a mean of 81%; thus, in answer to the first research question, it is likely that four out of five children with EBD had at least mild LI that escaped the attention of relevant adults" (p. 181). "Regarding severity of those deficits, of the 838 participants in 14 studies, 47% had deficits categorized as moderate to severe. That is, nearly half the children across studies had either a diagnosis of LI or standard scores below the 3rd percentile in comprehensive language proficiency. The majority of children evaluated in this study had at least a mild language deficit or impairment. This estimate is far higher than in the general population of school-age children, in which prevalence has been estimated at 3% to 14% depending on criteria used to determine case status (Law et al., 2000; Tomblin et al., 1997)" (p.182).

Hollo, A., Wehby, J. H., & Oliver, R. M. (2014). Unidentified language deficits in children with emotional and behavioral disorders: A meta-analysis. *Exceptional Children, 80*(2), 169-186.

"Swanson and Carson conducted a synthesis of the literature to identify effective interventions for students with SLD. The large average effect sizes for strategy instruction (1.07) and direct instruction (.91) suggested that students receiving these interventions performed about one standard deviation higher than peers who did not receive these interventions" (p. 189).

"Oral reading fluency is a critically important area to consider because the number of words students read per minute is a metric of reading competence and because it strongly predicts reading comprehension (Fuchs, Fuchs, Hosp, & Jenkins, 2001). Oral reading fluency rates can reliably distinguish between students with SLD and their peers with speech and language delays (Puranik, Petscher, A1 Otaiba, Catts, & Lonigan, 2008) and between students with differing levels of English proficiency with and without SLD (A1 Otaiba et al, 2009) . Both oral reading fluency level and rate of growth have been shown to predict current (Roehrig, Petscher, Nettles, Hudson, & Torgesen, 2008) and later (Baker et al., 2008; Wanzek et ah, 2010) reading performance on statewide tests" (p. 190).

" … current research for students with ED and SLD indicates that student learning can be accelerated beyond what these students achieve without intervention (e.g., Rivera et al., 2006; Swanson & Carson, 1996), but there is little evidence to date that researchers have identified instructional techniques or the intensity of interventions needed to allow most students with disabilities to achieve "normalized" outcomes" (p.201).

Wanzek, J., Al Otaiba, S., & Petscher, Y. (2014). Oral reading fluency development for children with emotional disturbance or learning disabilities. *Exceptional Children, 80*(2), 187-204.

"In a review comparing students with ID to students with LD, Caffrey and Fuchs (2007) found that students with ID made smaller gains after intervention and experienced more difficulty transferring new information, though both groups responded favorably to constant time delay, direct instruction, and strategy instruction" (p. 288).

"In contrast to explicit and systematic instruction in the areas of phonics, phonemic awareness, vocabulary, fluency, and comprehension, most research related to teaching reading to students with ID has focused narrowly on training isolated skills such as sight word reading or letter-sound correspondences (see reviews by Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Browder & Xin, 1998; Conners, 2003; Joseph & Seery, 2004; Saunders, 2007). Recent research, however, suggests that students with ID can be taught to process the internal structure of spoken and printed words (e.g., Bradford, Shippen, Alberto, Houchins, & Flores, 2006; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006; Joseph & Seery, 2004; Stewart, Hayashi, & Saunders, 2010). Further, recent studies also show that students with low

IQs, including those who are nonverbal, respond positively to intensive, individualized, comprehensive research-based reading instruction (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008; Browder, Ahlgrim-Delzell, Flowers, & Baker, 2012; Lemons & Fuchs, 2010)" (p. 288).

"These findings converge with earlier work by McGrew and Evans (2003), who found that IQ did not predict academic achievement as accurately as many practitioners assumed. McGrew and Evans (2003) reported that IQ only accounts for 40% to 50% of concurrent academic achievement, leaving the majority (50%-60%) of achievement related to variables outside of intelligence. Last, some students with ID required not only more intensive instruction but also more carefully scaffolded instruction within a narrow band of skills (Allor, Champlin, Gifford, & Mathes, 2010; Allor, Gifford, A1 Otaiba, Miller, & Cheatham, 2013)" (p. 289).

"Unlike prior research, we provided comprehensive instruction across multiple years, allowing us to determine the relatively long-term impact of evidence-based instruction for students with low IQs. These findings extend our previous findings, as the positive trends reported earlier continued through the fourth (final) year of our study (Allor, Mathes, Roberts, Cheatham, et al., 2010; Allor, Mathes, Roberts, Jones, et al., 2010)" (p. 301).

"The sobering reality is that a typical student in our treatment group with an IQ of 75 (borderline range) would require 52 weeks of intervention to move from 20 words per minute (wpm) to 60 wpm on firstgrade passages. Thus, based on our data, students with IQs between 70 and 80 require approximately one and a half school years to move from reading 20 wpm to 60 wpm, the average reading fluency of an ending first grader. A student in the mild range (56-69) would require approximately three academic years to move from 10 wpm to 60 wpm. Students with IQs in the moderate range (40-55) would require approximately three and a half years to move from 0 wpm to 20 wpm, which is roughly similar to the scores of students without disabilities midway through first grade. This is consistent with a developmental lag hypothesis as demonstrated by Wei and colleagues (2011). Students with lower IQs require intensive instruction to make these meaningful gains. Skills that are typically learned in a matter of weeks for students without disabilities may take years for students with ID. The relatively large sample across a broad range of low IQ scores increases the likelihood of generalizability to other samples" (p. 302).

"We did find significant differences favoring the treatment condition for reading comprehension with a moderate effect size (ES = 0.69), but not for listening comprehension (ES = 0.01). These findings are encouraging, given that after 3 years significant differences in comprehension had not been found (see Allor, Mathes, Roberts, Cheatham, et al., 2010)" (p. 302).

"Our findings from the present study have several important implications for serving students with low IQs in general and special education settings. First and foremost, students with low IQs, including those with ID and those with IQs in the borderline range (i.e., 70-80), should be provided with evidence-based reading instruction. Although it might seem unsurprising to some that these students made meaningful progress, our study provides strong empirical evidence of reading progress across several academic years with a relatively large sample of students with low IQs who participated in a randomized control trial in which the treatment was delivered by highly trained interventionists. Specifically, our data indicate what is possible for students with low IQs if they are given access to evidence-based reading instruction. The curriculum is very explicit and systematic and was delivered with fidelity, providing very consistent, explicit, and repetitive routines, focusing on key skills, and delivering clear and explicit modeling. Thus, students with low IQs do benefit from comprehensive reading programs that were designed for struggling readers and readers with LD, but progress is slower" (p. 302-3).

" … this study is both a clear demonstration of the potential of students with low IQs to achieve meaningful literacy goals and a clear demonstration of the persistence and intensity it takes to help children with low IQs learn to read. This longitudinal study provides solid empirical support for educators to provide intensive, comprehensive, research-based reading instruction to all students, including those with mild or moderate ID" (p.304).

Allor, J. H., Mathes, P. G., Roberts, J. K., Cheatham, J. P., & Al Otaiba, S. (2014). Is scientifically based reading instruction effective for students with below-average IQs? *Exceptional Children, 80*(3), 287-306.

"A clinical and educational goal of reading research is to improve the accuracy with which children at risk for dyslexia are identified so that they can receive early, preventive intervention rather than intervention that follows years of reading failure (Strickland, 2002). Although behavioral measures of phonological awareness, RAN, and letter knowledge in kindergartners predict reading ability years later (Catts et al., 2001; Schatschneider et al., 2004), the sensitivity and specificity of these behavioral measures is modest (Pennington and Lefly, 2001). There is some evidence that brain measures substantially enhance the accuracy of predicting reading ability across a school year (Hoeft et al., 2007; Rezaie et al., 2011) or across multiple years (Maurer et al., 2009; Hoeft et al., 2011). The present study indicates that DWI measures of white matter organization reveal a specific structural risk factor for reading difficulty that, in combination with behavioral and other brain measures, may improve the identification of prereaders at risk for dyslexia" (p.13256).

Saygin, Z.M., Norton, E.S., Osher, D.E., Beach, S.D., Cyr, A.B., Ozernov-Palchik, O., Yendiki, A., Fischl, B., Gaab,N., & Gabrieli, J.D.E. (2013). Tracking the roots of reading ability: White matter volume and integrity correlate with phonological awareness in prereading and early-reading kindergarten children. *The Journal of Neuroscience 33*(33), 13251-13258. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3742917/

"This survey showed the difficulty of closing students' gaps in the middle years (from 4th to 8th grade). Fewer than 10%" of *far off track* students (more than one standard deviation below benchmark in 4th grade) caught up in the four years to 8th grade. Between 8th grade and 12th grade only 6% of those far off track students in 8th grade reached benchmark by 12th grade".

Dougherty, C. (2014). Catching up to college and career readiness: The challenge is greater for at-risk students. *ACT Research & Policy, May 2014. 1-12*. Retrieved from http://www.act.org/research/policymakers/pdf/CatchingUp-Part3.pdf

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"Hard evidence rather than self-reported intentions) indicates that students who went through a Direct Instruction program significantly exceeded controls in the percentage completing high school, the percentage applying for college admission, and the percentage being accepted. … the extensive and well documented case for the educational benefits of Direct Instruction (p. 289)."

Bereiter, C. (1986). Does Direct Instruction cause delinquency? Response to Schweinhart and Weikart. *Early Childhood Research Quarterly, 1*(3), 289-292.

My chief mentor, the late Daniel Patrick Moynihan, occasionally warned against "semantic infiltration," which he correctly attributed to the late arms-control expert, Fred Ikle. It is, of course, the judo-like practice of using terms that are appealing to an audience as fig leaves for practices that the same audience would find repugnant—turning one's own language against one's interests, you might say.

Moynihan noted, for example, that countries that style themselves "democratic republics" are almost never either democratic or republics.

Finn, C.E. (2014). The 'balanced literacy' hoax. Education Next, 29/6/2014. Retrieved from http://educationnext.org/balanced-literacy-hoax/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+EducationNext+%28Education+Next%29

"Background: The goal of this study was to investigate the automaticity/cerebellar theory of dyslexia. We tested phonological skills and cerebellar function in a group of dyslexic 8–12-year-old children and their matched controls. Tests administered included the Phonological Assessment Battery, postural stability, bead threading, finger to thumb and time estimation. Results: Dyslexic children were found to be significantly poorer than the controls at all tasks but time estimation. About 77% of dyslexics were more than one standard deviation below controls in phonological ability, and 59% were similarly impaired in motor skills. However, at least part of the discrepancy in motor skills was due to dyslexic individuals who

had additional disorders (ADHD and/or DCD). The absence of evidence for a time estimation deficit also casts doubt on the cerebellar origin of the motor deficiency. About half the dyslexic children didn't have any motor problem, and there was no evidence for a causal relationship between motor skills on the one hand and phonological and reading skills on the other. Conclusion: This study provides partial support for the presence of motor problems in dyslexic children, but does not support the hypothesis that a cerebellar dysfunction is the cause of their phonological and reading impairment" (p. 712).

Ramus, F., Pidgeon, E., & Frith, U. (2003). The relationship between motor control and phonology in dyslexic children. *Journal of Child Psychology and Psychiatry, 44* (5), 712-722.

"An on-going debate surrounds the relationship between specific language impairment and developmental dyslexia, in particular with respect to their phonological abilities. Are these distinct disorders? To what extent do they overlap? Which cognitive and linguistic profiles correspond to specific language impairment, dyslexia and comorbid cases? At least three different models have been proposed: the severity model, the additional deficit model and the component model. We address this issue by comparing children with specific language impairment only, those with dyslexia-only, those with specific language impairment and dyslexia and those with no impairment, using a broad test battery of language skills. We find that specific language impairment and dyslexia do not always co-occur, and that some children with specific language impairment do not have a phonological deficit. Using factor analysis, we find that language abilities across the four groups of children have at least three independent sources of variance: one for non-phonological language skills and two for distinct sets of phonological abilities (which we term phonological skills versus phonological representations). Furthermore, children with specific language impairment and dyslexia show partly distinct profiles of phonological deficit along these two dimensions. We conclude that a multiple-component model of language abilities best explains the relationship between specific language impairment and dyslexia and the different profiles of impairment that are observed" (p. 630).

Ramus, F., Marshall, C. R., Rosen, S., & van der Lely, H. K. J. (2013). Phonological deficits in specific language impairment and developmental dyslexia: towards a multidimensional model. *Brain*, 136(2), 630-645.

"We placed kindergarten children in a laboratory classroom for six introductory science lessons, and we experimentally manipulated the visual environment in the classroom. Children were more distracted by the visual environment, spent more time off task, and demonstrated smaller learning gains when the walls were highly decorated than when the decorations were removed".

Fisher, A.V., Godwin, K.E., & Seltman, H. (2014). Visual environment, attention allocation, and learning in young children. When too much of a good thing may be bad. Psychological Science, Published online May 21, 2014, doi: 10.1177/0956797614533801

"The results of two training studies support this proposed direction of causality (at least for inference and comprehension monitoring). Poor comprehenders benefitted more than skilled comprehenders when taught how to make inferences from key "clue" words in deliberately obscure texts (Yuill & Joscelyne, 1988). Further, training that combined inference making and comprehension monitoring lead to substantial gains in comprehension on a standardized measure of reading comprehension for poor comprehenders (Yuill & Oakhill, 1988). The current findings, together with these training studies, provide converging evidence that inference skills and comprehension monitoring are causally implicated in the development of reading comprehension. … Preschoolers are capable of generating inferences, monitoring their comprehension, and demonstrate knowledge of story structure (e.g., Kendeou et al., 2008; Skarakis-Doyle, 2002; Trabasso & Nickels, 1992). However, these skills continue to develop after reading instruction has begun (e.g., Baker, 1984; Barnes, Dennis, & Haefele-Kalvaitis, 1996; Trabasso & Stein, 1997). The main educational implication of our findings is that these discourse-level skills could usefully be taught to children to help foster their comprehension development. Whether these skills should be taught independently, or as part of an integrated package of skills training, and whether they are best taught in the context of oral language skills, or as part of the reading curriculum specifically, are open questions that require further research" (p.24, 26).

Oakhill, J. V., & Cain, K. (2012). The precursors of reading ability in young readers: Evidence from a four-year longitudinal study. *Scientific Studies of Reading, 16*(2), 91-121. Retrieved from https://www.google.com.au/#q=The+Precursors+of+Reading+Ability+in+Young+Readers%3A+Evidence +From+a+Four-Year+Longitudinal+Study.+

"The pattern of results was clear across nine cohorts and three grades, totaling more than 425,000 students in all.Well under 1 percent of first- through third-grade students were poor at reading comprehension yet adequate at both decoding and vocabulary. … "Our results are consistent with the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) in that nearly all cases of poor reading comprehension were associated with inadequate decoding, oral language (i.e., vocabulary), or both. Our results also support Catts et al.'s (2006) recommendation to use a framework based on the simple view (see Table 1) when assessing and intervening with poor readers. When assessing poor readers, it is important to target oral language and decoding in addition to reading connected text for meaning because students' poor reading comprehension scores alone are not sufficiently informative for the purposes of remediation. It would be important to identify how much of the poor reading comprehension is attributable to poor decoding and to poor oral language skills such as limited vocabulary knowledge" (p.7, 8).

Spencer, M., Quinn, J. M., & Wagner, R. K. (2014). Specific reading comprehension disability: Major problem, myth, or misnomer*? Learning Disabilities Research & Practice, 29*(1), 3-9. doi: 10.1111/ldrp.12024. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/ldrp.12024/pdf

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"This paper addresses the question whether the cognitive underpinnings of reading and spelling are universal or language/orthography-specific. We analyzed concurrent predictions of phonological processing (awareness and memory) and rapid automatized naming (RAN) for literacy development in a large European sample of 1062 typically developing elementary school children beyond Grade 2 acquiring five different alphabetic orthographies with varying degrees of grapheme–phoneme consistency (English, French, German, Hungarian, Finnish). Findings indicate that (1) phonological processing and RAN both account for significant amounts of unique variance in literacy attainment in all five orthographies. Associations of predictors with reading speed, reading accuracy, and spelling are differential: in general, **RAN is the best predictor of reading speed while phonological processing accounts for higher amounts of unique variance in reading accuracy and spelling**; (2) the predictive patterns are largely comparable across orthographies, but they tend to be stronger in English than in all other orthographies" (p.65). … Assessment tools should therefore include both, phonological processing and RAN, given that both cognitive skills are significant and unique predictors of literacy performance across orthographies (p.75). … Phonological processing was the better proximal predictor of spelling in all orthographies except English, where RAN accounted for more variance than phonological awareness (p.75).

Moll, K., Ramus, F., Bartling, J., Bruder, J., Kunze, S., Neuhoff, N Streiftau, S., Lyytinen, H., Leppänen, P. H. T., Lohvansuu, K., Tóth, D., Honbolygó, F., Csépe, V., Bogliotti, C., Iannuzzi, S., Démonet, J-F., Longeras, E., Valdois, S., George, F., Soares-Boucaud, I., Le Heuzey, M-F., Billard, C., O'Donovan, M., Hill, G., Williams, J., Brandeis, D., Maurer, U., Schulz, E., van der Mark, S., Müller-Myhsok, B., Schulte-Körne, G., & Landerl, K. (2014). Cognitive mechanisms underlying reading and spelling development in five European orthographies. *Learning and Instruction, 29*, 65–77.

" … phonology not only plays an important role in early reading development but continues to exert a robust influence throughout reading development. This finding challenges the view that more advanced readers should rely less on phonological information than younger readers" (p.1026).

In sum then, although the present study was not longitudinal, it nevertheless draws a clear picture about the development of orthographic and phonological marker effects in silent reading. **The data show that phonological information not only plays an important role in early reading development (Bosman & de Groot, 1996) but continues to exert a stable effect throughout reading development.** At the same time, orthographic development takes place, which manifests itself as an increase in the size of TL priming effects, which, in turn, is in line with the hypothesized development of coarse-grained orthographic coding as children become more skilled readers (Grainger, Lété, et al., 2012; Grainger & Ziegler, 2011)" (p.1033).

Ziegler, J. C., Bertrand, D., Lété, B., & Grainger, J. (2014). Orthographic and phonological contributions to reading development: Tracking developmental trajectories using masked priming. *Developmental Psychology, 50*(4), 1026-1036.

"It is concluded that very young readers rely on phonological encoding when reading for meaning; as they grow older, reliance on visual encoding becomes more important" (p 195).
Doctor, E.A., & Coltheart, M. (1980). Children's use of phonological encoding when reading for meaning. *Memory & Cognition, 8*(3), 195-209. Retrieved from
http://link.springer.com/article/10.3758%2FBF03197607

"A child with a reading disability who is not identified early may require as many as 150 – 300 hours of intensive instruction (at least 90 minutes a day for most school days over a 1 – 3 year period) if he is going to close the reading gap… between himself and his peers. And, of course the longer identification and effective reading instruction is delayed, the longer the child will require to catch up" (Shaywitz, 2003, p.259)
Shaywitz, S. (2003). Overcoming dyslexia: A new and complete science-based program for reading problems at any level. New York: Alfred A. Knopf.

"Although [reading] fluency may be learned in 100 hours, it requires more like 50 months to gain sufficient knowledge to bring students to grade level in reading" (Guthrie & Davis, 2003).
Guthrie, J. T., & Davis, M. H. (2003). Motivating struggling readers in middle school through an engagement model of classroom practice. *Reading & Writing Quarterly, 19*, 59-85.

Estimates of the requisite number of exposures for learning a new word range from: • as few as 6 (Jenkins, Stein, & Wysocki, 1984) • to as many as 40 (McKeown, Beck, Omanson, & Pople, 1985)

"One of the most commonly cited reasons for this is that students simply do not have the literacy skills to keep up with the high school curriculum, which has become increasingly complex."
(Kamil, 2003; Snow and Biancarosa, 2003)

"One way to think of the E-Z Reader model is that it explains the mechanisms that drive the eyes forward in reading and that higher-order processes such as syntactic parsing and constructing the discourse representation lag behind this process of comprehending words and do not usually intervene in the movement of the eyes. Given that these higher-order processes lag behind word identification, it would probably slow reading appreciably if the eyes had to wait for successful completion of these processes. A more likely scenario is that these higher-order processes intervene in the normal forward movement of the eyes (driven largely by word identification) only when a problem is detected (such as an incorrect parse of the sentence) and then the "normal processing" is interrupted and a signal goes out either not to move the eyes forward and/or to regress back to the point of difficulty and begin to recompute a new structure. … **However, effects of context on word identification are generally small, and much of the work on word perception suggests that visual information can be processed quickly even without the aid of context. Thus, predictability and other contextual factors may actually only play a limited role in word processing in reading**. More specifically, as Balota et al. (1985; see also Drieghe et al., 2005) have shown, context primarily influences the amount of information that may be extracted from the parafovea and, thus, more generally, context may become increasingly important when visual information is poor." (p. 570-571)
Rayner, K., Pollatsek, A. & Schotter, E.R. (2012). Reading: Word identification and eye movements. In A. Healy (Ed.) Handbook of Psychology, Volume 4: Experimental Psychology (pp. 548-577). Hoboken: Wiley.

"Researchers have estimated that the spellings of nearly 50 percent of English words are predictable based on sound-letter correspondences that can be taught (e.g., the spellings of the /k/ sound in back, cook, and tract are predictable to those who have learned the rules). And another 34 percent of words are predictable except for one sound (e.g., knit, boat, and two).† If other information such as word origin and word

meaning are considered, only 4 percent of English words are truly irregular and, as a result, may have to be learned visually (e.g., by using flashcards or by writing the words many times)" (p.8).

Joshi, R. M., Treiman, R., Carreker, S., & Moats, L. C. (2008–2009). How words cast their spell. *American Educator, 6*–43.

"3. What Are the Implications of Your Findings for Teaching Struggling Readers?
Instructional significance of triple word form theory. Early in reading development, children with dyslexia require explicit instruction in mapping existing phonological word forms in their long-term and working memory onto orthographic word forms they are constructing (Berninger&Richards, 2002). Early intervention that teaches phonological awareness and phonics (alphabetic principle) helps children construct these mental maps and results in brain changes (B. A. Shaywitz et al., 2004; Simos et al., 2002; Simos et al., this issue). Later in reading development, children with dyslexia require explicit instruction in mapping morphological and phonological word forms in their long-term and working memory onto orthographic word forms that are increasingly longer and of Latin, French, and Greek origin (Aylward et al., 2003; Berninger & Richards, 2002; Carlisle, 1994; Henry, 2003; Nagy,Osborn,Winsor,& O'Flahaven, 1994; Richards et al., 2002).Carlisle (1994), Henry(2003), and Nagy et al. (1994) contained practical instructional recommendations for teaching children to coordinate phonological, morphological, and orthographic word forms and their parts. As Nagy explained it to children, words live in families just like children do; to learn to read and spell, children need to learn how families of sounds, families of word parts for meaning, and families of letter units work together harmoniously. Explicit instruction in word forms and their interrelationships can be embedded in instruction that also teaches vocabulary (Stahl & Nagy, 2006) and comprehension (Carlisle & Rice, 2002), as recommended by the National Reading Panel (2000) and implemented in our instructional treatment (Berninger, 2000; Berninger & Abbott, 2003; Berninger et al., 2003)." (p.581)

"Thus, the greater an individual's initial discrepancy between right and left (right > left) IFG activation, the lower his/her phonological decoding after treatment, that is, the less the response to intervention. An alternative way of explaining this relationship that predicts treatment response is that the greater the initial left–right discrepancy, with left > right, the higher the phonological decoding after treatment. Such comparisons of homologous structures may prove fruitful in future imaging studies that assess brain response to instructional interventions."p. 575

Richards, T., Aylward, E., Raskind, W., Abbott, R., Field, K., Parsons, A., Richards, A., Nagy, W., Eckert, M., Leonard, C., & Berninger, V. (2006). Converging evidence for Triple Word Form Theory in child dyslexics**.** Special issue on brain imaging in *Developmental Neuropsychology. 30*, 547-590.

"The new conceptual framework for teaching reading – the simple view of reading', which explains the research basis for the recommendations in the report and how the National Literacy Strategy Searchlights model can be reconstructed to map into the new conceptual framework".

Primary framework for literacy and mathematics.

Dr Stuart commented, "The model of reading which is presented to teachers [in the NLS] which is this black hole of four things [i.e. four 'searchlights'] operating and disappearing into a text is completely and utterly misleading and bears no relation to any research on reading that I know of."[49] (para 47).

Select Committee on Education and Skills. (2005). *Teaching Methods, Eighth Report*. Retrieved from http://www.publications.parliament.uk/pa/cm200405/cmselect/cmeduski/121/12106.htm

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"One of the outcomes of the whole language movement was that schools not only minimized the importance of decoding instruction in reading but also dropped spelling programs altogether or deemphasized spelling instruction" (p.13).

Berninger, V. W., Nielsen, K. H., Abbott, R. D., Wijsman, E., & Raskind, W. (2008). Writing problems in developmental dyslexia: Under-recognized and under-treated. *Journal of School Psychology, 46*, 1–21.

"Recommendation 5

The committee recommends that the Minister take up with Universities Australia the need to encourage a more rigorous and evidence-based approach to the preparation of trainee teachers in regard to literacy and mathematics method" (p.64).
Senate Employment, Workplace Relations and Education Committee. (2007). *Quality of school education.* Commonwealth of Australia. Retrieved from
http://www.aph.gov.au/SEnate/committee/eet_ctte/completed_inquiries/2004-07/academic_standards/index.htm

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"More than 80% of the teachers surveyed agreed with statements such as the following: "Individuals learn better when they receive information in their preferred learning style (for example, auditory, visual, kinesthetic)"; "Differences in hemispheric dominance (left brain, right brain) can help explain individual differences among learners"; and "Short bouts of coordination exercises can improve integration of left and right hemispheric brain function" (p.136).
Weigmann, K. (2013). Educating the brain. *EMBO reports, 14*(2), 136-9. European Molecular Biology Organization.

"The results of this review suggest that phonics training had a large effect on nonword reading accuracy, a moderate effect on word reading accuracy, word reading fluency, spelling, letter-sound knowledge, and phonological output" (p.26).
McArthur, G., Eve, P.M., Jones, K., Banales, E., Kohnen, S., Anandakumar, T., Larsen, L., Marinus, E., Wang, H.C., & Castles, A. (2012). Phonics training for English-speaking poor readers. *Cochrane Database Syst Rev 12:CD009115*. Retrieved from
http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009115.pub2/abstract

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His meta-analysis found a moderate effect size of phonics training on reading skills, pre-reading skills, and comprehension skills in children who were struggling readers.
Suggate, S. (2010). Why what we teach depends on when: Grade and reading intervention modality moderate effect size. *Developmental Psychology, 46*, 1556–79.

"First, subgroup analyses demonstrated that children and adolescents with mild reading disabilities show more improvement in literacy skills than more severely impaired participants. Second, interventions with higher amounts of treatment or longer durations of treatment seem to be more effective in improving literacy skills than therapies with small amounts of treatment or short-time interventions" (p.10).

"Auditory trainings intend to foster reading and spelling by focussing on the underlying causes of the poor performance. At first glance, this approach seems convenient, but the results of the present meta-analysis demonstrate that auditory trainings do not significantly improve children's reading and spelling skills. Based on the results of the present meta-analysis and those reported by other systematic reviews and non-randomized trials [10,51,52], it can be concluded that focussing directly on literacy skills is effective but the efficacy of interventions focussing on the underlying causes could not be confirmed to date" (p.10).

"The mean effect size of coloured lenses (Irlen lenses) did not reach statistical significance. Some studies compared the effect of coloured lenses to a placebo control group; other studies used an untrained control group instead. An interesting observation is that Irlen lenses showed small effect sizes if the experimental group was compared to an untreated control group [41]. If the experimental group was compared to a placebo control group, effect sizes were negligible [33,41]. This finding confirms earlier systematic reviews that could not prove any positive effect of coloured lenses on literacy achievement, and suggests that results are mainly due to placebo effects" (p.10).

"The results revealed that phonics instruction is not only the most frequently investigated treatment approach, but also the only approach whose efficacy on reading and spelling performance in children and adolescents with reading disabilities is statistically confirmed. … The present meta-analysis demonstrates that severe reading and spelling difficulties can be ameliorated with appropriate treatment" (p.1).

"At the current state of knowledge, it is adequate to conclude that the systematic instruction of lettersound-correspondences and decoding strategies, and the application of these skills in reading and writing activities, is the most effective method for improving literacy skills of children and adolescents with reading disabilities. … The present results demonstrate that when phonemic awareness interventions are provided to schoolaged children and adolescents with reading difficulties, they do not have a significant effect on a child's reading or spelling performance. This indicates that phonemic awareness and reading fluency trainings alone are not sufficient to achieve substantial improvements. However, the combination of these two treatment approaches, represented by phonics instruction, has the potential to increase the reading and spelling performance of children and adolescents with reading disabilities (p.9).

Galuschka, K., Ise, E., Krick, K., & Schulte-Körn, G. (2014). Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials. *PLoS ONE, 9*(2), 1-12. e89900. doi:10.1371/journal.pone.0089900.

"Whether or not more effective schools can successfully mitigate the impacts of early disadvantage upon educational attainment remains uncertain. We investigated 2,664 children aged 6–11 years and measured their academic skills in English and maths along with self-regulation at 6, 7, and 11. Experiencing multiple disadvantages before age 5 strongly impaired later self-regulation and academic attainment. However, attending a more academically effective primary school for just a single year was found to partially protect all outcomes at age 6. In addition, more academically effective primary schools significantly lessened the extent to which earlier abilities in reading, writing, and self-regulation predicted these same abilities at age 11. Thus, although attending a more academically effective primary school does not eliminate the adverse impacts of multiple disadvantage experienced at a younger age, it can mitigate them by promoting better academic attainment and self-regulation up to age 11 for children who had experienced more disadvantages" (p.251).

Sammons, P., Hall, J., Sylva, K., Melhuish, E., Siraj, I., Taggart, B., & B. (2013). Protecting the development of 5–11-year-olds from the impacts of early disadvantage: The role of primary school academic effectiveness. *School Effectiveness and School Improvement: An International Journal of Research, Policy and Practice, 24*(2), 251-268.

"At the current state of knowledge, it is adequate to conclude that the systematic instruction of lettersound-correspondences and decoding strategies, and the application of these skills in reading and writing activities, is the most effective method for improving literacy skills of children and adolescents with reading disabilities" (p.9).

"Phonemic awareness trainings are widely recognised as being effective for the remediation of preschool children at risk for reading disabilities [46,47]. The present results demonstrate that when phonemic awareness interventions are provided to school-aged children and adolescents with reading difficulties, they do not have a significant effect on a child's reading or spelling performance. This indicates that phonemic awareness and reading fluency trainings alone are not sufficient to achieve substantial improvements. However, the combination of these two treatment approaches, represented by phonics instruction, has the potential to increase the reading and spelling performance of children and adolescents with reading disabilities" (p. 9).

"Auditory trainings intend to foster reading and spelling by focussing on the underlying causes of the poor performance. At first glance, this approach seems convenient, but the results of the present meta-analysis demonstrate that auditory trainings do not significantly improve children's reading and spelling skills. Based on the results of the present meta-analysis and those reported by other systematic reviews and non-randomized trials [10,51,52], it can be concluded that focussing directly on literacy skills is effective but the efficacy of interventions focussing on the underlying causes could not be confirmed to date" (p.10).

"First, subgroup analyses demonstrated that children and adolescents with mild reading disabilities show more improvement in literacy skills than more severely impaired participants. Second, interventions with higher amounts of treatment or longer durations of treatment seem to be more effective in improving literacy skills than therapies with small amounts of treatment or short-time interventions. Third, consistent

with previous meta-analyses [8,14], it was found that interventions that were conducted by the study author tend to show higher effect sizes than interventions that were implemented by other conductors. This suggests that solid and professional knowledge about reading disability in children and adolescents might enhance treatment efficacy" (p.10).

"Consistent with prior research [9,11,12,14,45], this analysis demonstrated that severe reading and spelling difficulties can be ameliorated with appropriate treatment. The need for evidencebased interventions is obvious given the emotional and academic consequences for children with persistent reading disorders [6]. To increase the informative value of studies, research in this domain should improve its methodological quality. Studies were often excluded from this analysis because of the absence of randomized allocation concealment" (p.10).

Galuschka, K., Ise, E., Krick, K., & Schulte-Körne, G. (2014). Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials. PLoS ONE 9(2), 1-12.

"The world's languages contain approximately 600 consonants and 200 vowels (Ladefoged, 2001). Each language uses a unique set of about 40 distinct elements, phonemes, which change the meaning of a word (e.g. from bat to pat in English). But phonemes are actually groups of non-identical sounds, phonetic units, which are functionally equivalent in the language. Japanese-learning infants have to group the phonetic units r and l into a single phonemic category (Japanese r), whereas English-learning infants must uphold the distinction to separate rake from lake. Similarly, Spanish learning infants must distinguish phonetic units critical to Spanish words (bano and pano), whereas English learning infants must combine them into a single category (English b). If infants were exposed only to the subset of phonetic units that will eventually be used phonemically to differentiate words in their language, the problem would be trivial. But infants are exposed to many more phonetic variants than will be used phonemically, and have to derive the appropriate groupings used in their specific language. The baby's task in the first year of life, therefore, is to make some progress in figuring out the composition of the 40-odd phonemic categories in their language(s) before trying to acquire words that depend on these elementary units" (p.718-9).
Kuhl, P.K. (2010). Brain mechanisms in early language acquisition. *Neuron, 67*(5), 713–727.

"Our studies show that the ability to discriminate two simple vowels at 6 months of age predicts language abilities and pre-reading skills such as rhyming at the age of 5 years, an association that holds regardless of socio-economic status and the children's language skills at 2.5 years of age (Cardillo, 2010)" (p.719).
Kuhl, P.K. (2010). Brain mechanisms in early language acquisition. *Neuron, 67*(5), 713–727.

"Qi and Mitchell (2012) summarized achievement data over the past 30 years, illustrating two critical findings: first, that the median grade equivalent outcomes for graduating high school SDHH ranges between fourth and seventh grade, depending on the subject area, and second, that this finding has largely remained stable over time and across subjects" (p. 5).
Cawthon, S. W., Schoffstall, S. J., & Garberoglio, C. L. (2014). How ready are institutions for students who are deaf or hard of hearing? Education Policy Analysis Archives, 22 (13), 1-25. Retrieved from http://dx.doi.org/10.14507/epaa.v22n13.2014.

Studies have converged in their findings of relatively less gray matter volume (GMV) in developmental dyslexia in bilateral temporoparietal and left occipitotemporal cortical regions. However, the interpretation of these results has been difficult. The reported neuroanatomical differences in dyslexia may be causal to the reading problems, following from, for example, neural migration errors that occurred during early human development and before learning to read. Alternatively, less GMV may represent the consequence of an impoverished reading experience, akin to the experience-dependent GMV differences attributed to illiterate compared with literate adults. Most likely, a combination of these factors is driving these observations. Here we attempt to disambiguate these influences by using a reading level-matched design, where dyslexic children were contrasted not only with age-matched controls, but also with younger controls who read at the same level as the dyslexics. Consistent with previous reports, dyslexics showed less GMV in multiple left and right hemisphere regions, including left superior temporal sulcus when

compared with age-matched controls. However, not all of these differences emerged when dyslexics were compared with controls matched on reading abilities, with only right precentral gyrus GMV surviving this second analysis. When similar analyses were performed for white matter volume, no regions emerged from both comparisons. **These results indicate that the GMV differences in dyslexia reported here and in prior studies are in large part the outcome of experience (e.g., disordered reading experience) compared with controls, with only a fraction of the differences being driven by dyslexia per se.**
Krafnik, A. J., Flowers, D. L., Luetje, M. M., Napoliello, E. M., & Eden, G. F. (2014). An investigation into the origin of anatomical differences in dyslexia. *The Journal of Neuroscience, 34*(3), 901-908.

What is clearly evident is that the extensive use of so-called "whole language" approaches which downplay the role of structured and targeted phonics teaching as a key element of a broader literacy programme is inappropriate for poor readers. A wealth of research evidence has clearly shown that, in comparison with normally reading peers, those who struggle to acquire reading skills typically require more individualised, more structured, more explicit, more systematic, and more intense reading inputs (p. 4).

Bertrand Russell "The fact that an opinion has been widely held is no evidence whatever that it is not utterly absurd; indeed in view of the silliness of the majority of mankind, a widespread belief is more likely to be foolish than sensible".

"The results revealed no support for the theory that a preceding phonological awareness deficit caused the reading deficit in the risk children, since only a very small proportion of the risk children exhibited phonological awareness problems in kindergarten and only part of these children developed a reading deficit. Furthermore, 80% of all risk children who did develop a reading deficit did not reveal a phonological awareness deficit in kindergarten. Since a phonological awareness deficit and a letter–sound association deficit only rarely co-occurred in the same individuals, there was also no support for the assumption that 'unstable' letter–sound associations 'explain' the reading problems of children with a phonological deficit. The finding that only very few risk children exhibited deficits in other potentially relevant phonological processes, like working memory and lexical processing deficits, did not provide an interpretation for the suggestion by Wimmer et al. (1991), that a certain level of phonological 'sensitivity' probably is necessary to start to learn to read. The large majority of risk children who effectively developed reading deficits in first grade did perform in the normal range on all included phonological processing tasks in kindergarten. In summary, the results of this study with familial risk children did not support the phonological (awareness) deficit theory of dyslexia; more precisely, the results render this theory rather unlikely" (p.312).

"The fact that a substantial part of these risk children did not develop reading deficits reiterates that non-word reading probably is not the best measure of letter–sound association skills and further indicates that more direct research of letter–speech sound processing in opaque orthographies is needed" (p.314).

Blomert, L., & Willems, G. (2010). Is there a causal link from a phonological awareness deficit to reading failure in children at familial risk for dyslexia? *Dyslexia 16,* 300–317.

" … environmental changes, such as a specific reading intervention, could change the dynamic genetic influences through a possible, unmeasured, gene– environmental interplay in the early school years, as well as affect the environmental influence on the general development of reading" (p. 1980).
Hart, S. A., Logan, J. A. R., Soden-Hensler, B., Kershaw, S., Taylor, J., & Schatschneider, C. (2013). Exploring how nature and nurture affect the development of reading: An analysis of the Florida twin project on reading. *Developmental Psychology, 49*(10), 1971-1981.

What might be required to enhance the long-term outcomes of an early reading intervention like the one in the original study, especially given the school factors that work against maintaining gains (e.g., evidence that public school remedial and special education programs do little more than maintain the students' degree of reading failure; Torgesen, 2005). Ideally, one would want to build on the initial large effects seen immediately posttreatment on word recognition, reading rate, spelling, and passage reading (with respective effect sizes of 1.69, .96, 1.13, and .78) by providing the kind of **extended instruction that**

would facilitate an accelerated growth rate over time, especially in fluency (automaticity) and comprehension. To close the achievement gap between struggling readers and typical readers, more extensive efforts are clearly required. … Thus, 1 year of reading intervention in second or third grade did not appear to be adequate to strongly accelerate growth in subsequent years. In a recent series of adolescent reading interventions summarized in Vaughn and Fletcher (2012), 1 year of intervention produced small effects that largely were not statistically significant (p.54).

Blachman, B. A., Schatschneider, C., Fletcher, J. M., Murray, M. S., Munger, K. A., & Vaughn, M. G. (2014). Intensive reading remediation in grade 2 or 3: Are there effects a decade later? *Journal of Educational Psychology, 106*(1), 46-57.

"Scores for higher- and lower-income groups improved in the past decade, but proficiency levels increased significantly more for higher-income students (17 percent improvement) than for their lower-income peers (6 percent improvement). As a result, the gap in proficiency rates between low-income and higher-income children widened by nearly 20 percent over the past decade and got worse in nearly every state. The most recent data show that 80 percent of children in low-income families are below proficiency in reading, compared with 49 percent of higher-income children. Children in low-income families fare even worse when they attend economically disadvantaged schools" (p.2).

The Annie E. Casey Foundation. (2014). Early reading proficiency in the United States. Retrieved from http://www.aecf.org/KnowledgeCenter/Publications.aspx?pubguid={35DCA3B7-3C03-4992-9320-A5A10A5AD6C9}

The best way to increase engagement of students at risk is to employ approaches that prove they can succeed (Carnine, Silbert, Kame'enui, & Tarver, 2004).

Carnine, D. W., Silbert, J., Kame'enui, E.J., & Tarver, S.G. (2004). *Direct Instruction reading*. (4th ed.). Upper Saddle River, NJ: Prentice Hall.

"Dolores Durkin's (1978/79) conducted a landmark study of the comprehension instructional practices of elementary teachers. Durkin observed grade-3 through -6 classrooms, and watched for comprehension instruction during reading and social studies, but did not see much direct instruction in comprehension by the teachers. Instead of teaching students to comprehend, Durkin observed that the teachers were "mentioning" comprehension and assessing comprehension by "interrogating" students about the material they read" (p.4).

Campanaro, M. (ND). Teachers respond to What's Hot, What's Not in reading: Bridging the gap between the views of teachers and reading experts. Texas A & M University-Commerce. Retrieved from http://developingreaders.net/!virtualroot!/Resources/330/Article2.pdf

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"Thinking cannot be carried on without the materials of thought; and the materials of thought are facts, or else assertions that are presented as facts. A mass of details stored up in the mind does not in itself make a thinker; but on the other hand thinking is absolutely impossible without that mass of details. And it is just this latter impossible operation of thinking without the materials of thought which is being advocated by modern pedagogy and is being put into practice only too well by modern students. In the presence of this tendency, we believe that facts and hard work ought again to be allowed to come to their rights: it is impossible to think with an empty mind."

-J Gresham Machen

"A consistent pattern identified in our review points to the effectiveness of Direct Instruction (DI), a specific teaching program, and of specific explicit instructional practices underpinning the program (e.g., guided practice, worked examples) in maximizing student academic achievement. Collectively, studies, reviews, and encompassing meta-analyses (e.g., Borman et al., 2003; Hattie, 2009) show that DI has significantly large effects on achievement" (p.368).

Liem, A., & Martin, A. (2013). Direct Instruction. In John Hattie and Eric M. Anderman (Eds.), *International guide to student achievement* (pp. 366-368). New York: Routledge.

Hattie

presents the model twice, first in the commentary of his findings on DI (Hattie, 2009, pp. 204–227), and later as the basis of his lesson descriptions in *Visible Learning for Teachers* (2012, pp. 65–66). The model, which, according to Hattie, was first outlined by Adams and Engelmann (1996), involves seven major steps:

(p.97)
De Florio, I. (2016). Effective teaching and successful learning: Bridging the gap between research and practice. Universität Kassel, Germany

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"In addition to word reading automaticity, language comprehension processes during connected text reading, including automatic semantic activation and conscious prediction processes (Posner & Snyder, 1975) and morphological, semantic, and syntactic processes (Wolf & Katzir-Cohen, 2001), facilitate children's word reading, and result in faster reading of words in context than in a list format (Biemiller, 1977–1978; Jenkins et al., 2003). Critically, however, the facilitation of language comprehension appears to depend on children's reading proficiency. Text reading fluency was uniquely predicted by children's **listening comprehension** over and above word reading fluency **only after children reached a certain level of word reading proficiency**—for skilled word readers but not average word readers in first grade (Kim et al., 2011)" (p. 81).

"Thus, these findings from English-speaking children and Korean-speaking children suggest that the hypothesized "bridging" role of text reading fluency (Chard et al., 2006; Kuhn et al., 2010; Pikulski & Chard, 2005; Rasinski, 2004) is not static but changes as a function of children's reading skill. During the initial phase of reading, individual differences in word reading skills explain a large amount of variation in reading comprehension. With further development, text reading fluency mediates the relation between word reading and reading comprehension (perhaps from a partial mediation to a complete mediation), followed by a phase in which listening comprehension largely explains variation in children's reading comprehension. The developmentally changing role of word reading and language comprehension has been hypothesized by the simple view of reading (Hoover&Gough, 1990)—the relation of listening comprehension to reading comprehension becomes stronger whereas the relation of word reading to reading comprehension becomes weaker from beginning to later stage of reading development. Similar patterns of relationships have been reported for English-speaking children (Adlof et al., 2006; Hoover & Gough, 1990; Francis, Fletcher, Catts, & Tomblin, 2005; Storch & Whitehurst, 2002) such that the relative importance of word reading and listening comprehension change for beginning readers versus advanced readers. For instance, the correlation between word reading fluency and reading comprehension latent variables decreased from .90 to .77 from grade one to four, and the correlation between listening comprehension and reading comprehension increased from .70 to .90 from grade one to four for English-speaking children (Kim & Park, 2012). This pattern of relations was also found in the present study such that word reading fluency was strongly and uniquely related to reading comprehension for kindergartners (i.e., r = .88), but only moderately related for first graders (r = .54). In contrast, listening comprehension was moderately related to reading comprehension (r = .55) for kindergartners but very strongly related for first graders (r=.91). To sum up, the present study confirms a developmentally changing nature of the relationships of word reading and listening comprehension to reading comprehension, but also demonstrates that another skill, text reading fluency, might be another important necessary component of reading comprehension and its relation changes as children's reading skills develop" (p. 95).

Young-Suk, K., Chea, H.P., & Wagner, R.K. (2014). Is oral/text reading fluency a "bridge" to reading comprehension? *Reading and Writing, 27*(1), 79-99.

"The purpose of this study was to examine the opportunities for academic responding during teacher-facilitated instruction for kindergarten students at-risk for reading difficulties during classroom, Tier I,

reading instruction. Our first aim was to document the amount of time individual students were academically responding during teacher-facilitated reading instruction. We found students at-risk for reading difficulties were academically responding to reading-related tasks for small amounts of time (approximately 3–4 % of the instructional block). Even less time was spent academically responding by reading print (approximately 1 % of the instructional block). These data suggest that, on average, students in our sample who were at-risk for reading difficulties spent the majority of their time in passive learning tasks (e.g., listening to the teacher or peers) and/or independent tasks without teacher assistance during Tier I instruction" (p.69).

Wanzek, J., Roberts, G., & Al Otaiba, S. (2014). Academic responding during instruction and reading outcomes for kindergarten students at-risk for reading difficulties. *Reading and Writing, 27*(1), 55–78.

"In a recent meta-analysis examining the effect of print exposure from infancy through young adulthood, Mol and Bus (2011) found that the role of print exposure becomes stronger (additive) as children get older. Their findings showed that print exposure explained increasing amounts of variance in the oral language skills of preschoolers and kindergarteners (12 %) and students in primary school (13 %), middle school (19 %), and high school (30 %). At the postsecondary level, print exposure explained 34 % of the variance in the oral language skills of undergraduate and graduate students. Although the aforementioned evidence suggests that reading should start early to take advantage of the positive effects of print exposure, Stanovich et al. (1996) have indicated that exposure to print is helpful regardless of children's cognitive ability or their level of reading comprehension. Therefore, it is crucial to ensure that young children are taught the word recognition skills needed for successful reading early in school so that they have the opportunity to become active and engaged readers. Likewise, it is equally important to provide broad and frequent reading experiences for older children, particularly those with low verbal abilities, because reading itself improves the language skills they need to become strong readers (Cunningham & Stanovich, 2001)" (p.190-191).

" … like those of Cunningham and Stanovich, our findings indicate that early success in reading and early development of language skills by 2nd grade may be indicative of a predilection toward the habit of reading and more engagement in reading-related activities. Likewise, the findings suggest that children who fall behind in reading in 1st grade but catch up with their peers by 2nd or 3rd grade may have a positive prognosis for engaging in reading that will further develop both their reading and language skills" (p.208). … "The results suggest that there may be an ongoing relationship between reading volume and declarative knowledge; that is, students who read well are likely to read more and increase their store of declarative knowledge. The findings also suggest that print exposure may be important for developing a fund of general knowledge regardless of a student's cognitive ability (Cunningham & Stanovich 1998; Stanovich & Cunningham, 1993; Stanovich, 1993) (p.209).

"As early as first grade, a pattern is established whereby children with strong early reading skills engage in reading more than their less skilled peers. Through reading, they strengthen not only their reading skills but also reading-related and cognitive skills such as spelling, vocabulary, listening comprehension, and declarative knowledge. The roots for this productive habit can be seen in early exposure to print through caregiver shared reading experiences and effective early reading instruction in which strong decoding skills are established. Some researchers have conceptualized this relationship between strong reading skills, engagement in reading, and development of reading-related and cognitive abilities as a ''virtuous circle'' (Snowling & Hulme, 2011). Other researchers have described the process by which children who fail to establish early reading skills find reading to be difficult and unrewarding, avoid reading and reading-related activities, and fail to develop reading-related and cognitive abilities as a ''vicious circle'' that is disastrous for their cognitive development and school achievement (Pulido & Hambrick, 2008). An early start in learning to read is crucial for establishing a successful path that encourages a ''lifetime habit of reading'' (Cunningham & Stanovich, 1997, p. 94) and for avoiding the decline in motivation for reading that can have devastating effects on reading growth and cognitive development over time" (p.209-210).
Sparks, R. L., Patton, J., & Murdoch, A. (2014). Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later'. *Reading and Writing, 27*(1), 189-211.

Gentaz, E., Sprenger-Charolles, L., Theurel, A., & Colé, P. (2013). Reading comprehension in a large cohort of French first graders from low socio-economic status families: A 7-month longitudinal study. *PLoS ONE 8*(11). e78608. doi:10.1371/journal.pone.0078608. Retrieved from http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0078608

"Nearly 80 percent of New York City high school graduates need to relearn basic skills before they can enter the City University's community college system".
CBS. (2013). Officials: Most NYC high school grads need remedial help before entering CUNY Community Colleges. Retrieved from http://newyork.cbslocal.com/2013/03/07/officials-most-nyc-high-school-grads-need-remedial-help-before-entering-cuny-community-colleges/2/

"Direct protective effects of primary school academic effectiveness
Attending a more academically effective primary school throughout Year 1 was found to be of especial benefit to those children who had experienced a greater number of early disadvantages between birth and age 5 years (higher scores on the multiple disadvantage measure). Although early disadvantage was still linked to significantly lower academic skills and self-regulation at age 6 years, this association was significantly reduced for children who now attended a more academically effective primary school" (p.263).… This study extends current knowledge about the links between equity and effectiveness that are a long-standing focus of much EER (educational effectiveness research). The results illustrate that attending an academically effective primary school has benefits for all students but may have especial importance in boosting outcomes for disadvantage groups (i.e., offers some protection against the adverse impacts of disadvantage experienced in the birth-preschool period). It also demonstrates the importance of both direct and indirect effects in shaping children's developmental and academic trajectories across their primary school career (age 6–11). The findings suggest that policy makers and practitioners should focus on promoting the academic effectiveness of primary schools for all children but especially those serving disadvantaged communities" (p.264-5).
Sammons, P., Hall, J., Sylva, K., Melhuish, E., Siraj-Blatchford, S., & Taggart, B. (2013). Protecting the development of 5–11-year-olds from the impacts of early disadvantage: The role of primary school academic effectiveness. *School Effectiveness and School Improvement: An International Journal of Research, Policy and Practice, 24*(2), 251-268.

Process training has always made the phoenix look like a bedraggled sparrow. You cannot kill it. It simply bides its time in exile after being dislodged by one of history's periodic attacks upon it and then returns, wearing disguises or carrying new noms de plum, as it were, but consisting of the same old ideas, doing business much in the same old ways (Mann, 1979, p. 539),

"For Dehaene et al., reading would not be the product of a specific phylogenetic evolution of the human brain, but is rather the result of a neuronal recycling from an area of the brain that evolution has dedicated to the recognition of certain forms, notably intersections of straight lines or curves. In other words, the brain would not have evolved to allow reading, but humans would have invented the characters for reading in a particular way because their brains had already put in place a system for decoding specific features" (p. 873).
Quercia, P., Feiss, L., & Michel, C. (2013). Developmental dyslexia and vision. *Clinical Ophthalmology, 7*, 869–881.

"I see these findings as devastating for advocates of the expansion of state pre-k programs. This is the first large scale randomized trial of a present-day state pre-k program. Its methodology soundly trumps the quasi-experimental approaches that have heretofore been the only source of data on which to infer the impact of these programs. And its results align almost perfectly with those of the Head Start Impact Study, the only other large randomized trial that examines the longitudinal effects of having attended a public pre-k program. Based on what we have learned from these studies, the most defensible conclusion is that these statewide programs are not working to meaningfully increase the academic achievement or social/emotional skills and dispositions of children from low-income families. I wish this weren't so, but

facts are stubborn things. Maybe we should figure out how to deliver effective programs before the federal government funds preschool for all".

Whitehurst, G.J. (2013). New evidence raises doubts on Obama's preschool for all. Brown Center on Education Policy. Retrieved from http://www.brookings.edu/blogs/brown-center-chalkboard/posts/2013/11/20-evidence-raises-doubts-about-obamas-preschool-for-all-whitehurst

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"The diagnostic criteria widely differ between studies. Whereas lower word reading is one of the most common criteria for defining dyslexia, the usage of a discrepancy criterion (e.g. age, grade or IQ discrepancy) is quite different, additionally the magnitude of discrepancy (e.g. 1, 1, 1.5 or 2 standard deviations below the norm) varies greatly. These differences might lead to the identification of different sub-groups from the large population suffering from dyslexia and to different grades of severity of affectedness" (p.1805).

Schulte-Körne, G., & Bruder, J. (2010). Clinical neurophysiology of visual and auditory processing in dyslexia: A review. *Clinical Neurophysiology,* 121(11), 1794–1809.

"Functional imaging studies have consistently demonstrated that children with reading disability display under-activation of a network of left-lateralized areas during reading, including occipito-temporal, temporo-parietal, and inferior frontal cortical regions (Hoeft et al., 2006, 2007; Meyler et al., 2007; Shaywitz et al., 2002; Simos et al., 2000a, 2000b), and that effective remedial reading interventions lead to increases in the activation in these same areas (Aylward et al., 2003; Meyler et al., 2008; Shaywitz et al., 2004; Simos et al., 2002; Temple et al., 2003), indicating that effective remediation can lead to a change in the brain functioning of poor readers. … Here we report a longitudinal DTI study indicating that intensive remedial reading instruction (approximately 100 hr) can change the structural integrity of the cortical white matter of children who are poor readers." (p.624).

Keller, T. A., & Just, M. A. (2009). Altering cortical connectivity: Remediation-induced changes in the white matter of poor readers. *Neuron, 64,* 624–631.

"Conclusions: Results of this study indicated that real word oral reading fluency was the strongest predictor of reading comprehension and suggest that real word oral reading fluency may be an efficient method for identifying potential reading comprehension difficulties for a more comprehensive evaluation" (p.340).

Wise, J. C., Sevcik, R. A., Morris, R. D., Lovett, M. W., Wolf, M., Kuhn, M., Meisinger, M., & Schwanenflugel, P. (2010). The relationship between different measures of oral reading fluency and reading comprehension in second grade students who evidence different oral reading fluency difficulties. *Language, Speech, and Hearing Services in Schools, 41,* 340-348.

"Ramus and colleagues (Ramus, 2003; Ramus et al., 2003) suggested that the auditory deficits observed in individuals with dyslexia have little influence on the development of phonology and reading and that with a proper control of the measurement error, these disorders would not be observed in more than 39% of the children with dyslexia. Several studies have supported this argument by showing that only a small number of children with dyslexia have auditory temporal processing deficits (e.g. Gibson, Hogben, & Fletcher, 2006; Marshall, Snowling, & Bailey, 2001; Share, Jorm, MacLean, & Matthews, 2002) and that performance on auditory temporal processing is not associated with phonological processing (e.g. Bretherton & Holmes, 2003; Georgiou et al., 2010; Landerl & Willburger, 2010; Protopapas & Skaloumbakas, 2007)" (p.112).

Georgiou, G.K., Papadopoulos, T.C., Zarouna, E., & Parrila, R. (2012). Are auditory and visual processing deficits related to developmental dyslexia*? Dyslexia, 18*(2), 110-29.

"Victoria's outcomes have not improved in the past decade, despite increased expenditure in the same period. International assessment programs consistently show that the gap between Victoria and the best performing jurisdictions internationally has grown, with implications for our global competitiveness and future economic growth. International benchmarking from 2011 shows that Australian and Victorian performance has remained largely static and our overall ranking has dropped, while other nations have

moved ahead. In the Progress in International Reading Literacy Study, 20 per cent of Victorian students (and 25 per cent of Australian students) did not meet the literacy proficiency standard, while overall Australia ranked 22nd out of 45 countries.1 In the Trends in International Mathematics and Science Study over a third of Victoria's Year 8 students did not meet the proficiency standard in maths. Overall Australia's Year 4 students were ranked equal 18th in maths and 19th in science out of over 40 countries" (p.6).

Department of Education and Early Childhood Development. (2013). From New Directions to Action: World class teaching and school leadership. Retrieved from http://www.education.vic.gov.au/Documents/about/department/teachingprofession.pdf

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But even in low-income families, parents who speak to their children more frequently can enhance vocabulary. In separate research, Ms. Fernald, working with Adriana Weisleder, a graduate student in psychology, recorded all the words that 29 children from low-income households heard over a day.

The researchers differentiated between words overheard from television and adult conversations and those directed at the children. They found that some of the children, who were 19 months at the time, heard as few as 670 "child-directed" words in one day, compared with others in the group who heard as many as 12,000.

Those who had heard more words were able to understand words more quickly and had larger vocabularies by age 2.

Weisleder, A. & Fernald, A. (2013). Talking to children matters: Early language experience strengthens processing and builds vocabulary. *Psychological Science, 24*(11), 2143-2152.

"At 18 months children from wealthier homes could identify pictures of simple words they knew — "dog" or "ball" — much faster than children from low-income families. By age 2, the study found, affluent children had learned 30 percent more words in the intervening months than the children from low-income homes".

Fernald, A., Marchman, V.A., & Weisleder, A. (2013). SES differences in language processing skill and vocabulary are evident at 18 months. *Psychological Science, 16*(2), 234-238.

"To further explore contextual reading rate, an important aspect of reading fluency, we examined the relationship between word reading efficiency (WRE) and contextual oral reading rate (ORR), the degree to which they overlap across different comprehension measures, whether oral language (semantics and syntax) predicts ORR beyond contributions of word-level skills, and whether the WRE–ORR relationship varies based on different reader profiles. Assessing reading and language of average readers, poor decoders, and poor comprehenders, ages 10 to 14, ORR was the strongest predictor of comprehension across various formats; WRE contributed no unique variance after taking ORR into account. Findings indicated that semantics, not syntax, contributed to ORR. Poor comprehenders performed below average on measures of ORR, despite average WRE, expanding previous findings suggesting specific weaknesses in ORR for this group. Together, findings suggest that ORR draws upon skills beyond those captured by WRE and suggests a role for oral language (semantics) in ORR".

Eason, S, H., Sabatini, J., Goldberg, L., Bruce, K., & Cutting, L.E. (2013). Examining the relationship between word reading efficiency and oral reading rate in predicting comprehension among different types of readers. *Scientific Studies of Reading, 17*(3), 199-223.

The present study investigated the relationships between lexical access, reading fluency, and comprehension. Two components of speed of lexical access were studied: phonological and semantic. Previous studies have mainly investigated these components of lexical access separately. The present study examined both components in naming tasks—with isolated letters (phonological) and pictures (semantic). Seventy-five Grade 5 students were administered measures of letter and picture naming speed, word and

nonword reading fluency, and reading comprehension, together with control measures of vocabulary. The results showed that letter naming was a unique predictor of word reading fluency, whereas picture naming was not. Conversely, picture naming speed contributed unique variance to reading comprehension, whereas letter naming did not. The results indicate that phonological and semantic lexical access speed are separable components that are important for different reading subskills (p. 303).

Poulsen, M., & Elbro, C. (2013). What's in a name depends on the type of name: The relationships between semantic and phonological access, reading fluency, and reading comprehension. *Scientific Studies of Reading, 17(*4), 303-314.

"Effect sizes decrease by school level (e.g., greater for younger students than middle school and upper elementary students). Also, there were larger effects for quasi-experimental than experimental studies and for researcher-designed measures than for standardized measures. Implications for educational settings and research agendas are discussed" (p.257).

Goodwin, A.P., & Ahn, S. (2013). A meta-analysis of morphological interventions in English: Effects on literacy outcomes for school-age children. *Scientific Studies of Reading, 179*(4), 257-285.

"Conclusion Although we recognize that extreme environmental variation in early reading development may have large effects on individual and group differences, the small shared family and school environment influences on variation in our twins' early reading and spelling development seem inconsistent with current popular and political views in the United States, as illustrated by the No Child Left Behind Act (2008), that individual differences in children's early reading skills are primarily due to environmental differences related to family environment and/or teacher and school quality. Although there is considerable evidence that intensive intervention can significantly ameliorate reading difficulties in some children, other children may still fall short of grade level due to their slower genetically influenced learning rates in reading and related skills (Byrne et al., 2008; Byrne et al., in press). Therefore, greater attention to the importance of genetic influences could lead to a more nuanced and realistic understanding of individual differences in children's early reading development" (p.366).

Christopher, M.E., Hulslander, J., Byrne, B., Samuelsson, S., Keenan, J.M., Pennington, B., DeFries, J.C., Wadsworth, S.J., Willcutt, E.G., & Olson, R.K. (2013). Modeling the etiology of individual differences in early reading development: Evidence for strong genetic influences. *Scientific Studies of Reading, 17*(5), 350-368.

"Based on detailed information for a set of nationally normed achievement tests, the academic developmental trajectory for average students in the United States appears to be one of rapid growth in the first several grades of elementary school, followed by gradually declining gains in later grades. Expressed as effect sizes, the annual gains in the early years are around 1.00, while those in the final grades of high school are 0.20 or less. … an intervention effect of a given magnitude represents a much larger proportion of normal annual growth for students in higher grades than it does for students in lower grades. … With respect to student subgroups, it was demonstrated that the gaps on standardized achievement tests range from less than 0.10 standard deviation for gender differences in math performance to almost a full standard deviation for race/ethnicity differences in math and reading. Any given intervention effect size will therefore "look" very different, depending on the gap (or gaps) with which it is compared". (p.29).

Bloom, H.S., Hill, C.J., Black, A.R., & Lipsey, M.W. (2008). *Performance trajectories and performance gaps as achievement effect-size benchmarks for educational interventions*. MDRC Working Papers on Research Methodology. Retrieved from http://mdrc.org/sites/default/files/full_473.pdf

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As Dr. Samuel Blumenfeld has mordantly noted in The Victims of Dick and Jane, "The International Reading Association...is perhaps the only organization of such size in which a form of educational malpractice has been enshrined as the highest pedagogical good and its practitioners awarded prizes for their achievements....The vast majority of American children are trapped within a system that is turning their brains into macaroni."

Blumenfeld, S.L. (2003). *The victims of Dick and Jane.* Chalcedon.

Palmaffy (1997) suggested that approximately 50% of children easily learn to read, 25% experience some degree of difficulty, and 25% experience serious difficulty learning to read.

Palmaffy, T. (1997, November - December). See Dick Flunk. *Policy Review, 86*, 32-40.

" … individual differences in response to early literacy instruction are increasingly accounted for by genetic factors as the intensity and consistency of instruction increases. In general, our results support the basic RTI approach that recognizes the need for more intense instruction for poor readers that are not otherwise instructional failures, which our results say are most poor readers at the end of first grade for the samples in our three countries" (p.295).

Samuelsson, S., Byrne, B., Olson, R.K., Hulslander, J., Wadsworth, S., et al. (2008). Response to early literacy instruction in the United States, Australia, and Scandinavia: A behavioral-genetic analysis. *Learning & Individual Differences, 18*(3), 289-295.

"Here I want to briefly examine some basic considerations, from the perspective of a scientist who studies how reading works, which suggest that how reading is taught is indeed a significant part of the literacy problem in the United States and other countries. There are three main points: (a) Contemporary reading science has had little impact on educational practice mainly because of a two-culture problem separating science and education; (b) This disconnection has been harmful. Current practices rest on outdated assumptions about reading and development that make learning to read harder than it needs to be, a sure way to leave many children behind; (c) Connecting the science to educational practice would be beneficial but is extremely difficult to achieve. The current environment limits the amount of collaborative work at the all-important translational interface. In the United States, the conflicting and often strongly entrenched interests of various stakeholders—educators, politicians, scientists, taxpayers, labor organizations, parent groups—make it hard to achieve meaningful change within the existing institutional structure of public education" (p.340-1).

Seidenberg, M.S. (2013). The science of reading and its educational implications. *Language Learning and Development, 9*(4), 331-360.

As Hanley et al. (2004) noted, "this result suggests that a transparent orthography does not confer any advantages as far as reading comprehension is concerned. As comprehension is clearly the goal of reading, this finding is potentially reassuring for teachers of English" (p. 1408).

Hanley, J. R., Masterson, J., Spencer, L., & Evans, D. (2004). How long do the advantages of learning to read a transparent orthography last? An investigation of the reading skills and reading impairment of Welsh children at 10 years of age. *Quarterly Journal of Experimental Psychology, 57*, 1393–1410.

Italian, German, Russian, Finnish, Korean, Serbo-Croatian, and many other alphabets are "shallow" (Katz & Frost, 1992).

Katz, L., & Frost, R. (1992). The reading process is different for different orthographies: The orthographic depth hypothesis. In R. Frost & L. Katz (Eds.), *Orthography, phonology, morphology, and meaning* (pp. 67–84). Amsterdam, the Netherlands: Elsevier North Holland Press.

"Gersten et al. (1986) evaluated perceptions of teachers and paraprofessionals with regard to a Direct Instruction program. Teachers were interviewed toward the end of the first and second year of implementation. Initially, teachers were concerned with the high degree of structure leaving little room for fun activities and felt that scripted lessons were overly mechanical. At least half of the teachers believed that their teaching philosophy conflicted with that of Direct Instruction. By mid year, Gersten et al. found that teachers and paraprofessionals generally came to accept the program. By the end of the first year, attitudes had improved along with student achievement. Gersten et al. found that by the end of the second year of implementation, all but one teacher agreed with the main objectives of Direct Instruction as a program for educationally disadvantaged students (p.26-27).

In the final discussion, Proctor concludes that 89% of all subjects agreed that regular use of Direct Instruction had increased their appreciation of the method. Also, the results show evidence supporting the relationship between the amount of supervised experience and positive attitudes towards Direct Instruction (p.28).

Results from the pre and post internship evaluation show that responses in favor of Direct Instruction increased. Differences in responses regarding attention signals, response signals, and feedback were statistically significant. Cossairt et al. conclude, "After completion of an internship where they work directly with educationally handicapped students, students felt even more strongly about the usefulness and values of these techniques" (p. 170)" (p.28-9)

"It is evident that the majority of the responses favored Reading Mastery. Overall, the teachers surveyed seemed to have mostly positive attitudes and perceptions towards the program. In general, it appears that the majority of participants believe that Reading Mastery aids learning and that they have seen positive results with the program" (p.58).

Cossairt, A., Jacobs, J., & Shade, R. (1990). Incorporating direct instruction skills throughout the undergraduate teacher training process: A training and research direction for the future. *Teacher Education and Special Education, 13*, 167-171.

Gersten, R., Carnine, D., & Cronin D. (1986). A multifaceted study of change in seven inner-city schools. *Elementary School Journal*, 86, 257-276.

Proctor, T. J. (1989). Attitudes toward direct instruction. *Teacher Education and Special Education*, *12*, 40-45.

Gervase, S. (2005). *Reading Mastery: A descriptive study of teachers attitudes and perceptions towards Direct Instruction.* (Electronic Thesis or Dissertation). Retrieved from http://rave.ohiolink.edu/etdc/view?acc_num=bgsu1120001760

"The results show that teachers often prefer direct instruction, and seldom promote discovery learning. While teachers sometimes realize authentic pedagogy, constructive learning tasks are seldom used. Teachers' reported practice and parents' preferences for their children appear to correspond reasonably" (Abstract). … "However, the infrequent use of discovery learning environments, compared with direct instruction, is mirrored by parent preferences" (p.17).

Roelofs, E., Visser, V., & Terwel, J. (2003). Preferences for various learning environments: Teachers' and parents' perceptions. *Learning Environments Research, 6*(1), 77-110.

"Snow and Moje (2010) described the widespread and misguided assumption that we should finish reading instruction by the end of third grade. They used the term "inoculation fallacy" to illustrate the notion that an early vaccination of reading instruction, especially in grades K–3, does not protect permanently against reading failure. Educators must continue to provide reading instruction beyond third grade. In sum, academic literacy goes beyond being able to read—a successful reader should be able to navigate advanced narrative and content-area text with ease and understanding" (p.162).

Marchand-Martella, N.E., Martella, R.C., Modderman, S.L., Petersen, H.M., & Pan, S. (2013). Key areas of effective adolescent literacy programs. *Education and Treatment of Children, 36*(1), 161-184.

"Research almost universally supports explicit instructional practices (Archer & Hughes, 2011; Kirschner, Sweller, & Clark, 2006; Klahr & Nigam, 2004; Marchand-Martella, Slocum, & Martella, 2004). Explicit instructional approaches are considered more effective and efficient as compared to discovery-based approaches (Alfieri, Brooks, Aldrich, & Tenenbaum, 2010; Ryder, Tunmer, & Greaney, 2008), particularly when students are naïve or struggling learners" (p.166).

Marchand-Martella, N.E., Martella, R.C., Modderman, S.L., Petersen, H.M., & Pan, S. (2013). Key areas of effective adolescent literacy programs. *Education and Treatment of Children, 36*(1), 161-184.

"Based on the research reviews and meta-analyses on adolescent literacy instruction, recommendations can be organized into five general areas: word study, fluency, vocabulary, comprehension, and motivation (Boardman et al., 2008; Kamil et al., 2008; Roberts et al., 2008; Scammacca et al., 2007; Torgesen et al., 2007)" (p.167).

Marchand-Martella, N.E., Martella, R.C., Modderman, S.L., Petersen, H.M., & Pan, S. (2013). Key areas of effective adolescent literacy programs. *Education and Treatment of Children, 36*(1), 161-184.

Questions have sometimes been raised about the extent to which reading skills of struggling adolescents can be remediated and whether the money spent on such interventions is justified in light of the degree of benefit attained (Vaughn et al., 2010, 2011, 2012). Adolescents who have already gone through years of reading instruction and still lag behind their same age peers are a very heterogeneous group in their reading abilities. Through the use of both group and individual differences analysis we were able to gain a more complete and finely-tuned picture of how these struggling readers respond to treatment. The struggling readers in this study were multiple grade levels (3–7 years) behind their typically developing peers in reading ability. Results of both group and individual analyses indicate these older struggling readers can be remediated **and for some, gains of two, three, four, or more years can be accomplished with only 1 year of instruction.** While two to three years of gain for students who are four to six years behind by no means closes the achievement gap, these findings are encouraging in providing information on which modality of instruction closes the achievement gap best

"Most compelling from the current analyses are results directly investigating the differences between three modalities (Alternating, Integrated, Additive) of instruction. Outcomes showed clearly that modality of instruction can matter considerably for these older struggling readers. The differences in gains clearly demonstrate that the Additive modality, with its sequential addition of each component (isolated phonological decoding instruction, followed by addition of spelling instruction, followed by addition of fluency instruction, and finally the addition of comprehension instruction [see Table 1]) is potentially the best modality for remediating reading skills (decoding, spelling, fluency, comprehension) in older struggling readers, of the three approaches that were compared in this research. These students show that they are highly sensitive to the scheduling of the components and the amounts of instructional time per component; this is an important finding for the development and refinement of reading programs for struggling adolescent readers. While more research still needs to be conducted in this area, this study lends credence to the different requirements this unique population of students may need in order to close the achievement gap in acquiring adequate reading skills" (p.588-9).
Calhoon, M. B., & Prescher, Y. (2013). Individual and group sensitivity to remedial reading program design: Examining reading gains across three middle school reading projects. *Reading and Writing: An Interdisciplinary Journal, 26,* 565-592.

"Impressive and unexpected were the large gains made in comprehension by students in the Additive modality, insofar as they receive relatively few hours of explicit comprehension instruction (12–13 h.) in comparison to the other modalities (24–39 h). The theoretical underpinnings of the Additive modality are that reading is hierarchical and that automaticity of lower level skills (decoding, spelling) allows cognitive efforts to then be allocated to attaining higher level skills (fluency, comprehension; LaBerge & Samuels, 1974; Reynolds, 2000, Samuels & Kamil, 1984). Clearly, the changes brought about by other aspects of instruction (front loading of phonics instruction, followed by the addition of spelling instruction, followed by the addition of fluency instruction) laid the groundwork for comprehension gains, without having to supply a great deal of explicit comprehension instruction. These older struggling readers were able to master decoding, spelling, and fluency, before comprehension was even introduced into instruction, enabling them to more fully understand strategy instruction and achieve comprehension gains with very little explicit comprehension strategy instruction. These results strongly suggest that it may not be how many hours of instruction for each component that is important, but instead when those hours are incorporated into organization of instruction, that matters most" (p.587).
Calhoon, M. B., & Prescher, Y. (2013). Individual and group sensitivity to remedial reading program design: Examining reading gains across three middle school reading projects. *Reading and Writing: An Interdisciplinary Journal, 26,* 565-592.

"With regard to skill improvement, outcomes in three of the studies were associated with differences in the initial reading skill level of older learners (Calhoon and Petscher, 2013; Greenberg et al., 2012; Scarborough et al., 2012)" (p.492). That is the higher were the pretest scores the higher were the gains.
Calhoon, M.B., Scarborough, H.S., & Miller, B. (2013). Interventions for struggling adolescent and adult readers: Instructional, learner, and situational differences. *Reading and Writing, 26,* 489–494.

"Calhoon and Petscher found compelling indications that the level of improvement by their adolescent sample and the percentages of students classified as gainers, were influenced by the way that elements of how a common curriculum were organized and sequenced during instruction" (p.492).

Calhoon, M.B., Scarborough, H.S., & Miller, B. (2013). Interventions for struggling adolescent and adult readers: instructional, learner, and situational differences. *Reading and Writing, 26,* 489–494.

"Older struggling readers fall into a wide range of developmental levels, presenting a unique set of circumstances not found in younger more homogeneous beginning readers (Biancarosa & Snow, 2004). These struggling adolescents readers generally belong to one of two categories, those provided with little or poor early reading instruction or those possibly provided with good early reading instruction, yet for unknown reasons were unable to acquire reading skills (Roberts, Torgesen, Boardman, & Sammacca, 2008). Additionally within these two categories, older struggling readers are extremely heterogeneous and complex in their remediation needs (Nation, Snowling, & Clarke, 2007; Torgesen et al., 2007)" (p.566).

Calhoon, M. B., & Prescher, Y. (2013). Individual and group sensitivity to remedial reading program design: Examining reading gains across three middle school reading projects. *Reading and Writing: An Interdisciplinary Journal, 26,* 565-592.

"A recent meta-analysis of 85 studies with struggling readers in preschool through 7th grades suggests that the optimal type or modality of reading intervention may vary with grade level (Suggate, 2010). Phonics interventions produced greater effect sizes for kindergarten and 1st grade students, while mixed (phonics with comprehension) interventions and pure comprehension interventions yielded larger effects for older students. However, given the wide range of results from adolescent intervention studies (Fuchs, Fuchs, & Kazdan, 1999; Hasselbring & Goin, 2004; Lovett, Borden, DeLuca, Lacerenza, Benson, & Brackstone, 1994; Lovett, Lacerenza, Borden, Frijters, Steinbach, & De Palma, 2000; Lovett & Steinbach, 1997; Lovett, Steinbach, & Frijters, 2000; Mastropieri et al. 2001; Vaughn et al., 2010, 2011,2012), additional research on this issue is needed to provide a more complete picture that can inform the design and delivery of instruction for older struggling readers (Suggate, 2010)" (p.566).

Calhoon, M. B., & Prescher, Y. (2013). Individual and group sensitivity to remedial reading program design: Examining reading gains across three middle school reading projects. *Reading and Writing: An Interdisciplinary Journal, 26,* 565-592.

"Unfortunately, quality training in research-based principles, tactics, and components is not commonplace. For instance, in a survey conducted by the National Council on Teacher Quality of 72 teacher education programs (Walsh, Glaser, & Wilcox, 2006), only 15% of them taught all five components of successful reading instruction (National Reading Panel [NRP], 2000) and almost half of the programs taught none of them. Similar results were found for preparation programs in special education (Reschly, Holdheide, Smartt, & Oliver, 2007)" (p.174).

Slocum, T. A., Spencer, T. D., & Detrich, R. (2012). Best available evidence: Three complementary approaches. *Education and Treatment of Children, 35*(2)*,* 153 – 181.

"Baker, Gersten, Dimino, and Griffiths (2004) found that knowledge of a practice's underlying principles distinguished between teachers who were high sustainers and teachers characterized as moderate sustainers. The results of these studies suggest that when teachers lack an understanding of research-based principles that allow effective adaptation, interventions may be prematurely discarded and practitioners may conclude that research has little relevance to their practice (Gersten, Vaughn, Deshler, & Schiller, 1997)" (p.172).

Slocum, T. A., Spencer, T. D., & Detrich, R. (2012). Best available evidence: Three complementary approaches. *Education and Treatment of Children, 35*(2)*,* 153 – 181.

Bear in mind that whilst the budgets for the provision of health and education services are roughly similar, the funding for health research is about 16 times that for education.

Australian Bureau of Statistics. (2010). *ABS Research and Experimental Development, All Sector Summary, Australia, 2008-09*. Retrieved from
http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8112.02008-09?OpenDocument

The US D.O.E. spends about $80 million annually in educational research; whereas, the Department of Health and Human Services provides about $33 billion for health research.
The Haan Foundation. (2012). The federal education research project. Retrieved from
http://www.haan4kids.org/fed_proj/

"Research evidence indicates strongest gains in PA skills are observed when no more than one to two PA skills are taught at any one time (Ehri, Nunes, Willows et al., 2001), emphasising phoneme segmenting and blending sounds in spoken words as key foundation literacy skills. Furthermore, PA training is most effective in facilitating early PA skill and accelerating early word reading, when combined with letter knowledge training (Byrne & Fielding-Barnsley, 1991; Ehri, Nunes, Stahl et al., 2001; Ehri, Nunes, Willows et al. 2001; Hatcher et al., 1994, 2006), and when instruction includes exercises to teach the application of PA in reading (words and connected text) and writing tasks (Cunningham, 1990; Hatcher et al., 1994, 2006)" (p.99).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

"The rates of responsiveness are less positive than those following early intervention, ranging from 15% to 60% of pupils in any sample of dyslexics (depending on reading outcome measures) unable to make significant, long lasting gains, when assessed up to 2 years following the end of the intervention (Torgesen, 2000, 2005). The gains in word reading fluency from phonologically based interventions are typically weaker for older pupils than for younger pupils receiving early intervention" (p.100).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

"Roberts et al. (2008) suggest the five areas recognised by the NRP as key ingredients for early reading intervention should be adapted for older readers to include: (i) word study, (ii) fluency, (iii) vocabulary, (iv) comprehension and (v) motivation. Low levels of motivation are a common barrier to learning (Guthrie & Davis, 2003) and a predictor of response to intervention (RTI: Duff, 2008), particularly in older pupils. Reduced reading experience following a long-lasting reading difficulty may also impact on a pupil's spoken and written vocabulary, reading fluency and effective comprehension strategies. Hence, careful assessment and diagnosis of older pupils is essential to ensure the appropriate programme of intervention is provided" (p.100).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

Group size. Evidence from reviews of the literature has shown small group delivery (typically three to four pupils per adult) can be as effective as individual tutoring (1:1) when effect sizes are compared across studies employing one of these two methods of delivery (Elbaum, Vaughn, Hughes & Moody, 2000; Vaughn, Linan-Thompson, Kouzekanani et al., 2003; see also Hatcher et al., 2006). To our knowledge, only one study has manipulated group size using the same intervention programme (Helf, Cooke & Flowers, 2009), reporting equivalent levels of programme efficacy for small group instruction (1:3) relative to individual tutoring (1:1). Even with older pupils with severe and persisting dyslexic reading difficulties, there is evidence from well-controlled studies that small group intervention, when intensive (e.g. 100 hours), can be as effective as individually delivered intervention, bringing below average pre-intervention reading levels into the average range (Lovett et al., 2000; Rashotte et al., 2001; Torgesen, Rashotte, Alexander, Alexander & MacPhee, 2003). Such findings have clear implications for costs, when making decisions about effective Wave 2 reading intervention programmes" (p.101-102).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

"Characteristics of pupils who fail to respond to Wave 2 intervention. Recent research has begun to investigate the characteristics of these 'nonresponders' to otherwise effective early reading intervention (at Wave 2), with a small number of longitudinal studies evaluating progress of pupils from Wave 1 through Wave 3 within the RTI framework. A number of the large-scale intervention studies reviewed in previous sections concur that predictors of poor response rates in their studies include weak pre-intervention levels of phonological/reading skills, problem levels of teacher-rated behaviour and inattention and low SES (Hatcher et al., 2006; Torgesen et al., 1999; for reviews, see Al Otaiba & Fuchs, 2002, 2006; Duff, 2008; Nelson, Benner & Gonzalez, 2003). A small number of studies have identified co-occurring weak oral language skills as an additional predictor of response to phonological-based interventions (e.g. Vadasy, Sanders & Abbott, 2008; Whiteley et al., 2007; but see Hatcher & Hulme, 1999; Vellutino et al., 1996). "A recent meta-review of five intervention studies reported in the United States identified seven cognitive‑ linguistic variables related to variation in RTI, listed from strongest to weakest predictor (see Duff, 2008 for further details): slow rapid naming (RAN), problem behaviour, poor PA, limited understanding of the alphabetic principle, weak verbal memory, IQ and demographics. Environmental factors influencing RTI potentially include quality of Wave 1 teaching, point of intervention (early or late, where 'late' is defined as after KS 1 in England or G2 in the United States) and programme fidelity. The careful training, implementation, supervision and monitoring which characterises research studies may not always be observed in other circumstances with detrimental effects on the outcome of the intervention (Byrne & Fielding-Barnsley, 1995; Byrne et al., 2010; see Carter & Wheldall, 2008 for further discussion of this issue). Programme content may also influence outcome when the evidence base for inclusion of that content is weak or the content and/or implementation is inappropriate for the individual's profile of needs, due to insufficient assessment and monitoring" (p.105).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

"The evidence base reviewed above, of the characteristics of effective Wave 2 intervention programmes for early and more persisting word reading difficulties, suggests more research is needed to better understand the role of: (a) instructional intensity (length of intervention, hours of instruction, optimal ratios of teachers to students, reading time, etc.); (b) programme integrity/fidelity; (c) teacher ability/experience; (d) programme focus/explicitness/multidimensionality; and (e) individual student prior instructional experiences/exposure and reading abilities. The ways in which these factors, individually and together, affect treatment outcomes are just beginning to be addressed, particularly for treatment resisters (Shaywitz et al., 2008)" (p.106).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

"More research is also needed to explore the impact of other co-occurring difficulties, such as inattention, on responsiveness. Empirical investigation of ways to increase the motivation of older struggling readers could also impact on the effectiveness of teaching these hard-to-teach pupils" (p.112).
Griffiths, Y., & Stuart, M. (2013). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 36*(1), 96-116.

"In conclusion, then, our contention is as follows: while it is possible to design and carry out a study which could provide unequivocal evidence that there is a causal link from competence in phonological awareness to success in reading and spelling acquisition, we do not think that such a study exists in the literature. We hope that this review will provide the stimulus for just such a study" (p.105).
Castles, A., & Coltheart, M. (2004). Is there a causal link from phonological awareness to success in learning to read? *Cognition, 91*(1), 77-111.

"Overall, the data suggest that there is little value in training pre-schoolers in either letter forms or sounds in isolation in advance of providing instruction on the links between the two" (p. 68).
Castles, A., Coltheart, M., Wilson, K., Valpied, J., & Wedgwood, J. (2009). The genesis of reading ability: what helps children learn letter-sound correspondences? *Journal of Experimental Child Psychology, 104*(1), 68-88.

"Phonological memory refers to the ability to maintain phonological information in working memory (Wagner & Torgesen, 1987). It consists of the phonological loop, a two-part storage system of auditory information (Baddeley, 1992). These two parts of the phonological loop work together, with the first part "recording" the last two seconds of phonological information and the second part providing articulatory input and refreshing the information in phonological storage to permit longer retention (Wagner et al., 1999b; see Baddeley, 2007 for a discussion of the phonological loop). An efficient phonological memory system facilitates reading by allowing the allocation of cognitive resources to blending the sounds together to make words rather than needing to employ a strategy to remember the sounds (Baddeley, 1982). Rapid automatized naming refers to the ability to retrieve phonological information from long-term memory (Wagner et al., 1987). When readers decode words, they unconsciously engage in a variety of cognitive processes that are influenced by rapid automatized naming. They must quickly retrieve the phonological codes for the letters from long-term memory, blend the codes together, and search their long-term memory's internal dictionary in order to make meaning of the combined codes (Wagner et al., 1987)" (p.180).

Nelson, J.M., Lindstrom, J.H., Lindstrom, W., & Denis, D. (2012). The structure of phonological processing and its relationship to basic reading. *Exceptionality: A Special Education Journal, 20*(3), 179-196.

"In the absence of empirical research, proponents rely heavily on testimonials, anecdotal evidence and in-house unpublished research studies (see for example, DDAT, n.d.; Irlen Institute, n.d.). The presentation of anecdote and professional experience in the absence of scientific evidence (e.g., Evans et al., 1999; Irlen, 1991; Kimball, 1988; Pheloung, 1997) is undoubtedly a factor in the persistence of these approaches. Reliance on anecdotes and testimonies is recognized as one of the signs of pseudoscience (Park, 2003) and as a characteristic of controversial or fad treatments in special education (McWilliam, 1999). A clear belief that personal perceptions are inherently reliable, even when they are in conflict with objective evidence, is a key feature of pseudoscientific thinking (Sagan, 1997; Shermer, 1997). The power of testimonials as persuaders is recognized by the advertising industry (Cialdini, 2001). Newman (2003) provided some compelling accounts of the power of personal stories over hard scientific data in the field of medicine and concluded that a conscious effort is required to make decisions based on scientific evidence" (p.331).

Hyatt, K.J., Stephenson, J., & Carter, M. (2009). A review of three controversial educational practices: Perceptual motor programs, sensory integration, and tinted lenses. *Education and Treatment of Children, 32*(2), 313-342.

"Among these struggling readers, most (85 %) also had weaknesses on nationally standardized measures, particularly in comprehension; however, most of these also had difficulties in decoding or fluency".

Cirino, P.C., Romain, M., Barth, A.E., Tolar, T., Fletcher, J.M., & Vaughn, S. (2013). Reading skill components and impairments in middle school struggling readers. *Reading and Writing,* 26(1), 1059–1086.

"The practice of referring to letters by their sounds was motivated by the idea that letter sounds are more useful than letter names in learning to read and spell (e.g., Feitelson, 1988). However, letter names may be worth learning because most of them, in English as in other languages, contain a phoneme that the letter symbolizes (Treiman & Kessler, 2003). Children who are familiar with the names of letters take advantage of this fact (Ellefson et al., 2009; McBride-Chang, 1999; Treiman et al., 1998). A further benefit of conventional letter names is that they follow the same phonological patterns as other words of the language. Some sound-based labels, such as /æ/ for a, do not; normal English words never end with short vowels. Informal and formal instruction that stresses letter names as opposed to sounds leads to different patterns of performance and different types of errors for young learners of English. However, one set of practices does not make mastering this complex writing system markedly easier than the other" (p.485-486).

Treiman, R., Stothard, S.E., & Snowling, M.J. (2013). Instruction matters: Spelling of vowels by children in England and the US. *Reading and Writing, 26*(3), 473-487.

"Background: Our ability to look at structure and function of a living brain has increased exponentially since the early 1970s. Many studies of developmental disorders now routinely include a brain imaging or electrophysiological component. Amid current enthusiasm for applications of neuroscience to educational interventions, we need to pause to consider what neuroimaging data can tell us. Images of brain activity are seductive, and have been used to give credibility to commercial interventions, yet we have only a limited idea of what the brain bases of language disorders are, let alone how to alter them. Scope and findings: A review of six studies of neuroimaging correlates of language intervention found recurring methodological problems: lack of an adequate control group, inadequate power, incomplete reporting of data, no correction for multiple comparisons, data dredging and failure to analyse treatment effects appropriately. In addition, there is a tendency to regard neuroimaging data as more meaningful than behavioural data, even though it is behaviour that interventions aim to alter. Conclusion: In our current state of knowledge, it would be better to spend research funds doing well designed trials of behavioural treatment to establish which methods are effective, rather than rushing headlong into functional imaging studies of unproven treatments" (p.247).

"The impression is that the field is trying to run before it can walk. Our first priority should be to first develop interventions for children with language impairments and other neurodevelopmental disorders, and to produce good evidence of their efficacy using randomized controlled trials. Second, we also need to do far more methodological work to ensure our neuroimaging tools are as reliable, sensitive and standardized as our behavioural measures (Dichter et al., 2012). Third, we will need to develop multicentre collaborations to do studies with adequate statistical power to detect treatment effects. Only then will we be in a strong position to combine neuroimaging with intervention to answer questions about underlying mechanisms of effective intervention" (p.257).

Bishop, D. V. M. (2012). Neuroscientific studies of intervention for language impairment in children: interpretive and methodological problems. Research Review: Emanuel Miller Memorial Lecture 2012. *Journal of Child Psychology and Psychiatry, 54*(3), 247–259.

"Letter knowledge is a strong predictor of individual differences in early word reading skills. For example Bond and Dyjkstra (1967) reported correlations varying between .5 and .6 for letter knowledge assessed at the beginning of first grade and word identification skills measured at the end of the school year; Muter et al. (2004) reported a correlation of .35 between letter knowledge assessed at the beginning of Year 1 and reading skills assessed 1 year later. High correlations between letter knowledge and later decoding skills are also reported in other longitudinal studies (Badian, 1998; Roth, Speece, & Cooper 2002; Stephenson, Parrila, Georgiou, & Kirby, 2008). Studies differ in whether they assess letter–name or letter–sound knowledge. In the United States, typically children are taught letter names first (Treiman, Pennington, Shriberg, & Boada, 2008), and U.S. studies typically report relationships between letter–name knowledge and reading ability (e.g., Bond & Dyjkstra, 1967). Conversely, in the United Kingdom and many other European countries, **letter sounds are usually taught before letter names,** and accordingly studies in these countries often report measures of letter–sound knowledge. Many studies do not distinguish between letter–name and letter–sound knowledge and report a composite measure of both skills (Lervåg et al., 2009; Muter et al., 2004). A small number of studies (e.g., Caravolas, Hulme, & Snowling, 2001; McBride-Chang, 1999) have reported separate measures of letter–name and letter–sound knowledge from the same children, and in those studies both measures (name and sound knowledge) are typically correlates of reading ability. Concurrent measures of letter–name and letter–sound knowledge typically correlate moderately with each other (.43–.80 at different time points in McBride-Chang, 1999, and Caravolas et al., 2001), and both measures typically correlate with reading ability, with letter–sound knowledge tending to show the stronger relationship (Caravolas et al., 2001; McBride-Chang, 1999)" (p.4).
Melby-Lervåg, M., Lyster, S-A H., & Hulme, C. (2012). Phonological skills and their role in learning to read: A meta-analytic review. *Psychological Bulletin, 138*(2), 322-352.

3.35 However, as with the early intervention studies, even the most effective intervention programmes do not lead to significant reading gains for *all* of the participating children and depending on the reading skills measured, from 15 to 60% of older pupils with dyslexia may fail to respond [i.e., scores falling below the 30th percentile](p.70).

Rose, J. (2009). *Identifying and teaching children and young people with dyslexia and literacy difficulties*. An independent report from Sir Jim Rose to the Secretary of State for Children, Schools and Families, June 2009. Retrieved from dera.ioe.ac.uk/14790/1/00659-2009DOM-EN.pdf

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A US review of the effectiveness of early intervention suggests that between 11% and 35% may show a poor response.
Torgesen, J.K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40,* 7-26.

Literate cultural capital is a generic term referring to literacy-related knowledge and abilities at school entry that are an outgrowth of activities in the home environment that support early literacy development (Chapman et al., 2012)

"Developmental dyslexia is a reading disorder, yet deficits also manifest in the magnocellular-dominated dorsal visual system. Uncertainty about whether visual deficits are causal or consequential to reading disability encumbers accurate identification and appropriate treatment of this common learning disability. Using fMRI, we demonstrate in typical readers a relationship between reading ability and activity in area V5/MT during visual motion processing and, as expected, also found lower V5/MT activity for dyslexic children compared to age- matched controls. However, when dyslexics were matched to younger controls on reading ability, no differences emerged, suggesting that weakness in V5/MT may not be causal to dyslexia. To further test for causality, dyslexics underwent a phonological-based reading intervention. Surprisingly, V5/MT activity increased along with intervention-driven reading gains, demonstrating that activity here is mobilized through reading. Our results provide strong evidence **that visual magnocellular dysfunction is not causal to dyslexia but may instead be consequential to impoverished reading**" (p.1).

Olulade, O. A., Napoliello, E. M., & Eden, G. F. (2013). Abnormal visual motion processing is not a cause of dyslexia. *Neuron, 79,* 1-11.

"Text level as determined by running records appears to be an unreliable measure that yields inflated estimates of reading achievement (Authors, 2003; Blaiklock, 2004; Elbaum, Vaughn, Hughes, & Moody, 2000; Hiebert, 1994)."
Tunmer, W.E., Chapman, J.W., Greaney, K.T.,. Prochnow, J.E. & Arrow, A.W. (2013) Why the New Zealand National Literacy Strategy has failed and what can be done about it: Evidence from the Progress in International Reading Literacy Study (PIRLS) 2011and Reading Recovery monitoring reports. *Australian Journal of Learning Difficulties, 18*(2), 139-180.
Blaiklock, K. E. (1997). Bring back the Burt: Some comments on the value of word recognition tests for the assessment of reading. *New Zealand Reading Forum, 2,* 13-16.
Elbaum, B., Vaughn, S., Hughes, M., & Moody, S. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of Educational Psychology, 92*, 605-619.
Hiebert, E. H. (1994). Reading Recovery in the United States: What difference does it make to an age cohort? *Educational Researcher, 23*, 15-25.

Nationally, the percentage of 3- to 21-year-old students with learning disabilities dropped from 6.1 percent in 2000 to 4.9 percent in 2010 … Gene Lenz, director of federal and state education policy for the Texas Education Agency says Texas has moved away from over-diagnosing students. At one point, children may have been sent to special education because of the color of their skin, he said. Now, every effort is made to refer students only after they fail to respond to intervention. "Districts are taking care to make sure that's 100 percent true before they place a label on a child," Lenz said.

Radcliffe, J. (2012). Experts can't explain drop in state's special education numbers. Houston Chronicle, 4/7/2012. Retrieved from http://www.chron.com/news/houston-texas/article/Experts-can-t-explain-drop-in-state-s-special-3684502.php

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"The Peter Effect is based on the biblical story of the Apostle Peter, who when asked for money by a beggar replied that he could not give what he himself did not have (Acts 3:5). Applegate and Applegate (2004) applied the principle of the Peter Effect as an explanation to their findings from an investigation of teacher candidates' attitudes toward enjoyment of reading. Findings revealed that 54.3% of 195 teacher candidates were classified as unenthusiastic about reading and only 25.2% of teacher candidates reported unqualified enjoyment of reading. In the present study, we hypothesized not only that can teachers not pass on an enthusiasm for reading when they do not possess it but also that teachers cannot pass on understanding of the basic language constructs considered essential for early reading success when they do not possess that understanding" (p.526-7).

"Although a lack of teacher expertise in basic language constructs has been demonstrated in previous studies, little research has focused on the knowledge and abilities of the teachers of teachers. This study addressed an area of research that could be vital to improving the high incidence of reading difficulties and low reading achievement seen in U.S. schools today—the level of understanding of those teaching our teachers. The results of this study showed that teacher educators do not possess a good understanding of basic language constructs (also see Joshi, Binks, Hougen, Dahlgren, et al., 2009). This may be at least one reason for poor teacher understanding—as teacher educators cannot give what they themselves do not possess. Effective teaching is the best weapon against reading failure, and, in order for preservice teacher preparation to be improved, an increase in teacher educators' understanding of the critical basic language constructs of reading is needed" (p.534-5).

Binks-Cantrell, E., Washburn, E.K., Joshi, R.M., & Hougen, M. (2012): Peter Effect in the preparation of reading teachers. *Scientific Studies of Reading, 16*(6), 526-536.

"*Spelling Mastery* represents a third example of an explicit, whole-word approach to spelling instruction. For high frequency, irregular words that cannot be spelled by applying phonemic rules, *Spelling Mastery* uses an explicit wholeword approach to spelling instruction. A typical whole-word lesson in *Spelling Mastery* begins by introducing students to a sentence that contains irregular words (e.g., *I thought he was through.*). At first the unpredictable letters or letter combinations are provided and students must fill in the missing letters (e.g., _ _ _ ough _ _ _ _ a _ _ _ _ ough). Presenting the irregular words in this way teaches the students that even irregular words have some predictable elements. Gradually, the number of provided letters is decreased until students are able to spell all the words without visual prompts. Once the sentence is learned, variations are presented so that students can apply the spelling of irregular words to various sentence contexts (e.g., *She thought about her homework throughout the night.*). This explicit approach to whole-word spelling instruction leads students through gradual steps toward the ultimate goal of accurate spelling performance" (p.100).

Simonsen, F., & Gunter, L. (2001). Best practices in spelling instruction: A research summary. *Journal of Direct Instruction, 1*(2), 97–105.

"Although the interventions used in this study, Reading Mastery and Corrective Reading were not specifically designed for use by non-teachers, the study demonstrated that that instructional assistants – when provided with training – were able to implement these scripted reading programs effectively, with benefits for students across reading skill subsets. Both of these programs, which had been previously evaluated for small-group and whole-class use (Stahl & Miller, 1989), include critical alphabetic, decoding, and fluency components identified for inclusion in effective early reading programs, and incorporate features of effective instructional design (e.g., explicit skills instruction, teacher modelling, review cycles)" (p.310).

Vadasy, P.F. (2011). Supplemental reading instruction by paraeducators and tutors: Recent research and applications. In Rollanda E. O'Connor & Patricia F. Vadasy (Eds.). *Handbook of reading interventions.* New York: Guildford (p.310).

"In intervention research, treatment fidelity is defined as the strategies that monitor and enhance the accuracy and consistency of an intervention to ensure it is implemented as planned and that each component is delivered in a comparable manner to all study participants over time. Reviews of the literature in special education and other disciplines reveal that reports of treatment fidelity are limited" (p.121).

Smith, S.W., Daunic, A.P., & Taylor, G.G. (2007). Treatment fidelity in applied educational research: Expanding the adoption and application of measures to ensure evidence-based practice. *Education & Treatment of Children 30*(4), 121-134.

"In a study by Eckert et al. (2006), CBM material was used as an indicator of students' mathematics and reading skills. Teachers were asked to estimate students' reading and mathematics level (mastery, instructional, or frustrational). This judgment was compared with students' actual reading and mathematics level as measured by the CBM material via percentage agreement. The results indicated that teachers overestimated students' performance across most mathematics skills and on reading material that was at or below grade level. Bates and Nettelbeck (2001) subtracted students' reading accuracy and reading comprehension scores on a standardized achievement test from teachers' predictions of these scores. **Teachers generally overestimated the performance of the 6- to 8-year-old students; inspection of the difference scores revealed that this held to a greater extent for low-achieving readers** than for average- and high-achieving students. In line with this result, Begeny et al. (2008) found that teachers' judgments of students with average to low oral reading fluency scores were rather inaccurate, and Feinberg and Shapiro (2003) reported that teachers generally overestimated the performance of low-achieving readers" (p.757).

Südkamp, A., Kaiser, J., & Möller, J. (2012). Accuracy of teachers' judgments of students' academic achievement: A meta-analysis. *Journal of Educational Psychology, 104*(3), 743-762.

*Begeny, J. C., Eckert, T. L., Montarello, S. A., & Storie, M. S. (2008). Teachers' perceptions of students' reading abilities: An examination of the relationship between teachers' judgments and students' performance across a continuum of rating methods. *School Psychology Quarterly, 23,* 43–55.

Feinberg, A. B., & Shapiro, E. S. (2003). Accuracy of teacher judgments in predicting oral reading fluency. *School Psychology Quarterly, 18,* 52–65.

"Studies on the effects of grade retention— having to repeat a grade—on academic and psychosocial adjustment have a long history, dating from the early 20th century (Owings & Magliaro, 1998). The nearly unanimous conclusion from reviews of this research (for meta-analytic reviews, see Allen, Chen, Willson, & Hughes, 2009; Holmes, 1989; Jimerson, 2001a; for narrative reviews, see Jimerson, 2001b; Shepard, Smith, & Marion, 1996; Sipple, Killeen, & Monk, 2004) is that in terms of academic achievement, students retained in a grade fare the same as or worse than they would have if they had been promoted (p.603). … "These results suggest that had the students who were retained in first grade been promoted instead, they would have performed as well by the end of fifth grade on a well-validated, nationally standardized measure of reading and math achievement as they did" (p.615). … "These results extend previous research on retention effects. Using a more direct test of the effects of retention on students' performance relative to their grade mates, these results extend and refine those of Wu et al. (2008). Retention in first grade results in an initial increase in scores on a nationally standardized measure of reading and math achievement that dissipates beyond the repeat year and is lost by the time students are in fifth grade" (p.618).

Moser, S. E., West, S. G., & Hughes, J. N. (2012). Trajectories of math and reading achievement in low-achieving children in elementary school: Effects of early and later retention in grade. *Journal of Educational Psychology, 104*(3), 603-621.

"Population estimates revealed that 13.4% of children could be classified as late-emerging poor readers. These children could be divided into those with problems in comprehension alone (52%), word reading alone (36%), or both (12%). Further results indicated that late-emerging poor readers often had a history of language and/or nonverbal cognitive impairments in kindergarten. Subtypes of poor readers also differed significantly in their profiles of language, early literacy, and nonverbal cognitive abilities in kindergarten" (p. 166.) … Furthermore, retrospective analyses showed that these children indeed had late-emerging problems, not late-identified problems. That is, late-emerging poor readers did not appear to have early reading problems that had been missed as a result of flaws in the identification process (e.g., overlooked due to their high intelligence, good behavior, or compensatory strategies), as had sometimes been assumed" (p.167).

Catts, H. W., Compton, D., Tomblin, J. B., & Bridges, M. S. (2012). Prevalence and nature of late-emerging poor readers. *Journal of Educational Psychology, 104*(1), 166-181.

"It has been widely established that there is a link between externalizing problems and academic/cognitive deficits, but there is a lack of consensus regarding the cause of this relation. Some research supports the notion that academic and cognitive deficits lead children to display externalizing behavior (e.g., Halonen, Aunola, Ahonen, & Nurmi, 2006; Miles & Stipek, 2006), whereas other studies support the theory that externalizing behavior problems lead children to experience academic and cognitive difficulties (e.g., Jorm, Share, Matthews, & Maclean, 1986; McMichael, 1979; Palfrey, Levine, Walker, & Sullivan, 1985). In addition, there is empirical support for a reciprocal model whereby early academic/cognitive problems and externalizing behavior affect one another over time (e.g., Chen, Rubin, & Li, 1997; Morgan, Farkas, Tufis, & Sperling, 2008; Richman, Stevenson, & Graham, 1982; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006). There is also other empirical evidence suggesting that third variables may account for the relation between academic/cognitive problems and externalizing problems (Fergusson & Lynskey, 1997). Much of the literature on the relation between academic/ cognitive and behavior problems has historically focused on elementary school children and adolescents; however, it is now understood that difficulties in these domains can be identified at early ages (Grimm, Steele, Mashburn, Burchinal, & Pianta, 2010)" (p.1).

Metcalfe, L. A., Harvey, E. A., & Laws, H. B. (2013). The longitudinal relation between academic/cognitive skills and externalizing behavior problems in preschool children. *Journal of Educational Psychology. 105*(1), 1-14.

"Our data thus add to the literature on trait predictors of teacher success and confirm earlier findings that cognitive ability alone does not contribute systematically to success in the teaching profession (Bromme, 2001; Getzels & Jackson, 1963; Zumwalt & Craig, 2005). Thus, selection procedures for entry into teacher education that are based solely on this indicator may run the risk of rejecting candidates capable of developing the necessary knowledge, beliefs, motivation, and selfregulation (which we found to covary independently of general academic ability). This may pose a particular problem for education systems grappling with teacher shortages (p.13).

Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013, April 29). Professional Competence of teachers: Effects on instructional quality and student development. *Journal of Educational Psychology*, *105*(1), 1-16.

Orthographic depth correlates with incidence of dyslexia (e.g., Wolf et al, 1994) and with word and nonword reading in typically developing children (Seymour et al. 2003). Syllabic complexity correlates with word decoding (Seymour et al, 2003).

		Orthographic depth			
		Shallow			Deep
Syllabic structure	Simple	Finnish	Greek Italian Spanish	Portuguese	French
	Complex		German Norwegian Icelandic	Dutch Swedish	Danish English

Figure: The relative orthographic depth of 13 languages and the complexity of their syllabic structure. From Willingham http://www.danielwillingham.com/1/category/reading/1.html

Seymour, P. H. K., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology, 94,* 143-174.

"Effect sizes for all outcomes except oral reading fluency met criteria for substantive importance; however, many of the students in the intervention continued to struggle. An evaluation of cognitive profiles of adequate and inadequate responders was consistent with a continuum of severity (as opposed to qualitative differences), showing greater language and reading impairment prior to the intervention in students who were inadequate responders (p.1). … the results are consistent with prior studies of the cognitive attributes of Tier 2 adequate and inadequate responders, suggesting a continuum of severity corresponding with the level of reading ability at baseline. These results show little evidence of qualitative differences that might suggest differences in the type of intervention or alternative approaches to intervention other than a more intense focus on oral language development" (p.12).

Denton, C. A., Tolar, T. D., Fletcher, J. M., Barth, A. E., Vaughn, S., & Francis, D. J. (2013). Effects of Tier 3 Intervention for students with persistent reading difficulties and characteristics of inadequate responders. *Journal of Educational Psychology*, *105*(1), 1-16.

"There is now a large, complex, and sometimes seemingly contradictory literature on the associations between different phonological skills and learning to read. This meta-analytic review substantially clarifies the patterns in this literature. It appears that phonemic skills measured in children at the earliest stages of learning to read are closely related to the early growth in children's word reading skills. We have argued that converging evidence from longitudinal and training studies suggests that this relationship may be a causal one, such that adequate phonemic skills may be one prerequisite for learning to read effectively. These effects seem to be essentially universal across the different alphabetic languages that have been studied. In contrast, the two other skills considered here (rime awareness and verbal short-term memory) are less closely correlated with individual differences in learning to read, and their relationships with reading seem to be explicable in terms of shared variance with phonemic skills. These findings have important applied implications" (p.21).

Melby-Lervåg, M., Lyster, S-A H., & Hulme, C. (2012). Phonological skills and their role in learning to read: A meta-analytic review. *Psychological Bulletin, 138*(2)*,* 322-352.

"An ostensible strength of WM training is that it provides a focused, theoretically motivated method through which broad cognitive change may be stimulated (Klingberg, 2010; Sternberg, 2008). However, contrary to the reports provided at the beginning of this article (and contrary to the claims of commercial providers), the present literature provides **insufficient evidence of its efficacy.** Our primary concerns regard the need for researchers to (a) include multiple measures of abilities of interest, (b) consistently measure near transfer with valid WM capacity tasks that differ from the method of training, (c) eliminate the use of no-contact control groups, and (d) ensure that when subjective measures of change are used, raters are blind to condition assignment. Until these controls are consistently applied, the meaningfulness of training effects cannot be evaluated (p.647).

Shipstead, Z., Redick, T. S., & Engle, R. W. (2012). Is working memory training effective? *Psychological Bulletin, 138*(4), 628-654.

"Our meta-analysis supports Perfetti and Hart's (2001) proposal that the quality of representations in multiple domains (orthographic, phonological, semantic and/or lexical, sublexical) is important for successful word reading. Developmental research provides substantial evidence for this position" (p.786).

Taylor, J. S. H., Rastle, K., & Davis, M. H. (2013). Can cognitive models explain brain activation during word and pseudoword reading? A meta-analysis of 36 neuroimaging studies. *Psychological Bulletin, 139*(4), 766-791.

"Preservice programs need to do their best to turn out capable, intentional, reflective teachers who have knowledge and skills that will be useful in any setting," Slavin says, "but don't count on this experience to gradually lead to reformed schools. For that, we need to reform the schools directly, as whole organizations, and then staff them with the best teachers we can find. As more schools use proven models, preservice programs will hopefully prepare their students to teach in schools using them."

Slavin, R. (2013). Preservice education and school reform. The Huff Post, 15 July. Retrieved from http://www.huffingtonpost.com/robert-e-slavin/preservice-education-and_b_3597785.html

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"Skilled language users have large vocabularies; there may be 20,000 or more words a skilled reader is familiar with in print" (p.6).
Coltheart, M. (2006). Dual route and connectionist models of reading: An overview. *London Review of Education, 4*(1), 5–17.

Research shows that instruction geared to common learning characteristics can be more effective than instruction focused on individual differences (p.16).
Willingham, D.T., & Daniel, D. (2012). Teaching to what students have in common. *Educational Leadership, 69*(5), 16-21. Retrieved from http://www.ascd.org/publications/educational-leadership/feb12/vol69/num05/Teaching-to-What-Students-Have-in-Common.aspx

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Scholarly treatments have been positive about the prospects, but more sober, and most have taken a position that is broadly consistent with ours. They argue that neuroscience has been and will continue to be helpful to education — indeed, recent reviews show beyond doubt that this is true (e.g., Katzir & Paré-Blagoev, 2006) — but they argue that data from neuroscience must be funneled through a behavioral level of analysis (e.g., Bruer, 1997, 1998; Hirsh-Pasek & Bruer, 2007) or that neuroscience should be part of a broader approach to research in education, not the sole savior (e.g., Ansari & Coch, 2006 ; Byrnes & Fox, 1998; Fischer et al., 2007; Geake & Cooper, 2003) (p. 147).
Willingham, D.T., & Lloyd, J.W. (2007). How educational theories can use neuroscientific data. *Mind, Brain, and Education*, *1*(3), 140-149. Retrieved from
http://www.danielwillingham.com/uploads/5/0/0/7/5007325/willingham__lloyd_2007.pdf

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Developmental dyslexia is a reading disorder, yet deficits also manifest in the magnocellular-dominated dorsal visual system. Uncertainty about whether visual deficits are causal or consequential to reading disability encumbers accurate identification and appropriate treatment of this common learning disability. Using fMRI, we demonstrate in typical readers a relationship between reading ability and activity in area V5/MT during visual motion processing and, as expected, also found lower V5/MT activity for dyslexic children compared to age-matched controls. However, when dyslexics were matched to younger controls on reading ability, no differences emerged, suggesting that weakness in V5/MT may not be causal to dyslexia. To further test for causality, dyslexics underwent a phonological-based reading intervention. Surprisingly, **V5/MT activity increased along with intervention-driven reading gains**, demonstrating that activity here is mobilized through reading. Our results provide strong evidence that visual magnocellular dysfunction is not causal to dyslexia but may instead be consequential to impoverished reading (p.1).

Having established that the visual magnocellular deficit is likely to be an epiphenomenon of dyslexia, we then provided the dyslexic children with a phonological-based reading intervention, which resulted in better reading ability, and, somewhat surprisingly, also in greater activity in right area V5/MT during visual motion perception. This final result is important in that it reveals information about the mechanism by which phonological and visual deficits may come to coexist in dyslexia. Specifically, they do not support the above-mentioned models (Eden and Zeffiro, 1998; Ramus, 2004) that have argued that dyslexia is best described as a condition that gives rise to sensory deficits in addition to the language-based problem. Instead our results demonstrate that the acquisition of reading has a positive influence on magnocellular visual system function, as demonstrated by the increase in right V5/MT activity after reading gains in the dyslexics. Since dyslexia impedes reading acquisition, it is most likely that the differences in magnocellular function reported here and elsewhere between dyslexics and their typically reading peers may be attributed to their lower reading level and less reading experience. In other words, the magnocellular visual deficit is a consequence and not the cause of impoverished reading.

Several ideas have been put forward to explain the mechanism by which weaknesses in the magnocellular visual system might affect reading (Boden and Giaschi, 2007; Stein, 2001). It has been argued that the magnocellular system is involved in direction of visual attention, visual search, and eye movements and that these problems directly impact a person's ability to read accurately (Eden et al., 1994). However, since our results do not support a causal relationship, it becomes necessary to look at the other side of the same coin and consider how subdued magnocellular function in dyslexia might be a result of lower reading

ability. For example, extensive eye movements associated with reading experience may serve to train processes linked to the dorsal magnocellular system such as oculomotor control, visual attention, and spatial position encoding (Boets et al., 2011). From this viewpoint, one can agree on a relationship between reading and magnocellular function, even if the precise mechanisms are not well understood. **However, it is likely that learning to read is followed by changes in the magnocellular system and not vice versa**. Further, this theory would hold that reading acquisition exerts an influence on the size of neurons in the magnocellular layers of the LGN, or the amount of activity in area V5/MT, with the degree of influence modulated by the amount of reading experience. This model provides a parsimonious account of the findings reported to date. …

"It is important to keep in mind that reading is a uniquely human skill that is explicitly taught over several years of formal schooling. During this time, significant functional changes occur as a direct consequence of learning to read, as has been shown with fMRI (Gaillard et al., 2003; Schlaggar et al., 2002; Turkeltaub et al., 2003). However, reading does not have a sufficiently long evolutionary history that would reserve dedicated neural populations specifically to this skill. Therefore, reading makes use of brain areas that were most likely dedicated to other functions, an idea that has been captured in the ''neuronal recycling hypothesis'' (Dehaene et al., 2010). As such, the process of learning to read most likely results in diminishing of some skills, while at the same time promoting others. The consequential outcomes of reading acquisition have been elegantly revealed in studies contrasting literates with illiterates, demonstrating that the profound anatomical and physiological effects that learning to read has on the brain exist within and well beyond brain regions directly associated with reading (Carreiras et al., 2009)".
(p.185).
Olulade, O. A., Napoliello, E. M., & Eden, G. F. (2013). Abnormal visual motion processing is not a cause of dyslexia. *Neuron, 79*(1), 180-190.

"Stakeholders are debating the value of cognitively focused instruction for students who have not benefited from a skills-based approach. Much of the discussion, however, is occurring without recognition of research that has been conducted in the past 2 decades. In this article, we reviewed the research. Electronic databases and hard copies of scholarly journals were searched; 239 references were identified; and 50 pertinent studies were analyzed to determine the effects of cognitively focused instruction - delivered alone or in combination with academic instruction - on students described as demonstrating poor academic achievement, learning disabilities, or specific cognitive deficits. Findings suggest that several cognitive interventions accelerated low-achieving students' academic progress. Nevertheless, when the research is taken as a whole - when the pertinent studies and the interventions they describe are considered with regard to their content, quality, and results - we conclude that it does not support the use of cognitively focused instruction at this time" (p.263).

"Multiple research teams grappling with school-based implementations of RTI have independently demonstrated the veracity of this claim (e.g., Fuchs, Fuchs, & Compton, 2004; Vaughn et al., 2010). Extrapolating from their respective study samples, researchers have estimated that from 2% to 6% of the general population will not benefit from a skills-based approach when implemented by researchers (rather than by practitioners), suggesting these percentages are a conservative estimate. Thus, research (and common sense) promotes a view that if a child has not responded sufficiently to skills-based instruction at Tier 1, nor to a more intensive version at Tier 2, it makes little sense to "triple down" on the same approach at Tier 3. This raises the important question: If not a skills-based approach, then what?" (p.263)

Kearns, D., & Fuchs, D. (2013). Does cognitively focused instruction improve the academic performance of low-achieving students? *Exceptional Children, 79*(3), 263-290.

"Many liberal educators hold that the primary goal for education is for children to become autonomous, to develop fully who they are in the classroom setting without having arbitrary, outside standards forced upon them.This is a very reasonable goal for people whose children are already participants in the culture and power and who have already internalized its codes."
In Stanley, N. (2003). *Florida Reading Quarterly, 40*(2), 12–18.

Delpit, L. (1988). "The silenced dialogue: Power and pedagogy in educating other people's children". *Harvard Educational Review, 58*(3), 280–298.

Delpit, L. (1988). "The silenced dialogue". *Harvard Educational Review, 58*(3), 280–299.

"Given the small number of studies, the lack of methodological rigor of the existing studies, and the inconclusive findings of the effectiveness of OG programs, additional research is needed before the scientific basis can be established" (p.171).

Ritchey, K.D. & Goeke, J.L. (2006). Orton-Gillingham and Orton-Gillingham-based reading instruction: A review of the literature. *The Journal of Special Education, 40*(3), 171-183.

"No studies of unbranded Orton-Gillingham–based strategies that fall within the scope of the Students with Learning Disabilities review protocol meet What Works Clearinghouse (WWC) evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, the WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of unbranded Orton-Gillingham–based strategies for students with learning disabilities" (p.2). What Works Clearinghouse (2010). *Unbranded Orton-Gillingham-based interventions.* Retrieved from *Unbranded Orton-Gillingham-based interventions* http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=528

"We must conclude that, although the Orton-Gillingham Approach contains many of the characteristics of effective intervention programs that have been identified in scientifically based research on reading, there are no studies available at present to provide an estimate of its impact on the reading growth of young children" (p.2). (Florida Center for Reading Research, 2006). http://www.nayattschool.org/Document%20Library/Response%20to%20Intervention--Orton_Gillingham_Approach.pdf.

Neither creating more competition among schools nor giving them more autonomy without support to improve learning are the vital solutions that will lift the performance of Australian students.

The myth of markets in school education shows that at least 40 to 60 per cent of schools face no or very limited competition, and there is very little government can do about it.

Providing more information about schools, cutting private school fees or increasing the capacity of high-performing government schools will do little to increase school competition and lift student performance.

Giving school leaders autonomy to run their schools well is a good idea, but it has little impact on performance when governments do not implement it as part of a larger plan to improve teaching and learning.

The report is the first analysis of a 20-year policy in some Australian school systems to give schools more autonomy and to try to increase competition among them. These systems have led the world and influenced many countries but the evidence of an increase in student performance through market-based and pro-autonomy policies is not there.

One problem is that not enough schools have local competitors that have the capacity to take on new students, are good performers, and are affordable. Even when parents have good information about differences between schools, the good ones don't grow and bad ones don't shrink.

And the link between school autonomy and high performance is weak. Victoria, which led the world in increasing autonomy, has not performed above New South Wales, which was centralised until recently.

The world's best systems have varying levels of autonomy but they all articulate the best way to teach and learn, then make sure they have the best teachers to carry it out.

Autonomy and competition are often linked in government policy because autonomy can allow schools to differentiate themselves and thereby attract parents from competing schools. The myth of markets shows that neither competition nor an excessive focus on autonomy is the best way to improve Australian schools.

Jensen, B. (2013). The myth of markets in school education. Grattan Institute. Retrieved from http://grattan.edu.au/publications/reports/post/the-myth-of-markets-in-school-education/

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11. The provision for secondary age children with persistent reading difficulties calls for greater attention. Despite differences in school organisation, the same principles embodied in 'Simple View of Reading' and the three Waves of Provision for children with literacy difficulties should apply in secondary schools, as

they do in primary schools. However, it is well known that the nature of the problems for secondary aged children who have experienced repeated failure with reading often include negative attitudes and disengagement that are much more entrenched than in primary schools. Additional support for those children starting secondary school without secure reading skills is essential if they are to make progress and not fall further behind their peers (p.13).

Rose, J. (2009). *Identifying and teaching children and young people with dyslexia and literacy difficulties*. An independent report from Sir Jim Rose to the Secretary of State for Children, Schools and Families. Retrieved from www.dera.ioe.ac.uk/14790/1/00659-2009DOM-EN.pdf

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My sense is that the expectation that educational research should regulate classroom instruction, emblematic of broader trends in reading instruction, reveals a profound disrespect for the pedagogical knowledge and professional preparation of teachers and a concomitant desire to control their work (p.272-3).

Dudley-Marling, C. (2005). Disrespecting teachers: Troubling developments in reading instruction. *English Education, 37*(4), 272-279.

Stakeholders are debating the value of cognitively focused instruction for students who have not benefited from a skills-based approach. Much of the discussion, however, is occurring without recognition of research that has been conducted in the past 2 decades. In this article, we reviewed the research. Electronic databases and hard copies of scholarly journals were searched; 239 references were identified; and 50 pertinent studies were analyzed to determine the effects of cognitively focused instruction - delivered alone or in combination with academic instruction - on students described as demonstrating poor academic achievement, learning disabilities, or specific cognitive deficits. Findings suggest that several cognitive interventions accelerated low-achieving students' academic progress. Nevertheless, when the research is taken as a whole - when the pertinent studies and the interventions they describe are considered with regard to their content, quality, and results - we conclude that it does not support the use of cognitively focused instruction at this time. Implications for future research are discussed (p.263).

Kearns, D. M., & Fuchs, D. (2013). Does cognitively focused instruction improve the academic performance of low-achieving students? *Exceptional Children, 79*, 263-290.

Book, Byers, and Freeman (1983) reported that entering prospective teachers believed that improving student self concept was a more worthy goal than promoting students' academic achievement or creating a good learning environment.

Book, C., Byers, J., &Freeman, D. (1983). Student expectations and teacher education traditions with which we can and cannot live. *Journal of Teacher Education, 34*, 9-13.

"A few studies have evaluated whether poor reading performance negatively impacts "distal" feelings and behaviors that are not specific to reading activities. In these studies, poor readers have been reported to be more likely to act out or be aggressive (e.g., Morgan, Farkas, & Wu, 2009; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006), distractible and inattentive (Goldston et al., 2007; Morgan, Farkas, Tufis, & Sperling, 2008), and anxious and depressed (Arnold et al., 2005; Carroll, Maughan, Goodman, & Meltzer, 2005). Older poor readers have been reported to be more likely to consider or attempt suicide (Daniel et al., 2006).

The increasingly generalized Matthew effects are more likely to occur as children age (Stanovich, 1986) if they begin to avoid reading activities both at home and in school, thereby further constraining growth in their basic reading skills, comprehension, and, eventually, cognitive functioning (Cunningham & Stanovich, 1991; Echols, West, Stanovich, & Zehr, 1996; Griffiths & Snowling, 2002; Guthrie, Schafer, & Huang, 2001; Senechal, LeFevre, Hudson, & Lawson, 1996). The children's resulting inability to meet their classroom's academic demands can lead to increasingly frequent feelings of frustration, agitation, withdrawal, and social isolation (e.g., Fleming, Harachi, Cortes, Abbott, & Catalano, 2004; Kellam, Mayer, Rebok, & Hawkins, 1998; Lane, Beebe-Frankenberger, Lambros, & Pierson, 2001; Wehby, Falk, Barton-Arwood, Lane, & Cooley, 2003). These feelings and behaviors may in turn further interfere with children's learning (p.361).

We investigated whether and to what extent being a poor reader increases a child's likelihood of reporting feeling angry, distractible, sad, lonely, anxious, and unpopular. Poor reading performance has repeatedly been hypothesized to contribute to children's socioemotional maladjustment (e.g., Stanovich, 1986). Although there is some evidence indicating that poor reading performance results in "proximal" negative Matthew effects (e.g., poorer attitude toward reading, less persistence during reading tasks, less independent reading practice), less is known about the "distal" or more generalized effects on socioemotional maladjustment (e.g., frequently feeling angry, sad, or unpopular). To better estimate these predicted relationships, we statistically controlled for a range of child-, family-, school-, and community-level confounds including the autoregressor. Multilevel logistic regression analyses indicated that poor readers are at substantially greater risk of socioemotional maladjustment. This was the case across multiple self-report measures as well as after extensive statistical control of possible confounding factors (p.373). Morgan, P.L., Farkas, G., & Qiong, W. (2012). Do poor readers feel angry, sad, and unpopular? *Scientific Studies of Reading, 16*(4), 360-381.

Print awareness, phonological awareness, and decoding have each been shown to be influenced by genetic and environmental factors in prereaders and early readers. Measures of print awareness tend to be modestly affected by genetic factors (heritability estimates less than 30%) and more substantially influenced by environmental factors. For example, a composite measure of print knowledge in preschoolers in the International Longitudinal Twin Study (ILTS; Byrne et al., 2002) showed a shared environmental influence that was roughly twice the magnitude of the genetic influence. A similar outcome was found for letter identification in kindergarten and first-grade twins (*M* age=6.1) in the Western Reserve Reading Project (WRRP; Petrill et al., 2006). In a sample of kindergarteners in the Florida Twin Project on Reading (FTP-R), Taylor and Schatschneider (2010) found that letter naming fluency had approximately equivalent influences of genetic, shared environmental, and nonshared environmental influences.

In contrast, moderately high heritability estimates (50%–65%) have been found for phonological awareness across various studies of first- and secondgrade children (Byrne et al., 2002; Hohnen & Stevenson, 1999) and for a latent phonological awareness factor in kindergarten (Byrne et al., 2005). Shared environmental influences on phonological awareness in these studies were moderately low but nonetheless larger than the estimate of nonshared environment. The WRRP sample showed similar estimates of genetic and shared environmental influences (.48 and .43, respectively; Petrill et al., 2006) as did the FTP-R, although with estimates of genetic and shared environment both in the 20% to 40% range (Taylor & Schatschneider, 2010). The genetic effects on decoding pseudowords and words are substantial in early readers as compared to environmental effects. High heritabilities were found in a sample of 7-year-olds participating in the Twins Early Development Study (Kovas, Haworth, Dale, & Plomin, 2007) on both nonword reading (.67) and word reading (.69), whereas shared environmental influences were minimal (.15 and .13, respectively). In the WRRP sample, about half of the variability in decoding pseudowords (.49) was due to genetic factors, with a moderate effect of shared environment (.31; Petrill et al., 2006). In contrast, genetic effects on reading words (.68) were substantial, whereas shared environment was much less so (.22). Hohnen and Stevenson (1999) reported heritabilities of .60 and .59 on a literacy composite for 6- and 7-year-old children, respectively. Conversely, shared environmental influences were more modest (.36 and .32, respectively). A latent factor of reading that included both words and nonwords was highly heritable (.70) with only modest shared environment effects (.22) in the ILTS kindergarten sample (Byrne et al., 2005) (p.459).

Soden-Hensler, B., Taylor, J., & Schatschneider, C. (2012). Evidence for common etiological influences on early literacy skills in kindergarten. *Scientific Studies of Reading, 16*(5), 457-474.

In one of the first studies of teacher knowledge, experienced reading, language arts, and special education teachers were assessed in their awareness of language elements (e.g., phonemes and morphemes) and how these elements were represented in writing (e.g., knowledge of sound–symbol correspondences; Moats, 1994). The results indicated that even highly motivated and experienced teachers generally had a poor understanding about spoken and written language structure. A second study found that teachers had "insufficiently developed concepts about language and pervasive conceptual weaknesses in the very skills

that are needed for direct, systematic, language-focused reading instruction, such as the ability to count phonemes and to identify phonic relationships" (Moats & Lyon, 1996, p. 79). More recently, Moats and Foorman (2003) reported that teachers continued to struggle particularly with (a) manipulating speech sounds; (b) knowledge of differing letter-sound combinations; (c) conceptualization of functional spelling units such as digraphs, blends, and silent-letter spellings; (d) common syllable types and division patterns; and (e) recognition of children's difficulties with phonological, orthographic, and syntactic learning. Similarly, Spear-Swerling and Brucker (2003) found that none of the elementary and special education teacher participants scored at a high level on all of the tasks assessing knowledge of reading constructs and very few scored a high level on any task. Further, none had received intensive preparation in structured and systematic phonics instruction. Cunningham, Perry, Stanovich, and Stanovich (2004) in turn found that not only did K–3 teachers know very little about phonemic awareness and phonics, but also teachers were often unable to calibrate their knowledge of reading. These findings are also not specific to inservice teachers or to the United States. Bos et al. (2001) reported that 53% of teacher candidates and 60% of inservice educators were unable to correctly answer nearly half of the items assessing their knowledge of language structure. Although teachers indicated that they believe such reading instructional practices were important, their knowledge in such "important" practices was lacking (Bos et al., 2001). Similarly, teachers in Australia demonstrated a poor knowledge of the role of metalinguistics in the process of learning to read (Fielding-Barnsley & Purdie, 2005). Further, even though there were some differences in the patterns of understanding between the two populations, teacher candidates from both the United States and England demonstrated an insufficient understanding of English phonology, phonics, and morphology needed to effectively teach early reading skills (Binks, Joshi, & Washburn, 2009). Furthermore, Washburn, Joshi, and Binks-Cantrell (2011a, 2011b) found that a majority of teacher candidates and inservice teachers reported misconceptions about dyslexia in conjunction with weak explicit knowledge about phonology, phonetics, and morphology (p.527-8).

Binks-Cantrell, E., Washburn, E.K., Joshi, R.M., & Hougen, M. (2012). Peter Effect in the preparation of reading teachers. *Scientific Studies of Reading, 16*(6), 526-536.

A commonly held view of early phonological development and alphabetic literacy has been that phonological awareness proceeds from large units—namely, syllables—to awareness of small units or phonemes (Carroll, Snowling, Hulme, & Stevenson, 2003; Treiman & Breaux, 1982). It has been proposed that in order to abstract the principles of the alphabetic system, children need to develop both phoneme awareness and letter knowledge (Byrne, 1998; Share, 1995). However, an alternative view is that phoneme awareness is a consequence rather than a precursor of learning to read (Castles & Coltheart, 2004; Goswami & Bryant, 1990; Morais, Carey, Alegria, & Bertelson, 1979). Much of the debate regarding the causal relations between phoneme awareness and reading skills draws on evidence from readers of alphabetic languages (Hulme, Snowling, Caravolas, & Carroll 2005; Mann & Wimmer, 2002). Within such languages, the rate of development of phoneme awareness and of decoding skills varies with the consistency of the orthography, readers of more consistent orthographies gaining competence more quickly than readers of English (Seymour, Aro, & Erskine, 2003). Thus, phoneme awareness plays a time-limited role as a predictor of individual differences in consistent orthographies (de Jong & van der Leij, 2003), whereas in English it continues to predict reading skill throughout development (Bruck, 1992; McDougall, Hulme, Ellis, & Monk, 1994; Muter, Hulme, Snowling, & Stevenson, 2004). Such findings favour the idea of reciprocal causation whereby phoneme awareness, letter knowledge, and reading skills interact in the process of learning to read and phoneme awareness develops rapidly in readers who primarily encounter consistent grapheme–phoneme relationships (p.405).

Nag, S., & Snowling, M.J. (2012). Reading in an alphasyllabary: Implications for a language universal theory of learning to read. *Scientific Studies of Reading, 16*(5), 404-423.

"Individual differences in phonological awareness are closely related, concurrently and longitudinally, to variations in reading achievement (e.g., Lonigan, Burgess, & Anthony, 2000; Muter, Hulme, Snowling, & Stevenson, 2004; Wagner et al., 1997). Evidence supporting a causal role of phonological awareness in reading development comes from studies showing that training phonological awareness improves reading (e.g., Lundberg, Frost, & Petersen, 1988; Schneider, Küspert, Roth, Visé, & Marx, 1997; but see also Castles & Coltheart, 2004; Hulme, Snowling, Caravolas, & Carroll, 2005). The relationship between semantic knowledge and learning to read words is less well understood. However, evidence suggests that

semantic effects on single word reading tend to be greatest when mapping between orthography and phonology is least efficient, that is, in young or poor readers (Briggs, Austin, & Underwood, 1984; Coltheart, Laxon, & Keating, 1988; Nation & Snowling, 1998) and for inconsistent or infrequent words (Juel, 1980; Stanovich & West, 1983; Strain, Patterson, & Seidenberg, 2002). (p.505).
Duff, F.J., & Hulme, C. (2012): The role of children's phonological and semantic knowledge in learning to read words. *Scientific Studies of Reading, 16*(6), 504-525.

The National Assessment of Educational Progress (NAEP; National Center for Education Statistics, 2009) shows that approximately 35% of a fourth-grade cohort fails to attain the basic level, while an additional 32% fails to reach the proficient level that is the goal for all students. Our analyses of the texts that have been used on these assessments indicate that they are at approximately a 3.5 grade level according to conventional readability formulas. The text on the NAEP, then, is not the complex text that is emphasized within the Common Core Standards (Common Core State Standards Initiative, 2010) (p.112) …
Hiebert, E.H., Samuels, S.J., & Rasinski, T. (2012). Comprehension-based silent reading rates: what do we know? What do we need to know? *Literacy Research and Instruction, 51*(2), 110-124.

There has been a large body of literature on the relationship between oral reading performances (without comprehension and measured as words correct per minute [wcpm]) and performances on silent reading tests, which have included standardized reading tests and state standards-based tests (Good, Simmons, & Kame'enui, 2001; McGlinchey & Hixson, 2004; Schatschneider et al., 2004). In Marston's (1989) review of such studies, the correlations were between .63 and .90 with the most clustering around .80. In Good and Jefferson's (1998) review of the correlations within a single grade (grade 3), the correlations ranged from .60 to .80. Wiley and Deno (2005) and Pressley, Hildren, and Shankland (2005) have reported lower correlations (.40 to .50). This finding of a high correlation between wcpm in oral reading and comprehension has had a strong influence on policy and practice in reading education (p.112-113).
Hiebert, E.H., Samuels, S.J., & Rasinski, T. (2012). Comprehension-based silent reading rates: what do we know? What do we need to know? *Literacy Research and Instruction, 51*(2), 110-124.

The inclusion of a simple, word recognition-timed task in an assessment battery affords important diagnostic possibilities. For example, attending just to the relationship between word recognition-timed and oral reading rate, we might envision four types of readers or print processors.
1. *Good WR-t—good ORR*. At a given difficulty level, an adequate reading rate is supported by a strong sight vocabulary or store of automatically recognized words.
2. *Poor WR-t—poor ORR*. Slow, possibly inaccurate, reading is caused by a weak sight vocabulary.
3. *Poor WR-t—good ORR*. An adequate reading rate is achieved by skillfully using context to compensate for a weak sight vocabulary. As reading material becomes more difficult in later grades, the weak sight vocabulary (or orthographic system) may become a serious hindrance to efficient print processing.
4. *Good WR-t—poor ORR*. Underlying a slow, inadequate reading rate is a surprisingly strong sight vocabulary. It is as if the child reads words more easily in isolation than in context. Such a "patterning" problem indicates difficulty mapping the temporal flow of language to its printed representation on the page (Morris, 2008).

Instructional implications obviously follow from these hypothesized case types. Whereas some form of word study or phonics instruction might be appropriate for cases 2 and 3, this would not be true for case 4 where the problem seems to be contextually-based as opposed to word-based (p.61).
Morris, D., Trathen, W., Frye, E.M., Kucan, L., Ward, D., Schlagal, R., & Hendrix, M. (2013). The role of reading rate in the informal assessment of reading ability. *Literacy Research and Instruction, 52*(1), 52-64.

That is, we believe that reading rate (words read per minute), *if recorded in a reading-for-meaning context*, is an efficient and valid measure of fluency. Hendrix, Trathen, and Morris (2008) reported correlations approaching .90 among three measures of fourth grade students' reading fluency: fluency rating-scale score, prosody score (number of pauses), and reading rate (see also, Daane, Campbell, Grigg, Goodman, & Oranje, 2005) (p.53). … At a given grade level (e.g., fourth), how slowly can a child read and still benefit from instruction and practice at that level? With this question in mind, we propose the following end-of-grade rate *minimums.* • Second Grade: 80 wpm - • Third Grade: 90 wpm - • Fourth Grade: 100 wpm - •

Fifth Grade: 105 wpm - • Sixth Grade: 110 wpm (p.58). … Regarding oral reading accuracy, craft knowledge, passed down over the years, has held that students should be instructed at a level where they miss no more than 5 words out of 100 in running text (Betts, 1946; Johnson et al., 1987; McKenna & Stahl, 2003). … comprehension scores in the present study (see Table 2) fell within the traditionally accepted IRI range of 75 to 90% (Betts, 1946, Johnson et al., 1987; Barr et al., 2007) (p.59). … In large part, but not wholly, fluent reading depends on automatic word recognition (Adams, 1990; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001). Therefore, we should not be surprised to find that an isolated measure of automatic word recognition (WR-t) is a good predictor of oral reading rate (ORR) (p.60-61).

Morris, D., Trathen, W., Frye, E.M., Kucan, L., Ward, D., Schlagal, R., & Hendrix, M. (2013): The role of reading rate in the informal assessment of reading ability. *Literacy Research and Instruction, 52*(1), 52-64.

"Research has consistently demonstrated the importance of a well-prepared teacher to profoundly influence student reading achievement (Darling-Hammond, 2004, 2006; Rowan, Correnti, & Miller, 2002; Sanders & Horn, 1994). Therefore, training highly effective and competent reading teachers is of utmost importance. Currently, almost 50% of all public school teachers in the United States are inexperienced, novice teachers (National Education Association, 2003), with limited knowledge and expertise regarding topics such as phonics and word study (Mather, Bos, & Babur, 2001), thus entering the profession with knowledge limitations about how to provide effective evidence-based literacy instruction. Furthermore, beginning teachers are teaching a more diverse group of students than ever before and are likely at some point in their careers to spend time teaching in high-poverty and lowachieving schools (Valencia, Place, Martin, & Grossman, 2006). Professional teaching is a field plagued with unrelenting public criticism regarding its effectiveness (Walsh, Glaser, & Dunne-Wilcox, 2006;Wold, Young, & Risko, 2011), is pressured by federal mandates such as *No Child Left Behind* and more recently the *Common Core State Standards Initiative* (CCSSI, 2010), and divided by a history about *how* teachers should teach young children to read (Pearson, 2004). As a consequence, educating highly proficient reading teachers is an increasingly challenging and complex endeavour". (p.87)

Clark, S.K., Jones, C.D., Reutzel, R., & Andreasen, L. (2013). An examination of the influences of a teacher preparation program on beginning teachers' reading instruction. *Literacy Research and Instruction, 52*(2), 87-105.

Phelps and Schilling (2004) suggest three reasons for the lack of extensive inquiry into preservice teachers' development of content knowledge for reading. First, reading is not viewed as a separate discipline, but rather, is integrated into other disciplines. Second, although many elementary teachers may lack knowledge in science or mathematics, few individuals question teachers' knowledge of reading because most teachers are competent readers. Finally, there seems to be a greater concern with preservice teachers acquiring knowledge of methods and curriculum than there is with the specific content knowledge supporting reading instruction. Although preservice teachers' content knowledge and self efficacy for teaching reading are relatively new areas of research, there is a theoretical foundation on which research can be built. The purpose of this study was to examine preservice teachers' development and growth in content knowledge and self-efficacy for teaching reading as they participated in a literacy course/reading clinic practicum experience.

Leader-Janssen, E.M., & Rankin-Erickson, J.L. (2013). Preservice teachers' content knowledge and self-efficacy for teaching reading. *Literacy Research and Instruction, 52*(3), 204-229.

"In a recent study, Swanson and O'Connor (2009) found that in addition to word attack skills, working memory capacity moderated not only word identification and comprehension, but also fluency in children with reading disabilities. Phonological memory can be viewed as an indicator of working memory and Table 2 indicates a significant correlation between comprehension and phonological memory in the study population of .48 and that participants possess less than adequate skill in this domain (p.307). … The results of this study suggest, as do those by Kuhn and others (2006), that the critical factor for oral reading development in children with reading disabilities, including those with naming-speed deficits, is time-on-text, meaning simply that students from this population must spend significant time engaged in structured, monitored reading in order to develop the necessary automaticity in phonological and word identification sub-processes that are required for proficient reading." (p.307)

Paige, D.D. (2011). Testing the acceleration hypothesis: Fluency outcomes utilizing still-versus accelerated-text in sixth-grade students with reading disabilities. *Literacy Research and Instruction, 50*(4), 294-312.

Recent Reviews of Vocabulary Research In addition to the NRP report, six reviews and two meta-analyses of vocabulary instruction were published between 1998 and 2009 (Baker et al., 1998; Baumann, Kame'enui et al., 2003; Elleman et al., 2009; Harmon et al., 2005; Jitendra et al., 2004; Kuhn & Stahl, 1998; Read, 2004; Swanborn & de Glopper, 1999). The most recent meta-analysis, by Elleman et al., included 37 studies in prekindergarten to twelfth grade. Among the findings was that students with reading difficulties who were exposed to vocabulary instruction benefited three times as much as those who were not. The meta-analysis conducted by Swanborn and de Glopper examined incidental word learning. Kuhn and Stahl synthesized the research of learning words from context, whereas Baker et al. identified advances in the research on vocabulary development for diverse learners. Baumann, Kame'enui et al. categorized vocabulary strategies by their use: strategies for teaching specific words and strategies to learn words independently. The other vocabulary reviews focused on more restrictive populations or topics. For example, Read examined studies in second language learners' vocabulary instruction since 1999, and Harmon et al. identified several effective strategies for students struggling with content-area texts. Jitendra et al. highlighted the importance of choosing an instructional method based on instructional goals and the needs of individual students. However, none of these reviews highlighted the methodologies of the studies cited (p.254-55).

Hairrell, A., Rupley, W., & Simmons, D. (2011). The state of vocabulary research. Literacy Research and Instruction, 50(4), 253-271.

"Americans hold the notion that good teaching comes through artful and spontaneous interactions with students during lessons. This kind of on-the-fly decision making is made possible by the innate intuitions of natural teachers. Such views minimize the importance of planning increasingly effective lessons and lend credence to the folk belief that good teachers are born, not made. If we really believe this, it is no wonder that teacher development is not a high priority" (Stigler & Hiebert, 1997, 16).

This randomized control trial examined the efficacy of a multitiered supplemental tutoring program within a first-grade responsiveness-to-intervention prevention model. Struggling first-grade readers (n = 649) were screened and progress monitored at the start of the school year. Those identified as unresponsive to general education Tier 1 (n = 212) were randomly assigned to receive Tier 2 small-group supplemental tutoring (n = 134) or to continue in Tier 1 (n = 78). Progress-monitoring data were used to identify nonresponders to Tier 2 (n = 45), who were then randomly assigned to more Tier 2 tutoring (n = 21) or one-on-one Tier 3 tutoring (n = 24). Tutoring in Tier 3 was the same as in Tier 2 except for the delivery format and frequency of instruction. Results from a latent change analysis indicated nonresponders to Tier 1 who received supplemental tutoring made significantly higher word reading gains compared with controls who received reading instruction only in Tier 1 (effect size = 0.19). However, no differences were detected between nonresponders to Tier 2 who were assigned to Tier 3 versus more Tier 2. This suggests more frequent 1:1 delivery of a Tier 2 standard tutoring program may be insufficient for intensifying intervention at Tier 3. Although supplemental tutoring was effective in bolstering reading performance of Tier 1 nonresponders, only 40% of all Tier 2 students and 53% of Tier 2 responders were reading in the normal range by grade 3. Results challenge the preventive intent of short-term, standard protocol, multitiered supplemental tutoring models.

Gilbert, J. K., Compton, D. L., Fuchs, D., Fuchs, L. S., Bouton, B., Barquero, L. A., & Cho, E. (2013). Efficacy of a first-grade responsiveness-to-intervention prevention model for struggling readers. *Reading Research Quarterly, 48*(2), 135.

Torgerson et al. (2006) criticised the NRP report for including both RCT 'true experimental designs' and quasi-experimental studies in the same systematic review. Torgerson et al. (2006) completed an updated systematic review of research literature using phonics in the teaching of reading and spelling based exclusively on RCT or 'true experimental' studies. They concluded that there is scarce evidence from

studies using high-quality RCT designs to investigate the long-term effects of different kinds of early reading instruction. They found only three studies formally contrasting synthetic and analytic phonics (namely, Johnston & Watson, 2004; Skailand, 1971; Torgesen et al., 1999). Overall, the Torgerson et al. (2006) review concludes that there is not enough clear evidence for one instructional method as better than the other for enabling children to make progress in reading accuracy. A pooled effect size of d=0.02 across the three well-designed studies (Johnston & Watson, 2004; Skailand, 1971; Torgesen et al., 1999) was weak and nonsignificant (p.70).

Di Stasio, M.R., & Savage, R. (2012). A follow-up study of the ABRACADABRA web-based literacy intervention in Grade 1. *Journal of Research in Reading, 35*(1), 69–86.

"She talks about her personal journey of discovering the brain's ability to change (neuroplasticity)" (p.1). http://www.arrowsmithschool.org/arrowsmithprogram/news.html

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For S-RCD (specific reading comprehension deficits), the context-dependent functional interaction anomaly was most prominently seen in left IFG, which covaried to a greater extent with hippocampal, parahippocampal, and prefrontal areas than for TD for low- as compared to high-frequency words. Given the greater lexical access demands of low frequency as compared to high-frequency words, these results may suggest specific **weaknesses in accessing lexical-semantic representations during word recognition**. These novel findings provide foundational insights into the nature of S-RCD, and set the stage for future investigations of this common, but understudied, reading disorder (p. 199).

Cutting, L.E., Clements-Stephens, A., Pugh, K.R., Burns, S., Cao, A., Pekar, J.J., Davis, N., & Rimrodt, S.L. (2013). Not all reading disabilities are dyslexia: Distinct neurobiology of specific comprehension deficits. *Brain Connect, 3*(2), 199-211.

Many times over the course of the Teacher Prep Review as well as the 10 pilot studies that preceded it, we have asked ourselves what might explain the chaotic nature of the field of teacher preparation. Frankly, our earliest theories were simply wrong, and it was only late in the process that we stumbled across evidence that the field decided it was not its job to train teachers but to *prepare* them (p.93)

The "reading wars" are far from over. Three out of four elementary teacher preparation programs still are not teaching the methods of reading instruction that could substantially lower the number of children who never become proficient readers, from 30 percent to under 10 percent. Instead, the teacher candidate is all too often told to develop his or her "own unique approach" to teaching reading (p.2).

Greenberg, J., McKee. A., & Walsh, K. (2013). *NCTQ Teacher Prep Review.* National Council of Teacher Quality. Retrieved from http://www.nctq.org/dmsStage/Teacher_Prep_Review_2013_Report

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The DI model has enjoyed a more than 30-year history of framing successful learning experiences. The model has evolved to address current understandings about learners and learning, but maintains the central purpose of promoting student on-task behavior through explicit instruction, ongoing support, and student engagement in successful practice. The DI model is well suited to the design of technology-enhanced and technology-based instruction because of its clear structure and potential for providing learners with opportunities for practice and immediate feedback, especially in asynchronous learning environments. … DI continues to hold potential as an effective teaching method, particularly in technology mediated learning environments. Computer-based programs have been designed to model instructor-led DI approaches while leveraging the technological ability to provide feedback, remediation, and guided practice, all essential components of the DI process and all of which contribute to its effectiveness (p.51).

DiMagliaro, S., Lockee, B., & Burton, J. (2005). Direct instruction revisited: A key model for instructional technology. *Educational Technology Research & Development, 53*(4), 41-55. Retrieved from http://projects.ict.usc.edu/itw/materials/Lockee/DI%20Revisited.pdf

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"Word reading rate appears key to students' fluency deficits. It is the most important factor in text reading fluency (Torgesen & Hudson, 2006) and was found to be more highly predictive of reading comprehension than rate of connected text reading for average and below average comprehenders (Wise et al., 2010). The complex developmental time-course leading to fluency deficits supports the current focus on effective

instruction, progress monitoring, and intervention in the earliest school years. At present it appears the most effective intervention for fluency is early intervention in phonemic awareness, phonemic decoding, and automaticity".

Metsala, J.L. (2012). Difficulties in word reading and fluency in English: Interventions. *Encyclopedia of Language and Literacy Development.* Retrieved from
http://literacyencyclopedia.ca/index.php?fa=items.show&topicId=312

Torgesen (2006) therefore suggested that it may be the lack of reading practice over such an extended amount of time that is the obstacle to closing the fluency gap for samples of older children with reading disabilities (e.g., 9-12 years and beyond).

Torgesen, J. K. (2006). Recent discoveries from research on remedial interventions for children with dyslexia. In M. Snowling & C. Hulme (Eds*.), The science of reading: A handbook*. Oxford: Blackwell Pulishers.

Barnyak, N.C., & Paquette, K.R. (2010). An investigation of elementary preservice teachers' reading instructional beliefs. *Reading Improvement, 47*(1), 7-17.

Self-regulated learning (SRL) is often portrayed as an active, dynamic process in which self-motivated learners set their learning goals, employ effective learning strategies, monitor their learning progress, evaluate their progress against some self-set standards and use this information to regulate their study (Metcalfe, 2009; Pintrich, 2000; Thiede & Dunlosky, 1999; Winne & Hadwin, 1998; Zimmerman, 1998). However, research has shown that **most people are far from being effective self-regulated learners**. One of the reasons is that self-monitoring of learning is usually inaccurate (Karpicke, Butler, & Roediger, 2009; Koriat & Bjork, 2005). This is true whether the learning materials are word pairs (Nelson & Dunlosky, 1991), passages of text (Glenberg & Epstein, 1985), or school subject materials (Hacker, Bol, Horgan, & Rakow, 2000; Kostons, van Gog, & Paas, 2010) and whether the learning context is the laboratory (Dunlosky & Lipko, 2007; Maki, 1998), the classroom (Hacker et al., 2000), or computer-based learning environments (Kostons et al., 2010). Inaccurate monitoring is detrimental to SRL because initiation of self-regulatory processes, such as redefinition of a learning task, adjustment of task goals and standards, and changes in study strategies, is contingent on the outcomes of monitoring and evaluation of learning (Winne & Hadwin, 1998) (p.78).

Shiu, L., & Chen, Q. (2013). Self and external monitoring of reading comprehension. *Journal of Educational Psychology, 105*(1), 78-88.

According to Kim, Wagner, and Foster (2011), the correlation between reading comprehension and fluency is high (ranging from .73 to .76 for first graders and from .67 to .70 for third graders); reading comprehension is, therefore, interconnected with fluency but is also a distinct aspect of reading competence.

Kim, Y.-S., Wagner, R. K., & Foster, E. (2011). Relations among oral reading fluency, silent reading fluency, and reading comprehension: A latent variable study of first-grade readers. *Scientific Studies of Reading, 15,* 338–362.

When children start to learn to read English, they benefit from learning grapheme–phoneme correspondences. As they become more skilled, they use larger graphophonic units and morphemes in word recognition and spelling. We hypothesized that these 2 types of units in decoding make independent contributions to children's reading comprehension and fluency and that the use of morphological units is the stronger predictor of both measures. In a longitudinal study with a large sample in the United Kingdom, we tested through multiple regressions the contributions that these different units make to the prediction of reading competence (reading comprehension and fluency). The predictors were measured when the children were aged 8–9 years. Reading comprehension and rate were measured concurrently, and reading list fluency was measured at 12 and 13 years. After controlling for age and verbal IQ, the children's use of larger graphophonic units and their use of morphemes in reading and spelling made independent contributions to predicting their reading comprehension and reading fluency. The use of morphemes was the stronger predictor in all analyses. Thus, teaching that promotes the development of these different ways of reading and spelling words should be included in policy and practice (p.959).

Nunes, T., Bryant, P., & Barros, R. (2012). The development of word recognition and its significance for comprehension and fluency. *Journal of Educational Psychology, 104*(4), 959-973.

Essentially, these matrices classified children into one of four categories, as illustrated in the Appendix: (a) not meeting the benchmark and being at risk on the first-grade literacy outcome (true positive); (b) not meeting the benchmark but not being at risk on the first-grade literacy outcome (false positive); (c) meeting the benchmark and being at risk on the first-grade literacy outcome (false negative); or (d) meeting the benchmark and not being at risk on the first-grade literacy outcome (true negative). Using the formulas presented in the Appendix, these matrices were used to generate several diagnostic efficiency indices: sensitivity, specificity, positive predictive power, and negative predictive power. These indices represent those typically used to describe classification accuracy (Streiner, 2003). In the present study, sensitivity represented the proportion of children who did not meet the preschool benchmark out of all children who were at risk on first-grade literacy outcomes. Specificity represented the proportion of children who met the benchmark out of all children who were not at risk on first-grade literacy outcomes. Positive predictive power indicated that the proportion of children who were at risk on first-grade literacy outcomes out of all children who did not meet the preschool benchmark. Negative predictive power indicated the proportion of children who were not at risk on first-grade literacy outcomes out of all children who met the preschool benchmark (i.e., true negatives). In addition to these indices, a phi coefficient was computed to provide a classification agreement index that corrected for chance (p.949-950). … Our data support optimal benchmarks of **18 uppercase letters and 15 lowercase letters** when considering all three literacy outcomes. These optimal benchmarks continued to have high negative predictive power, as described earlier, but also maximized classification accuracy in balancing negative predictive power with sensitivity, specificity, and positive predictive power. Use of these optimal benchmarks thus affords the most confidence that children who meet the benchmarks will continue to succeed in literacy tasks and that children who do not meet the benchmarks are those most likely to continue to struggle with literacy learning. Ensuring such accuracy is not a trivial matter (p.953).

Piasta, S. B., Petscher, Y., & Justice, L. M. (2012). How many letters should preschoolers in public programs know? The diagnostic efficiency of various preschool letter-naming benchmarks for predicting first-grade literacy achievement. *Journal of Educational Psychology, 104*(4), 945-958.

The most commonly reported measure quantifying the correspondence between teachers' judgments and students' actual achievement is the correlation between the two. Overall, moderate to high correlations are reported (Begeny et al., 2008; Demaray & Elliot, 1998; Feinberg & Shapiro, 2003). For example, Feinberg and Shapiro (2009) reported correlations of .59 and .60 between teachers' judgments and students' decoding skills and reading comprehension, as measured by subtests of the Woodcock- Johnson–III Test of Achievement. In the same study, a correlation of .64 was found between students' oral reading fluency as measured by a CBM procedure and teachers' predictions of oral reading fluency. In a review of 16 studies, Hoge and Coladarci (1989) found a median correlation of .66 between teachers' judgments and students' achievement on a standardized test. On the one hand, these results may be interpreted as indicating that teachers' judgments are quite accurate; on the other hand, their judgments are evidently far from perfect, and more than two thirds of the variance in teachers' judgments cannot be explained by student performance. Additionally, the correlations found ranged substantially across studies, from .28 to .92 (Hoge & Coladarci, 1989) (p.744).

Südkamp, A., Kaiser, J., & Möller, J. (2012). Accuracy of teachers' judgments of students' academic achievement: A meta-analysis. *Journal of Educational Psychology, 104*(3), 743-762

Teachers have various assessment tools at their disposal, including "oral questioning of students, observation, written work products, oral presentations, interviews, projects, portfolios, tests, and quizzes" (Shepard, Hammerness, Darling-Hammond, & Rust, 2005, p. 294).

Shepard, L., Hammerness, K., Darling-Hammond, L., & Rust, F. (2005). Assessment. In L. Darling-Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world* (pp. 275–326). San Francisco, CA: Wiley.

O'Connor, R. E.; Swanson, H.L., & Geraghty, C. 2010). Improvement in reading rate under independent and difficult text levels: Influences on word and comprehension skills. *Journal of Educational Psychology, 102*(1), 1-19.

There is robust evidence for a phenotypic relationship between mathematics and reading, with studies reporting moderate to high correlations (approx. .24 –.62; e.g., Durand, Hulme, Larking, & Snowling, 2005; Hart, Petrill, Thompson, & Plomin, 2009; Hecht, Torgesen, Wagner, & Rashotte, 2001). In most cases, these studies have focused on word decoding or global measures of reading, in conjunction with global measures of mathematics or arithmetic. Similarly, there is substantial comorbidity between difficulty in word reading and difficulty in mathematics (e.g., Dirks, Spyer, van Lieshout, & de Sonneville, 2008; Landerl & Moll, 2010). The overlap between reading and mathematics has typically been attributed to language and working memory processes that are required for both, such as phonological processing skills (e.g., De Smedt, Taylor, Archibald, & Ansari, 2010; Hecht et al., 2001) (p.623). … our results lead to the prediction that children with reading difficulties are at elevated risk for co-occurring difficulties in mathematics, and this risk is highest for children with deficits in reading comprehension (p.632).
Harlaar, N., Kovas, Y., Dale, P. S., Petrill, S. A., & Plomin, R. (2012). Mathematics is differentially related to reading comprehension and word decoding: Evidence from a genetically sensitive design. *Journal of Educational Psychology, 104*(3), 622-635.

The initial improvement retained students make, relative to their younger grade mates, is likely a powerful motivator for educators. Teachers of the retained students observe their success in the repeat-year classroom but may not have the opportunity to observe these students' performance 2 to 5 years later. If teachers were made aware that the immediate boost retained children experience dissipates over the following 3 or 4 years, they might be less likely to recommend this intervention. In essence, by the end of elementary school, children retained and children promoted in first grade do not differ in their levels of achievement in math or reading, but there is an additional cost of one year of additional schooling for the retained children (p.618).
Moser, S. E., West, S. G., & Hughes, J. N. (2012). Trajectories of math and reading achievement in low-achieving children in elementary school: Effects of early and later retention in grade. *Journal of Educational Psychology, 104*(3), 603-621.

"The present study included a comprehensive model of cognitive skills that contribute to successful reading comprehension, and overall, our findings revealed that children's comprehension is not identical across all types of text and questions. In particular, we found that **higher level cognitive skills such as inferencing and reasoning contributed to expository texts and more complex question types, while word recognition and oral language contributed to all types of texts and questions**. … our findings indicate that interactions between reader characteristics such as different cognitive skills and specific text and question categories exist. Such findings support a more multidimensional scale of text complexity (Graesser et al., 2011)" (p.524).
Eason, S. H., Goldberg, L. F., Young, K. M., Geist, M. C., & Cutting, L. E. (2012). Reader–text interactions: How differential text and question types influence cognitive skills needed for reading comprehension. *Journal of Educational Psychology, 104*(3), 515-528.

Mild perinatal adversities, such as being small for gestational age or being born late preterm, are usually considered to be risk factors for subsequent child development, including cognitive development (Chyi, Lee, Hintz, Gould, & Sutcliffe, 2008; Nomura et al., 2009; Van Baar, Vermaas, Knots, de Kleine, & Soons, 2009). Here we present experimental data supporting a radically different view, derived from the theory of differential susceptibility (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; Boyce & Ellis, 2005; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2011). We suggest that mild (but not severe) perinatal adversities may program children to be more susceptible than other children to the environment, for better *and* for worse. Children who are small for gestational age or born late preterm may acquire the **poorest early literacy skills in unfavorable environments**, but they might perform at the highest literacy level if delays in early literacy development are addressed at an early stage. Children may profit more from beginning reading instruction when they receive an early literacy intervention in kindergarten that prompts them to **pay attention to print** as an object of exploration, an important

precursor of the beneficial effects of reading instruction (Byrne, Fielding-Barnsley, & Ashley, 2000; Duursma, Augustyn, & Zuckerman, 2008; Silva & Alves Martins, 2002; Snider, 1997; Van der Kooy-Hofland, Bus, & Roskos, 2011; Van der Kooy-Hofland, Kegel, & Bus, 2011).

van der Kooy-Hofland, V. A. C., van der Kooy, J., Bus, A. G., van IJzendoorn, M. H., & Bonsel, G. J. (2012, February 6). Differential susceptibility to early literacy intervention in children with mild perinatal adversities: Short- and long-term effects of a randomized control trial. *Journal of Educational Psychology*, *104*(2), 337-349.

This suggests that the mirror writings may occur (depending on the context) between some other incorrect writings (or absence of writing) and correct writings in the development of **almost all** children. In addition, contextual or situational factors, such as the preceding writing or the position of the writing on the page, had a much stronger influence on mirror writing than individual factors, such as writing hand or gender (p.193).

Fischer, J-P., & Tazouti, Y. (2012). Unraveling the mystery of mirror writing in typically developing children. *Journal of Educational Psychology, 104*(1), 193–205.

Some children demonstrate adequate or better reading achievement in early school grades but fall significantly behind their peers in later grades. These children are often referred to as late-emerging poor readers. In this study, we investigated the prevalence and heterogeneity of these poor readers. We also examined the early language and nonverbal cognitive abilities of late-emerging poor readers. Participants were 493 children who were a subsample from an epidemiological study of language impairments in school-age children. In kindergarten, children were administered a battery of language, early literacy, and nonverbal cognitive measures. Word reading and reading comprehension achievement was assessed in 2nd, 4th, 8th, and tenth grades. Latent transition analysis was used to model changes in reading classification (good vs. poor reader) across grades. **Population estimates revealed that 13.4% of children could be classified as late-emerging poor readers. These children could be divided into those with problems in comprehension alone (52%), word reading alone (36%), or both (12%).** Further results indicated that late-emerging poor readers often had a history of **language and/or nonverbal cognitive impairments in kindergarten**. Subtypes of poor readers also differed significantly in their profiles of language, early literacy, and nonverbal cognitive abilities in kindergarten. Results are discussed in terms of causal factors and implications for early identification (p.166).

Catts, H.W., Compton, D., Tomblin, J.B. & Sittner Bridges, M. (2012). Prevalence and nature of late-emerging poor readers. *Journal of Educational Psychology, 104*(1), 166–181.

The trustworthiness of "at risk" and "low risk" instructional recommendations on the basis of oral reading rates was high. We discuss these findings in light of the existing research on reading fluency. Our findings have implications for research and instruction for fluency and literacy development of both fluent and nonfluent readers.

Wang, C., Algozzine, B., Ma, W., & Porfeli, E. (2011, March 28). Oral reading rates of second-grade students. *Journal of Educational Psychology, 103*(2), 442-454

Overall, results suggest that some young children do have the ability to make orthographic analogies when given multiple exemplars but that most improvement in target word reading reflects purely phonological activation. Practical steps for identifying genuine analogy use in a subset of children are thus described (p. 190).

Savage, R.S., Deault, L., Daki, J., & Aouad, J. (2011). Orthographic analogies and early reading: Evidence from a multiple clue word paradigm. *Journal of Educational Psychology, 103*(1), 190–205.

Discovery learning approaches to education have recently come under scrutiny (Tobias & Duffy, 2009), with many studies indicating limitations to discovery learning practices. Therefore, 2 meta-analyses were conducted using a sample of 164 studies: The 1st examined the effects of unassisted discovery learning versus explicit instruction, and the 2nd examined the effects of enhanced and/or assisted discovery versus other types of instruction (e.g., explicit, unassisted discovery). Random effects analyses of 580 comparisons revealed that outcomes were favorable for explicit instruction when compared with unassisted

discovery under most conditions (d _ –0.38, 95% CI [–.44, _.31]). In contrast, analyses of 360 comparisons revealed that outcomes were favorable for enhanced discovery when compared with other forms of instruction (d _ 0.30, 95% CI [.23, .36]). The findings suggest that unassisted discovery does not benefit learners, whereas feedback, worked examples, scaffolding, and elicited explanations do. P .

Alfieri, L., Brooks, P. J., Aldrich, N. J., & Tenenbaum, H. R. (2010). Does discovery-based instruction enhance learning? *Journal of Educational Psychology*, 103(1), 1-18.

"The purposes of this study were (a) to identify measures that when added to a base 1st-grade screening battery help eliminate false positives and (b) to investigate gains in efficiency associated with a 2-stage gated screening procedure. We tested 355 children in the fall of 1st grade and assessed for reading difficulty at the end of 2nd grade. The base screening model included measures of phonemic awareness, rapid naming skill, oral vocabulary, and initial word identification fluency (WIF). Short-term WIF progress monitoring (intercept and slope), dynamic assessment, running records, and oral reading fluency were each considered as an additional screening measure in contrasting models. Results indicated that the addition of WIF progress monitoring and dynamic assessment, but not running records or oral reading fluency, significantly decreased false positives. The 2-stage gated screening process using phonemic decoding efficiency in the 1st stage significantly reduced the number of children requiring the full screening battery."(p.327)

Compton, D. L., Fuchs, D., Fuchs, L. S., Bouton, B., Gilbert, J. K., Barquero, L. A., et al (2010). Selecting at-risk first-grade readers for early intervention: Eliminating false positives and exploring the promise of a two-stage gated screening process. *Journal of Educational Psychology, 102*(2), 327–340.

"Among the 1st-grade predictors, individual differences in growth rate in oral reading fluency in 1st grade, followed by vocabulary skills and the autoregressive effect of reading comprehension, made the most contribution to reading comprehension in 3rd grade. Among the 2nd- and 3rd-grade predictors, children's initial status in oral reading fluency had the strongest relationships with their reading comprehension skills in 3rd grade."

Young-Suk, K., Petscher, Y., Schatschneider, C., & Foorman, B. (2010). Does growth rate in oral reading fluency matter in predicting reading comprehension achievement? *Journal of Educational Psychology, 102*(3), 652–667.

O'Connor, R.E., Swanson, H.L, & Geraghty, C. (2010). Improvement in reading rate under independent and difficult text levels: Influences on word and comprehension skills. *Journal of Educational Psychology, 102*(1), 1-19.

The special case of English: A perfect storm?

Note that the processes I have been outlining would in principle apply to any alphabetic writing system – they all code phonemes, and they are all morphological as well as phonological. But I propose that English creates special problems. The apparently unruly nature of the orthography, the existence of many words that do not follow straightforward one-to-one mapping of letter onto phoneme, may undermine the resolve of teachers to teach reading as if it were an exercise in alphabetic decoding. And teachers may not have such a resolve in the first place. We know that some do not because they have been trained to avoid explicit instruction in the alphabetic principle (Goodman, 1986; Shankweiler & Fowler, 2004). This in turn has been in part based on the conviction that reading cannot be done this way anyway, precisely because of the existence of irregular words like *the, once, one, was, were, there* … .So, we may have the beginnings of a perfect storm – children *ill* equipped to discover, all by themselves, the alphabetic nature of English writing, the same children well equipped, all by themselves, to discover its morphemic nature, and a teacher who advertently or inadvertently fosters the morphemic hypothesis and obscures the phonemic one, leading to children trapped in an initially successful strategy but one that will eventually leave them floundering (Byrne, Freebody, & Gates, 1992) (Byrne, 2011, p. 182).

Byrne, B. (2011). Evaluating the role of phonological factors in early literacy development. In S. Brady, D. Braze, & C.A. Fowler (Eds.), *Explaining individual differences in reading: Theory and evidence*. New York: Psychology Press.

"Research shows that about 40% of children learn to read fairly easily with any instructional approach. For another 30-40% of children, learning to read requires more effort. For the remaining 20-30%, reading may be one of the most difficult tasks they will have to master in their school years."

Lyon, G.R. (April 1998). Overview of NICHD reading and literacy initiatives. U.S. Senate Committee on Labor and Human Resources, United States Congress. Washington, D.C. Congressional Printing Office.

Likewise, the data suggest that formation of memories through neural consolidation works best if students have a number of short learning sessions separated over time, not single long sessions. Again, the advantages of spaced or distributed practice over massed practice have also been known for many decades (see Olson & Hergenhahn, 2009; Ebbinghaus, 1913). Neuroscience, in this case, reinforced these best practices by providing the data at the neural level that supported these methods" p.50).

Alferink, L.A., & Farmer-Dougan, V. (2010): Brain-(not) based education: Dangers of misunderstanding and misapplication of neuroscience research, *Exceptionality, 18*(1), 42-52.

Genetic studies, too, provide support for the notion that accuracy- improved and persistently poor readers may represent different etiologies. Twin studies report that subjects with relatively higher IQs, as is true of accuracy-improved readers or those with dyslexia, tend to have stronger genetic influence, whereas shared environment is a stronger influence for those with lower IQs, comparable to that found in persistently poor readers or those with general reading backwardness. Here, the investigators postulate that ''poor home and educational environment could be jointly responsible for the concurrent expression of low IQ'' and poor reading (Olson, 1999, p.13). In contrast, in accuracy-improved readers or those with dyslexia, reading difficulties are more likely to be unexpected and to reflect stronger genetic influences … persistently poor readers read real words using memory systems, suggesting brain systems for analyzing and reading words have not developed (Shaywitz, Mody, & Shaywitz, p.280).

Shaywitz, S.E., Mody, M. & Shaywitz, B.A. (2006). Neural mechanisms in dyslexia. *Current Directions in Psychological Science, 15*(6), 278-281.

A study of 30,000 Florida students in Grades 1-3 found that those using SRA/McGraw-Hill's Reading Mastery earned the highest scores. "Examining the core: Relations among reading curricula, poverty, and first through third grade reading achievement," was published in the Journal of School Psychology, Issue 47, by a team of researchers at the Florida Center for Reading Research. The study compared the effects of six core reading curricula on oral reading fluency growth, while appraising whether these effects differ by grade level and for children living in lower socioeconomic (SES) households. Success was measured by oral reading fluency (ORF), which correlates positively with standardized measures of reading achievement. ORF is often touted as the best overall indicator of reading proficiency for students in the early stages of learning to read. Overall, students in the Reading Mastery curriculum demonstrated generally greater overall ORF growth than students in other curricula. Also, they more frequently met or exceeded benchmarks for adequate achievement in Grades 1-3.

Crow, E.C., Connor, C.M., & Petscher, Y. (2009). Examining the core: Relations among reading curricula, poverty, and first through third grade reading achievement. *Journal of School Psychology, 47*(3), 187–214.

Unfortunately, very little rigorous evaluation of programs and cost-effectiveness analysis is done within the Australian school system. Decisions are made without the best possible understanding of what works in different contexts, or — critically — which programs achieve results at the lowest cost. (sub. 30, p. 8)

Productivity Commission. (2012). *Schools Workforce*. Research Report, Canberra. JEL code: I21, I28, J24. Retrieved from http://www.pc.gov.au/projects/study/education-workforce/schools/report

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In the literature, highly standardized interventions and those with less standardization (i.e., more responsive to individual student needs) were not associated with differential impact (p.164).

After third grade, the emphasis on instruction in learning to read often begins to fade from instruction in the general education classroom, meaning students who do not read proficiently by the end of Grade 3 may face serious consequences in their academic achievement (p.164-5).

Spelling and writing are incorporated in some reading interventions because the skills associated with successful reading—such as phonological knowledge, text structure knowledge, and reasoning—also play a role in spelling and writing (Abbott & Berninger, 1993; Graham, Harris, & Chorzempa, 2002; Wanzek et al., 2006) (p.166).

Both Edmonds et al. (2009) and Scammacca et al. (2007) noted smaller mean effects when considering only norm-referenced outcome measures (p.166).

Following a pattern of findings in which studies that are more rigorous yield smaller effects than those that are less rigorous (Swanson, Hoskyn, & Lee, 1999), the small effects noted for extensive interventions were notably lower than effects reported in previous syntheses of reading interventions for adolescents (p.186).

Although instructional group size is often noted as an important intervention variable for early elementary students (Elbaum et al., 2000; Vaughn et al., 2003; Wanzek & Vaughn, 2007), this synthesis did not find support for instructional group size as a significant moderator of effects for students in Grades 4 through 12, despite the variety of group sizes noted in the corpus of studies. This finding aligns with an experimental study that directly compared large- (10–15 students) and small-group (3–5 students) extensive intervention at the sixth-grade level, reporting no differences in student outcomes based on group size (Vaughn, Wanzek, et al., 2010). There are several possible interpretations of this finding. First, perhaps group size needs to be reduced further to yield effects. Second, teachers in these studies may not have adequately differentiated instruction, so that adjustments in group size are associated with differential outcomes. Third, for students struggling with reading after Grade 3, receiving the same instruction in a smaller group size may not be sufficient for improving student outcomes. … For secondary students with significant reading difficulties, very intense and sustained interventions may be required to maintain reading growth each year of school (p.187-8).

Wanzek, J., Vaughn, S., Scammacca, N.K., Metz, K., Murray, C.S., Roberts, G., & Danielson, L. (2013). Extensive reading interventions for students with reading difficulties after Grade 3. *Review of Educational Research, 83*(2), 163-195.

This review synthesizes research on English reading outcomes of all types of programs for Spanish-dominant English language learners (ELLs) in elementary schools. … the largest and longest term evaluations, including the only multiyear randomized evaluation of transitional bilingual education, did not find any differences in outcomes by the end of elementary school for children who were either taught in Spanish and transitioned to English or taught only in English. The review also identified whole-school and whole-class interventions with good evidence of effectiveness for ELLs, including Success for All, cooperative learning, Direct Instruction, and ELLA. Programs that use phonetic small group or one-to-one tutoring have also shown positive effects for struggling ELL readers. What is in common across the most promising interventions is their use of extensive professional development, coaching, and cooperative learning. The findings support a conclusion increasingly being made by researchers and policymakers concerned with optimal outcomes for ELLs and other language minority students: Quality of instruction is more important than language of instruction.

Cheung, A.C.K., & Slavin, R.E. (2012). Learners (ELLs) in the elementary grades: A synthesis of research effective reading programs for Spanish-dominant English language. *Review of Educational Research, 82*(4), 351-395.

Several national reports have suggested the usefulness of systematic, explicit, synthetic phonics instruction based on English word structure along with wide reading of quality literature for supporting development in early reading instruction. Other studies have indicated, however, that many in-service teachers are not knowledgeable in the basic concepts of the English language. They may be well versed in children's literature but not know how to address the basic building blocks of language and reading. The authors hypothesized that one of the reasons for this situation is that many instructors responsible for training future elementary teachers are not familiar with the concepts of the linguistic features of English language. This hypothesis was tested by administering a survey of language concepts to 78 instructors. The results showed that even though teacher educators were familiar with syllabic knowledge, they performed poorly

on concepts relating to morphemes and phonemes. In a second study, 40 instructors were interviewed about best practices in teaching components and subskills of reading. Eighty percent of instructors defined phonological awareness as letter-sound correspondence. They also did not mention synthetic phonics as a desirable method to use for beginning reading instruction, particularly for students at risk for reading difficulties. In conclusion, providing professional development experiences related to language concepts to instructors could provide them the necessary knowledge of language concepts related to early literacy instruction, which they could then integrate into their preservice reading courses.

Joshi, R.M., Binks, E., Hougen, M., Dahlgren, M. E., Ocker-Dean, E., & Smith, D. L. (2009). Why elementary teachers might be inadequately prepared to teach reading. *Journal of Learning Disabilities, 42*(5), 392-402. doi:http://dx.doi.org/10.1177/0022219409338736

Aaron, Joshi, Boulware- Gooden, and Bentum (2008) demonstrated that when the weak component was identified first and then appropriate intervention was provided, there was a significant improvement in that skill, which led to overall higher reading achievement. **This study also demonstrated that identification of LD based on the discrepancy model is not necessary and can be dispensed with.** Furthermore, SVR accounts for approximately 40% to 80% of the variance in reading comprehension between Grades 2 through 10 (Catts et al., 2006; Hoover & Gough, 1990; Johnston & Kirby, 2006; Joshi & Aaron, 2000; Savage, 2006) (p.388) Aaron and colleagues (Aaron, Joshi, Boulware-Gooden, et al., 2008; Aaron, Joshi, & Quatroche, 2008) extended SVR and proposed the "componential model of reading" (CMR), according to which reading performance is influenced by several factors that can be classified into three domains— cognitive, psychological, and ecological. Each domain has its own components. For instance, the cognitive domain has two components: word recognition and comprehension; components of the psychological domain include factors such as motivation and interest, teacher expectation, and gender differences; and the ecological domain includes components such as teacher knowledge, dialect differences, home environment, and English as a second language (p.388)

The online version of this article can be found at: DOI: 10.1177/0022219411431240 *J Learn Disabil* 2012 45: 387 R. Malatesha Joshi and P. G. Aaron Componential Model of Reading (CMR) : Validation Studies

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Because of the Flynn effect, IQ scores rise as a test norm ages but drop on the introduction of a newly revised test norm. The purpose of the current study was to determine the impact of the Flynn effect on learning disability (LD) diagnoses, the most prevalent special education diagnosis in the United States. Using a longitudinal sample of 875 school children who were initially diagnosed with LD on the *Wechsler Intelligence Scale for Children–Revised* (WISC-R), children experienced a significant decline in IQ when retested on the third edition of the WISC (WISC-III) compared to peers who were tested on the WISC-R twice. Furthermore, results from logistic regression analyses revealed that the probability of a rediagnosis of LD on reevaluation significantly decreased, in part, because of this decline on the WISC-III. DOI: 10.1177/0022219410392044 *J Learn Disabil* 2012 45: 319 originally published online 30 December 2010

Tomoe Kanaya and Stephen Ceci The Impact of the Flynn Effect on LD Diagnoses in Special Education

"Our long-term goal is to develop efficient batteries to identify children who are in immediate need of Tier 3 intervention such that the costs of administering and interpreting the assessments are far exceeded by the costs and the potential negative psychological and educational outcomes resulting from administering Tier 2 instruction that is ineffective for children unable to benefit from that level of intensity or intervention approach. With these caveats in mind, results of the logistic regression models indicated that Tier 2 response data may not be necessary to predict accurately a group of children who are at considerable risk of being unresponsive at Tier 2. This suggests that at-risk children can be identified accurately for Tier 3 intervention without participating in (and failing to respond to) Tier 2 intervention. Model 3, which included universal screening data, Tier 1 response data (PM WIF data as well as instruction teacher ratings of student behavior and attention during regular classroom instruction), and a battery of norm-referenced tests, distinguished nonresponders to Tier 2 with sensitivity of 90% and specificity of 80%" (p.212-13). Compton, D.L., Gilbert, J.K., Jenkins, J.R., Fuchs, D., Fuchs, L.S., & Eunsoo Cho, L.A. (2012). Ensure selection accuracy? Accelerating chronically unresponsive children to Tier 3 instruction: What level of data is necessary to ensure selection accuracy? *Journal of Learning Disabilities, 45*, 204-216.

"Australia does not perform as well as comparable countries in giving students equal opportunity to realise their educational potential, irrespective of their background or ability. The resulting educational disadvantage is particularly evident among Australian students who are Indigenous, from low socioeconomic backgrounds, have a disability or other special needs, or reside in a rural or remote area". Productivity Commission Research Report, Schools Workforce, April 2012, p. 54.

"According to the National Assessment of Educational Progress, the percentage of students who are proficient in basic reading and math are roughly half of the rates reported by the states (p.5)".
Stone, J.E. (2013). Reversing American decline by reducing education's casualties: First, we need to recapture our school boards. Education Consumers Foundation. Retrieved from http://www.education-consumers.org/rad.htm

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"Children who have not mastered reading by 3rd grade are the poor readers seen in the 8th grade and the students who struggle with science, technology, engineering, and math (STEM) skills. They become the discouraged learners, the behavior problems, the drop-outs, and the high school graduates who need remedial instruction in college. Essentially, their lack of early reading mastery predicts failure in school, college, and eventually in the workplace" (p.3).
Stone, J.E. (2013). Reversing American decline by reducing education's casualties: First, we need to recapture our school boards. Education Consumers Foundation. Retrieved from http://www.education-consumers.org/rad.htm

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"In addition to the evidence from successful schools, there are teaching methodologies that have been carefully researched and shown to be effective in bringing disadvantaged students to grade level by the 3rd grade. Although often used with special education students, they are demonstrably effective in preventing almost all reading failure when implemented in kindergarten as part of the general education curriculum. *Direct Instruction*, a program originally developed and tested in the 1960s and 70s, and *Success for All*, developed in the late 1980s, are two well known examples" (p.7).
Stone, J.E. (2013). Reversing American decline by reducing education's casualties: First, we need to recapture our school boards. *Education Consumers Foundation*. Retrieved from http://www.education-consumers.org/rad.htm

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The importance of learning math facts
Students with higher and lower math scores use different parts of the brain when doing simple calculations, according to a new study in *The Journal of Neuroscience*. High achievers use an area of the brain associated with arithmetic fact retrieval, whereas students with lower scores use an area associated with quantity-processing mechanisms. The suggestion is that the ability to recall math facts (rather than do the sum from scratch) helps the students to go onto more complex mathematics.

The researchers used an fMRI scanner to examine the brains of 33 students (aged 17-18) as they performed simple, single-digit arithmetic. There was a clear association between particular areas of the brain and the students' scores in the PSAT math test (taken at age 15-16). The results suggest a correlation between arithmetic fact retrieval and higher scores, but more research is needed to see whether there is also a causational link - for example, whether interventions where lower-scoring students learn math facts lead to changes in brain activity and/or higher math scores.
Price, G.R., Mazzocco, M.M.M., & Ansari, D. (2013). Why mental arithmetic counts: Brain activation during single digit arithmetic predicts high school math scores. *The Journal of Neuroscience, 33*(1), 156-163.

"The way we went down the road to whole language is really a story of stupidity".
Reid Lyon, G. (2005). *Children of the Code Interview*. Retrieved from http://www.childrenofthecode.org/interviews/lyon.htm#WholeLanguage

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"In addition, results of instructional studies imply causal relationships between handwriting and other written language skills. Teaching automatic letter writing improved compositional fluency: Students wrote

texts that were longer (Berninger, Abbott, Whitaker, Sylvester, & Nolen, 1995) and were completed in less time (Berninger, Vaughan, Abbott, Abbott, Brooks, Rogan, et al., 1997; Berninger, Rutberg, Abbott, Garcia, Anderson-Youngstrom, Brooks, et al., 2006; Graham, Harris, & Fink, 2000). Teaching handwriting has also shown transfer to improved word reading (e.g., Berninger, Dunn, Lin, & Shimada, 2004; Berninger et al., 1997, 2006; Dunn & Miller, 2009)" (p. 494).

Todd, L. R., Berninger, V.W., Stock, P., Altemeier, L., Trivedi, P., & Maravilla, K. R. (2011). Differences between good and poor child writers on fMRI contrasts for writing newly taught and highly practiced letter forms. *Reading and Writing, 24*(5), 493-516.

"Curriculum-based measurement of oral reading (CBM-R) is frequently used to set student goals and monitor student progress. … The number of data points, quality of data, and method used to estimate growth all influenced the reliability and precision of estimated growth rates. Results indicated that progress monitoring outcomes are sufficient to guide educational decisions if (a) ordinary least-squares regression is used to derive trend lines estimates, (b) a very good progress monitoring data set is used, and (c) the data set comprises a minimum of 14 CBMs-R" (p.356).

Theodore, J. C., Zopluoglu, C., Jeffery, D. L., & Barbara, D. M. (2012). Curriculum-based measurement of oral reading: Quality of progress monitoring outcomes. *Exceptional Children, 78*(3), 356-373.

"Our findings converge with recent research that end-of-year status may provide the most reliable information related to student response. Schatschneider and colleagues (Schatschneider et al., 2008) studied 23,000 first graders and reported their end-of-first-grade scores on oral reading fluency uniquely predicted end-of-firstgrade reading comprehension, beginning-of-second-grade oral reading fluency, and end-of-second-grade reading comprehension. In contrast, oral reading fluency growth did not provide independent contribution beyond end-of-year scores to the prediction of any outcomes at first or second grade".

Otaiba, S. A., Folsom, J. S., Schatschneider, C., Wanzek, J., Greulich, L., Meadows, J., Zie, L., & Connor, C. M. (2011). Predicting first-grade reading performance from kindergarten response to Tier 1 instruction. *Exceptional Children, 77*(4), 453-470.

"Remediation of reading difficulties in older students may require considerable intensity and differentiation of instruction. A significant problem is that intensive, small-group instruction provided by highly skilled teachers is an expensive and infrequently applied instructional practice within most educational settings (Vaughn, Levy, Coleman, & Bos, 2002; Vaughn, Moody, & Schumm, 1998). Therefore, it is perhaps not surprising that the few available studies of students who receive special education services show fair levels of growth and little evidence that interventions through special education actually close the achievement gap (Bentum & Aaron, 2003; Foorman et al., 1997; Hanushek, Kain, & Rivkin, 1998; Torgesen et al., 2001) (p.74)".

Wanzek, J., Vaughn, S., Roberts, G., & Jack, M. F. (2011). Efficacy of a reading intervention for middle school students with learning disabilities. *Exceptional Children, 78*(1), 73-87.

"Despite advances in the science of teaching reading, there still exists a small percentage of students who fail to make the expected progress in reading-related skills, notwithstanding attempts at intervention. Even if these struggling readers learn to decode adequately, fluency remains a problem for many, and little is known about the effectiveness of fluency interventions for older students with severe reading deficits. This study used a randomized experimental design to test the efficacy of a fluency intervention program on the word-identification and reading-comprehension outcomes of 60 middle-school students with severe reading delays. Results showed that students in the experimental group made more progress on standardized tests of reading fluency than students in the control group. No gains were seen in reading comprehension" (p.76).

Spencer, S.A., & Manis, F.R. (2010). The effects of a fluency intervention program on the fluency and comprehension outcomes of middle-school students with severe reading deficits. *Learning Disabilities Research & Practice*, 25(2), 76–86.

"In another longitudinal study, Lipka, Lesaux, and Siegel (2006) examined reading and reading-related abilities of children with poor word reading skills. From a sample of 1,100 children who had been followed from kindergarten through fourth grade, 22 children were identified with word-reading deficits in fourth grade. Seven of the poor readers had persistent problems across grades, eight had late-emerging deficits (after third grade), and seven had borderline deficits at other grades. Additional results indicated that those

with late-emerging word-reading problems had phonological processing deficits, especially after second grade. Such deficits were evident on tests of phonological awareness, phonological decoding, and spelling. Lipka et al. suggested that these children may have been able to compensate for their phonological deficits in the early grades, but as words became more complex, they showed reading and spelling difficulties" (p.167).

Lipka, O., Lesaux, N., & Siegel, L. (2006). Retrospective analyses of the reading development of Grade 4 students with reading disabilities: Risk status and profiles over 5 years. *Journal of Learning Disabilities, 39,* 364–378.

Juel (1991) suggested that some children may rely heavily on memorization of words, appear to be successful in beginning word reading, but struggle when such memorization becomes inefficient in the later grades. See also Carnine

Juel, C. (1991). Beginning reading. In R. Barr, M. L. Kamil, P. B. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 759–788). New York, NY: Longman.

"Retention has been studied for many years, and the research is reasonably clear. Children who repeat a grade do very poorly in reading and, ultimately, graduation rates compared similarly to their low-achieving age mates who were promoted. In comparison to their new grade mates, they show a short-term gain because they are older when they take the test, but this advantage wears off within a few years".

Slavin, R. (2013). Reading by third grade: Thinking beyond retention. *The Blog: Huffington Post* 29/1/2013. Retrieved from http://www.huffingtonpost.com/robert-e-slavin/reading-by-third-grade_b_2567959.html

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In this longitudinal study, those third grade students who were struggling with their reading had four times the rate of early school leaving compared with average readers.

Lesnick, J., Goerge, R., Smithgall, C. & Gwynne, J. (2010). *Reading on grade level in third grade: How is it related to high school performance and college enrollment?* Chapin Hall; Consortium on Chicago School Research; The Annie E. Casey Foundation. Retrieved from http://www.aecf.org/KnowledgeCenter/Publications.aspx?pubguid={61221250-BC02-49C9-8BDA-D64C45B1C80C}

"Fifteen years of experience with problem solving and RTI and several small-scale evaluation studies have led me to some conclusions about RTI and alternative educational practices. First, people in schools want to implement practices that are good for students, but teachers in general may not have the skills they need to deliver instruction that is differentiated beyond accommodations. Second, when teachers implement proven practices, students improve. Third, it is difficult to implement proven practices in school settings. Fourth, "the system" still reinforces teacher referrals. Fifth, a system that relies on teacher referral for special education identification can result in disproportionate representation. Sixth, special education identification rates may not reduce when RTI is implemented. Seventh, and of most concern to me, is that an interventions-based system of identification has not led to better individualized education program (IEP) outcomes for students identified as eligible for special education services" (p. 274-5).

Ikeda, M.K. (2012). Policy and practice considerations for Response to Intervention: Reflections and commentary. *Journal of Learning Disabilities, 45*(3), 274-277.

"Compton et al. show that assessing a student's response to generally effective small-group tutoring may not be required to identify students as LD. Schools might use a multistage screening model productively for simultaneously identifying (a) students who require and will benefit from less-intensive, shorter-term supplemental tutoring and (b) those who will fail to respond to such intervention and instead should be moved immediately into the more intensive and longerterm intervention they require. In these and other ways, research continues to refine understanding about how to conceptualize and conduct screening to optimize RTI's effectiveness and reduce its costs" (p.196).

Fuchs, L.S., & Vaughn, S. (2012).Responsiveness-to-Intervention: A decade later. Journal of Learning Disabi*lities, 45*(3), 195-203.

"In synthesizing the results of 24 code-focused early childhood intervention studies meeting inclusion criteria, the NELP study found an overall average effect size of 0.38 (95% confidence interval = 0.18 to 0.58) on alphabet knowledge outcomes. Effects on alphabet learning were found to vary based on demographic characteristics (child age, ethnicity, extent of literacy knowledge, population density of the

location in which the study was conducted) as well as whether letter instruction was combined with training in phonological awareness. Other types of interventions investigated by the Panel (e.g., shared reading, general preschool/kindergarten programs) showed no reliable impact on children's alphabet knowledge. …

A growing body of research demonstrates reciprocal relations between letter name and sound knowledge and suggests that instruction in letter names may facilitate letter sound learning for those letters whose names also include their sounds (e.g., the /b/ at the beginning of the letter name B or the /f/ at the end of the letter name F), with children using the information contained in the letter names to derive or cue corresponding sounds (e.g., Evans, Bell, Shaw, Moretti, & Page, 2006; Levin, Shatil-Carmon, & Asif-Rave, 2006; McBride-Chang, 1999; Share, 2004; Treiman, Tincoff, Rodriguez, Mouzaki, & Francis, 1998; Treiman, Weatherston, & Berch, 1994). There is also some evidence that suggests reciprocal relations between phonological skills and alphabet knowledge development (Burgess & Lonigan, 1998; Lonigan, Burgess, & Anthony, 2000; McBride-Chang, 1999; Wagner et al., 1994), including potential benefits of phonological training on alphabet skills (Ball & Blachman, 1991)." (p.8)

"In its synthesis of more than 60 studies from the early reading literature, the present study demonstrates a significant impact of instruction on children's alphabet learning. Effect size magnitude depended not only on the type of alphabet knowledge assessed, but also instructional factors such as skills taught, setting, grouping, and duration." (p.20)

" … additional research on *how* to effectively impart alphabet knowledge remains necessary. Despite our efforts to capture meaningful variations in instructional content and implementation for moderator analyses, details regarding individual studies could be coded only if they were explicitly mentioned within the text of research reports. Many proposed research questions concerning additional potential moderators of the effect of instruction on alphabet learning (e.g., organization of alphabet lessons including the order in which letters were taught, instructional materials, fidelity of implementation, training of instructors) could not be answered because of lack of information. Future design work, in which various ways of promoting mastery of letters and sounds are contrasted, is necessary to reliably answer such detailed questions concerning the efficacy and efficiency of alphabet instruction. Finally, as previously discussed, research aimed at elucidating the causal role of alphabet knowledge in promoting literacy development is required." (p.24-5)

Piasta, S.P., & Wagner, R.K. (2010). Developing early literacy skills: A meta-analysis of alphabet learning and instruction. *Reading Research Quarterly, 45*(1), 8–38.

"Traditionally, pupils are allowed a fixed amount of time to learn a particular task or unit. The result is variation in the achievement level attained, with the amount learned per unit of time taken as a measure of learning rate. Surprisingly few studies have been conducted to investigate the actual time it takes to learn or the amount learned as essential variables in school learning. Research that has been done emphasizes setting fixed achievement goals and then looking at the resulting variance in the amount of time needed to achieve these goals. Pupil variations in the time to achieve criterion level have ratios of 1:4 on a single programmed unit of an imaginary language (Carroll & Spearritt, 1967), 1:3.4 on a three-unit sequence of matrix mathematics (Block, 1970), and 1:7 on a seven-unit imaginary science course (Arlin, 1973). On the basis of these studies, Carroll (1970) estimated that the range of time to achieve criterion level in school learning is about 1:5. Anderson (1976) examined the stability of these individual differences on programmed matrix arithmetic material and concluded that learning time is alterable over successive units through effective tutoring strategies" (p.338).

Gettinger, M., & White, M. A. (1980). Evaluating curriculum fit with class ability. *Journal of Educational Psychology, 72*(3), 338-344. doi: http://dx.doi.org/10.1037/0022-0663.72.3.338

"Only a very small percentage of the population (l%-2%) met criteria for specific learning disabilities. In addition to substantial psychometric issues underlying these methods, general application did not improve the efficiency of the decision model, may not be cost effective because of low base rates, and may result in many children receiving instruction that is not optimally matched to their specific needs" (p.3).

" … efforts to relate cognitive patterns of strengths and weaknesses (PSW) to identification or treatment have met with limited success, especially when the focus is on individual profiles. Kavale and Forness (1984) conducted a meta-analysis of 94 studies of the validity of the Wechsler Intelligence Scales for Children--Revised (Wechsler, 1974) subtest regroupings for differential diagnosis of SLD and found that "no recategorization profile, factor cluster, or pattern showed a significant difference between learning disabled and abnormal samples" (p. 136). Similarly, Kramer, Henning-Stout, Ullman, and Schellenberg (1987) reviewed studies of scatter analysis of Wechsler Intelligence Scales for Children--Revised subtests and concluded that these measures were "unrelated to diagnostic category, academic achievement, or specific remedial strategies" (p. 42). Research with the third edition of the Wechsler Intelligence Scales for Children (WISC-III; Wechsler, 1991) found that the subtest profiles of 579 students replicated across test-retest occasions at chance levels ([Mdn.sub.K] = 0.02; Watkins & Canivez, 2004)" (p.4).

Stuebing, K. K., Fletcher, J. M., Branum-Martin, L., & Francis, D. J. (March 2012). Evaluation of the technical adequacy of three methods for identifying specific learning disabilities based on cognitive discrepancies. *School Psychology Review*, *41*(1), 3-22. Retrieved from Academic OneFile via Gale: http://find.galegroup.com.ezproxy.lib.rmit.edu.au/gtx/start.do?userGroupName=rmit&prodId=AONE

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1) Knowledge is crucial to support cognitive processes. (e.g., Carnine & Carnine, 2004; Hasselbring, 1988; Willingham, 2006).

2) Children who grow up in disadvantaged circumstances have fewer opportunities to learn important background knowledge at home (Walker et al, 1994) and they come to school with less knowledge, which has an impact on their ability to learn new information at school (Grissmer et al 2010) and likely leads to a negative feedback cycle whereby they fall farther and farther behind (Stanovich, 1986).
Willingham blog http://www.danielwillingham.com/daniel-willingham-science-and-education-blog.html
Carnine, L., & Carnine, D. (2004). The interaction of reading skills and science content knowledge when teaching struggling secondary students. *Reading & Writing Quarterly*, *20*(2), 203-218.
Grissmer, D., Grimm, K. J., Aiyer, S. M., Murrah, W. M., & Steele, J. S. (2010). Fine motor skills and early comprehension of the world: Two new school readiness indicators. *Developmental psychology*, *46*(5), 1008.
Hasselbring, T. S. (1988). Developing Math Automaticity in Learning Handicapped Children: The Role of Computerized Drill and Practice. *Focus on Exceptional Children*, *20*(6), 1-7.
Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading research quarterly*, 360-407.
Willingham, D. T. (2006). How knowledge helps. *American Educator*, *30*(1), 30-37.

"Moreover, there is strong evidence that increasing the general knowledge and vocabulary of a child before age six is the single highest correlate with later success".
Hirsch, E.D. (2013). Primer on success: Character and knowledge make the difference. *Education Next, 13*(1). Retrieved from http://educationnext.org/primer-on-success/

"In summary, drill and practice through high-quality CAI, implemented with fidelity, can be considered a useful tool in developing students' automaticity, or fast, accurate, and effortless performance on computation, freeing working memory so that attention can be directed to the more complicated aspects of complex tasks" (6/142).
Gersten, R., Ferrini-Mundy, J., Benbow, C., Clements, D., Loveless, T., Williams, V., Arispe, I., & Banfield, M. (2008). *Report of the task group on instructional practices (National Mathematics Advisory Panel).* Retrieved from the U.S. Department of Education Web site:http://www.ed.gov/about/bdscomm/list/mathpanel/report/instructional-practices.pdf

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"Students who scored higher on NAEP vocabulary questions also scored higher in reading comprehension".
National Center for Education Statistics (2012). *The Nation's Report Card: Vocabulary Results From the 2009 and 2011 NAEP Reading Assessments* (NCES 2013–452). Institute of Education Sciences, U.S. Department of Education, Washington, D.C.

"In fact, one study reported that spell checkers usually catch just 30 to 80 percent of misspellings overall

(partly because they miss errors like *here vs. hear*), and that spell checkers identified the target word from the misspellings of students with learning disabilities only 53 percent of the time."

Moats, L.C. (2005). How spelling supports reading. *American Educator,* Winter 2005/06, 12-43. Retrieved from http://www.readingrockets.org/article/8845/

Abstract Two studies from English-speaking samples investigated the methodologically difficult question of whether the later reading achievement of children learning to read earlier or later differs. Children (*n*=287) from predominantly state-funded schools were selected and they differed in whether the reading instruction age (RIA) was either five or seven years. Study 1 covered the first six years of school following three cohorts across a two-year design. Analyses accounted for receptive vocabulary, reported parental income and education, school-community affluence, classroom instruction, home literacy environment, reading self-concept, and age. The earlier RIA group had initially superior letter naming, non-word, word, and passage reading but this difference in reading skill disappeared by age 11. In Study 2, the decoding, fluency, and reading comprehension performance of 83 additional middle school-age children was compared. The two groups exhibited similar reading fluency, but the later RIA had generally greater reading comprehension. Given that the design was non-experimental, we urge further research to better understand developmental patterns and influences arising from different RIAs. Highlights ► Around age 10, children learning to read at seven had caught up to those learning at 5. ► Later starters had no long-term disadvantages in decoding and reading fluency. ► For whatever reason, the later starters had slightly better reading comprehension. ► Reading appears to be built on oral language, decoding, and reading skills. ► This research suggests some focus on teaching reading early could be relaxed.

Suggatea, S.P., Schaughency, E.A., & Reeseb, E. (2013). Children learning to read later catch up to children reading earlier. *Early Childhood Research Quarterly, 28*(1), 33-48.

"Most theorists are agreed that the bulk of vocabulary growth during a child's lifetime occurs indirectly through language exposure rather than through direct teaching (Miller & Gildea, 1987; Nagy & Anderson, 1984; Nagy, Herman, & Anderson, 1985; Sternberg, 1985, 1987). Furthermore, many researchers are convinced that reading volume, rather than oral language, is the prime contributor to individual differences in children's vocabularies (Hayes, 1988; Hayes & Ahrens, 1988; Nagy & Anderson, 1984; Nagy & Herman, 1987; Stanovich, 1986)".

Cunningham, A., & Stanovich, K. E. (1998). What reading does for the mind. *American Educator, 22*(1-2), 8-15. Retrieved from http://www.aft.org/pdfs/americaneducator/springsummer1998/cunningham.pdf

"Certainly our understanding of how neurons work, the role of neurotransmitters, and data showing correlations between brain activity and academic tasks has provided distinct clues into how a child learns. The problem, then, is not with the neuroscience data themselves, but how authors of these purported brain-based approaches appear to have erroneously filled in the missing research gaps. Thus, the problem is not with what neuroscientists and educators know, but with what they think they know. This 'filling-in-the-gaps' results from a variety of factors including misunderstanding of the research, misinterpretation or over interpretation of the data, and a belief in claims that are unsubstantiated or go beyond what the evidence supports."

Alferink, L. A., &Farmer-Dougan, V. (2010). Brain-(not) based education: Dangers of misunderstanding and misapplication of neuroscience research. *Exceptionality, 18*, 42-52.

"Whether our mind ever goes straight from the written word to its meaning without accessing pronunciation or whether it unconsciously transforms letters into sound and then sound into meaning has been the topic of considerable discussion. The organisation of the mental pathways for reading fueled a debate that divided the psychological community for over thirty years. Some thought that the transformation from print to sound was essential – written language, they argued, is just a by-product of spoken language, and we therefore have to sound the words out, through a *phonological route,* before we have any hope of recovering their meaning. For others, however, phonological recoding was just a beginners trait characteristic of young readers. In more expert readers, reading efficiency was based on a direct *lexical route* straight from the letter string to its meaning.

Nowadays, a consensus has emerged: in adults, both reading routes exist, and both are simultaneously active. We all enjoy direct access to meaning, which spares us from pronouncing words mentally before we can understand them. Nevertheless, even proficient readers continue to use the sounds of words, even if they are unaware of it. Not that we articulate words covertly – we do not have to move our lips, or even

prepare an intention to do so. At a deeper level, however, information about the pronunciation of words is automatically retrieved. Both the lexical and phonological pathways operate in parallel and reinforce each other. There is abundant proof that we automatically access speech sounds while we read. ………" (p.26).

"It simply is not true that there are hundreds of ways to learn to read […] when it comes to reading we all have roughly the same brain that imposes the same constraints and the same learning sequence" (p. 218).

"We now know that the whole-language approach is inefficient; all children regardless of their socioeconomic backgrounds benefit from explicit and early teaching of the correspondences between letters and speech sounds. This is a well-established fact, corroborated by a great many classroom experiments. Furthermore, it is coherent with our present understanding of how the reader's brain works" (p. 326).

Dehaene, S. (2009). *Reading in the brain: The science and evolution of a human invention.* New York: Viking/Penguin.

Research proves students' socioeconomic background, while influential, is not the most important factor determining whether they succeed or fail. The Melbourne-based researcher Gary Marks has argued for some years that more important factors include student ability and motivation, school culture and classroom environment, and teacher quality and curriculum rigour. In a 2010 paper, Marks says "the relationship between socioeconomic background and student achievement is far from deterministic, with the most comprehensive measure explaining at most 33 per cent of the variation in student performance, but as (sometimes) little as 10 per cent to 12 per cent". An analysis of Australia's performance in international tests carried out by the Australian Council for Educational Research draws a similar conclusion when it argues that only "13 per cent of the explained variance in student performance in Australia was found to be attributable to students' socioeconomic background".

Donnelly, K. (2012). Defining education in terms of victimhood is unhelpful. *The Australian*, October 27,

In education, we continue to be seduced by the equivalent of snake-oil remedies, fake cancer cures, perpetual-motion contraptions, and old wives' tales. Myth and reality are not clearly differentiated, and we frequently prefer the former to the latter ....We have been innocents in education because we have not put our own house in order. We need to be much clearer about what we do and do not know so that we don't continually confuse the two. If I could have one wish for education, it would be the systematic ordering of our basic knowledge in such a way that what is known and true can be acted on, while what is superstition, fad, and myth can be recognized as such and used when there is nothing else to support us in our frustration and despair (p. 332).

Bloom, B. S. (1972). Innocence in education. *School Review, 80*, 332-352.

"More typically, someone comes across an idea she or he likes and urges its adoption… often the changes proposed are both single and simple – more testing of students, loosening certification requirements for teachers, or a particular school improvement model…(p.740)".

Levin, B. (2010). Governments and education reform: Some lessons from the last 50 years. *Journal of Education Policy, 25*(6), 739-747.

On May 18, 2012 Jeffrey Zients, Acting Director of the Office of Management and Budget (OMB), sent out a memo that could change history. In guidance to executive departments and agencies, the memo asks the entire Executive Branch to use every available means to promote the use of rigorous evidence in decision-making, program administration, and planning.

"Since taking office, the President has emphasized the need to use evidence and rigorous evaluation in budget, management, and policy decisions to make government work effectively. This need has only grown in the current fiscal environment. Where evidence is strong, we should act on it. Where evidence is suggestive, we should consider it. Where evidence is weak, we should build the knowledge to support better decisions in the future" (p.1).

Zient, J.D. (2012).Use of evidence and evaluation in the 2014 Budget: Memorandum to the heads of executive departments and agencies. Executive Office of the President, Office of Management and Budget. Retrieved from http://www.whitehouse.gov/sites/default/files/omb/memoranda/2012/m-12-14.pdf

The US D.O.E. spends about $80 million annually in educational research; whereas, the Department of Health and Human Services provides about $33 billion for health research.
The Haan Foundation. (2012). The federal education research project. Retrieved from http://www.haan4kids.org/fed_proj/

 "A large body of data supports the view that movement plays a crucial role in letter representation and suggests that handwriting contributes to the visual recognition of letters. … After training, we found stronger and longer lasting (several weeks) facilitation in recognizing the orientation of characters that had been written by hand compared to those typed. Functional magnetic resonance imaging recordings indicated that the response mode during learning is associated with distinct pathways during recognition of graphic shapes. Greater activity related to handwriting learning and normal letter identification was observed in several brain regions known to be involved in the execution, imagery, and observation of actions, in particular, the left Broca's area and bilateral inferior parietal lobules. Taken together, these results provide strong arguments in favour of the view that the specific movements memorized when learning how to write participate in the visual recognition of graphic shapes and letters" (p.67).
Longcamp, M., Zerbato-Poudou, M. T., & Velay, J. L. (2005). The influence of writing practice on letter recognition in preschool children: A comparison between handwriting and typing. *Acta Psychologica, 119*, 67-79.

 "If procedures applied during processing are on automatic pilot, limited resources of working memory are freed for the cognitively draining self-regulation executive processes (Berninger et al., 1992; McCutchen, 1996)-which include managing attention, goal setting and planning, generating and applying strategies, monitoring, revising, and accessing and applying metaknowledge-and thinking processes (which include generating opinions in or about text, elaborating on others' ideas, considering multiple perspectives, synthesizing information, and constructing new ideas). … " … **the ability to read words correctly may facilitate the creation of precise, word-specific representations in long-term memory; these representations can be accessed during spelling and increase the probability of spelling words correctly** especially words with silent letters or alterations in phoneme-spelling relationships that must be learned for specific word contexts (see Berninger, Abbott, et al., 1998; Berninger, Vaughn, et al., 1998).
Berninger, V.W., Abbott, R.D., Abbott, S.P., Graham, S., & Richards, T. (2002). Writing and reading: Connections between language by hand and language by eye. *Journal of Learning Disabilities, 35*, 39-56.

 What does it mean that most of our children are chronically improficient in the skill areas most critically important for success in school? David Boulton, Director, Children of the Code http://www.childrenofthecode.org/

 The number of US students diagnosed with a learning disability fallen over the last 10 years, especially among students aged 6 to 11. The development of Response-to-Intervention (RTI), in which struggling students receive early assistance in general education, played a role in reducing the need for a special education classification. Cortiella, C. (2011). *The state of learning disabilities.* New York: National Center for Learning Disabilities.

Since 2006, DEECD has distributed more than $2.6 billion to schools through the PSD. … (DEECD) does not monitor how schools use the (Program for Students with Disabilities) funds nor does it adequately oversee the educational outcomes of students with special learning needs. Schools are not implementing DEECD's policies consistently or effectively. As a result, the quality and type of support provided to students with special learning needs is not equitable. … More broadly, DEECD does not know how many students in Victoria have unfunded special learning needs. It cannot identify these students, nor can it determine if they are being adequately supported by schools. Victorian Auditor-General (2012).Programs for students with special learning needs: Audit summary. Retrieved from http://www.audit.vic.gov.au/publications/20120829-Special-Learning-Need/20120829-Special-Learning-Need.rtf

Programs for Students with Special Learning Needs
This audit assessed whether the Department of Education and Early Childhood Development has effectively supported students with special learning needs and maximised their educational outcomes. DEECD has developed policies and guidance to help schools to support students with special learning needs. However, it does not monitor how schools use the Program for Students with Disabilities funds nor

does it adequately oversee the educational outcomes of these students.
 Does the ILP clearly explain

| 6 | Who to speak to if the strategies aren't working | Yes 9% | No 91% |

http://www.audit.vic.gov.au/reports_and_publications/latest_reports/2012-13/20120829-special-learning-need.aspx

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A joint statement of the Committee on Children With Disabilities, American Academy of Pediatrics, American Association for Pediatric Ophthalmology and Strabismus, and the American Academy of Pediatric Ophthalmology and Strabismus:

'No scientific evidence supports claims that the academic abilities of children with learning disabilities can be improved with treatments that are based on 1) visual training, including muscle exercises, ocular pursuit, tracking exercises, or 'training' glasses; 2) neurological organisational training (laterality training, crawling, balance board, perceptual training); or 3) coloured lenses'.

Committee on Children With Disabilities, American Academy of Pediatrics, American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus. (1998). Learning disabilities, dyslexia, and vision: A subject review. *Pediatrics, 102*, 1217–9.

"Overall, the group taught by synthetic phonics had better word reading, spelling, and reading comprehension. There was no evidence that the synthetic phonics approach, which early on teaches children to blend letter sounds in order to read unfamiliar words, led to any impairment in the reading of irregular words (p. 1365).

"It was found in Study 1 that, after 6 years at school, children taught by the synthetic phonics approach read words, spelt words and had reading comprehension skills significantly in advance of those taught by the analytic phonics method. This shows that despite English being an opaque orthography, children are not impaired when taught by an approach to reading that is common in transparent orthographies"(p.1378).

"The analytic phonics approach, having an early sight word element and late teaching of sounding and blending, may lead to some children reading largely by a form of sight word reading underpinned only by superficial connections between print and sounds" (p.1382).

"This present study makes an important contribution to documenting the long term effects of synthetic phonics teaching. Maintaining the gain in word reading for age would have been noteworthy, but in fact it increased over time, leading to a high level of attainment at the age of 10" (p. 1384).

Johnston, R.S., McGeown, S., & Watson, J.E. (2012). Long-term effects of synthetic versus analytic phonics teaching on the reading and spelling ability of 10 year old boys and girls. *Reading & Writing, 25*(6), 1365-1384.

 "In general, data indicate that intensive early interventions positively affect students' reading skills, resulting in lower rates of grade retention, reduced incidence of placement in special education, and higher rates of high school completion. Difficulties with reading may interfere with students' motivation and engagement at school and with learning" (p. 67).

"Difficulty with reading is one of the primary reasons students are recommended for grade retention or referred for special education evaluation, events that are consistently linked to later dropout. As students progress through levels of education, proficiency in reading becomes increasingly important as a means of garnering new knowledge; students who do not have sufficient skills are often unable to keep up with course content and expectations, leaving them to fall further and further behind their peers. It is also believed, however, that difficulties learning to read affect students' engagement, motivation, and connections to school (Guthrie & Wigfield, 2000; Klem & Connell, 2004; Snow et al., 1998), contributing to the gradual process of withdrawal that precedes later dropout (Finn, 1989)" (p.68).

"Numerous meta-analyses, reviews, and individual research papers report negative effects of grade retention (e.g., Holmes, 1989; Holmes & Matthews, 1984; Jimerson, 2001; Shepard & Smith, 1990; Silberglitt, Appleton, Burns, & Jimerson, 2006). The most recent of these meta-analyses found negative effects in terms of students' academic, socioemotional, and behavioral outcomeswhen retained students were compared to similar students promoted to the next grade (Jimerson, 2001). Despite the consistent findings regarding the effects of grade retention, retention rates have increased in the past several years (Frey, 2005; National Association of School Psychologists, 2003), likely a result of the proliferation of policies and public sentiment to end social promotion and the inclusion of grade retention as an integral part of school reform and accountability initiatives (Bali, Anagnostopoulos, & Roberts, 2005). The marriage of grade retention and accountability appears to increase the likelihood of students being placed in special education (Roderick & Nagaoka, 2005), which is, for a number of students, a precursor of later dropout" (p.70).

Reschly, A.L. (2010): Reading and school completion: Critical connections and Matthew Effects. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 67-90.

"The retention rate of 1st-grade students decreased by 47% after RTI was implemented. … Grade-level retention has been linked with increased school dropout rates (Grissom & Shepard, 1989; Jimerson, Anderson, & Whipple, 2002; Roderick, 1995; Rumberger, 1995); greater academic failure (Meisels & Liaw, 1993; Reynolds, 1992); lower self-concept (Nason, 1991); and fewer employment opportunities, a greater number of arrests, and elevated rates of substance abuse compared to non-retained students (Cairns & Cairns, 1994; Catterall, 1987; Center for the Study of Social Policy, 1994). (p. 26).
Murray, C.S., Woodruff, A.L., & Vaughn, S. (2010): First-grade student retention within a 3-tier reading framework. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 26-50.

"Results suggest that approximately 2.5 hr per school day of general education and small-group intervention literacy instruction is needed to bring students within average range" (p. 4).

"However, the results point to another facet beyond development that closely mirrors a medical model. When effective medicines are given at too low of a dosage, they fail to produce effective results. … Returning students to the same low levels of general education with insufficient intensity and duration of intervention fails to produce accelerated learning" (p.20).
Abbott, A., Wills, H., Greenwood, C.R., Kamps, D., Heitzman-Powell, L., & Selig, J. (2010). The combined effects of grade retention and targeted small-group intervention on students' literacy outcomes. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 4-25.

"The clearest message from automaticity research is that practice is necessary to develop skill. Repetition is a good thing. The research suggests that readers will benefit most from consistent practice" (p.139).

"Repeated reading is an effective method for teaching students to read fluently, motivated in part by the LaBerge and Samuels (1974) theory of automaticity" (p.140).
Logan, G.D. (1997). Automaticity and reading: Perspectives from the instance theory of automatization. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 13*(2), 123-146.

The negligible effects of individualisation are particularly important when it is recognised that students spend about 66 percent of their time working alone (Rosenshine, 1979).

One of the common criticisms is that Direct Instruction works with very low-level or specific skills, and with lower ability and the youngest students. These are not the findings from the meta-analyses. The effects of Direct Instruction are similar for regular (d=0.99), and special education and lower ability students (d=0.86), higher for reading (d=0.89) than for mathematics (d=0.50), similar for the more low-level word attack (d=0.64) and also for high-level comprehension (d=0.54), and similar for elementary and high school students. The messages of these meta-analyses on Direct Instruction underline the power of stating the learning intentions and success criteria, and then engaging students in moving towards these. Summarised from (p. 206-7):
Hattie, J. A.C. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement.* London and New York: Routledge.

" … include all possible studies, code them for the nature of the experimental design and for the quality of the study, and then use meta-analysis techniques to address whether the effects differed as a consequence of design and quality. The aim should be to summarize all possible studies regardless of their design—and then ascertain if quality is a moderator to the final conclusions (see Benseman, Sutton, & Lander, 2005 for a full analysis)." (p. 11)
Hattie (2009) Visible Learning

Because word decoding is the primary bottleneck in the acquisition of skilled reading, it is not surprising to find underactivation among this population in brain areas associated with converting print to sound, even when reading sentences for comprehension. Children who have a school history of reading problems tend to have particular difficulty reading words, both in isolation and in context (Gayan & Olson, 2001). Instructional treatments that target word-decoding skills, such as those used in the present study, may induce characteristic changes in these areas of the brain.

Meyler, A., Keller, T.A., Cherkassky, V.L., Gabrieli, J.D., & Just, M.A. (2008). Modifying the brain activation of poor readers during sentence comprehension with extended remedial instruction: A longitudinal study of neuroplasticity. *Neuropsychologia, 46*(10), 2580-92.

This is an adage written by social scientist Donald T. Campbell in a 1976 paper. It says: "The more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor."

Abstract: Learning disabilities constitute a diverse group of disorders in which children who generally possess at least average intelligence have problems processing information or generating output. Their etiologies are multifactorial and reflect genetic influences and dysfunction of **brain** systems. Reading disability, or dyslexia, is the most common learning disability. It is a receptive language-based learning disability that is characterized by difficulties with decoding, fluent word recognition, rapid automatic naming, and/or reading-comprehension skills.

These difficulties typically result from a deficit in the phonologic component of language that makes it difficult to use the alphabetic code to decode the written word. Early recognition and referral to qualified professionals for evidence-based evaluations and treatments are necessary to achieve the best possible outcome.

Because dyslexia is a language-based disorder, treatment should be directed at this etiology. Remedial programs should include specific instruction in decoding, fluency training, vocabulary, and comprehension. Most programs include daily intensive individualized instruction that explicitly teaches phonemic awareness and the application of **phonics**. Vision problems can interfere with the process of reading, but children with dyslexia or related learning disabilities have the same visual function and ocular health as children without such conditions. **Currently, there is inadequate scientific evidence to support the view that subtle eye or visual problems cause or increase the severity of learning disabilities.**

Because they are difficult for the public to understand and for educators to treat, learning disabilities have spawned a wide variety of scientifically unsupported vision-based diagnostic and treatment procedures. Scientific evidence does not support the claims that visual training, muscle exercises, ocular pursuit-and-tracking exercises, behavioral/perceptual vision therapy, "training" glasses, prisms, and colored lenses and filters are effective direct or indirect treatments for learning disabilities. There is no valid evidence that children who participate in vision therapy are more responsive to educational instruction than children who do not participate.

Handler, S.M., & Fierson, W.M. (2011). Joint technical report-Learning disabilities, dyslexia, and vision. *Pediatrics 127*(3), 818-856.

Reading disability research has also established that reading difficulties are not caused by visual deficits of the types most often proposed over the years. Contrary to popular belief, impaired readers do not see letters and words in reverse, nor do they suffer from inherent spatial confusion or other visual anomalies of the types proposed in the early literature. More recent research provides suggestive evidence that some

poor readers may suffer from low-level sensory deficits in both the visual and auditory spheres, but the evidence is inconclusive, and in, some instances, equivocal and controversial. Moreover, no causal relationships have been established between such deficits and difficulties in learning to read.

Vellutino, F.R., Fletcher, J.M., Snowling, M.J., & Scanlon, D.M. (2004). Specific reading disability (dyslexia): What have we learned in the past four decades? *Journal of Child Psychology and Psychiatry 45*(1), 2–40.

A joint statement of the American Academy of Pediatrics (Section on Ophthalmology, Council on Children with Disabilities), the American Academy of Ophthalmology, the American Association for Pediatric Ophthalmology and Strabismus and the American Association of Certified Orthoptists. Learning disabilities, including reading disabilities, are commonly diagnosed in children. Their etiologies are multifactorial, reflecting genetic influences and dysfunction of brain systems. Learning disabilities are complex problems that require complex solutions. Early recognition and referral to qualified educational professionals for evidence-based evaluations and treatments seem necessary to achieve the best possible outcome. Most experts believe that dyslexia is a language-based disorder. Vision problems can interfere with the process of learning; however, vision problems are not the cause of primary dyslexia or learning disabilities. Scientific evidence does not support the efficacy of eye exercises, behavioral vision therapy, or special tinted filters or lenses for improving the long-term educational performance in these complex pediatric neurocognitive conditions. Diagnostic and treatment approaches that lack scientific evidence of efficacy, including eye exercises, behavioral vision therapy, or special tinted filters or lenses, are not endorsed and should not be recommended.

American Academy of Pediatrics. (2009). Learning disabilities, dyslexia and vision. Retrieved from http://pediatrics.aappublications.org/content/124/2/837.short

 Because teachers are kept in ignorance of specific learning difficulties, students are under diagnosed and under supported. Teachers are not able to recognise the signs which should lead to testing by a psychologist or specialist in specific learning difficulties. Furthermore, they often don't know who the student should be referred to. (sub. DR76, p. 2)" (Productivity Commission, 2012, p.284).
Productivity Commission. (2012). *Schools Workforce*. Research Report, Canberra. JEL code: I21, I28, J24. Retrieved from http://www.pc.gov.au/projects/study/education-workforce/schools/report

 Teacher training "... All too often Victoria's teacher training, referred to as pre-service education, falls short of the demands of today's schools. While there are many providers, quality outcomes are inconsistent. Principals report that in the case of more than one-third of teachers, insufficient pedagogical preparation hinders student instruction.

14 The market does not provide transparent data about the quality of graduates and has not been open to competition from new entrants, such as high quality providers from overseas that have obtained better results. Despite being the largest employer of graduates in Victoria, the Department of Education and Early Childhood Development has not used its influence to make providers more responsive to schools' needs.

In our decentralised system demand from principals, as the direct employers of graduates, will drive improvements in pre-service education, rather than the Department. At present less than 30 per cent of principals feel new teachers are well prepared to communicate with parents, manage classroom activities well, and provide effective support and feedback to students, which are all largely recognised as important skills for effective teaching and learning.

15 Around 15 to 20 per cent of graduates are not employed as teachers following graduation and only around half report satisfaction with the preparation provided by their courses.

A recent review of the practical component of these programs found large variability between providers, which is significant given that practical school experience has one of the greatest impacts on student outcomes, and graduates themselves regard this component of teacher education as one of the most valuable.

16 There is a clear need for pre-service teacher education programs to respond to changing circumstances and to prepare graduates with the skills and motivation they need to become great teachers. We also need all Victorian schools, including the nongovernment sector, to work with universities to provide practicum placements for preservice teachers in their schools...”

DEECD. (2012). *New directions for school leadership and the teaching profession: Discussion paper*, June 2012. Department of Education and Early Childhood Development. Retrieved from http://www.eduweb.vic.gov.au/edulibrary/public/commrel/about/teachingprofession.pdf

 “In 2008, 19.6 per cent of Australian students were at or below the National Minimum Standard (NMS) in reading, and 18.7 per cent were at or below the NMS in numeracy. International data also shows that although Australian students ranked highly in literacy and numeracy skills compared to the rest of the world, Australian testing results have declined in reading (2000–2009) and mathematics (2003–2009)”.

“ANAO analysis of NAPLAN data from 2008 to 2011 indicates that the LNNP is yet to make a statistically significant improvement, in any state, on the average NAPLAN results of schools that received LNNP funding, when compared to schools that did not receive funding” (Para 17).

Australian National Audit Office. (2012). *National Partnership Agreement on Literacy and Numeracy*. Retrieved from http://www.anao.gov.au/Publications/Audit-Reports/2011-2012/National-Partnership-Agreement-on-Literacy-and-Numeracy/Audit-brochure

 ALMOST half of aspiring primary school teachers failed parts of a landmark test featuring literacy and numeracy questions that Year 7 students should be able to answer**.** Figures released by the Queensland College of Teachers reveal about 40 per cent of third or fourth-year teaching students who sat the trial Pre-Registration for Aspiring Primary Teachers Test failed the literacy, numeracy or science component.

Chilcott, T. (2012). Student teachers fail primary school-level tests. *The Courier Mail,* June 11.

 Print Awareness and Reading Achievement A new study indicates that making one small change in how we read aloud to preschoolers can make a big difference in literacy achievement. The small change? Pointing out printed words as we read aloud. Researchers have been studying the impact of this simple intervention on a group of preschoolers from at-risk communities. So far, the kids have been followed for two years and according to the most recent findings (published in the journal *Child Development*), these small changes make a measurable difference. "Children who focused their attention on print … had better literacy outcomes than those who did not," says Shane Piasta, one of the researchers. "It was very clear."

Piasta, S. B., Justice, L. M., McGinty, A. S. and Kaderavek, J. N. (2012). Increasing young children's contact with print during shared reading: Longitudinal effects on literacy achievement. *Child Development, 83*(3), 810–820. doi: 10.1111/j.1467-8624.2012.01754.x

 On May 18, Jeffrey Zients, Acting Director of the Office of Management and Budget (OMB), sent out a memo that could change history. In guidance to executive departments and agencies, the memo asks the entire Executive Branch to use every available means to promote the use of rigorous evidence in decision-making, program administration, and planning.
http://www.whitehouse.gov/sites/default/files/omb/memoranda/2012/m-12-14.pdf

 “Consistent with previous reviews of similar focus, the findings suggest that education technology generally produced a positive, though small, effect (ES=+0.16) in comparison to traditional methods. However, the effects may vary by education technology type. In particular, the types of supplementary computer-assisted instruction programs that have dominated the classroom use of education technology in the past few decades are not producing educationally meaningful effects in reading for K-12 students. In contrast, innovative technology applications and integrated literacy interventions with the support of extensive professional development showed somewhat promising evidence. However, too few randomized studies for these promising approaches are available at this point for firm conclusions.

Cheung, A., & Slavin, R.E. (2012, April). *The effectiveness of educational technology applications for enhancing reading achievement in k-12 classrooms: A meta-analysis.* Baltimore, MD: Johns Hopkins University, Center for Research and Reform in Education. Retrieved from http://www.bestevidence.org/reading/tech/tech.html

 “Key findings from extensive meta-analytic syntheses of evidence-based reading research – many of

which are cited in this review – consistently indicate that since systematic, explicit phonics approaches are significantly more effective than nonsystematic approaches for children with and without reading difficulties, it is vital that children should initially be provided with direct instruction in phonics as an essential part of a comprehensive and integrated reading program that includes meaning-centred approaches" (p.11).

National Inquiry into the Teaching of Literacy (2005). Teaching reading - A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties. Australian Government: Department of Education, Science and Training. Retrieved from
http://research.acer.edu.au/cgi/viewcontent.cgi?filename=2&article=1004&context=tll_misc&type=additional

"After half a century of advocacy associated with instruction using minimal guidance, it appears that there is no body of sound research that supports using the technique with anyone other than the most expert students. Evidence from controlled experimental (a.k.a. "gold standard") studies almost uniformly supports full and explicit instructional guidance rather than partial or minimal guidance for novice to intermediate learners. These findings and their associated theories suggest teachers should provide their students with clear, explicit instruction rather than merely assisting students in attempting to discover knowledge themselves" (p.11).

Clark, R.E., Kirschner, P.A., & Sweller, J. (2012). Putting students on the path to learning: The case for fully guided instruction. *American Educator*, March 23, 2012. Retrieved from
http://www.aft.org/pdfs/americaneducator/spring2012/Clark.pdf

"In the category of "strong evidence of effectiveness" were several programs. Success for All, with an effect size of +0.52 in 9 studies, had more evidence of strong effects than any other program. Direct Instruction, a whole-class instructional process approach (ES=+0.37 in 2 small studies) and Corrective Reading, a remedial small group form of Direct Instruction (ES=+0.71 in 2 studies) were considered together as having strong evidence (ES=+.56 in 4 studies)" (p.112).

Slavin, R.E., Lake, C., Davis, S., & Madden, N. (2009, June). *Effective programs for struggling readers: A best evidence synthesis*. Baltimore, MD: Johns Hopkins. Retrieved from
www.bestevidence.org/word/strug_read_Jun_02_2010.pdf

"The evidence does not support the idea that a relatively brief tutoring experience in first grade is enough to ensure success throughout elementary school and beyond, but it does suggest that with a continuing focus on effective classroom instructional models, most children who receive effecting tutoring interventions in first grade can be kept on track in reading" (p.109).

Slavin, R. E., Lake, C., Davis, S. & Madden, N. A. (2009, April). *Effective programs for struggling readers: A best-evidence synthesis*. Paper presented at the annual meetings of the American Educational Research Association, San Diego, CA. Retrieved from
http://www.bestevidence.org/word/strug_read_Jun_02_2010.pdf

"We (educational researchers) do our science under conditions that physical scientists find intolerable. We face particular problems and must deal with local conditions that limit generalizations and theory building – problems that are different from those faced by the easier-to-do sciences (chemistry, biology, medicine" (p.18).

Berliner, D.C. (2002). Educational research: The hardest science of all. *Educational Researchers, 31*(8), 18-20.

"At the moment children who struggle with significant problems get some level of funding, but other children with problems don't. If we can meet those children's needs and they can engage with school they will go on. But if we don't, they'll keep disengaging to the point where they just leave school."

Associate Professor Sharon Goldfeld, paediatrician in charge of Australia's national data base. Australian Early Development Index (AEDI) on child health - quoted in: Milburn, C. (2012). Schools stagger under young burden. The Age, 7 May 2012.

"Fluent decoding appears to be an important predictor of reading comprehension across elementary, middle, and high school" (p.463).

Kershaw, S., & Schatschneider, C. (2012). A latent variable approach to the simple view of reading. *Reading & Writing: An Interdisciplinary Journal, 25*(2), 433–464.

"Explicit instruction is a systematic instructional approach that includes a set of delivery and design procedures derived from effective schools research merged with behavior analysis (Hall, 2002). Instructional design refers to the way in which information in a particular domain (e.g., phonemic awareness, reading, mathematics) is selected, prioritized, sequenced, organized, and scheduled for instruction within a highly orchestrated series of lessons and materials that make up a course of study (Simmons & Kame'enui, 1998). According to Smith and Ragan (1993), instructional design refers to the ''systematic process of translating principles of learning and instruction into plans for instructional materials and activities'' (p. 2). Instructional design is concerned with the intricacies of analyzing, selecting, prioritizing, sequencing, and scheduling the communication of information before it is packaged for delivery or implemented. **In other words, it is the behind-the-scenes activity that appears as the sequence of objectives, schedule of tasks, components of instructional strategies, amount and kind of review, number of examples, extent of teacher direction, and support explicated in teachers' guides and lesson plans"** (p.145-6).

Pollard-Durodola, S.D., & Simmons, D.C. (2009). The role of explicit instruction and instructional design in promoting phonemic awareness development and transfer from Spanish to English. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 25*(2-3), 139-161.

"This article argues that reading interventions are a key dropout prevention strategy. A review of the literature connects reading skills and interventions with events such as grade retention, placement in special education, and high school dropout. In general, data indicate that intensive early interventions positively affect students' reading skills, resulting in lower rates of grade retention, reduced incidence of placement in special education, and higher rates of high school completion. Difficulties with reading may interfere with students' motivation and engagement at school and with learning. The article presents an integrated model describing spiraling, or Matthew, effects across reading competence, student engagement and motivation, and eventual high school completion or dropout" (p.67).

Reschly, A.L. (2010). Reading and school completion: Critical connections and Matthew Effects. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 67-90.

"As the pressure has grown for teachers, schools, districts, and states to increase the number of students who meet state-governed reading proficiency, the lure of student retention as a remedy for low student academic achievement has become more popular (Hess, 2004). An alternative ideology is intensive direct instruction in core literacy components plus a systematic small-group intervention (SGI) to remediate poor literacy skills and to promote grade-level performance on standardized academic measures" (p.5).

"Results from this study indicate that it is unwise to return students to the same insufficient academic environment that failed them in the first place … a plan needs to be created to massively strengthen literacy instruction in terms of both intensity and length of instruction" (p.22).

"Results suggest that approximately 2.5 hr per school day of general education and small-group intervention literacy instruction is needed to bring students within average range" (p.4).

Abbott, M., Wills, H., Greenwood, C.R., Kamps, D., Heitzman-Powell, L., & Selig, J. (2010): The combined effects of grade retention and targeted small-group intervention on students' literacy outcomes. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 26*(1), 4-25.

"Interventions for older students with reading difficulties "Although it is unlikely that these students will make accelerated progress without intensive interventions, there is evidence that secondary students may experience improved reading outcomes when provided explicit reading intervention with adequate time and intensity for reading instruction (Archer, Gleason, & Vachon, 2003; Torgesen et al., 2001)" (p.932).

Vaughn, S., Wanzek, J., Wexler, J., Barth, A.E., Cirino, P.T., Fletcher, J.M., Romain, M.A., Denton, C.A., Roberts, G., & Francis, D.J. (2010). The relative effects of group size on reading progress of older students with reading difficulties. *Reading and Writing: An Interdisciplinary Journal, 23*(8), 931-956.

"Research evidence has shown that two of the most significant predictors of success in alphabetic literacy acquisition are knowledge of alphabet letters and early phonological awareness skills (Adams, 1990; Ball

& Blachman, 1991; Bradley & Bryant, 1983; Byrne & Fielding-Barnsley, 1989; Cardoso-Martins, Resende, & Rodrigues, 2002; Stuart & Coltheart, 1988)" (p.27).

Manolitsis, G., & Tafa, E. (2011). Letter-name letter-sound and phonological awareness: Evidence from Greek-speaking kindergarten children. *Reading and Writing: An Interdisciplinary Journal*, *24*(1)*,* 27-53.

"Moreover, the results of this study imply that any improvement in basic processes involved in reading proficiency produced by the whole language approaches to reading instruction for both the normal and the low achieving readers dissipates by grade three" (p.545).

Faust, M., & Kandelshine-Waldman, O. (2011) The effects of different approaches to reading instruction on letter detection tasks in normally achieving and low achieving readers *Reading and Writing: An Interdisciplinary Journal*, *24*(5), 545–566.

In first grade, letter sound fluency (LSF) was a unique predictor of oral reading fluency level.

Speece, D. L., & Ritchey, K. D. (2005). A longitudinal study of the development of oral reading fluency in young children at risk for reading failure. Journal of Learning Disabilities, 38, 387–399.

"Collectively the results indicate that decodability is a critical characteristic of early reading text as it increases the likelihood that students will use a decoding strategy and results in immediate benefits, particularly with regard to accuracy" (p.1).

Cheatham, J.P., & Allor, J.H. (2011). The influence of decodability in early reading text on reading achievement: A review of the evidence*. Reading and Writing: An Interdisciplinary Journal*, *25*, 2223-46.

"A major goal of Tier 2 or secondary intervention is to allow the majority of students with learning (e.g., reading) difficulties to attain grade-level expectations. If students with below-grade- level performance are to catch up with normally developing students, their rate of growth must be *accelerated*; simply learning at an average rate will only maintain the deficit. Thus, Tier 2 interventions must be intensive enough to not only improve students' performance, but to actually enable students with learning difficulties to progress at rates that are *faster* than the learning rates of average students. At the same time, these interventions must be feasible for teachers to implement and sustain" (p.433).

Vaughn, S., Denton, C. A., & Fletcher, J. M. (2010). Why intensive interventions are necessary for students with severe reading difficulties*. Psychology in the Schools, 47*(5), 432–444.

UK Study: Parents, Not Teachers, Key to Education A new study finds that pupil attainment and ability is affected five times more by parental influence than by teachers.
http://www.educationnews.org/parenting/uk-study-parents-not-teachers-key-to-education/

The study, led by Dr Arnaud Chevalier, from Royal Holloway, University of London, analysed data for teenagers at Danish schools between 2002 and 2010. It compared pupils who were forced to change school at the age of 16 to brothers or sisters who remained in the same secondary throughout their teenage years. Using the data, they tested the differences in pupils' exam results between the two stages to assess the relative influence of various factors such as children's school, families and individual pupil characteristics. The study found that the parental impact on results was far higher than that for schools themselves. "Half of the variation in test scores is attributable to shared family factors, while schools only account for 10 per cent," it was claimed. The remaining variation was down to pupils themselves. Researchers said the effect of families on test scores remained the same irrespective of household income.

Teachers key to Education "The debate about VA (value adding) stems from two fundamental questions. First, does VA accurately measure teachers' impacts on scores or does it unfairly penalize teachers who may systematically be assigned lower achieving students? Second, do high VA teachers improve their students' long-term outcomes or are they simply better at teaching to the test? Researchers have not reached a consensus about the accuracy and long-term impacts of VA because of data and methodological limitations.

We address these two questions by tracking one million children from a large urban school district from 4th grade to adulthood. We evaluate the accuracy of standard VA measures using several methods, including natural experiments that arise from changes in teaching staff. We find that when a high VA teacher joins a school, test scores rise immediately in the grade taught by that teacher; when a high VA teacher leaves, test scores fall. Test scores change only in the subject taught by that teacher, and the size of the change in scores matches what we predict based on the teacher's VA. These results establish that VA

accurately captures teachers' impacts on students' academic achievement and thereby reconcile the conflicting conclusions of Kane and Staiger (2008) and Rothstein (2010)" (p.1).

Raj Chetty, R., Friedman, J.N., & Rockoff, J.E. (2011). The long-term impacts of teachers: Teacher value-added and student outcomes in adulthood. Executive Summary of National Bureau of Economic Research Working Paper No. 17699, December 2011. Retrieved from http://obs.rc.fas.harvard.edu/chetty/va_exec_summ.pdf

"At present, though, genetic, structural and functional findings remain largely correlational and unconnected with one another. Results are provocative, but much work still is needed to move from a list of "neurophenotypes" towards a causal theory of gene-brain behavior relations in reading acquisition and RD" (p.22).

Pugh, K., & Hagan, E.C. (2010). New directions in the cognitive neuroscience of reading development and reading disability. *Perspectives on Language and Literacy, 36*(1), 22-25.

"Thus, although assessing cognitive processes for intervention purposes may not be associated with qualitatively distinct cognitive characteristics and may not justify the extensive assessments as proposed by Hale et al. (2010), assessment of reading components and other academic skills appears to be well be justified"(p. 19).

Fletcher, J.M., Stuebing, K.K., Barth, A.E., Denton, C.A., Cirino, P.T., Francis, D.J., & Vaughn, S. (2011). Cognitive correlates of inadequate response to intervention. *School Psychology Review, 40*(1), 3-22.

"Greater national wealth or higher expenditure on education does not guarantee better student performance. Among high-income economies, the amount spent on education is less important than how those resources are used. Successful school systems in high-income economies tend to prioritise the quality of teachers over the size of classes. School systems that perform well in PISA believe that all students can achieve, and give them the opportunity to do so" (p. 2).

OECD. (2012). Does money buy strong performance in PISA? *Pisa in Focus, 13,* 2012/02 (February). Retrieved from http://www.pisa.oecd.org/dataoecd/50/9/49685503.pdf

"Across studies, the generalized findings are that Matthew effects are present in LD and that disadvantaged students continue to be at a great disadvantage in the future. This finding was evident particularly with regard to the relationship between vocabulary and reading comprehension (Oakhill & Cain; Sideridis et al.) as well as with regard to other reading skills such as phonological awareness (McNamara et al.) or math abilities (e.g., Morgan et al.; Niemi et al.). When looking at the framework of responsiveness to instruction implemented in the United States and various parts of the world, the message from the present studies is clear: Students with LD are likely to be classified as nonresponders as their trajectories of growth suggest. We need to switch our attention from assessing the difficulties of students with LD to how to intervene to solve their problems" (p.401).

Sideridis, G.D. (2011). Exploring the presence of Matthew Effects in learning disabilities. *Journal of Learning Disabilities, 44*(4), 399-401.

"Focus, then, must be two-fold. First is the focus on ensuring appropriate environmental and nutritional conditions that stimulate dendritic growth in infancy and early childhood. But second must be emphasis on improving the strength of particular neural circuits, not simply on the overall growth of dendrites. Most interestingly, instructional activities such as memorization, mastery learning, and repetition-based activities appear to best strengthen and solidify the formation and maintenance of these circuits (Garrett, 2009; Freeberg, 2006). Data strongly support the use of precision teaching, mastery learning approaches, and programs such as DISTAR or direct instruction (Kirschner, Sweller, & Clark, 2006; Mills, Cole, Jenkins, & Dale, 2002; Ryder, Burton, & Silberg, 2006; Swanson & Sachse-Lee, 2000). In addition, programs that focus on mastery, including applied behavior analysis and evidence-based approaches such as Treatment and Education of Autistic and related Communication Handicapped Children (TEACCH) (Mesibov & Shepler, 2004; Panerai, Ferrante, & Zingale, 2002), have been shown to elicit better educational growth than instructional practices, which focus on open-ended or child-guided instructional practices. Thus, given the data from neuroscience combined with evidence-based practices used in special education, special educators can be assured that they are, indeed, using brain-based educational instruction. Mastery-based programs that focus on fluency and repetition are most likely to increase both better traditional learning outcomes and produce neural circuits critical for both educational activities and transfer to daily living skills" (p. 46).

Alferink, L.A., & Farmer-Dougan, V. (2010): Brain-(not) based education: Dangers of misunderstanding and misapplication of neuroscience research, *Exceptionality, 18*(1), 42-52.

"For example, the research described above on the formation of memory through long-term potentiation strongly suggests that neural connections are strengthened through repetition or practice (Freeberg, 2006; Garrett, 2008; Hardiman, 2003). Note that the importance of practice and rehearsal has been known for more than a century, long before the process of long-term potentiation was identified (Ebbinghaus, 1913; Hebb, 1949; Thorndike, 1913). Likewise, the data suggest that formation of memories through neural consolidation works best if students have a number of short learning sessions separated over time, not single long sessions. Again, the advantages of spaced or distributed practice over massed practice have also been known for many decades (see Olson & Hergenhahn, 2009; Ebbinghaus, 1913). Neuroscience, in this case, reinforced these best practices by providing the data at the neural level that supported these methods" p.50).

Simmons and Kame'enui (1998) suggest the following formula to determine whether to focus on accuracy or fluency: More than one error every 10 words: Work on accuracy. Fewer errors (one in 15–20 words) but a low speed: Work on fluency.
Kame'enui, E. J., & Simmons, D. C. (1998). Beyond effective practice to schools as host environments: Building and sustaining a school-wide intervention model in beginning reading. *Oregon School Study Council, 41*(3), 3–16.

"Students who start with low phonological awareness develop reading ability at much slower rates".
McNamara, J.K., Scissons, M., & Gutknecht, N. (2011). A longitudinal study of kindergarten children at risk for reading disabilities: The poor really are getting poorer. *Journal of Learning Disabilities*, *44*(4), 21-430.

"Across studies, the generalized findings are that Matthew effects are present in LD and that disadvantaged students continue to be at a great disadvantage in the future" (p.401).
Sideridis, G.D. (2011). Exploring the presence of Matthew Effects in learning disabilities. *Journal of Learning Disabilities, 44*(5) 399–401.

"CBM was designed to provide educators with a set of tasks that were reliable, valid, low-cost, and time-efficient indicators of student achievement in core academic areas. In reading, there is remarkable consistency in the relationship between R-CBM and other standardized measures of reading achievement across decades, samples, and various achievement tests. These results are extraordinary when one considers the brevity, availability, and low-cost of R-CBM. Educators should have great confidence in their use of R-CBM as an indicator of students' overall reading achievement" (p.463).
Reschly, A.L., Busch, T.W., Betts, J. Deno, S.L., & Long, J.D. (2009). Curriculum-based measurement oral reading as an indicator of reading achievement: A meta-analysis of the correlational evidence, *Journal of School Psychology, 47*(6), 427-469.

"Post hoc analyses of early intervention outcomes for 128 at-risk first graders revealed that Verbal IQ was a minor contributor to word identification skills relative to specific reading related language predictors like phonological processing, rapid naming, and orthographic skills (Stage et al., 2003)" (p.100).
Morris, R.D., Lovett, M.W., Wolf, M., Sevcik, R.A., Steinbach, K.A., Frijters, J.C., & Shapiro, M.B. (2012). Multiple-component remediation for developmental reading disabilities: IQ, socioeconomic status, and race as factors in remedial outcome. *Journal of Learning Disabilities, 45*(2), 99-127.

"Recent work by Frijters at our Toronto site (Frijters et al., 2004; Frijters, De Palma, Barron, & Lovett, 2005) indicates that motivational differences among disabled readers mediate their response to intervention. Frijters's work confirms that motivation for reading is not a unitary construct and that different preintervention motivational profiles can be identified in children with RD. These profiles predict responsiveness to remediation, indicating that motivation mediates remedial response. In addition, motivation appears to be amenable to modification in its interaction with intervention (Frijters et al., 2005; Frijters, Dodsworth, Lovett, Sevcik, & Morris, 2009)" (p.122). Morris, R.D., Lovett, M.W., Wolf, M., Sevcik, R.A., Steinbach, K.A., Frijters, J.C., & Shapiro, M.B. (2012). Multiple-component remediation for developmental reading disabilities: IQ, socioeconomic status, and race as factors in remedial outcome. *Journal of Learning Disabilities,* 45(2), 99-127.

"The variance explained by ISF in the fall of kindergarten was consistent with previous studies ([Good and Kaminski, 2002] and [Good et al., 2001]), and demonstrated that ISF in the beginning of kindergarten significantly predicted and accounted for variability on end-of-kindergarten measures of nonsense words, word identification, and reading comprehension. This study extends those findings by demonstrating that ISF in the beginning of kindergarten significantly predicts later reading performance for ELLs" (p.389).
Linklater, D.L., O'Connor, R.E., & Palardy, G.J. (2009). Kindergarten literacy assessment of English Only and English language learner students: An examination of the predictive validity of three phonemic awareness measures, *Journal of School Psychology,* 47(6), 369-394.

Over the past 25 years, research on Curriculum-Based Measurement (CBM) has supported the validity and reliability of CBM measures as indicators of growth in basic academic skills (Deno, 2003; Marston, 1989; Wayman, Wallace, Wiley, Ticha, & Espin, 2007; Yeo, 2008, 2010, 2011).
Seungsoo; Y., Dong-Il, K., Lee Branum-Martin, L., Wayman, M.M., & Espin, C.A. (2012). Assessing the reliability of curriculum-based measurement: An application of latent growth modelling. *Journal of School Psychology*, 50(2), 275-292.

"Finally, evidence. The influence of research and evidence on decision making has even greater value for those students with disabilities that, in most instances, even if a special education teacher is available as a co-teacher in the general education classroom, high-quality, intensive instruction is most often not delivered in the general education classroom (Murawski, 2006; Murawski & Swanson, 2001; Scruggs, Mastropieri, & McDuffie, 2007; Volonino & Zigmond, 2007). While a special educator working as a co-teacher could theoretically provide this instruction, research evidence shows that in most cases, this does not occur (Volonino & Zigmond, 2007). Observations in these classrooms have shown that responsibility for teaching the content typically remains with the general education teacher, while the special educator "provides scaffolding and support to help learners access the content" (Volonino & Zigmond, 2007 (p. 298) (p.51)".
McLeskey, J., & Waldron, N. (2011). Educational programs for elementary students with learning disabilities: Can they be both effective and inclusive? *Learning Disabilities Research & Practice, 26*(1), 48–57. http://onlinelibrary.wiley.com/doi/10.1111/j.1540-5826.2010.00324.x/full

"Key questions that are raised by these reviews relate to the nature of "high-quality" instruction, and where it can be effectively delivered. We contend that research that has been conducted over the last decade provides evidence that this instruction is best delivered in part-time, separate special education settings, and that full inclusion is not a feasible alternative for meeting the basic academic needs in reading and math for most students with LD".
McLeskey, J., & Waldron, N. (2011). Educational programs for elementary students with learning disabilities: Can they be both effective and inclusive? *Learning Disabilities Research & Practice, 26*(1), 48–57.

"A substantial body of NIFDI research has examined the effectiveness of the DI curricula. These studies have confirmed the accumulated findings of decades of other studies showing that students studying with DI have higher achievement scores and stronger growth rates than students studying with other curricula. These results have appeared with reading[1,2,8,9,10,13,15] and math[7]; in urban[1,2,7], rural[2,8] and suburban[8,13,15] settings; with middle class high achieving students[13]; with high risk students[16], general education students[1,2,7,8,9,10,13,15,16] and special education students[15]; with schools that are predominantly African American[1,7,9], those with substantial numbers of Hispanic students[2,8,15] and those with large numbers of non-Hispanic whites[8,13,15]; and with children from pre-school age[10] through middle school[4]. The strong positive results appear in studies examining state test scores[4], curriculum-based measures[2,4,8,10] and norm-referenced tests[1,4,7,9,10]; in the United States as well as in other countries[11] and with randomized control trials[10,13,14] as well as quasi-experimental designs[1,2,4,7,8,9,11,15] ".
The National Institute for Direct Instruction (2012). NIFDI's Research Office. Retrieved from http://www.nifdi.org/15/nifdis-research-office

"Whereas many typically achieving students can make up for lost time, learn well independently, and make up for mistakes made by educators, special education students cannot. The influence of research and evidence on decision making has even greater value for those students with disabilities who most require precision in their instructional and behavioral plans" p.27).
Vaughn, S., & Dammann, J.E. (2001). Science and sanity in special education. *Behavioral Disorders, 27*(1), 21–29.

"Nearly one-third of Australian Year 9 students perform at or below only the very the basic minimum level of writing literacy".
Jensen, B. (2010). NAPLAN tests help champion equality in the classroom. *The Age,* Thursday 15 April 2010

"For each extra year of education, the average Australian can expect to earn 5 to 12 per cent more a year. These figures are in line with international evidence that estimates returns of about 10 per cent. Years of schooling, along with initial income, explain roughly one-quarter of variation in countries' GDP". Daley, J. & Jensen, B. (2010). Strategy that gets top marks. *The Australian Financial Review*, Tuesday 17 August, (p. 63).

"Jensen says there are five main mechanisms to improve teacher effectiveness: boost the quality of applicants to the profession; improve the quality of teachers' initial education and training; appraise and provide feedback to improve teachers once they're working; recognise and reward effective teachers; and move on ineffective teachers who have been unable to increase their effectiveness through improvement programs".
Gittins, R. (2012). Education success is about more than money. The Age, 29 February, P. 13.

"Although there is no agreed on number of how many students makes a "small group," group size can vary significantly from 1-to-1 to as many as 1-to-10. Although not conclusive for making individual student-level decisions, there is compelling research indicating that instruction provided to groups of 3 to 5 students is as effective as 1-to-1 instruction, even for the most at-risk students (Elbaum, Vaughn, Hughes, & Moody, 2000)" .
Wanzek, J., & Vaughn, S. (2008). Response to varying amounts of time in reading intervention for students with low response to intervention. *Journal of Learning Disabilities, 41*(2), 126-142.

"Our research highlights the importance of using measures that assess the fluency or automaticity of skill development (i.e., phonological awareness, letter knowledge, connected text). It is not enough for a student to be simply accurate on the component skills of reading; the skills must be so well developed that the accuracy and pace of performance is effortless in order to support continued reading development (Ehri, 2005; Harn, Stoolmiller, & Chard, 2008). Students who do not display this ease early in their reading development are the most in need of intensive instructional supports".
Harn, B.A. Jamgochian, E., & Parisi, D.M. (2009). *Characteristics of students who don't respond to research-based interventions.* Council for Exceptional Children, *71* (2), 1-4.

"Although the OECD average for reading literacy has not changed between 2000 and 2009, ten countries have significantly improved their performance over this time, while five countries, including Australia, have declined significantly. … Australia's reading literacy performance has declined, not only in terms of rankings among other participating countries but also in terms of average student performance. The mean scores for Australian students in PISA 2000 was 528 points, compared to 515 for PISA 2009. A decline in average scores was also noted between PISA 2000 and PISA 2006, when reading literacy was a minor domain." Highlights from the full Australian Report: Challenges for Australian Education: Results from PISA 2009

"We have identified the Government's approach to teaching children diagnosed with dyslexia to read—namely, a structured phonics-based programme—is evidence-based on the best available evidence" (para 86, p.31).
House of Commons Science and Technology Committee (2009). *Evidence Check 1: Early Literacy Interventions*. House of Commons, London: The Stationery Office Limited.

"Few interventions improved conventional literacy skills or the precursor skills most related to later literacy growth, the exception being code-focused interventions" (p.ix).

"It should be noted that the interventions that produced large and positive effects on children's code-related skills and conventional literacy skills were usually conducted as one-on-one or small-group instructional activities. These activities tended to be teacher-directed and focused on helping children learn skills by engaging in the use of those skills. Almost all of the code-focused interventions included some form of PA intervention. These PA activities generally required children to detect or manipulate (e.g., delete or blend) small units of sounds in words. Few of the interventions used rhyming activities as the primary teaching approach. Teaching children about the alphabet (e.g., letter names or letter sounds) or

simple phonics tasks (e.g., blending letter sounds to make words) seemed to enhance the effects of PA training" (p. x).

Lonigan, C.J., & Shanahan, T. (2008). *Executive Summary. Developing Early Literacy: Report of the National Early Literacy Panel*. Jessup, MD: National Institute for Literacy.

"Modules crafted by evolution and refined by experience It is generally accepted that humans are evolutionarily 'prepared' for language. Of course, this is an abstract sort of preparation, one that allows for the acquisition of any human language depending on the experiences we have as infants and young children. We are also evolutionarily prepared for visual pattern recognition. This point is often not emphasized, however, perhaps because we do not differ from all other species in this regard. Communication and vision are of great importance to human survival, thus the modules that mediate language and visual pattern recognition are characterized by highly redundant coding schemes enabling them to function reasonably well even in the presence of small insults or degraded inputs. In contrast, written language is a human artifact of recent vintage, and therefore the mechanisms for decoding it (viz. reading) have not been used by the species long enough for evolution to have improved them via natural selection. The natural function of naming the objects and events we experience visually is mediated by pathways linking the language and visual pattern recognition modules.

Reading, attaching names and meanings to visual symbols and groups of symbols (lexical access), involves the opportunistic use of these pathways. Through repeated reading experiences, the modules and pathways involved in this artificial collaboration become relatively more and more efficient. In the normal reader this will be reflected in the development of a visual word form system, as well as a representation (either explicit or implicit) of the grapheme-phoneme correspondences in an alphabetic writing system. Skilled reading of prose for comprehension depends on a coordination of parallel activities: voluntarily guided visual scanning, visually driven lexical access, and the natural processes of spoken language comprehension and production. Breakdowns in the acquisition of this complex coordination (skill) are referred to as developmental dyslexia" (p.227).

Klein, R.M. (2002). Observations on the temporal correlates of reading failure. *Reading and Writing: An Interdisciplinary Journal,* 15, 207–232.

"Older students demonstrate a broad and complex range of difficulties related to reading. These include problems in recognizing words, understanding word meanings, and understanding and connecting with text; students often lack background knowledge required for reading comprehension (Biancarosa & Snow, 2004). We examined several syntheses on interventions for secondary students with reading difficulties to identify effective interventions to meet this range of reading difficulties. Edmonds et al. (2009) conducted a meta-analysis examining the effects of adolescent reading interventions (Grades 6 through 12) that included instruction in decoding, fluency, vocabulary, or comprehension on reading comprehension outcomes. Analyses revealed a mean weighted effect size in the moderate range in favor of treatment students over comparison students. Promising approaches were those that provided targeted reading intervention in comprehension, multiple reading components, or word-recognition strategies" (p.392).

Vaughn, S., Wexler, J., Roberts, G., Barth, A.A., Cirino, P.T., Romain, M.A., Francis, D., Fletcher, J., & Denton, C.A. (2011). Effects of individualized and standardized interventions on middle school students with reading disabilities. *Exceptional Children, 77*(4), 391-407.

"Elbaum, Vaughn, Hughes, and Moody's (2000) meta-analysis provides support for the view that benefits of small group instruction are equal to one-to-one tutoring in elementary reading instruction. Several studies showed that when highly qualified teachers rigorously implement a well-designed intervention, the academic benefit to students is the same, whether students are taught individually or in a group of 2 to 6 students. Conversely, a recent synthesis of evidence-based studies with struggling readers indicates that, although small group tutorials can be effective, they are not as effective as one-to-one instruction by teachers or paraprofessionals (Slavin, Lake, Davis, &Madden, 2009). Further, Ritter, Barnett, Denny, and Albin's (2009) meta-analysis found elementary and middle school volunteer tutoring programs compared

to no tutoring had significant positive effects on reading letters and words, oral reading fluency, writing, and reading in general" (p.220).

Mellard, D., McKnight, M., & Jordan, J. (2010). RTI tier structures and instructional intensity. *Learning Disabilities Research & Practice, 25*(4), 217–225.

The large majority of neuroimaging studies investigating the neurobiological correlates of poor reading have concentrated on lower-level reading tasks involving letters and words. One of the most consistent results in these studies is a finding of reduced or absent activation among poor readers in the left parieto-temporal and/or occipito-temporal cortices (e.g. Aylward et al., 2003; Brunswick, McCroy, Price, Frith, & Frith, 1999; [Corina et al., 2001], [Eden et al., 2004], [Georgiewa et al., 1999], [Hoeft et al., 2006], [Hoeft et al., 2007], [Paulesu et al., 1996], [Rumsey et al., 1992], [Rumsey et al., 1997], [Shaywitz et al., 1998], [Shaywitz et al., 2002], [Shaywitz et al., 2003] and [Shaywitz et al., 2004]; Simos, Breier, Fletcher, Bergman, & Papanicolaou, 2000; [Simos et al., 2002] and [Temple et al., 2003]). While only a few studies have examined cortical function among poor readers in higher-level reading tasks, evidence is beginning to emerge indicating that underactivation in the parieto-temporal and occipito-temporal regions may likewise characterize poor readers when they are reading sentences for comprehension (e.g. [Kronbichler et al., 2006], [Meyler et al., 2007] and [Seki et al., 2001]). Together, the findings from word-level and sentence-level studies support the view that underfunctioning of these regions represents a neural signature of poor reading ability (e.g. Shaywitz & Shaywitz, 2005).

Meyler, A., Keller, T.A., Cherkassky, V.L., Gabrieli, J.D., & Just, M.A. (2008). Modifying the brain activation of poor readers during sentence comprehension with extended remedial instruction: A longitudinal study of neuroplasticity. *Neuropsychologia, 46*(10), 2580-92.

"Strong claims that a given program is brain-based are premature at best" (p.22).

Pugh, K., & Hagan, E.C. (2010). New directions in the cognitive neuroscience of reading development and reading disability. *Perspectives on Language and Literacy; 36*(1), 22.

Howard-Jones (in the February 2011 issue of The Psychologist, the journal of the British Psychological Society) reports a survey of a sample of 158 recently-graduated UK teacher trainees who were about to take up their first teaching positions in schools. This survey found that:

• 82 per cent considered teaching children in their preferred learning style could improve learning outcomes. This approach is commonly justified in terms of brain function, despite educational and scientific evidence demonstrating the learning-style approach is not helpful (Kratzig & Arbuthnott 2006).

• 65 per cent of trainees considered that coordination exercises could improve integration of left–right hemispheric function. No neuroscientist would think this makes any sense.

• 20 per cent thought their brain would shrink if they drank less than six to eight glasses of water a day.

This parallels a study of new teachers in Australia, carried out by Ruth Fielding-Barnsley. See http://eprints.qut.edu.au/1940/1/1940.pdf published in 2005.

• More than 75% were unable to correctly count the number of sounds in a word spoken to them. • Few knew what was meant by the terms "syllable" or "diphthong" or "voiced consonant"

As far as I can see, neither in the UK nor in Australia have there been any changes in teacher-training syllabi as a consequence of any of the working parties/reports, including the Rose Report. Teaching children to correctly count the number of sounds in a word spoken to them is regarded by most as relevant to phonics. How can this happen in schools when the teachers themselves can't do it?

Student Support Group Guidelines 2012 DEECD Identifying the most appropriate learning style It is most important to identify the student's preferred learning styles and rates of learning. All students have preferences in the way in which they interpret information, make connections between learning and demonstrate that learning. Major differences in learning styles include learning by experimenting, reflecting, doing or feeling, and learning individually or within a group. Enabling students to be involved

in learning tasks in ways which are most comfortable for them, and which give them the opportunity to face challenges, will enhance the quality of their learning and ultimately the outcomes they will achieve (p.7).

DEECD (2012). Student Support Group Guidelines 2012. Retrieved from http://www.eduweb.vic.gov.au/edulibrary/public/stuman/wellbeing/SSG_Guidelines_2012.pdf

"Some of the biggest teaching schools are accepting entry-level students with TER scores so low as to be equivalent to failure in other states" (p.7).

Senate Employment, Workplace Relations and Education Committee. (2007). *Quality of school education.* Commonwealth of Australia. Retrieved from http://www.aph.gov.au/SEnate/committee/eet_ctte/completed_inquiries/2004-07/academic_standards/index.htm

TRAINING COMPONENTS	OUTCOMES % of Participants who Demonstrate Knowledge, Demonstrate New Skills in a Training Setting, and Use New Skills in the Classroom		
	Knowledge	Skill Demonstration	Use in the Classroom
Theory and Discussion	10%	5%	0%
...+Demonstration in Training	30%	20%	0%
...+ Practice & Feedback in Training	60%	60%	5%
...+ Coaching in Classroom	95%	95%	95%

Mellard, D. (2009, June). Response to intervention: Reforms to meet the needs of all students. Presented at the Supporting Student Learning Conference, Indianapolis , IN .

"Students who are behind do not learn more in the same amount of time as students who are ahead. Catch-up growth is driven by proportional increases in direct instructional time. Catch-up growth is so difficult to achieve that it can be the product only of quality instruction in great quantity" (p. 62).

Fielding, L., Kerr, N., & Rosier, P. (2007). *Annual growth for all students, Catch-up growth for those who are behind*. Kennewick, WA: The New Foundation Press, Inc.

Mellard (2009) suggests that schools evaluate 10 distinct variables that may be adjusted to increase instructional intensity. These variables include three dosage-related elements (minutes of instruction, frequency, and duration), as well as instructional group size, immediacy of corrective feedback, the mastery requirements of the content, the number of response opportunities, the number of transitions among contents or classes, the specificity and focus of curricular goals, and instructor specialty and skills.

Mellard, D., McKnight, M., & Jordan, J. (2010). RTI tier structures and instructional intensity. *Learning Disabilities Research & Practice, 25*(4), 217–225.

"The authors examine the reassessments of the National Reading Panel (NRP) report (National Institute of Child Health and Human Development, 2000) by G. Camilli, S. Vargas, and M. Yurecko (2003); G. Camilli, P. M. Wolfe, and M. L. Smith (2006); and D. D. Hammill and H. L. Swanson (2006) that disagreed with the NRP on the magnitude of the effect of systematic phonics instruction. Using the coding of the NRP studies by Camilli et al. (2003, 2006), multilevel regression analyses show that their findings do not contradict the NRP findings of effect sizes in the small to moderate range favoring systematic phonics. Extending Camilli et al. (2003, 2006), the largest effects are associated with reading instruction enhanced with components that increase comprehensiveness and intensity. In contrast to Hammill and Swanson, binomial effect size displays show that effect sizes of the magnitude found for systematic phonics by the NRP are meaningful and could result in significant improvement for many students depending on the base rate of struggling readers and the size of the effect. Camilli et al. (2003, 2006) and Hammill and Swanson do not contradict the NRP report, concurring in supporting comprehensive approaches to reading instruction" (p. 123).

Stuebing, K.K., Barth, A.E., Cirino, P.T., Francis, D.J, & Fletcher, J.M. (2008). A response to recent reanalyses of the National Reading Panel report: Effects of systematic phonics instruction are practically significant. *Journal of Educational Psychology, 100*(1), 123-134.

The gain in reading during a chronological time span, expressed as a ratio of that time span A ratio gain of 1.0 is exactly standard progress Brooks (2002) set a ratio gain of 1.4 as 'educationally significant' By 2007, Brooks stated that a ratio gain of 2.0 should be expected as '*many schemes now produce impacts of*

this order or more' (p30) Note, it is easier to achieve high ratio gains over a short period of intervention, than over a longer period www.ilsa.ie/PowerPoint/Nugent%20Mary%20ILSA%202011.ppt

"Writing practices cannot take the place of effective reading practices (see Biancarosa and Snow [2004] and NICHD [2000] for a review of such practices). Instead, writing practices complement reading practices and should always be used in conjunction, with each type of practice supporting and strengthening the other.

This study shows that students' reading abilities are improved by writing about texts they have read; by receiving explicit instruction in spelling, in writing sentences, in writing paragraphs, in text structure, and in the basic processes of composition; and by increasing how much and how frequently they write. Our evidence shows that these writing activities improved students' comprehension of text over and above the improvements gained from traditional reading activities such as reading text, reading and rereading text, reading and discussing text, and receiving explicit reading instruction.

The empirical evidence that the writing practices described in this report strengthen reading skills provides additional support for the notion that writing should be taught and emphasized as an integral part of the school curriculum. Previous research has found that teaching the same writing process and skills improved the quality of students' writing (Graham and Perin, 2007a; see also Graham, in press; Rogers and Graham, 2008) and learning of content (as demonstrated in Graham and Perin [2007a] and Bangert-Drowns, Hurley, and Wilkinson [2004]). Students who do not develop strong writing skills may not be able to take full advantage of the power of writing as a tool to strengthen reading" (p.29).

Graham, S., & Hebert, M. A. (2010). *Writing to read: Evidence for how writing can improve reading.* A Carnegie Corporation Time to Act Report. Washington, DC: Alliance for Excellent Education. Retrieved from http://carnegie.org/fileadmin/Media/Publications/WritingToRead_01.pdf

"At the level of brain systems, relative to typically developing (TD) readers, RD children and adolescents fail to coherently activate left hemisphere (LH) occipitotemporal (OT) and temporoparietal (TP) regions during reading" (p.22).
Pugh, K., & Hagan, E.C. (2010). New directions in the cognitive neuroscience of reading development and reading disability. *Perspectives on Language and Literacy, 36*(1), 22-25.

Viewed broadly, Australia's standing in international assessments has fallen over time. (As one illustration of this, table 4 shows that the decline in Australia's PISA results for reading and mathematics has been larger over the last decade than for the OECD as a whole.) This is despite a steady *increase* in per capita spending on education (p.8).
Australian Government Productivity Commission. (2012). Schools Workforce. Retrieved from http://www.pc.gov.au/inquiries/completed/education-workforce-schools/report

International research suggests that differences in teacher performance can explain a large portion of student achievement. Yet little is known about how the quality of the Australian teaching profession has changed over time. Using consistent data on the academic aptitude of new teachers, we compare those who have entered the teaching profession in Australia over the past two decades. We find that the aptitude of new teachers has fallen considerably. Between 1983 and 2003, the average percentile rank of those entering teacher education fell from 74 to 61, while the average rank of new teachers fell from 70 to 62. One factor that seems to have changed substantially over this period is average teacher pay. Compared to non-teachers with a degree, average teacher pay fell substantially over the period 1983-2003. Another factor is pay dispersion in alternative occupations. During the 1980s and 1990s, non-teacher earnings at the top of the distribution rose faster than earnings at the middle and bottom of the distribution. For an individual with the potential to earn a wage at the 90th percentile of the distribution, a non-teaching occupation looked much more attractive in the 2000s than it did in the 1980s. We believe that both the fall in average teacher pay, and the rise in pay differentials in non-teaching occupations are responsible for the decline in the academic aptitude of new teachers over the past two decades (p. 1).
Leigh, A., & Ryan, C. (2006). How and why has teacher quality changed in Australia? *Centre for Economic Policy Research Paper No. 534*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=961142

"As the number of low-skilled jobs in the employment market decreases, the importance of trade and

higher education qualifications increases. Students who fail to complete Year 12 have fewer employment opportunities and are more likely to experience extended periods of unemployment than Year 12 graduates (Lamb et al. 2000). In May 2005, 20% of school leavers who had completed Year 12 were not fully participating in either study or work compared with 40% of Year 11 completers and nearly 50% of Year 10 or below completers (Dusseldorp Skills Forum & Monash University–ACER 2006)" (p.45).

Australian Institute of Health and Welfare (2007). *Young Australians: Their health and well-being, 2007.* Downloaded from: http://www.aihw.gov.au/publication-detail/?id=6442468047 on 4th March, 2010.

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*The Australian Education Union's New Educators Survey 2008 found that 41.2 per cent of beginning teachers considered their pre-service teacher education to prepare them 'well' or 'very well' for the reality of teaching. **Australian Graduate Survey 2009

"Findings also indicate that a significant acceleration of reading outcomes for seventh- and eighth-graders from high-poverty schools is unlikely to result from a 50 min daily class. Instead, the findings indicate, achieving this outcome will require more comprehensive models including more extensive intervention (e.g., more time, even smaller groups), interventions that are longer in duration (multiple years), and interventions that vary in emphasis based on specific students' needs (e.g., increased focus on comprehension or word study)" (p. 931).

Vaughn, S., Wanzek, J., Wexler, J., Barth, A.E., Cirino, P.T., Fletcher, J.M., Romain, M.A., Denton, C.A., Roberts, G., & Francis, D.J. (2010). The relative effects of group size of reading progress of older students with reading difficulties. *Reading and Writing: An Interdisciplinary Journal, 23*(8), 931-956.

Studies of the use of Direct Instruction materials and procedures have shown that general language can be improved among mentally retarded pupils (e.g., Maggs & Morath, 1976), as well as disadvantaged children eligible for Head Start (e.g., Engelmann, 1968) and those in Follow- Through (Becker, 1977) (p.70).

Lloyd, J., Cullinan, D., Heins, E.D., & Epstein, M.H. (1980). Direct instruction: Effects on oral and written language comprehension. *Learning Disabilities Quarterly*, *3*, 70-76.

''Direct instructional time is proportional to their [children's] deficiency. The greater the need, the more time they get.'' Further, they caution that ''catch up growth'' requires more time and better quality instruction. Ikeda and colleagues cautioned that in most schools within the Iowa Heartland district, ''interventions were not sufficiently rigorous to impact reading performance'' (p.20).

Al-Otaiba, S., Calhoon, M. B., & Wanzek. J. (2010). Response to intervention: Treatment validity and implementation challenges in the primary grades and beyond to middle school. In Thomas E. Scruggs, Margo A. Mastropieri (Eds.). Advances in learning and behavioral disabilities, Volume 23; Learning and Literacy. Emerald Publishing.

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232. A key problem in assessing the impact of targeted programs for disadvantaged groups is the absence of any formal evaluation for many of these programs. This weakness is present across all school sectors and systems, and all states and territories. … over 40 per cent of programs did not record any evaluation having been undertaken.

Submissions noted that almost every report on the issue of inclusive education in Australia has stressed the need for systematic strengthening of teacher education and professional development. Skills development is the single most cost-effective method of improving outcomes for students with disabilities, and yet this area continues to be neglected (NPDCC 2009, p. 49-50).

254. Re students from disadvantaged groups, learning disabilities, indigenous, ESL, low SES, remote areas. *Weak monitoring and reporting* inhibits the capacity of school systems to build sector knowledge of the relevance and context of improvement strategies that have demonstrated effectiveness. This means there is a lack of evidence-based links for programs and their effects on learning (254).

Rorris, A., Weldon, P., Beavis, A., McKenzie, P., Bramich, M., & Deery, A. (2011). *Assessment of current process for targeting of schools funding to disadvantaged students*. An Australian Council for Educational Research report prepared for The Review of Funding for Schooling Panel. Retrieved from http://www.deewr.gov.au/Schooling/ReviewofFunding/Pages/PaperCommissionedResearch.aspx

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Australian student's performance in reading and mathematics has been falling since 2000. It should have improved given the increased investment in education. Other countries have improved significantly over the same period.

Nous Group Consortium. (2011). *Schooling challenges and opportunities: A report for the Review of Funding for Schooling Panel*. Nous Group Consortium, August 29.
http://www.deewr.gov.au/Schooling/ReviewofFunding/Pages/PaperCommissionedResearch.aspx

A long history of research on teaching suggests that effective teachers may be better at capturing more time for academic instruction and keeping students focused on their tasks than less effective teachers. Effective teachers may have more efficient routines for transitions between activities, and better classroom management that result in more time for instruction.
Grossman, P.L., Loeb, S., Cohen, J., Hammerness, K., Wyckoff, J.H., Boyd, D.J., & Lankford, H. (2010). Measure for measure: The relationship between measures of instructional practice in middle school English language arts and teachers' value-added score. Working Paper 45, National Center for Analysis of Longitudinal Data in Education research. Retrieved from
http://www.caldercenter.org/upload/CALDERWorkPaper_45.pdf

Al Otaiba and colleagues examined the predictors of early spelling. This study involved an economically and ethnically diverse sample of nearly 300 kindergarteners. The students spelled three types of words: irregular high-frequency words, decodable real words, and decodable pseudowords. Overall, results from their three-step hierarchical regression indicated that home literacy, parental education, demographic factors, and conventional literacy skills, accounted for 66% of the variance in spelling scores. The single strongest spring predictor was a one minute letter-sound fluency test. Researchers scored the spellings to allow partial credit for invented spelling, which made the test more sensitive to differences and less susceptible to floor effects, which is important for poor spellers and potentially for students with reading disabilities.
Al Otaiba, S., Puranik, C., Rouby, D.A., Greulich, L., Sidler, J.F., & Lee, J. (2010). Predicting kindergarteners' end-of-year spelling ability based on their reading, alphabetic, vocabulary, and phonological awareness skills. *Learning Disability Quarterly, 33*(3), 171-183.

"Over the last decade, research has revealed that many elementary students with mild academic disabilities (mostly students with LD) can make significant academic gains when provided high-quality instruction in part-time, separate settings (Foorman & Torgesen, 2001; Gersten et al, 2009a, b; Holloway, 2001; Marston, 1996, 2001; Torgesen, 2002; Torgesen et al., 2001; Vellutino, Scanlon, Small, & Fanuele, 2006). Furthermore, these gains are often significantly greater than gains that are experienced by most students with similar difficulties who are educated in high-quality, full-time inclusive settings (Marston, 2001; McLeskey & Waldron, 2010; Torgesen et al., 2001; Torgesen, 2009; Vellutino, Scanlon, Small, & Fanuele, 2006; Waldron & McLeskey, 1998). Perhaps most importantly, this research reveals that, for as many as 40–50 percent of these students, significant academic gains result in catching up with grade-level peers (Torgesen et al., 2001; Torgesen, 2009; Vellutino et al., 2006)" (p.49).
McLeskey, J., & Waldron, N.L. (2011). Educational programs for elementary students with learning disabilities: Can they be both effective and inclusive? *Learning Disabilities Research & Practice*, *26*(1), 48–57.

"The authors used a pretest-posttest control group design with random assignment to evaluate whether early reading failure decreases children's motivation to practice reading. First, they investigated whether 60 first-grade children would report substantially different levels of interest in reading as a function of their relative success or failure in learning to read. Second, they evaluated whether increasing the word reading ability of 15 at-risk children would lead to gains in their motivation to read. Multivariate analyses of variance suggest marked differences in both motivation and reading practice between skilled and unskilled readers. However, bolstering at-risk children's word reading ability did not yield evidence of a causal relationship between early reading failure and decreased motivation to engage in reading activities. Instead, hierarchical regression analyses indicate a covarying relationship among early reading failure, poor motivation, and avoidance of reading" (p.387).
Morgan, P.L. (2008). Does early reading failure decrease children's reading motivation? *Journal of Learning Disabilities, 41*(5), 387-404.

"This article presents the results of a meta-analysis of the empirical literature on anxious symptomatology among school-aged students with learning disabilities (LD) in comparison to their non-LD peers. Fifty-eight studies met inclusion criteria. Results indicate that students with LD had higher mean scores on measures of anxiety than did non-LD students. The overall effect size was statistically significant and medium in magnitude ($d = .61$) although substantial heterogeneity of results was found. Moderator effects

were examined for informant type, gender, grade, publication status, and identification source. Informant type (i.e., self-, parent, or teacher report) explained a significant amount of variability in the sample of studies, and identification source (i.e., school identified or special school and clinic/hospital identified) approached statistical significance. Implications for assessment and intervention are discussed" (p.3).

Nelson, J.M., & Harwood, H. (2011). Learning disabilities and anxiety: A meta-analysis. *Journal of Learning Disabilities*, *44*(1), 3-17.

"In summary, this study suggests that regardless of the variations in measures of the same construct across studies, variations in how RTI was implemented in terms of curriculum, length of intervention session, and how responders and low responders are defined, a clear pattern emerged suggesting that low responders can be identified prior to intervention. The key measures that play an important role in predicting posttest outcomes are related to initial level of real word reading, word attack, passage comprehension and rapid naming speed" (p.293).

Tran, L., Sanchez, T., Arellano, B., & Swanson, H.L. (2011). A meta-analysis of the RTI literature for children at risk for reading disabilities. *Journal of Learning Disabilities, 44*(3), 283-295.

The single strongest spring predictor of kindergarteners' end-of-year spelling ability is a 1-minute letter-sound fluency test.

Al Otaiba, S., Puranik, C.S., Rouby, D.A., Greulich, L., Sidler, J.F., Lee, J. (2010). Predicting kindergarteners' end-of-year spelling ability based on their reading, alphabetic, *Learning Disability Quarterly, 33*(3), 171-183.

Results showed that the Double Deficit group exhibited greater dysfunction in reading and orthographic processing compared to the single-deficit and no deficit groups. Also, although the three deficit groups were not easily differentiated in kindergarten, their differences were maximized in Grade 1 and retained in Grade 2. The type and severity of reading deficits found in the Naming Deficit group were mostly associated with naming speed at both the word- and text-reading levels, deficits that persisted across development. The Phonological Deficit group showed mostly deficient orthographic and poor decoding skills that improved across development.

Papadopoulos, T.C., Georgiou, G.K., & Kendeou, P. (2009). Investigating the double-deficit hypothesis in Greek: Findings from a longitudinal study. *Journal of Learning Disabilities 42*(6), 528-547.

The correlations between oral reading fluency and performance on comprehension tests are high (Allinder, Fuchs, & Fuchs, 1998; Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003; O'Connor et al., 2002; Pinnel et al., 1995; Rupley, Willson, & Nichols, 1998).

Swanson, H.L., & O'Connor, R. (2009). The role of working memory and fluency practice on the reading comprehension of students who are dysfluent readers. *Journal of Learning Disabilities, 42*(6), 548-557.

Using assessments that are similar to those used with children, literacy skills can be measured in adults. In addition, these measures are reliable and identify differences in reading proficiency in different segments of the adult literacy population.

Fletcher, J. (2010). Construct validity of reading measures in adults with significant reading difficulties. *Journal of Learning Disabilities, 43*(2), 166-168.

"Inclusion, as a philosophy, is consistent with the values of most school systems, but it is not, in and of itself, a means to close the achievement gap.... [All 38 studies] focused on social acceptance and peer interactions. This bias in academic research reveals a broader bias in the conventional thinking regarding inclusion: deep down, we have embraced it for social gains, not for learning gains" p.7).

"National research indicates that co-teaching seldom raises student achievement... no studies have shown student gains from co-teaching, and that on average, co-teaching actually produces less learning than a class with a single teacher" (p.9).

Levenson, N. (2011). *Something has got to change: Rethinking special education.* Future of American Education Working Paper Series. http://www.aei.org/docLib/AEI-Working-Paper-Rethinking-Special-Education.pdf

"One of my children learnt to read from cook books, because he loved cooking. … Reading is just like footy or cricket or golf. You learn by doing it"

Children's author, Paul Jennings interviewed in Cafarella, J. (2011). *Bringing books to life*. The Victorian Premiers' (sic) Reading Challenge. The Age, Sunday June 19.

Goodman et al. (1987) consider that semantic cues are deep structure processes, while grapho-phonic cues are surface structure processes. Smith (2004) explains that deep structure processes involve knowledge and meaning, while surface structure processes are the physical characteristics of text such as the visual and sound properties. Goodman et al. (1987) put the most emphasis on semantic followed by syntactic cues in the reading process. They suggested that grapho-phonic cues are utilised only when the former systems are unavailable. Whole-language advocates believe that skilled readers are more likely to depend on meaning and grammatical cues and are less likely to use grapho-phonic cues than are less skilled readers (Stanovich, 2000). Goodman (1979) claimed that the semantic acceptability of a reader's miscues prior to correction is the greatest predictor of reading ability. Consequently a focus on meaning is expected to lead to skilled reading (Robinson & McKenna, 2008).

Beatty, L., & Care, E. (2009). Learning from their miscues: Differences across reading ability and text difficulty. *Australian Journal of Language and Literacy,* Oct 2009.
http://findarticles.com/p/articles/mi_hb3336/is_3_32/ai_n45180004/

1. The dominant factor in explaining individual differences in performance on the FCAT in grade 3 is oral reading fluency

2. The dominant factor in explaining individual differences in performance on the FCAT in grade 10 is verbal knowledge and reasoning ability Schatschneider , C., Buck, J., Torgesen, J.K., Wagner, R.K., Hassler, L., Hecht, S., & Powell Smith, K. (2005). A multivariate study of factors that contribute to individual differences in performance on the Florida Comprehensive Reading Assessment Test. Technical Report # 5, Florida Center for Reading Research, Tallahassee, FL.
http://www.fcrr.org/technicalreports/multi_variate_study_december2004.pdf   Almost half of all Australians aged 15-74 years had literacy skills *below level 3*.

Level 1 - trouble using a bus timetable or completing basic forms. May be able to locate some information on a medicine label; however, skill level 1 includes people who could not complete such tasks.

Level 2 - may be able to complete the above, but may not be able to interpret a weather map or summarise a piece of text.

Level 3 - may not be able to compare and contrast written information, extract information from a pamphlet or interpret pie charts. Considered minimum for 'coping with the increasing demands of the emerging knowledge society and information economy'.

Australian Bureau of Statistics. (2008). *Adult Literacy and Life Skills Survey (ALLS 2006-2007).* Retrieved July 29, 2008, from http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Chapter6102008

"When students with borderline intellectual functioning begin school, academic motivation is rarely a problem (Hihi & Harachiewicz, 2000). However, as they get older, a consistent pattern emerges. Strong effort in the early grades is met with academic frustration and possible failure. Despite the students' efforts, this cycle of academic frustration and failure is repeated. After some years, the cumulative effect of frustration and failure is that students simply stop trying (Guay & Vallerand, 1996-1997). In the classroom, such students are referred to as unmotivated and, sometimes, as lazy. Academic motivation may have some temperamental and early environmental factors that place a child at risk for motivation deficits (Levine, 2003). However, academic motivation and effort are often extinguished by repeated failure and frustration (Levine, 2003)".

Shaw, S. R. (2008). An educational programming framework for a subset of students with diverse learning needs: Borderline intellectual functioning. *Intervention in School and Clinic, 43*, 291-299.

Because dyslexia is a language-based disorder, treatment should be directed at this etiology. Remedial programs should include specific instruction in decoding, fluency training, vocabulary, and comprehension. Most programs include daily intensive individualized instruction that explicitly teaches phonemic awareness and the application of **phonics**. Vision problems can interfere with the process of reading, but children with dyslexia or related learning disabilities have the same visual function and ocular

health as children without such conditions. Currently, there is inadequate scientific evidence to support the view that subtle eye or visual problems cause or increase the severity of learning disabilities.

Handler, S.M., & Fierson, W.M (2011). Joint technical report-Learning disabilities, dyslexia, and vision. *Pediatrics 127*(3), 818-856.

There is no single line of accountability for the success of Wannik. Despite identifying the Wannik strategy as a departmental priority project, DEECD has implemented it using a business-as-usual approach. There are no reporting mechanisms that provide a picture of the overall status of the Wannik strategy. There is insufficient information with which to identify and address any implementation problems. DEECD is more than two years late putting in place a monitoring and evaluation framework that allows it to reliably and objectively assess progress, and measure the strategy's success in achieving outcomes. DEECD was unable to provide reliable data about critical factors such as the workforce profile, skills and capabilities, workforce turnover and the extent of professional development provided to staff. VAEAI has not fulfilled its service obligations and reporting requirements in the agreement, and DEECD has not held it to account for this. The Koorie education workforce has inconsistent skills, and until it is properly trained it does not have the capacity to perform the required activities. DEECD is 12 months behind schedule in providing the planned professional learning to the Koorie education workforce and does not expect to have a statewide professional development plan until February 2012.

Victorian Auditor-General (2011). Indigenous Education Strategies for Government Schools. *download.audit.vic.gov.au/files/20110601-Indigenous-Ed.rtf*

"Consistent with previous reviews of similar focus, the findings suggest that education technology generally produced a positive, though small, effect (ES=+0.16) in comparison to traditional methods. However, the effects may vary by education technology type. In particular, the types of supplementary computer-assisted instruction programs that have dominated the classroom use of education technology in the past few decades are not producing educationally meaningful effects in reading for K-12 students. In contrast, innovative technology applications and integrated literacy interventions with the support of extensive professional development showed somewhat promising evidence. However, too few randomized studies for these promising approaches are available at this point for firm conclusions".

Cheung, A., & Slavin, R.E. (2011, May). *The effectiveness of education technology for enhancing reading achievement: A meta-analysis*. Baltimore, MD: Johns Hopkins University, Center for Research and Reform in Education.

"Students with borderline intellectual functioning are a subset of diverse learners who account for disproportionately high levels of school dropout, grade retention, school suspension and expulsion, referral for special education services, teen pregnancy, incarceration, illicit drug use, aggression, mental health problems, and underemployment and unemployment (Ahrens, Evans, & Barnett, 1990; Shaw, 1999a; 1999b)". … "When students with borderline intellectual functioning begin school, academic motivation is rarely a problem (Hihi & Harachiewicz, 2000). However, as they get older, a consistent pattern emerges. Strong effort in the early grades is met with academic frustration and possible failure. Despite the students' efforts, this cycle of academic frustration and failure is repeated. After some years, the cumulative effect of frustration and failure is that students simply stop trying (Guay & Vallerand, 1996-1997). In the classroom, such students are referred to as unmotivated and, sometimes, as lazy. Academic motivation may have some temperamental and early environmental factors that place a child at risk for motivation deficits (Levine, 2003). However, academic motivation and effort are often extinguished by repeated failure and frustration (Levine, 2003)" (p.291).

Shaw, S. R. (2008). An educational programming framework for a subset of students with diverse learning needs: Borderline intellectual functioning. *Intervention in School and Clinic, 43*, 291-299.

"Perhaps the most important distinction among tiers is the intensity of instruction associated with each tier. Instructional intensity, while a term that is commonly understood by educators, merits some discussion in the RTI context. Often educators view increased intensity as something that can be accomplished "primarily by increasing instructional time or reducing size of the instructional group, or doing both" (Torgesen, 2005, p. 3). Mellard (2009) suggests that schools evaluate 10 distinct variables that may be adjusted to increase instructional intensity. These variables include three dosage-related elements (minutes of instruction, frequency, and duration), as well as instructional group size, immediacy of corrective feedback, the mastery requirements of the content, the number of response opportunities, the number of

transitions among contents or classes, the specificity and focus of curricular goals, and instructor specialty and skills".

Mellard, D., McKnight, M., & Jordan, J. (2010). RTI tier structures and instructional intensity. *Learning Disabilities Research & Practice, 25*(4), 217–225.

"We highlight results from a series of hierarchical multiple regression analyses which show that: (1) IQ is not highly correlated with reading achievement, (2) IQ does not predict response to intervention, and (3) measures of response to intervention are better predictors of long-term risk status than IQ. As such, the current article is a position paper summarizing results from two extant datasets to support our view that RTI is a more valid approach to identification of SLD than is the more traditional psychometric approach that uses the IQ-achievement discrepancy as its central defining criterion".

Gresham, F.M., & Vellutino, F.R. (2010). What is the role of intelligence in the identification of specific learning disabilities? Issues and clarifications. *Learning Disabilities Research & Practice. 25*(4), 194–206.

"Predictable text has become widely used for beginning readers but has not been the subject of much research. This study used predictable books to compare 3 reading treatments reflecting different components of a whole-to-part instructional model. In 3 first-grade classrooms, beginning readers working with isolated words in a modified word bank activity learned more words than when they worked with sentence strips. They also learned more words using sentence strips than when they simply read and reread the books. There was a significant treatment effect, justifying the theoretical position that beginning readers learn more words when those words are removed from the supportive context offered by predictable text. Students with higher levels of literacy skill learned 5 times as many words as those with lower levels. The overall number of words learned in these predictable books appears limited. These findings have important implications for the use of texts in beginning reading programs".

Johnston, F. R. (2000). Word learning in predictable text. *Journal of Educational Psychology, 92*(2), 248-255.

"If some notion of the failure to respond to high quality, evidence-based instruction and intervention is not explicitly built into the definition of dyslexia (irrespective of whether or not RTI turns out to be the most feasible approach), it will not be possible to distinguish between poor readers who did not receive adequate instruction and those who are genuinely dyslexic. This is certainly a very real possibility in a country like New Zealand, which for the past two decades has strongly adhered to a constructivist, whole language approach to reading instruction that places heavy emphasis on the use of multiple cues (especially sentence context cues) in learning to read (Tunmer et al., 2003, 2004, 2006; Tunmer et al., 2008; Tunmer & Prochnow, 2009). The advocacy group most responsible for the recent recognition of dyslexia in New Zealand claims that 10% of New Zealand schoolchildren are dyslexic (Dyslexia Foundation of New Zealand, 2008). Although international studies of reading achievement over the past 20 years have consistently shown that New Zealand does indeed have a relatively high proportion of reading failures compared with other countries (see earlier discussion), the majority of these children are most likely "teaching disabled" rather than reading disabled. … A considerable amount of research indicates that with very rare exceptions, students diagnosed with dyslexia have a history of deficits in one or more aspects of phonological processing, especially phonological awareness and phonological recoding (Snowling, 2000; Vellutino & Fletcher, 2005; Vellutino et al., 2004)".   "In summary, we have presented arguments and evidence in support of defining dyslexia in terms of four components: (a) persistent literacy learning difficulties (b) in otherwise typically developing children (c) despite exposure to high quality, evidence-based literacy instruction and intervention, (d) due to an impairment in the phonological processing skills required to learn to read and write. In defining dyslexia in this manner, we are not suggesting that children diagnosed as having dyslexia cannot make progress in learning to read. Rather, our claim is that these children require more intensive instruction of longer duration of the kind provided in the third tier of RTI models".

Tunmer, W., & Greaney, K. (2010). Defining dyslexia. *Journal of Learning Disabilities, 43*(3), 229–243.

On average, when the Corrective Reading program was coupled with repeated reading lessons, findings reflected a large effect (*M ES* = 1.52) for students with disabilities (i.e., Gregory et al., 2005; Strong et al., 2004). In these two investigations, essentially, all students improved on their reading fluency, and results were varied with regard to performance on answering comprehension questions. … Although more research comparing whole-word to phonic instruction is needed with adolescent populations, one study

suggested that adolescents who were taught phonic analysis skills were better able to transfer their skills when they encountered words that were novel to them (*ES* = 1.30 on pseudoword reading), contrary to those adolescents who received either whole-word reading skills or no specialized instruction (i.e., Bhattacharya & Ehri, 2004)".

"Students who have not acquired some degree of reading decoding and fluency skills by middle school are at a disadvantage, as they are increasingly expected to extract and synthesize information from content area texts (Biancarosa & Snow, 2004; Santa, 2006). Moreover, "students who lack sufficient fluency entering into the middle grades are not likely to find much instructional support for their difficulties" (Rasinksi et al., 2005, p. 26)"

Joseph, L. M., & Schisler, R. (2009). Should adolescents go back to the basics?: A review of teaching word reading skills to middle and high school students RASE TL & LD. *Remedial and Special Education, 30*(3), 131. Retrieved from http://search.proquest.com/docview/236328142?accountid=13552

The difficulties experienced by below-average readers in phonological decoding tasks are well documented. Recent research has suggested that additional deficits in perceptual–motor fluency, handedness, and memory may also exist among below-average readers. To evaluate these claims, average and below-average readers and spellers were compared on a range of phonological processing, verbal short-term and working memory, rapid naming, handedness, and perceptual–motor fluency tasks. Average and below-average readers were sampled in a comparable manner and were also comparable on age, gender, nonverbal ability, socioeconomic status, and ethnicity. Below-average readers and spellers performed lower than average readers and spellers on rhyme detection, pseudoword decoding, and rapid digit (but not picture) naming tasks, but showed no differences in handedness tasks or on a range of other perceptual–motor tasks.

Savage, R.S., & Frederickson, N. (2006). Beyond phonology: What else is needed to describe the problems of below-average readers and spellers? *Journal of Learning Disabilities, 39*(5), 399–413.

We found that explicit, intensive, and highly structured reading instruction can increase the reading performance of incarcerated youth in a relatively short period of time. These findings are consistent with previous investigations of reading interventions with incarcerated youth (AlIen-DeBoer, Malmgren, & Glass, 2006; Drakeford, 2002; Malmgren & Leone, 2000).

Houchins, D. E., Jolivette, K., Krezmien, M. P., & Baltodano, H. M. (2008). A multi-state study examining the impact of explicit reading instruction with incarcerated students. *Journal of Correctional Education, 59*(1), 65-85. Retrieved from http://search.proquest.com/docview/229785905?accountid=13552

Findings revealed special education beginning teachers were somewhat knowledgeable about teaching reading, but this knowledge did not contribute a significant portion of variance to classroom practice. Practices in classroom management, decoding practices, and providing explicit, engaging instruction accounted for a significant portion of variance in student reading gains.

Brownell, M.T., Bishop, A.G., Gersten, R., Klingner, J.K., Penfield, R.D., Dimino, J., Haager, D., Menon, S., Sindelar, P.T, (2009). The role of domain expertise in beginning special education teacher quality. *Exceptional Children, 75*(4), 391-411.

Student behaviour problems can be more a function of the school than of the individual student - "Misbehaving students are often reacting in a predictable and even sensible way to the school as it affects them, and as they have learned to perceive it and react to it" (p. 117).

Wayson, W. & Pinnell, G. (1982). Creating a living curriculum for teaching self-discipline. In D. Duke (Ed), *Helping teachers manage classrooms*. Vancouver: Assoc. for Supervision and Curriculum.

It is concluded that regardless of the setting (regular or special classroom), the key to achievement gain by low-achieving students is maximizing the time that they spend being actively instructed or supervised by their teachers. The educational programs likely to be most effective with these students are programs developed on the basis of general principles of good instruction rather than programs designed from the beginning as responses to special needs or learning deficits diagnosed in compensatory education students.

Brophy, J. (1988). Research linking teacher behavior to student achievement: Potential Implications for instruction of Chapter 1 students. *Educational Psychologist, 23*(3), 235-286.

The Government notes the Committee's point on the issues with a definition of Dyslexia. The Expert Advisory Group established by Sir Jim Rose in preparation of his independent report considered many published definitions of dyslexia. They concluded that difficulties of a dyslexic nature can affect children across the range of intellectual abilities. This represents an important shift away from reliance on a discrepancy between measured IQ and measured attainment in reading and spelling once used to identify dyslexia. Evidence shows that, regardless of general level of ability, those with marked reading and spelling difficulties perform badly on tasks such as decoding, word recognition and phonological skills. Furthermore, measures of IQ do not predict how children will respond to literacy intervention or their long-term outcomes.

Science and Technology Committee (2010). The Legacy Report: Government Response to the Committee's Ninth Report of Session 2009-10. House of Commons London: The Stationery Office Limited www.publications.parliament.uk/pa/cm201011/cmselect/cmsctech/.../370.pdf

Meta-analyses consistently show positive effects of reducing instructional group size (Elbaum, Vaughn, Hughes, and Moody, 1999). Further, the intensive small group work must be frequent; in the studies my colleagues and I have reviewed, success has been produced when groups met 20 to 45 minutes per day, 4 to 5 days per week.

Torgesen, J. (2004, Fall). Preventing early reading failure. American Educator. Retrieved from http://www.aft.org/pubs-reports/american_educator/issues/fall04/reading.htm

The first few years of elementary school are considered by many to be the most important for modifying the trajectory of children's reading development (see Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008). Children who do not become competent readers during the first few years of school often will have difficulty in subsequent years (Torgesen & Burgess, 1998). For example, Juel (1988), in a longitudinal study of 54 low-income children, found a .88 probability that a child who was a poor reader at the end of first grade would remain such at the end of fourth grade. Similarly, Pianta et al. (2008) found that most of the change in reading trajectory in their longitudinal sample of children from 54 months to fifth grade took place by first grade with almost none taking place after third grade. Francis, Shaywitz, Stuebing, Shaywitz, and Fletcher (1996) found that 74% of children in the Connecticut Longitudinal Study who were poor readers in fourth grade continued to be poor readers in ninth grade.

Sonnenschein, S., Stapleton, L.M., Benson, A. (2010). The relation between the type and amount of instruction and growth in children's reading competencies. American Educational Research Journal, 47(2), 358–389.

"One intervention was the use of text-comprehension strategies, such as the technique of looking back to an earlier paragraph or sentence to infer the meaning of what was not understood. A second approach focused on introducing children to new vocabulary and developing their listening comprehension. The gains were largest for children who were taught using the second approach, and those gains could be entirely explained by an increase in their knowledge of vocabulary words and ability to understand them when spoken".

Clarke, P., Snowling, M.J., Truelove, E., & Hulme, C. (2010). Ameliorating children's reading comprehension difficulties: A randomised controlled trial. *Psychological Science, 21,* 1106-1116.

There is a close relationship between reading and spelling (the correlation between the two is quite strong, ranging from 0.66 to 0.90. Contrary to the perception of English as a language with arbitrary spelling, nearly 50 percent of English words are predictable on sound-letter correspondences that can be taught, and another 34 percent of words are predictable except for one sound. Knowing these patterns makes spelling predictable.

Joshi, R. M., Treiman, R., Carreker, S., & Moats, L. C. (2008). How words cast their spell. *American Educator,* 8(18), 42-43.

With regard to response to intervention (RTI), Vellutino, Scanlon, Zhang, and Schatschneider (2008) found in a multi-tiered, longitudinal intervention study that intelligence tests did not reliably distinguish between at-risk children who became independent readers with small-group intervention and those who did not, nor between children who attained grade-level expectations after receiving more intensive, individualized remedial assistance following the small-group intervention and those who did not attain grade-level expectations. However, language based cognitive measures and measures of incremental growth did distinguish between these groups of struggling readers. This finding and the finding that

nondiscrepancy-defined (i.e., low IQ) poor readers and discrepancy-defined poor readers (i.e., those with IQs in the average to above average range) do not acquire reading skills in a fundamentally different manner suggest that IQ is largely irrelevant to defining dyslexia (Aaron, 1997), other than in applying exclusionary criteria concerning intellectual impairment.

Tunmer, W., & Greaney, K. (2010). Defining dyslexia. *Journal of Learning Disabilities, 43*(3), 229–243.

JUNE 24, 2010 Is the learning disabilities epidemic waning? Look at the trend in the number of students with learning disabilities in recent years. (And consider that before this time period, the percentage of kids with LD was going up, up, up). This is an 11 percent drop in just five years. We might be witnessing one of the great untold success stories of recent educational history. So why isn't anyone talking about this? And remind me again why Congress and the Administration decided to kill Reading First? - Mike Petrilli
http://www.edexcellence.net/flypaper/index.php/2010/06/is-the-learning-disabilities-epidemic-waning/

"The program know as DI (or capital D, capital I) puts all of [the features of 'di'] into an explicit package. It's a more structured version of di that's been field tested. DI has taken the basic principles of di and applied them in explicit lessons to various aspects of curriculum at different levels. It includes programs to teach reading, math, and science. And because its lessons are written out ('scripted' or manualized), it's more consistent from teacher to teacher. DI has simple eaten the lunch of other instructional approaches in field tested and therefore is a best-practices example of the superiority of a scientifically based instruction program. And yet, ... it hasn't been declared by the federal government to be any better than the competition, much of which is unmitigated hogwash.!"

Kauffman, J. M. (2010). *The tragicomedy of public education: Laughing and crying; thinking and fixing.* Verona, WS: Attainment. ISBN 1578616824

U.K. College of Optometrists major reviews of the literature on vision therapy in 2000 and 2008. "The continued absence of rigorous scientific evidence to support behavioral management approaches, and the paucity of controlled trials in particular, represents a major challenge to the credibility of the theory and practice of behavioral optometry," The American Academy of Pediatrics in 2009 reviewed 35 years of the literature on vision therapy condemned the therapy and its contention that it could help with learning disabilities. Visual problems, it claimed, are not the basis for learning disabilities. "Ineffective, controversial methods of treatment such as vision therapy may give parents and teachers a false sense of security that a child's learning difficulties are being addressed, may waste family and/or school resources and may delay proper instruction or remediation."

This report on early literacy interventions is our first Evidence Check, a novel programme of work, launched in July 2009, that asks two questions of government: (1) what is the policy? and (2) on what evidence is the policy based?

We have discovered that the Government's focus on early literacy interventions and phonics-based teaching is based on the best available evidence. We have also found that the Government's use of Reading Recovery is based on evidence, but a lower quality of evidence than we, as a Science and Technology Committee, are comfortable with. The Government's decision to roll out Reading Recovery nationally to the exclusion of other kinds of literacy interventions was, however, not evidence-based, and we have suggested that the Government should commission some high quality research, such as randomised controlled trials, in this area.

We have identified the Government's approach to teaching children diagnosed with dyslexia to read—namely, a structured phonics-based programme—is evidence-based on the best available evidence. But we discovered that the evidence base could be much stronger in this area. The Government's focus on dyslexia, from a policy perspective, was led by pressure from the dyslexia lobby rather than the evidence, which is clear that educational interventions are the same for all poor readers, whether they have been diagnosed with dyslexia or not.

In broad conclusion, we found that there was a willingness from the Department to base its approach to early literacy interventions on the evidence. However, we discovered worryingly low expectations regarding the quality of evidence required to demonstrate the relative effectiveness and, in particular, the cost-effectiveness of different programmes.

It has often been noted by methodologists and authors of systematic reviews of research that studies with small sample sizes tend to have much larger, positive effect sizes than do studies with larger sample sizes. … Much as an emphasis on randomized experiments in program evaluation syntheses is appropriate, there are other methodological factors that may be as important as random assignment, and need to be taken into account in the same way. Sample size is one of these factors (p.2).
Slavin, R.E., & Smith, D. (2009). The relationship between sample sizes and effect sizes in systematic reviews in education. *Educational Evaluation and Policy Analysis, 31*(4), 500-506.
http://www.bestevidence.org/methods/eff_sample_size.htm

John Hattie at Melbourne University in his book Visible learning: A synthesis of over 800 meta-analyses relating to achievement examines meta-analyses of research studies relating to student achievement, and concludes that Direct Instruction is highly effective. No other curricular program showed such consistently strong effects with students of different ability levels, of different ages, and with different subject matters.

"One of the common criticisms is that Direct Instruction works with very low-level or specific skills, and with lower ability and the youngest students. These are not the findings from the meta-analyses. The effects of Direct Instruction are similar for regular ($d=0.99$), and special education and lower ability students ($d=0.86$), higher for reading ($d=0.89$) than for mathematics ($d=0.50$), similar for the more low-level word attack ($d=0.64$) and also for high-level comprehension ($d=0.54$), and similar for elementary and high school students. The messages of these meta-analyses on Direction Instruction underline the power of stating the learning intentions and success criteria, and then engaging students in moving towards these. The teacher needs to invite the students to learn, provide much deliberative practice and modeling, and provide appropriate feedback and multiple opportunities to learn. Students need opportunities for independent practice, and then there need to be opportunities to learn the skill or knowledge implicit in the learning intention in contexts other than those directly taught" (pp. 206-7).
Hattie, J. A.C. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. London and New York: Routledge.

In fact, the routine application of IQ tests for the classification of LD should not be supported because of the lack of evidence showing that IQ is necessary to identify LD and that IQ robustly predicts intervention response, prognosis, and school success (Fletcher et al., 2007).
Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2007). Learning disabilities: From identification to intervention. New York: Guilford.

IQ has a moderate correlation with achievement, but this does not translate to a conceptual model in which IQ is a robust determinant or cause of achievement. Indeed, there is considerable evidence that the cognitive problems that reduce achievement (e.g., language) also reduce IQ. Children who don't learn to read show declines in IQ over time. IQ tests measure skills that are taught in school, such as vocabulary and critical reasoning. If IQ tests measured skills like phonological awareness and rapid naming, many children with reading problems would obtain substantially lower scores.
Stuebing, K.K., Barth, A.E., Molfese, P.J., Weiss, B., & Fletcher, J.M. (2009). IQ is not strongly related to response to reading instruction: A meta-analytic interpretation. *Exceptional Children, 76*(1), 31-52.

"… all proficient readers use three major subsystems or cueing systems of language in order to construct meaning from text: the semantic, syntactic, and graphophonic systems".
Cambourne, B. & Turbill, J. (2007). Looking back to look forward: Understanding the present by revisiting the past: An Australian perspective. *International Journal of Progressive Education, 3*(2), 8-28.

"Empirical investigations may demonstrate, as miscue analysis has, that phonics is a distinctly inferior cuing system, one hardly deserving any privileged status (Flurkey and Xu, 2003)".
Strauss, S. L., & Altwerger, B. (2007). The logographic nature of English alphabetics and the fallacy of direct intensive phonics instruction. *Journal of Early Childhood Literacy, 7*(3), 299-317.
Flurkey, A. and Xu, J. (Eds.) (2003). *On the revolution of reading: The selected writings of Kenneth S. Goodman*. Portsmouth, NH: Heinemann.

Intensity of intervention is the key to significant improvement, and socialization with same-ability peers may be an equally important factor in intervention - an argument against full inclusion. The American

Speech-Language-Hearing Association www.asha.org

Corrective Reading, a remedial small group form of Direct Instruction has strong evidence of effectiveness (Slavin, 2009, Best Evidence Encyclopedia)

Slavin, R.E., Lake, C., Chambers, B., Cheung, A., & Davis, S. (2009, June). Effective beginning reading programs. Baltimore, MD: Johns Hopkins University, Center for Data-Driven Reform in Education. http://www.bestevidence.org/reading/begin_read/begin_read.htm

The Reading Recovery program provides a further example. The data … indicate that Reading Recovery is provided to up to 100 per cent of students in any one school (notably small schools) and the average is 40 to 50% of students, well above the intended 20 per cent (Section 7.43, p.90) of students. In 2000 and 2001, 60 per cent and 57 per cent, respectively, of Victorian government schools allocated further funds to Reading Recovery from their School Global Budget. Victorian Budget amounts:1999 ($27M), 2000 (28M), 2001 (31.4M), 2002 (30.6M), 2003 (28.7M)

Office of the Victorian Auditor General. (2003). Improving literacy standards in government schools. Retrieved 10/10/2004 from http://www.audit.vic.gov.au/reports_par/Literacy_Report.pdf

So the question is why is DI not being used in under-performing schools? My belief is that its a function of the political system's drive to reduce its accountability, and DI requires accountability.

Education indeed has deep problems. But the problem is not discovering how to teach children or get them to learn at grade level. DI solves that problem (though no doubt in can be continuously improved).

The deep problem is how do you get entrenched power structures to accept accountability and place improved performance as one of their goals (not just increasing their power and vanity)

Robert Sperry, DI Listserve, Saturday - 12 September, 2009 11:18 PM

Efforts to improve literacy achievement over the last 10 years ($1.19 billion over the past 6 years) have done little to improve the average achievement of students across the state.

Average student performance dropped further below the expected level each year as students progressed from Year 3 to Year 9 to be more than 1 term below the expected level by Year 9.

There has been no system-wide assessment of the ongoing effectiveness of key elements of the approach, such as the Reading Recovery intervention.

DEECD does not consistently use monitoring, program reviews and evaluations.

Victorian Auditor-General. (2009). *Literacy and numeracy achievement*. Retrieved from http://www.audit.vic.gov.au/reports__publications/reports_by_year/2009/20090204_literacy_numeracy/1_executive_summary.aspx

When we look at the kids who are having a tough time learning to read and we went through the statistics, thirty-eight percent nationally, disaggregate that, seventy percent of kids from poverty and so forth hit the wall. Ninety-five of those kids are instructional casualties. About five to six percent of those kids have what we call dyslexia or learning disabilities in reading. Ninety-five percent of the kids hitting the wall in learning to read are what we call NBT: Never Been Taught. They've probably been with teachers where the heart was in the right place, they've been with teachers who wanted the best for the kids, but they have been with teachers who cannot answer the questions: 1) What goes into reading, what does it take? 2) Why do some kids have difficulty? 3) How can we identify kids early and prevent it? 4) How can we remediate it?

G. Reid Lyon, 2003 Past- Chief of the Child Development and Behavior Branch of the National Institute of Child Health & Human Development,Source: COTC Interview - http://www.childrenofthecode.org/interviews/lyon.htm#InstructionaInstructional Casualtieslcasualties

Instructional Confusion So, we have a difficult code, we have a neural system that for some children is not optimal for dealing with this code, and then we throw them an instructional system, a teaching system; teachers who don't understand what the code really is or how it needs to be conveyed. And so the teacher

is suggesting you should do this when in fact the child should be doing that. You can sample first or second grade classrooms around the country and you will still find, despite what we know about the process of reading and have learned over the past twenty years, you will still find that teachers for a first grader who is struggling to sound out a word who will discourage the child from doing that, and encourage the child to look at the pictures in the book and guess what that word means. Good readers don't guess, good readers sound out almost every word on the page. And so the teacher is saying you solve the task this way when in fact the task has to be solved in an entirely different way. And that can not help but confuse children. So, non-optimal instruction, and in some cases simply misleading instruction, is a significant part of the problem.

Grover (Russ) Whitehurst, Ex-Director (2002-08), Institute of Education Sciences, U.S. Department of Education. Source: COTC Interview:
http://www.childrenofthecode.org/interviews/whitehurst.htm#WhyisReadingsoDifficult

Insufficient Instructional Approaches The fact of the matter is most of our kids at risk are kids who did not have these interactions that built the fundamental, foundational linguistic building blocks. They come into kindergarten, first grade, and if they then get instructional approaches that don't take advantage of what we know about the code, if they get instructional approaches that are philosophically based, holistic and so forth, they'll never get it. Because they're coming for clarity, and if they're expected to discover these kinds of things without all of those previous building blocks how are they going to do it? It's like me being sat in front of a piano listening to Mozart without any musical background and then being expected to induce these things, expected to pick it up naturally. It just doesn't happen. So, you've got all these kinds of cultural, instructional language things moving at one time, which all can be helped and adjudicated by just knowledge.

G. Reid Lyon, Past- Chief of the Child Development and Behavior Branch of the National Institute of Child Health & Human Development, National Institutes of Health, Current senior vice president for research and evaluation with Best Associates. Source: COTC Interview -
http://www.childrenofthecode.org/interviews/lyon.htm#Necessaryinsufficient

Instructional Confusion 2 It's arguable, and certainly in my position, that well designed instructional materials, by well designed I mean taking into account what we know about the code and how difficult it is, how to make it simpler and more transparent in particular stages in learning to read, well designed instructional materials, teachers who know how to support children as they are exposed to those instructional materials and periodic assessments so we know when children are falling behind. Standard packages of materials as preventive strategies may be sufficient to move us substantially ahead in terms of solving this problem. It will not get us the whole way, but it's going to get us, I think, a long way there. One of the principal problems here is instructional confusion. If we can reduce that confusion we're going to generate more successes in learning to read.

Grover (Russ) Whitehurst, Ex-Director (2002-08), Institute of Education Sciences, U.S. Department of Education. Source: COTC Interview:
http://www.childrenofthecode.org/interviews/whitehurst.htm#SyncvsSystematicInstruct

Instructional Confusion I sat in on a session that a colleague of mine was doing on phoneme grapheme mapping. She has designed an instructional procedure for phoneme grapheme mapping which is a nice little supplement for teachers. In the workshop I saw the same thing happening that I see all the time when I'm working with teachers which is the rather profound confusion that exists even among people who have degrees and certificates in reading instruction - how many aspects of the code are unclear to them and they go merrily along teaching their programs and teaching kids without ever resolving the questions that come up in a formal presentation. I saw this colleague of mine leading them through the phoneme grapheme mapping exercises and it was fun for me to see somebody else encountering the same questions and areas of confusion in the teacher audience that I experience all of the time. The universality of those confusions was impressed on me again and how totally oblivious the teacher certification process is to equipping teachers with that knowledge base. Schools typically don't take it on as a responsibility; they typically don't teach it very well if they teach it at all. The instruction is not well conceived even if it is there. People leave those certification programs with the responsibility of teaching kids but without the tools to really make any of these English code issues clear to kids.

Louisa Moats, Director, Professional Development and Research Initiatives at Sopris West Educational Services; Author, Speech to Print: Language Essentials for Teachers, Parenting a Struggling Reader, and

LETRS (Language Essentials for Teachers of Reading and Spelling). Source: COTC Interview: http://www.childrenofthecode.org/interviews/moats.htm#InstructionalConfusion

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 The Code Hasn't Been Seriously Taught My humble opinion is the problem with learning the code is not really with the code, it's with the teaching of the code. We have long periods in the history of reading instruction in America where the code wasn't taught or was taught in such a boring, offensive or misleading way that it didn't do much good. I could even be more extreme and say that teaching the code probably was a negative factor. Drilling kids to death on letter-sound correspondences probably is as bad as not teaching them at all. Or almost so. So, the first problem that I see is that it's difficult to find a time when the code was seriously taught and taught well. And I can't explain why it is that even today there is such enormous resistance to deal with the code among the college faculty who teach reading methods to pre-service and in-service teachers.
Richard Venezky, Past Unidel Professor of Educational Studies and Professor of Computer and Information Sciences, and Linguistics at the University of Delaware. He is the author of *The American Way of Spelling: The Structure and Origins of American English Orthography.* Source: COTC Interview - http://www.childrenofthecode.org/interviews/venezky.htm#TheCode

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 Efficacy of Good Instruction There's good research that points to the dramatic efficacy of good instruction. It is true that not enough good instruction is getting to kids. Kids just don't have the benefit of it. Teachers need to be trained in order to carry out the kind of instruction that is effective. And, there is good research to show that up to ninety-five percent or so of reading problems, reading difficulties can be effectively addressed if that instruction is there and delivered in the right way. That still leaves about four to six percent of the student population that is not responding, that is still struggling, that needs some other kind of intervention, some other kind of instruction. And interestingly, the percentage of children in the school age population who have learning disabilities right now is about five percent. And they need even more intensive, individualized instruction in order to address their underlying problems. Not all the problems are going to be solved simply because we get classroom teachers up to a certain level.
James Wendorf, Executive Director, National Center for Learning Disabilities. Source: COTC Interview - http://www.childrenofthecode.org/interviews/wendorf.htm#InstructionalCasualities

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 Difference Between an Instructional Casualty and a Student with a Neurobiological Disability I think there is a difference between a student who is an 'instructional casualty'; in other words, a student who has not flourished in the schools, who has not had access to the right kind of teaching, a student whom the schools have failed in some way. There's a difference between that kind of student and a student with an underlying neurobiological disability. Learning disabilities are not acquired; they are there - they are life long - they are real. They can be expressed in any number of ways early on; they could appear later in a school career, even as late as high school or adulthood.
James Wendorf, Executive Director, National Center for Learning Disabilities. Source: COTC Interview - http://www.childrenofthecode.org/interviews/wendorf.htm#NeurobiologicalDeficienciesVsInstruc

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 Is English Predictable Enough for Explicit Spelling Instruction? This is a question we hear often. If English spelling were completely arbitrary, one could argue that visual memorization would be the only option. However, spelling is not arbitrary. Researchers have estimated that the spellings of nearly 50 percent of English words are predictable based on sound-letter correspondences that can be taught (e.g., the spellings of the /k/ sound in back, cook, and tract are predictable to those who have learned the rules). And another 34 percent of words are predictable except for one sound (e.g., knit, boat, and two).† If other information such as word origin and word meaning are considered, only 4 percent of English words are truly irregular and, as a result, may have to be learned visually (e.g., by using flashcards or by writing the words many times).
Joshi, M.R., Treiman, R., Carreker, S., & Moats, L.C. (2008). How words cast their spell. *American Educator, 6*(16), 42. http://www.aft.org/sites/default/files/periodicals/joshi.pdf

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 The ideal solution to any object-identification task is template matching, rather than detection of individual features (Tjan, Braje, Legge, & Kersten, 1995). However, normal human readers appear constrained to proceed by features, even for identifying simple and highly trained stimuli such as letters.
Fiset, D., Blais, C., Éthier-Majcher, C., Arguin, M., l Bub, D., & Gosselin, F. (in press). Features for identification of uppercase and lowercase letters. Psychological Science.

 New patterns may be embedded in a fresh network relatively quickly. When a network is already converged to a specific set of patterns and partially pruned, it will require many more repetitions to

"overlearn" a new—especially a contradictory—pattern. Satinover, J. (2001). The quantum brain: The search for freedom and the next generation of man. New York: Wiley.

MOST teachers do not know how to teach grammar and will have to be retrained to do so, according to the head of the National Curriculum Board. Professor Barry McGaw says most teachers under 50 are unfamiliar with how to teach formal grammar because they were not taught it as children. "Lots of teachers do not have the vocabulary or the techniques to teach grammar because they didn't learn it at school," he says. "One of the reasons people turned away from grammar then was that educators became persuaded that it was boring for kids and it did not relate clearly to the way children wrote well and in an interesting manner." Milburn, C. (2008, 24 November). Teachers 'must learn' grammar. The Age Education, p. 3.

Although neurological variables may explain why individuals with dyslexia struggle more than children without dyslexia in learning to read, the dyslexic brain may still show plasticity in response to instructional interventions. Specific language processes may normalize after short-term treatment, suggesting that if appropriate instruction is sustained, this treatment may lead to full compensation (full recovery of normal reading). Evidence for such brain plasticity in individuals with dyslexia, which is associated with differences in occipital–temporal, temporal–parietal, and frontal brain systems (e.g. Shaywitz & Shaywitz, 2003), has been reported following treatment. fMRI tasks have shown pre- to post-treatment changes in brain activation levels and patterns in frontal systems (Aylward et al., 2003; Richards et al., 2000, 2002; Temple et al., 2000, 2003; Shaywitz et al., 2004), temporal–parietal regions (Aylward et al., 2003; Eden et al., 2004; Shaywitz et al., 2004; Simos et al., 2002; Temple et al., 2003), and occipital–temporal regions (Aylward et al., 2003; Shaywitz et al., 2004). Plasticity of brain response has been observed across the life span: (a) in younger students in response to explicit phonological awareness and phonics instruction (Shaywitz et al., 2004; Simos et al., 2002), (b) in upper elementary and middle school students in response to instruction designed to increase the precision of phonological and orthographic word representations and the efficiency of the working memory architecture (Aylward et al., 2003; Richards et al., 2000, 2002), and (c) in adults in response to explicit instruction in sound and articulatory awareness and phonics training (Eden et al., 2004). Brain plasticity has also been demonstrated for normal adolescents learning non-word associations (Molfese et al., 2002) and normal adults learning a miniature visual language (McCandliss, Posner, & Given, 1997). See Richards et al. (in press) and Berninger (in press) for additional details of these studies, which varied in imaging modality, imaging tasks, age of participants, and nature of the treatment.
Richards, T., Aylward, E., Berninger, V., Field, K., Grimme, A.C., Parsons, A., Richards, A.L., Nagy, W. (2006). Individual fMRI activation in orthographic mapping and morpheme mapping after orthographic or morphological spelling treatment in child dyslexics. Journal of Neurolinguistics, **19(1),** 56–86.

Our results, based on a combined analysis of white and gray matter abnormalities, demonstrate the coexistence of local cortical changes together with irregularity of cortico-cortical connectivity, which provides exceedingly strong evidence for a combination of a disconnection syndrome and/or dysfunction of cortical areas relevant for reading and spelling as the most likely mechanism in developmental dyslexia.

German dyslexics show relatively high reading accuracy already in childhood, but are impaired in reading speed (Wimmer, Landerl, & Frith, 1999; Ziegler, Perry, Ma-Wyatt, Ladner, & Schulte-Körne, 2003).

The relations between anisotropy and speed of pseudoword reading found in this study indicate that the integrity of the white matter might directly contribute to a central aspect of reading skills in German, namely to the speed with which the graphemic code can be recoded and transformed into a phonological code. For the dyslexic group, this seems to be a plausible explanation, as cortical structures located in proximity to the two left-hemispherical fronto-temporal and temporo-parietal white matter tracts related to pseudoword reading are preferentially involved in pseudoword reading and contribute to the process of transforming orthographic into phonological information (Burton, 2001; Fiez & Petersen, 1998; Pugh et al., 2000). Therefore, the degree of myelination of axons connecting brain regions involved in spelling to sound conversions seems to affect the speed of phonological decoding in reading. So far, our study is the first DTI study which demonstrates near significant relations between reading ability of dyslexics and white matter integrity in a right hemisphere region, namely a fronto-temporal region. Although right-sided inferotemporal cortical areas become less active in skilled readers (Turkeltaub, Gareau, Flowers, Zeffiro, & Eden, 2003), neuroimaging studies have shown that reading is still associated with widespread right-hemispheric activations in adulthood (Fiez & Petersen, 1998). Moreover, dyslexics exhibit increased

activation of the right inferior frontal gyrus in pseudoword reading, which is assumed to fulfil a compensatory function (Pugh et al., 2000).

Steinbrink, C., Vogt, K., Kastrup, A., Müller, H.-P., Juengling, F.D., Kassubek, J. & Riecker. A. (2008). The contribution of white and gray matter differences to developmental dyslexia: Insights from DTI and VBM at 3.0 T. Neuropsychologia 46(13), 3170–3178.

Some alphabetic writing systems, such as English, are fairly inconsistent in the mapping between orthography and phonology. Numerous studies have shown that lower phonological consistency, which occurs when the same spelling has different pronunciations (e.g. *seat* versus *sweat*), slows reaction time of adults during lexical decision, naming, and reading tasks in the visual modality (Fiez, Balota, Raichle, & Petersen, 1999; Jared,McRae, & Seidenberg, 1990; Lacruz & Folk, 2004; Stone, Vanhoy, & VanOrden, 1997; Ziegler,Montant, & Jacobs, 1997).

Neuroimaging studies have shown that phonological consistency is associated with specific brain activity. Studies have found that adults show greater activation for lower phonological consistency words in left inferior frontal gyrus (Binder, Medler, Desai, Conant, & Liebenthal, 2005; Fiez et al., 1999; Herbster, Mintun,Nebes, & Becker, 1997; Katz et al., 2005; Peng et al., 2004; Tan, Feng, Fox, & Gao, 2001), left superior temporal cortex (Peng et al., 2004; Tan et al., 2001) and left inferior parietal cortex (Binder et al., 2005; Peng et al., 2004). Other studies not examining the phonological consistency effect have implicated posterior dorsal inferior frontal gyrus and superior temporal gyrus in phonological processing (Poldrack et al., 1999; Vigneau et al., 2006) and inferior parietal cortex in integrating orthographic and phonological representations (Booth et al., 2002, 2003). Neuroimaging studies also show that lower phonological consistency words produce greater activation in medial frontal gyrus/anterior cingulate cortex (Binder et al., 2005; Tan et al., 2001).

Finally, only one study has shown a phonological inconsistency effect in fusiform gyrus, but this was limited to low frequency words (Peng et al., 2004). Fusiform gyrus has been implicated in orthographic processing (Cohen, Jobert, Le Bihan, & Dehaene, 2004; Dehaene et al., 2004). However, patient studies suggest that the fusiform gyrus may play a critical role in the phonological consistency effect. Adult patients with damage to posterior inferior temporal cortex (BA 20, 37) have a more severe deficit with spelling lower consistency compared to higher consistency words, and most errors are phonologically plausible (Rapcsak & Beeson, 2004). In addition, a case study in 14-year-old girl with left occipital lesion showed that she was more successful at reading higher consistency than lower consistency words, with most errors involving regularization (Samuelsson, 2000).

Bolgera, D.J., Minasa, J., Burmana, D.D., & Bootha, J.R. (2008). Differential effects of orthographic and phonological consistency in cortex for children with and without reading impairment. *Neuropsychologia, 46*(14), 3210–3224.

The "bottleneck" hypothesis, originally proposed by Broadbent (1958) has been used to explain reading comprehension difficulties as they related to speed of decoding (Treisman, 1960; Deutsch & Deutsch, 1963; Perfetti & Lesgold, 1977). According to this theory word decoding processes and comprehension processes compete for a space in the short term memory. Therefore in the case of poor readers, slow and less automatic decoding creates a "bottleneck" in working memory leaving less functional capacity available to them for comprehension processes. As a result it is possible that an earlier part of a sentence may no longer be available in the working memory when the final part has been decoded and can't be integrated with the earlier part.

Broadbent, D. E. (1958). Perception and communication. New York: Pergamon. Treisman, A. M. (1960). Contextual cues in encoding listening. *Quarterly Journal of Experimental Psychology, 12,* 242-248.

Perfetti, C.,A., & Lesgold, A.M. (1977). Coding and comprehension in skilled reading and implications for reading instruction. In L.B. Resnick & P.A. Weaver (Eds.), *Theory and practice of early reading* (Vol. 1, pp 57-84). Hillsdale, NJ: Erlbaum.

Deutsch, J. A., & Deutsch, D. (1963). Attention: some theoretical considerations. *Psychological Review, 70,* 80-90

However, Mastropieri, Leinart, and Scruggs (1999), researchers with a long history in devising and evaluating metacognitive strategies, offer this timely caveat to those tempted to focus exclusively on

comprehension strategies. "However, reading programs that do not attempt directly to enhance the reading fluency of dysfluent readers cannot be considered complete – no amount of comprehension training can compensate for a slow, labored rate of reading" (p.278).

Mastropieri, M.A., Leinart, A.W., & Scruggs, T.E. (1999). Strategies to increase reading fluency. *Intervention in School and Clinic, 34*(5), 278-283, 292.

Cognitive psychology has long since reached a level of sophistication that enables it to explain why it is highly ineffective to teach higher-order skills as formal structures. This finding is the most plausible explanation for the historical paradox that national systems that stress content more than skills nonetheless inculcate these higher-order skills more effectively than systems that try to teach higher-order skills as such. To teach content *is* to teach higher-order skills; to teach higher skills explicitly is to pursue a phantom.

Hirsch, E. D. (2003, Spring). Not so grand a strategy. *Education Next,* 68-72.

Previous research has identified at least six candidate genes that appear to influence the odds of developing dyslexia, a learning difficulty which affects the development of literacy and language skills. The most likely of the candidates - implicated in at least three separate studies - is a gene called KIAA0319, which lies on chromosome six. In the latest study, the Oxford team examined the link between this haplotype and reading ability in a sample of 6,000 seven to nine-year old children taking part in a major long-term study known as the Avon Longitudinal Study of Parents and Children (ALSPAC).

BBC News http://news.bbc.co.uk/2/hi/health/7643760.stm

Taken together with the findings of the present study, it would be estimated that the prevalence of late-emerging RD is between 36% and 46%. The late emergers' lack of age appropriate growth in phonological processing after Grade 2, combined with their sharp decline in age appropriate word reading skills in Grade 4, suggests that in earlier grades, these students were reading by sight and, thus, in the average range when reading high-frequency words. With the combination of underdeveloped phonological skills and the increased complexity of word reading by Grade 4, it is plausible that this group was not able to maintain age-appropriate word reading levels in Grade 4. This explanation is consistent with Juel's (1991) argument that some children rely almost entirely on memorization of words and appear to be succeeding in learning to read for the first several years, until that strategy becomes ineffective and insufficient.

Lipka, O., Lesaux, N.K., & Siegel, L.S. (2006). Retrospective analyses of the reading development of grade 4 students with reading disabilities: Risk status and profiles over 5 years. *Journal of Learning Disabilities, 39*(4), 364-78.

The What Works Clearinghouse (Institute of Education Sciences, 2003) identified several features of intervention research designs that improve confidence in findings from research. Three of the most significant criteria identified include (a) the use of random assignment, (b) evidence of the use of a fidelity of treatment check, and (c) the use of standardized measurements. Random assignment is the most critical element of a true experimental design, providing the greatest evidence of causal effects. Five of the 19 studies that met the criteria for this synthesis used random assignment of students to treatment and comparison groups (Darch, Kim, & Johnson, 2000; Fulk, 1996; Lewis, Graves, Ashton, & Kieley, 1998; Raskind & Higgins, 1999; Torgesen et al., 2001). A fidelity of treatment check, often referred to as treatment integrity, can improve our confidence in the accuracy and consistency of an intervention's implementation (Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). Data on intervention fidelity are necessary to determine whether the intervention was implemented as intended and, therefore, whether the intended intervention is responsible for the outcomes reported. Despite differences are research design, six studies in this synthesis included evidence of fidelity of treatment in the study (Grskovic & Belfiore, 1996, Hughes, Frederick, & Keel, 2002; Keel, Slaton, & Blackhurst, 2001; Lewis et al., 1998; Morton, Heward, & Alber, 1998; Telecsan, Slaton, & Stevens, 1999). Using reliable and valid standardized measures is another important criterion that can improve confidence in study results. When measures developed by researchers are used to measure the effects of an intervention, effect sizes are often higher (Swanson & Hoskyn, 1998), thereby contributing to potentially biased effects of the intervention. Only three studies (Masterson & Crede, 1999; Raskind & Higgins, 1999; Torgesen et al., 2001) in this synthesis used standardized measures. Markedly, none of the studies included in this synthesis

incorporated all three of the best evidence criteria. Only three studies included two or more of the criteria (Lewis et al., 1998; Raskind & Higgins, 1999; Torgesen et al., 2001).

Institute of Education Sciences. (2003). What Works Clearinghouse study review standards. Retrieved from http://www.whatworks.ed.gov/

However, it would seem that rapid and accurate word identification is particularly crucial if the reader is to complete higher-level processing successfully. The result fits well with the idea that efficient and automatic word identification liberates resources for effective higher-level processing (Perfetti, 1985, 1992). Recent research on younger readers has shown that the contribution of word recognition to reading comprehension can vary widely depending on the type of comprehension test used (Cutting & Scarborough, 2006; Keenan, Betjemann & Olson, 2008). This may be because an individual's phonological representations of words become increasingly influenced by their spelling knowledge (Ehri, 1991, 2005). Once reading is well under way, both children and adults have great trouble deleting sounds from spoken words when the phoneme is not clearly marked in the orthography, such as deleting the /w/ sound in quack or the /k/ sound in fox (Castles, Holmes, Neath & Kinoshita, 2003). People also respond that there are more sounds in spoken words containing more letters, such as pitch than in words containing fewer letters, such as rich (Ehri & Wilce, 1980; Tunmer and Nesdale, 1985). In short, literate individuals find it difficult to disregard their knowledge of the spelling of spoken words when asked to make judgments on how they sound.

Holmes, V.M. (2009). Bottom-up processing and reading comprehension in experienced adult readers. Journal of Research in Reading, 32(3), 309–326.

"We suggest that the source of our effects lies in the focus of attention (and hence direction of resources), specifically the degree to which readers are focused on orthographic and phonological mappings of a word while they decode it. The semantic information provided by sentence context provides top-down support for word reading that allows readers' focus to be drawn away from word decoding. Without enough focus, readers fail to encode the appropriate orthographic and phonological information. This is true for both more skilled and less skilled readers, but it is more relevant to less skilled readers because they have a greater need to focus on letter–sound processing of new words due to their weaker decoding skills."

Landi, N., Perfetti, C.A., Bolger, D.G., Dunlap, S. & Foorman, B.R. (2006). The role of discourse context in developing word form representations: A paradoxical relation between reading and learning. *Journal of Experimental Child Psychology, 94*(2), 114-133.

Almost half of all Australians aged 15-74 years had literacy skills *below level 3*. Someone with skill level 1 may have trouble using a bus timetable or completing basic forms. People at this skill level may be able to locate some information on a medicine label; however, skill level 1 includes people who could not complete such tasks.

At skill level 2 a person may be able to complete the tasks mentioned above, but may not be able to interpret a weather map or summarise a piece of text.

At skill level 3 people may not be able to compare and contrast written information, extract information from a pamphlet or interpret pie charts. Level 3 is regarded by experts as a suitable minimum for 'coping with the increasing demands of the emerging knowledge society and information economy'. Australian Bureau of Statistics. (2008). *Adult Literacy and Life Skills Survey (ALLS 2006-2007).* Retrieved July 29, 2008, from http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Chapter6102008

These findings support the notion that following visual processing of printed stimuli (which takes place in complex visual processing areas), poor readers do not use their left temporoparietal region for phonological processing of the visual symbols, but ineffectively employ their inferior frontal and right posterior temporal cortices (Simos et al., 2005; Simos, Breier, Fletcher, Foorman, et al., 2000; Simos, Breier, Fletcher, Bergman, & Papanicolaou, 2000).

Simos, P.G., Fletcher, J.M., Sarkari, S., Billingsley-Marshall, R.L., Denton, C.A., Papanicolaou, A.C. (2007). Intensive instruction affects brain magnetic activity associated with reading fluency in children with dyslexia. Journal of Learning Disabilities, 40(1), 37-48.

"Although the role of the left occipitotemporal region in complex visual–graphemic processing is now supported by several studies, mostly with experienced readers, there are some indications that the right occipitotemporal region may play a greater role in beginning reading. This is supported by findings of

bilaterally symmetric duration of activity in this region in children as opposed to adult skilled readers (Simos et al., 2001) and, of course, by the present findings. One possible explanation is that this region operates as a complex visual processing area in beginning readers, supporting an early strategy of visual letter/word recognition (see, e.g., Ehri, 1996; Gough, 1993)."

Simos, P.G., Fletcher, J.M., Sarkari, S., Billingsley-Marshall, R.L., Denton, C.A., Papanicolaou, A.C. (2007). Intensive instruction affects brain magnetic activity associated with reading fluency in children with dyslexia. *Journal of Learning Disabilities, 40*(1), 37-48.

"One could conclude from this that … above average reading skills draw more heavily and more consistently on left hemisphere mechanisms.… Average and below-average readers, in contrast, draw more heavily on right-hemisphere skills…. Above-average readers exhibit more hemisphere differences than average readers, who, in turn, generate more hemisphere differences than below-average readers."

Molfese, D. L., Key, A.F., Kelly, S., Cunningham, N., Terrell, S., Ferguson, M., Molfese, V.J., & Bonebright, T. (2006). Below-average, average, and above-average readers engage different and similar brain regions while reading. *Journal of Learning Disabilities, 39*(4), 352-363.

Based on all the evidence we have so far, we really have very little evidence that even in deep alphabetic orthographies people rely on more visual skills, so let's say memorization of whole words, more than readers of transparent orthographies. If you look at how well things like visual memory or visual discrimination tasks correlate with word reading across languages, you certainly don't find stronger correlations, let's say with English readers than you might with Czech readers. In fact, they tend not to correlate, or only very weakly, anyway. Whereas what we do find is that when you look at the role of phonological processing, morphological processing, these language-based processes, those do correlate, and they do account for variability in people's performance. The picture might be slightly different for reading nonalphabetic systems, like Chinese, in that visual processes might play a stronger role; that's what very recent work by people like Charles Perfetti and his colleagues is showing. But, even in Chinese, the phonological component is a critical component of word recognition. Then, another issue pertains to the typical severity of impairments in dyslexia in different languages. One lay belief is that children with dyslexia learning transparent orthographies must have "smaller" or less severe difficulties than children learning deep orthographies. Well, my own work comparing Czech and English speaking children, dyslexic groups and controls, shows that within their own language context -- for example, Czech dyslexic children -- they show very large delays, relative to typical readers in their language group. However, their overall performance tends to be higher relative to English speaking children if you give them the same types of tasks -- word level decoding, word level spelling, and phonological awareness tasks, and so on. So there does seem to be some sort of additional cost that English poor readers suffer over and above whatever they would suffer if they were functioning in a transparent system. But relative to the norm in their language, the deficits of Czech and English children with dyslexia are basically equally severe. The reciprocal relationship between spelling and reading: Initially, all of their skills were bottom up, driven by phonological awareness, letter knowledge, and some kind of mapping skill. But as they became more proficient spellers they also became more proficient decoders, and then eventually it was the decoding and the word recognition skills that started to impact on their ability to complete the orthographic representations, the spellings according to English conventions.

Caravolas, M. (2008). Children of the Code interview.
http://www.childrenofthecode.org/interviews/caravolas.htm

These findings of initial parietotemporal underactivation among poor readers provide evidence against a common misconception about dyslexia. There is a persistent but incorrect belief that dyslexia is primarily caused by difficulties in the visual perception of letters, leading to confusions between letters like "p" and "d". However, such visual difficulties are the cause of dyslexia in only about 10 percent of the cases. The most common cause, accounting for more than 70 percent of dyslexia, is a difficulty in relating the visual form of a letter to its sound, which is not a straightforward process in the English language. The same parietotemporal areas of the brain that showed increased activation following instruction are centrally involved in this sound-based processing.

Carnegie Mellon University (2008, June 12). Remedial instruction can make strong readers out of poor readers, brain imaging study reveals. *ScienceDaily*. Retrieved June 18, 2008, from
http://www.sciencedaily.com/releases/2008/06/080611103900.htm

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… there is this absolute difference between learners of deep and transparent writing systems, in just the

level of performance that they reach with the orthography at a particular age. …the factor that distinguishes the transparent ones from the deep or opaque systems is the inconsistency in the mapping between letters and phonemes. The extent to which a language allows multiple correspondences from print to sound, and from sound to print, is what makes it more or less opaque, more or less ambiguous, and makes it more or less difficult to learn. June 18, 2008

Marketa Caravolas: Orthographic depth and other contributors to international differences in children's reading acquisition. Children of the Code http://www.childrenofthecode.org/updates/061808.htm

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Christine Gilbert, chief inspector of Ofsted, said it was "unacceptable" that 20 per cent of pupils still fail to master basic English and maths aged 11, while one in 10 teenagers drops out of education and work. Judd, T. (2008). A fifth of 11-year-olds have failed to learn basic English and maths. The Independent, 20/5/2008. http://www.independent.co.uk/news/education/education-news/a-fifth-of-11yearolds-have-failed-to-learn-basic-english-and-maths-831023.html

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"The evidence is pretty much overwhelming," said Prof Steve Dinham, the Australian Council for Educational Research research director for teaching, learning and leadership. "Direct instruction and explicit teaching is two to three times more effective than inquiry-based learning or problem-based learning."

Smith, B. (2008). Results back principal's return to instruction. The Age, 10 May, p.8.

Balance deficits are associated with dyslexia, but these effects are apparently more strongly related to third variables other than to reading ability. Deficits of balance may indicate increased risk of developmental disorder, but are unlikely to be uniquely associated with dyslexia.

Rochelle, K.S.H., & Talcott, J.B. (2006). Impaired balance in developmental dyslexia? A meta-analysis of the contending evidence. *Journal of Child Psychology and Psychiatry, 47*(11), 1159–1166.

"Our findings are consistent with prior research findings showing that children with lower levels of initial reading and vocabulary skill are more vulnerable to the quality and quantity of instruction they receive (Scanlon & Vellutino, 1996; Snow et al., 1998; Sweet & Snow, 2002; Vellutino et al., 2003)".

Al Otaiba, S., Connor, C., Lane, H., Kosanovich, M.L., Schatschneider, C., Dyrlund, A.K., Miller, M.S., & Wright, T.L. (2008). Reading First kindergarten classroom instruction and students' growth in phonological awareness and letter naming–decoding fluency. *Journal of School Psychology, 46*(3), 281-314.

Thus, our findings are consistent with the emerging response to intervention literature base showing that (a) weak oral language skills and impoverished home environments are common characteristics of children who do not respond to early literacy instruction (Al Otaiba & Fuchs, 2002; Torgesen, 2000; Torgesen et al., 1999 (b) children with strong oral language skills may be more able to compensate for other weaknesses in reading (phonological awareness, decoding, or comprehension) than are children with weaker skills (Connor et al., 2004; NICHD-Early Child Care Research Network, 2005; Shaywitz et al., 2003; Spira et al., 2005; Stanovich, 1980; & Stanovich, 1984).

Al Otaiba, S., Connor, C., Lane, H., Kosanovich, M.L., Schatschneider, C., Dyrlund, A.K., Miller, M.S., & Wright, T.L. (2008). Reading First kindergarten classroom instruction and students' growth in phonological awareness and letter naming–decoding fluency. Journal of School Psychology, 46(3), 281-314.

Converging research findings have demonstrated that reading trajectories, which are established early in children's school careers, are remarkably stable and therefore difficult to change (Coyne et al., 2004; Good et al., 2001; Juel, 1988; Torgesen and Burgess, 1998). … A gap between weak and strong reading achievement in these two domains (decoding & comprehension) begins early and subsequently widens over the elementary years (Allington, 2002; Cunningham and Stanovich, 1997; Stanovich, 1986), and becomes increasingly difficult to close, particularly after third grade (Fletcher & Foorman, 1994; Kennedy et al., 1986; Lyon, 1985; Spira et al., 2005).

Al Otaiba, S., Connor, C., Lane, H., Kosanovich, M.L., Schatschneider, C., Dyrlund, A.K., Miller, M.S., & Wright, T.L. (2008). Reading First kindergarten classroom instruction and students' growth in phonological awareness and letter naming–decoding fluency. Journal of School Psychology, 46(3), 281-314.

One recent study of 20 urban first grade classrooms demonstrated a reliable association between student reading fluency outcomes and observations of their teachers' implementation efficacy (Haager, Gersten,

Baker & Graves, 2003). Teacher's observation scores had moderate to good correlations with their students' growth in oral reading fluency (ranging from .49 to .62). Teachers who were rated as "effective" or "very effective" modelled strategies, taught explicitly, maximized student time on task, and provided small group individualized instruction; their students read more words correctly per min than students with ineffective teachers. In classrooms led by teachers rated as ineffective, 60–88% of children were at high risk for future reading difficulties, scoring below 18 words correct per min.

Al Otaiba, S., Connor, C., Lane, H., Kosanovich, M.L., Schatschneider, C., Dyrlund, A.K., Miller, M.S., & Wright, T.L. (2008). Reading First kindergarten classroom instruction and students' growth in phonological awareness and letter naming–decoding fluency. Journal of School Psychology, 46(3), 281-314.

The correlations of ORF with both FCAT-SSS and SAT-10 were high (rS=.70–.71) and consistent with previous findings about the relationships between oral reading fluency and reading comprehension (Good et al., 2001; Buck & Torgesen, 2003; Schilling, Carlisle, Scott, & Zeng, 2007). As expected, the relationships between the third administration (Winter 2 Assessment) for ORF and both FCAT-SSS and SAT-10 were the strongest observed correlations in both samples, corresponding to the concurrent time interval the tests were given. Thus, DIBELS is related equally well to a common measure of reading comprehension used across states as it is to a state-developed measure.

Roehrig, A.D., Petscher, Y., Nettles, S.M., Hudson, R.F., & Torgesen, J.T. (2008). Accuracy of the DIBELS Oral Reading Fluency measure for predicting third grade reading comprehension outcomes. *Journal of School Psychology, 46*(3), 343–366.

Children who had quick and accurate oral reading had shorter and more adultlike pause structures, larger pitch declinations at the end of basic declarative sentences, and larger pitch rises at the end of yes–no questions. Furthermore, children who showed larger basic declarative sentence declinations and larger pitch rises following yes–no questions tended to demonstrate greater reading comprehension skills.

Miller, J., & Schwanenflugel, P.J. (2006). Prosody of syntactically complex sentences in the oral reading of young children. Journal of Educational Psychology, 98(4), 839-853.

We did a study to classify reading problems and found that 88 percent of the children with reading problems had phonologic difficulties.

Shaywitz, S. (2003). On the mind of a child: A conversation with Sally Shaywitz. Educational Leadership, 60(7), 6-10.

CHILDREN today are no better at reading, writing and arithmetic than their parents and grandparents were, despite better technology, smaller class sizes and developments in theories of education. The research, titled *How Has School Productivity Changed in Australia?* challenges the assumption that class sizes and school funding have a strong impact on academic results. With per-child spending rising but results almost unchanged, the researchers say this represents a decline in school productivity of 13% with regard to the numeracy data, and 73% in the area of literacy. Sharp, A. (2008). Teen performance on three Rs in decline. The Age, 11 February 2008, p.3. See report at

Leigh, A & Ryan, C. (2008). How has school productivity changed in Australia? The Australian National University, Canberra. Retrieved September 12, 2008, from http://econrsss.anu.edu.au/~aleigh/pdf/SchoolProductivity.pdf

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"In terms of literacy and numeracy test scores, a 75th percentile teacher can achieve in three-quarters of a year what a 25th percentile teacher can achieve in a full year; while a 90th percentile teacher can achieve in half a year what a 10th percentile teacher can achieve in a full year" (Leigh, 2010, p.498).

Leigh, L. (2010). Estimating teacher effectiveness from two-year changes in students' test scores. (2010) *Economics of Education Review*, 29, 480–488.

" … resources alone are not the answer to improving school performance. Instead, education policy makers should rigorously evaluate the impact of new reforms and focus on raising the quality of education expenditure" (p.131).

Leigh, A., & Ryan, C. (2011). *Long-run trends in school productivity: Evidence from Australia*. Education Finance and Policy, 6(1), 105–135. Retrieved from www.andrewleigh.org/pdf/schoolproductivity.pdf

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Phonics (the method of teaching children to read and pronounce words by associating letters with the

sounds they represent) should be prescribed in a national curriculum for students in the early years of school. Professor Barry McGaw, chairman of the National Curriculum Board in:
Tomazin, F. (2008). Stop holding back top students: Curriculum chief. The Age (Education), 1 February 2008, p.3.

Abstract: International research suggests that differences in teacher performance can explain a large portion of student achievement. Yet little is known about how the quality of the Australian teaching profession has changed over time. Using consistent data on the academic aptitude of new teachers, we compare those who have entered the teaching profession in Australia over the past two decades. We find that the aptitude of new teachers has fallen considerably. Between 1983 and 2003, the average percentile rank of those entering teacher education fell from 74 to 61, while the average rank of new teachers fell from 70 to 62. We find that two factors account for much of the decline: a fall in average teacher pay (relative to other occupations) and a rise in pay differentials in non-teaching occupations.
Leigh, A & Ryan, C. (2008). How and why has teacher quality changed in Australia? Australian Economic Review, 41(2), 141-159. Available at SSRN: http://ssrn.com/abstract=1148460 or DOI: 10.2139/ssrn.10.1111/j.1467-8462.2008.00487.x

A study by Andrew Leigh and Chris Ryan at the Australian National University shows that the academic aptitude of new teachers is plummeting. Between 1983 and 2003, the average percentile rank of those entering education courses fell from 74 to 61.
Milburn, C. (2008, Feb 4). Push for trial of merit pay. The Age (Education), p.3.

"In 2006, the results needed to meet national benchmarks for students in Years 3, 5 and 7 ranged from 22 per cent to 44 per cent, with an average of less than 34 per cent. Year 3 students needed to achieve only 22 per cent for reading, 39 per cent for numeracy, and 30 per cent for writing to be classified as meeting the minimum acceptable standard."
Strutt, J. (2007). Students fail on 'three Rs' test. The West Australian, Monday 10 December.

"Almost half of Australian adults do not have the basic reading and writing skills needed for everyday living have difficulty finding information in newspapers, using a bus timetable or understanding directions on medicine labels, a new report reveals. The Australian Bureau of Statistics adult literacy and life skills survey found the worst literacy problems were in school leavers aged 15 to 19. The survey tested nearly 9000 people aged between 15 and 74 on their ability to deal with the literacy demands of everyday life. 46 - 70% of Australian adults had poor or very poor skills across one or more areas of literacy. They had not attained the level of literacy skills regarded as the minimum required to cope with modern life.
Hiatt, B. (2007). Half of Australians illiterate. The West Australian, Wednesday 28 November, p.3.

More than 50% of individuals with RD also have deficits in mathematical competence (Badian, 1983). This comorbidity has been described by some investigators as reflecting general deficits in the representation or retrieval of information from semantic memory that adversely affect reading and math acquisition, and by others as representing secondary difficulties in math for individuals with RD (Ashcroft & Battaglia, 1978; Geary, 1993; Gillis & DeFries, 1991; Muth, 1984).
Lovett, M. W., Steinbach, K. A., &. Frijters, J.C. (2000). Remediating the core deficits of developmental reading disability: A Double-Deficit perspective. *Journal of Learning Disabilities, 33*, 334-358.

Older students with reading difficulties benefit from interventions focused both at the word level and at the text level. Identifying need and intervening accordingly in the appropriate areas (e.g., vocabulary, word reading, comprehension strategies, and so on) is associated with improved outcomes for older students with reading difficulties.
Scammacca, N., Roberts, G., Vaughn. S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. K. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
http://flare.ucf.edu/Research/Interventions%20for%20Struggling%20Readers.pdf

These various data converge to indicate that the cerebral representation of letters might not be strictly visual, but might be based on a complex neural network including a sensorimotor component acquired while learning concomitantly to read and write. Close functional relationships between the reading and writing processes might occur at a basic level, in addition to the interactions that have been described at a more cognitive level (Fitzgerald & Shanahan, 2000).
Longcamp, M., Zerbato-Poudou, M.T., & Velay, J.L. (2005). The influence of writing practice on letter recognition in preschool children: A comparison between handwriting and typing. Acta Psychologia, 119,

67-79.

Research conducted over the past thirty years has provided considerable evidence to support the efficacy of direct instruction programs in primary schools. Recent meta-analyses of intervention research have found that techniques associated with direct instruction are among the most effective teaching practices for improving academic achievement, particularly for students with learning difficulties (e.g., Borman et al., 2003; Forness, Kavake, Blum & Lloyd, 1997). … There is substantial evidence relating the use of direct instruction in the development of phonemic awareness and phonological knowledge, vocabulary knowledge and word recognition (e.g., Foorman, Francis, Fletcher, Schatschneider & Mehta, 1998; Munro, 1997, 1998, 1999, 2000a,b; Rohl, 2000; Rohl & Pratt, 1995; Swanson, 1999; Wright & Jacobs, 2003). … Support also has been found for the benefit of direct instruction in the teaching of reading comprehension (e.g., Foorman et al., 1998; Gardill & Jitendra, 1999; Swanson, 1999; Gersten & Carnine, 1986; Vallecorsa & de Bettencourt, 1997).

National Inquiry into the Teaching of Literacy (2005). Teaching reading - A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties. Australian Government: Department of Education, Science and Training. Retrieved November 1, 2007, from www.dest.gov.au/nitl/documents/literature_review.pdf.

Beginning primary teachers are not confident about teaching specific aspects of literacy such as spelling, grammar and phonics.

Louden, W., Rohl, M., Gore, J., Greaves, D., Mcintosh, A., Wright, R., Siemon, D., & House, H. (2005b). Prepared to teach: An investigation into the preparation of teachers to teach literacy and numeracy. Canberra, ACT: Australian Government Department of Education, Science and Training.

Whole-language theorists recommended repeated reading of texts with young children (e.g., Holdaway, 1979). However, the research evidence from this procedure has been limited and has been confounded by the type of text that whole-language theorists recommended for this activity—predictable text. Available evidence suggests that many beginning readers may repeat the words in predictable texts but they may be overrelying on their aural memory, rather than attending to the written words (Johnston, 2000).

Hiebert, E.H., & Fisher, C.W. (2006). Fluency from the first: What works with first graders. In T. Rasinski, C.L.Z. Blachowicz, & K. Lems (Eds.), Teaching reading fluency: Meeting the needs of all readers (pp. 279-294). New York: Guilford Press.

Eye exercises have been purported to improve a wide range of conditions including vergence problems, ocular motility disorders, accommodative dysfunction, amblyopia, learning disabilities, dyslexia, asthenopia, myopia, motion sickness, sports performance, stereopsis, visual field defects, visual acuity, and general well-being. A 2005 review of 43 studies indicated that there is no clear scientific evidence published in the mainstream literature supporting the use of eye exercises … and therefore their use remains controversial.

Rawstron, J., Burley, C., & Elder, M. (2005). A systematic review of the applicability and efficacy of eye exercises. J Pediatr Ophthalmol Strabismus, 42(2), 82-8.

According to Vivien Rutter, a Springvale behavioural optometrist, behavioural optometrists believe that physiotherapy, osteopathy, Alexander Technique, Reiki, even counselling can assist with improving vision.

Robertson, J. (2007). Sunday Age 14/10/2007. P. 14

Approximately 22.9 new unique words appear per every 100 words in the 2007 copyright of an American mid first-grade textbook. In 1962, the rate in this same program was 7.4.

Hiebert, E.H., & Martin, L.A. (2008). Repetition of words: The forgotten variable in texts for beginning and struggling readers. In E.H. Hiebert & M. Sailors (Eds.), Finding the right texts for beginning and struggling readers: Research-based solutions. NY: Guilford.

A group of first graders who were administered a battery of reading tasks in a previous study were followed up as 11th graders. Ten years later, they were administered measures of exposure to print, reading comprehension, vocabulary, and general knowledge. First grade reading ability was a strong predictor of all of the 11th grade outcomes, and remained so even when measures of cognitive ability were partialled out. Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, *33*, 934-945.

The main prediction of the timing hypothesis, that disabled readers will be impaired on tasks with rapid but not slow processing demands, was not confirmed. Correspondingly, despite the evidence of deficient

phonological processing vis-à-vis reading level control children, disabled readers showed faster processing speeds than reading-level controls. Because disabled readers' slower speed of processing and poorer performance on timing measures could not be explained by specific deficit models, it is implausible that they underlie the phonological core deficit characteristic of reading disability. Chiappe, P., Stringer, R., Siegel, L. S., & Stanovich, K. E. (2002). Why the timing deficit hypothesis does not explain reading disability in adults. *Reading and Writing: An Interdisciplinary Journal*, *15*, 73-107.

Empirical work and theoretical speculation has raised the possibility that the ability to form, store, and access orthographic representations may be able to account for some of the residual variance in word recognition skills not explained by phonological factors (Barker, Torgesen, & Wagner, 1992; Cunningham & Stanovich, 1990, 1993; Stanovich & West, 1989) and that these two sources of variance contribute differentially to reading difficulties (Castles, Datta, Gayan, & Olson, 1999; Manis, Custodio, & Szeszulski, 1993; Stanovich, Siegel, & Gottardo, 1997; Treiman, 1984).
Cunningham, A. E., Perry, K., Stanovich, K. E., & Share, D. L. (2002). Orthographic learning during reading: Examining the role of self-teaching. *Journal of Experimental Child Psychology*, *82*, 185-199.

"In a position paper on reading and phonics released by the English Teachers Association of NSW in July, it suggests a child reading the sentence "The car drove along the s..... at high speed" could guess it says street because the word starts with s. If the child said road, the paper says, the teacher will "have to weigh up whether to take the student back to the word" to read it correctly. "They may NOT because they recognise that meaning is most important, that we ALL make such mistakes EVERY time we read, and that this mistake shows that the child understands what they are reading," the paper says."
Ferrari, J. (2007). Teacher failures spell student trouble. *The Australian,* 17/9.

Children from poor homes are up to 9 months behind their peers before they even get to school. This gap in achievement widens at every stage from then on, and by age 14 are as much as two years behind.
Hirsch, D. (2007). Chicken and Egg: Child Poverty and Educational Inequalities. London, UK: Campaign to End Child Poverty. Retrieved September 14, 2007, from http://www.endchildpoverty.org.uk/index.html

"… a strategic approach would be to teach ten letter-sound relations and the skill of sounding out words. When students have learned these ten sounds and the sounding-out skill, they can read 720 words made up of three sounds (e.g., cat), 4,320 words of four sounds (e.g., cram), and 21,600 words of five sounds (e.g., scram) for a total of over 25,000 words. Not all of these words would be real words, some would be pseudowords (e.g., blums), but the example illustrates the power of strategic instruction."
Becker, W. C. (1971). An empirical basis for change in education. Chicago, Ill: Science Research Associates.

The disadvantaged three-year-olds have vocabularies of about 525 words, and their advantaged peers have vocabularies of just over 1,100 words.
Hart, B., & Risley, T.R. (2003, Spring). The early catastrophe: The 30 million word gap. American Educator, p. 4-9.

"We know how reading is acquired," says Louisa Cook Moats, a protégée of Jeanne Chall's at Harvard and director of the NICHD's Early Reading Interventions project from 1997 to 2001. "It's learning to process very specific kinds of linguistic information and build networks that coordinate phonological processing to the patterns of printed symbols that the eye sees, and it's also connected to meaning and the building of vocabulary. When I explain how the process works to teachers, I compare it to an unraveled rope with the strands sticking out. The strands are all those beginning skills to be woven together in the rope." Reading looks automatic and natural, Moats explains, but only because skilled readers are practiced enough to decode the symbols at lightning speed.
Allen, C. (2007). Read it and weep: Why does Congress hate the one part of No Child Left Behind that works? Weekly Standard, 12(41), 16/7/2007. Retrieved July 12, 2007, from http://www.weeklystandard.com/Utilities/printer_preview.asp?idArticle=13850&R=1143716CE7

In a series of vocabulary tests, the three-year-old sons and daughters of graduate parents were found to be 10 months ahead of those from families with few educational qualifications; they were 12 months ahead in their understanding of colours, letters, numbers, sizes and shapes.
Carvel, J. (2007). Class divide hits learning by age of three. The Guardian 11/6/2007
http://education.guardian.co.uk/schools/story/0,,2100041,00.html

This longitudinal study of 105 economically disadvantaged children examined the relation between reading problems and internalizing behavior in 3rd- and 5th-grade assessments (8- to 12-year olds). The

variable-centered results showed that reading problems predicted change in internalizing behavior in the context of child and family predictors. The person-centered results showed that children with reading problems in both grades had higher internalizing scores in 5th grade but not in 3rd grade than children with reading problems in 3rd grade or no problems. Child-reported negative emotion experiences varied similarly across grade. The results tie reading problems to emotional distress in school and support conclusions about the direction of effects and the internalization of academic difficulty for disadvantaged children.

Ackerman, B. P., Izard, C. E., Kobak, R., Brown, E. D., & Smith, C. (2007). Relation between reading problems and internalizing behavior in school for preadolescent children from economically disadvantaged families. *Child Development, 78,* 581-596.

Only 37.5 per cent of the surveyed parents believed that students were leaving school with adequate skills in literacy. 83.5 per cent of parents highlighted 'Grammar, spelling and punctuation' as 'very important'. As with a similar survey conducted in 2003, parents saw national consistency issues as important, with the majority regarding the following issues as 'important/very important': National standards for teachers and school leaders (93.0 per cent) Standard process for recognising skills of students when they move from one State or Territory to another (88.0 per cent); Model curriculum across all States and Territories (86.1 per cent); Standard tertiary entrance requirements for VET and higher education across all States and Territories (86.2 per cent): Standard school leaving age across all States and Territories (76.3 per cent); and National eligible school starting age (68.2 per cent). Overall, parents placed more importance on these issues in 2007 than in 2003. Also, parents' views on national consistency were similar for parents of children who attended government and non-government schools.

Department of Education, Science and Training. (2007). *Parents' attitudes to schooling*. Canberra: Australian Government.http://www.dest.gov.au/NR/rdonlyres/311AA3E6-412E-4FA4-AC01-541F37070529/16736/ParentsAttitudestoSchoolingreporMay073.rtf

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Lack of ability to accurately recognize many words that occur in grade-level text (limited "sight word" vocabulary) also limits these children's reading fluency. In fact, recent research has demonstrated that the primary factor that limits struggling readers' fluency is the high proportion of words in grade-level text that they cannot recognize at a single glance (Jenkins, Fuchs, van den Broek, Espin, and Deno, 2003; Torgesen and Hudson, 2006; Torgesen, Rashotte, and Alexander, 2001). Problems with reading fluency are emerging as one of the most common and difficult to remediate traits of older struggling readers (Torgesen & Hudson, 2006). For example, a recent study of the factors associated with unsatisfactory performance on one state's third-grade reading accountability measure—a measure of comprehension of complex text—found that students reading at the lowest of five levels on the test had reading fluency scores at the 6th percentile (Schatschneider et al. 2004).

Torgesen, J., Myers, M., Schirm, A., Stuart, E., Vartivarian, S., Mansfield, W., Stancavage, F., Durno, D., Javorsky, R., & Haan, C. (2006). National Assessment of Title I Interim Report to Congress: Volume II: Closing the Reading Gap, First Year Findings from a Randomized Trial of Four Reading Interventions for Striving Readers. Washington, DC: U.S. Department of Education, Institute of Education Sciences.

Some eye-movement studies have used homophones to demonstrate that the process of sounding out words mentally begins very rapidly after a reader's gaze first fixes on a particular word. And recent brain studies show that the primary motor cortex is active during reading, presumably because it is involved with mouth movements used in reading aloud. The process of mentally sounding out words is an integral part of silent reading, even for the highly skilled.

Rayner, K., Foorman, B.R., Perfetti, C.A., Pesetsky, D., & Seidenberg, M.S. (2002, March). How should reading be taught? Scientific American, 286, 84-91.

The subvocalization process used for rehearsal is also thought to allow recoding of visually presented verbal information into a form suitable for storage, whereas auditory-verbal information is assumed to have obligatory and direct access to the phonological store.

Paulesu, E., Frith, C. D., & Frackowiak, R. S. (1993). The neural correlates of the verbal component of working memory. Nature, 362(6418), 342-345. Awh, E., Jonides, J., Smith, E. E., Schumacher, E. H., Koeppe, R. A., & Katz, S. (1996). Dissociation of storage and rehearsal in verbal working memory: Evidence from positron emission tomography. Psychological Science, 7(1), 25-31.

Lower levels of education are associated with: • Lower wages and greater financial insecurity: an early school leaver can expect to earn approximately $500,000 less in the course of their working life than

someone who completes Year 12 • Poorer mental and physical health: Victorians who do not complete secondary school are almost four times more likely to report poorer health • A higher likelihood of child abuse and neglect when early leavers become parents • Higher instances of homelessness, drug and alcohol abuse and criminal activity • Mortality rates up to nine times higher than the general population (Chapman, Weatherburn, Kapuscinski, Chilvers & Roussel, 2002; Department of Premier and Cabinet, 2005; Long, 2005; Vinson, 2004a).

Chapman, B., Weatherburn, D., Kapuscinski, C.A., Chilvers, M., & Roussel, S. (2002). Unemployment Duration, Schooling and Property Crime. Centre for Economic Policy Research. Canberra: Australia National University.

Department of Premier and Cabinet. (2005). Better outcomes for disengaged young people: Initial scoping, analysis and policy review. Long, M. (2005). How young people are faring: Key indicators 2005. Sydney: Dusseldorp Skills Forum.

Vinson, T. (2004). Community adversity and resilience: The distribution of social disadvantage in Victoria and New South Wales and the mediating role of social cohesion. Melbourne: The Ignatius Centre for Social Policy and Research, Jesuit Social Services.

Even skilled adult readers progressively lose conscious graphophonemic awareness with age, and that this does not necessarily imply that they have never had it (Scarborough, Ehri, Olson, & Fowler, 1998).

Scarborough, H.S., Ehri, L.C., Olson, R.K., & Fowler, A.E. (1998). The fate of phonemic awareness beyond the elementary school years. Scientific Studies of Reading, 2, 115–142.

Phoneme deletion (one of the two tasks used by Morais et al., 1979) has been shown to be a highly reliable and valid measure of phonemic awareness (Wood & Terrell, 1998a; Yopp, 1988)

Morais, J., & Cary, L., Alegria, J., & Bertelson, P. (1979). Does awareness of speech as a sequence of phones arise spontaneously? Cognition, 7, 323–331.

Wood, C., & Terrell, C. (1998a). Pre-school phonological awareness and subsequent literacy development. Educational Psychology, 18, 253–274.

Yopp, H.K. (1988). The validity and reliability of phonemic awareness tests. Reading Research Quarterly, 23, 159–177.

"…50 percent of the Australian community have considerable difficulty reading, 35 percent can read but not possibly turn it into value or knowledge, leaving only 17 percent fully literate…"

The Australian Bureau of Statistics study (Aspects of Literacy, Assessed Skill Level, Australia, 1996 (Cat. no. 4228.0)

By the age of 8 years the correlation between spelling ability and reading achievement is of the order of .89 to .92, suggesting a very close (but not perfect) association between the two processes (Westwood, 1973) (p. 18).

Westwood, P.S. (2005). Spelling: Approaches to teaching and assessment (2nd ed.). Camberwell, Victoria: ACER Press.

There are some things that we think of as completely obvious concepts, like the word 'word'. What can be more obvious than that? But we know this, to a large extent, because we have in our mind's eye a word written, with spaces on either side of it. But in some languages which have never been written, it turns out it's not at all always obvious what a word is.

Dr. Guy Deutscher in The Evolution of Language, Children of the Code interview, 2007.
http://www.childrenofthecode.org/interviews/deutscher.htm

Reading First focuses on core reading programs in grades K-3. There are only two programs widely acknowledged to have strong evidence of effectiveness in this area: Success for All and Direct Instruction.

Slavin, R.E. (2007). Statement of Robert E. Slavin, Director Center for Data-Driven Reform in Education. Committee on Appropriations Subcommittee on Labor, Health and Human Services, Education, and Related Activities. Hearings on Implementation of No Child Left Behind. March 14, 2007. Retrieved March 16, 2007, from http://www.ednews.org/articles/8996/1/Statement-of-Robert-E-Slavin-Director-Center-for-Data-Driven-Reform-in-Education/Page1.html

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The Premier's 10-year plan concedes that the overall performance of Victorian students in literacy lags the world's best. … The literacy revamp includes a stronger focus on phonics and phonemic awareness in the teaching of reading.

Milburn, C. (2007). Schools 'slip behind' in basics. Education, The Age, p.3 5 March 2007

The whole language movement has been a major change agent and strength in the teaching of literacy over the last few decades.

Turbill, J. (2002, February). The four ages of reading philosophy and pedagogy: A framework for examining theory and practice. *Reading Online, 5*(6). Retrieved from http://www.readingonline.org/international/inter_index.asp?HREF=turbill4/index.html

Compared with kindergarteners from families in the bottom fifth of the socioeconomic distribution (measured by a combination of parental education, occupation, and income), children from the top fifth of all families are four times more likely to have a computer in the home, have three times as many books in the home, are read to more often, watch far less television, and are more likely to visit museums or libraries (Lee and Burkam 2002).

Lee, V.E., & Burkam, D.T. (2002. Inequality at the starting gate: Social background differences in achievement as children begin school. Economic Policy Institute, Washington, DC.

"Neuroplasticity - the one thing we know about plasticity, which is the capacity to adjust and adapt, is it's greatest when the brain is immature, and it is less as the brain becomes more mature. It's never completely gone. There is plasticity in the brains of adults. So we do know that there are some functions that emerge, in terms of brain development, in critical periods. And the well described ones are in the sensory area, vision and hearing, to some extent. But there has never been demonstrated in humans a critical period for anything related to cognition or emotional development or social development.

In a sensitive period, there isn't a time when the window closes and it's too late. But what it means is that when you pass the sensitive period, it's harder for these things to develop in an adaptive way, or they may develop in a way that is not as efficient as it might be, and that you have to try to overcome later. Unlike a critical period where it's too late, missing a sensitive period means that it just gets harder as you get older, it's harder to get it right. So the messages that come out of that basic principle of brain development is that getting things right the first time is better than trying to fix them later, trying to adapt to something that was not developed in the best way at the time that it was supposed to be developed. So the sobering message here is that if children don't have the right experiences during these sensitive periods for the development of a variety of skills, including many cognitive and language capacities, that's a burden that those kids are going to carry; the sensitive period is over, and it's going to be harder for them. Their architecture is not as well developed in their brain as it would have been if they had had the right experiences during the sensitive period. That's the sobering message. But there's also a hopeful message there, which is unlike a critical period where it's too late. The sensitive period says: It's not too late to kind of try to remediate that later. And you can develop good, healthy, normal competencies in many areas, even if your earlier wiring was somewhat faulty. But it's harder. It costs more in energy costs to the brain. The brain has to work at adapting to earlier circuits that were not laid down the way they should have been. And from a society's point of view, it costs more in terms of more expensive programming, more specialized help.

Shonkoff, J.P. (2007). *The neuroscience of nurturing neurons.* Children of the Code. Retrieved March 1, 2007, from http://www.childrenofthecode.org/interviews/shonkoff.htm

On 8 February, 2007 the Federal Senate referred to the Employment, Workplace relations and Education Committee an inquiry into the quality of school education, with particular reference to processes and standards and attainments though progressive stages of schooling. The committee will also consider the adequacy of core curriculum and the standards of attainment required for higher education. The committee will report on 15 August 2007. (Department of the Senate, PO Box 6100, Parliament House, Canberra)

MEDIA RELEASE 26 August 2005: National Accreditation of Pre-Service Teacher Education Dr Gregor Ramsey, Chair of the Interim Board of the National Institute for Quality Teaching and School Leadership, announced today that work has commenced on developing a national system for the accreditation of pre-service teacher education. The Australian Council for Educational Research (ACER) is being commissioned to evaluate current policies and practices for the approval of pre-service teacher education programs in Australia, examine developments in other countries, and analyse key issues in designing a national accreditation system. "Unlike many other professions in Australia, there is no professional body accrediting teacher education at the national level," Dr Ramsey said. "A national accreditation system will provide a mechanism for the consistent appraisal of pre-service teacher education programs across Australia."

The one social factor that researchers agree is consistently linked to longer lives in every country where it has been studied is education. It is more important than race; it obliterates any effects of income. Year after year, in study after study, says Richard Hodes, director of the National Institute on Aging, education "keeps coming up." A few extra years of school is associated with extra years of life and vastly improved health decades later, in old age.

Kilata, G. (2007). A surprising secret to a long life: Stay in school. *New York Times,* January 3. Retrieved February 7, 2007, from
http://www.nytimes.com/2007/01/03/health/03aging.html?_r=1&hp=&oref=slogin&pagewanted=print

Across varying contexts, Direct Instruction, the Comer School Development Program, and Success for All have shown robust results and have shown that, in general, they can be expected to improve students' test scores. These three models stand out from other available comprehensive school reform (CSR) designs by the quantity and generalizability of their outcomes, the reliable positive effects on student achievement, and the overall quality of the evidence. … These clear, focused, and well-supported school-based models of improvement are in stark contrast to top-down direction and flexibility for educational reform.

Borman, G. (2007). Taking reform to scale. Wisconsin Center for Educational Research Retrieved February 4, 2007, from http://www.wcer.wisc.edu/

For several decades, *whole language* has been the predominant teaching approach for early literacy learning (Westwood, 1999). Essentially, the *whole language* approach reflects a constructivist philosophy in which students are viewed as inherently active, self-regulating learners who construct knowledge in developmentally appropriate ways. In the context of the classroom, students read and write self-selected whole texts in a dynamic atmosphere, with very little explicit decoding instruction (Goodman, 1986, 1989). Westwood, P. (1999). Constructivist approaches to mathematical learning: A note of caution. In D. Barwood, D. Greaves, & P. Jeffrey, *Teaching numeracy and literacy: Interventions and strategies for "at risk" students*. Coldstream, VIC: Australian Resource Educators' Association.

Rowe, K., Purdie, N., & Ellis, L. (2005). *A review of the evidence-based research literature on effective teaching and learning strategies for students with learning difficulties, especially in reading literacy. Canberra*: Australian Government Department of Education, Science and Training.

Most Australian university departments of education currently base their teacher education programs on constructivist views of teaching and learning. For example, Westwood (1999) highlighted the results of a small (N = 24) South Australian study which found that most teachers (79 percent) had been strongly encouraged to use a constructivist approach in their initial teacher-training courses and during in-service programs. Even more notably, 67 percent of the teacher trainees in this study indicated that constructivism was the *only* teaching approach to which they had been exposed in their methodological courses (Westwood, 1999). As emphasised by Westwood (2003b) At the same time as constructivist approaches have been promoted, direct teaching methods have been overtly or covertly criticised and dismissed as inappropriate, with the suggestion that they simply don't work and are dull and boring for learners. The message that most teachers appear to have absorbed is that all direct teaching is old-fashioned and should be abandoned in favour of student-centred enquiry and activity-based learning. (p. 5) Given that constructivism is currently the prevailing theoretical model of how learners come to know, it is useful to provide an overview of its basic principles together with a consideration of its appropriateness as a foundation for teaching students with learning difficulties.

Westwood, P. (1999). Constructivist approaches to mathematical learning: A note of caution. In D. Barwood, D. Greaves, & P. Jeffrey, *Teaching numeracy and literacy: Interventions and strategies for "at risk" students*. Coldstream, VIC: Australian Resource Educators' Association
Westwood, P. (2003b). *Numeracy and learning difficulties: Approaches to teaching and assessment*. Camberwell, VIC: Australian Council for Educational Research.

Betty Hart and Todd Risley observed that by age 3, children of professionals had vocabularies of about 1,100 words while children whose parents were on welfare had vocabularies of 525 words. The average IQ among the professional children was 117, and the welfare children had an average IQ of 79.

"The speed of naming pronounceable nonwords is one of the tasks that most clearly differentiates good from poor readers."
Stanovich, K.E. (2000). *Progress in understanding reading: Scientific foundations and new frontiers*. New York: Guilford Press.

In 90% of cases, the source of reading comprehension problems is poor word recognition skills (Oakhill & Garnham, 1988).

Stuart, M. (1995). Prediction and qualitative assessment of five and six-year-old children's reading: A longitudinal study. *British Journal of Educational Psychology, 65*, 287-296. Oakhill, J.V. and Garnham, A. (1988) Becoming a Skilled Reader. Oxford: Basil. Blackwell.

More suffer life-harm from illiteracy than from parental abuse, accidents, and all other childhood diseases and disorders *combined.*

Whitehurst, G. (2003). *Children of the Code interview: Evidence based education, science and the challenge of learning to read.* Retrieved January 11, 2004, from http://www.childrenofthecode.org/cotcintro.htm

True research-based instruction, confirmed by multiple sources rather than a publisher's "data," is often weighted less by district decision-makers than are publisher sales pitches, political fads, etc.
Anonymous post EducationNews.org

"Whereas first readers through the mid-1980's were exposed to 15 new words or less a week, first grades now are exposed to twice the number of new words per week -32. Through the mid-1980's, 14 of the 15 new unique words would be repeated frequently - approximately 20 times each in the first 10 passages - and only one of the new words would be a singleton. For beginning readers in Texas in 2000, 13 of the 32 new words appear only once, and another 9 occur two or three times, typically in the same passage (p.37)
Hiebert E.H. (2002) State reform policies and the task for first grade readers. Manuscript submitted for publication. http://www.textproject.org/

The proportion of variance in student achievement that is explained by student SES (poverty's power rating) tends to be lower among smaller schools than among larger schools.
Coladarci, T. (2006). School size, student achievement, and the "power rating" of poverty: Substantive finding or statistical artifact?. Education Policy Analysis Archives, 14(28). Retrieved [date] from http://epaa.asu.edu/epaa/v14n28/.

Material studied for one semester or one year will be retained adequately for perhaps a year after the last practice (Semb, Ellis, & Araujo, 1993), but most of it will be forgotten by the end of three or four years in the absence of further practice. If material is studied for three or four years, however, the learning may be retained for as long as 50 years after the last practice (Bahrick, 1984; Bahrick & Hall, 1991). There is some forgetting over the first five years, but after that, forgetting stops and the remainder will not be forgotten even if it is not practised again.

Bahrick, H. P. (1984). Semantic memory content in permastore: Fifty years of memory for Spanish learned in school. Journal of Experimental Psychology: General, 113, 1-29.
Bahrick, H. P. & Hall, L. K. (1991). Lifetime maintenance of high school mathematics content. Journal of Experimental Psychology: General, 120, 20-33.
Semb, G. B., Ellis, J. A., & Araujo, J. (1993). Long-term memory for knowledge learned in school. Journal of Educational Psychology, 85, 305-316.

Word recognition: decoding (reading) and encoding (spelling) **Most children learn to:** read fluently and automatically by using phonic knowledge of grapheme-phoneme correspondences and the skills of blending as their prime approach for decoding unfamiliar words, and thereby: build up a store of words that are instantly recognised and understood on sight segment words into their constituent phonemes and understand that spelling is the reverse of blending phonemes into words for reading".
English Primary Framework (2006) Retrieved from http://www.standards.dfes.gov.uk/primaryframeworks/literacy/learningobjectives/Strands/Wordreadingskillsandstrategi/

A lack of learning in any particular situation should first be interpreted as a result of the inappropriate or insufficient use of teaching strategy rather than an inability on the part of the learner (p. 15).
Gold, M. (1980). *"Did I say that?"* Champaign, IL: Research Press.

These children thus have an increased lifetime risk for a broad range of psychiatric disorders (Esser, Schmidt, & Woerner, 1990), and particularly depressive disorders and Posttraumatic Stress Disorder (McNulty, 2003). For example, when compared to other pupils, college students with learning disabilities were found to be nearly three times more likely to have depressive illness, and have more problems with their grades and quality of their coping skills (Arnold, 2000). Even when the consequences of learning

disabilities such as harsh self-appraisal do not merit psychiatric diagnoses, children and adults with learning disabilities can still experience diminished confidence in the efficacy of their own academic, cognitive, and occupational efforts, having internalized repeated exposure to frustration (Cummings, Maddux, & Casey, 2000). As members of the adult workforce, those with learning disabilities are more likely to experience unemployment, or underemployment, and to earn less than non-disabled adults (Cummings et al., 2000). Even among adults who possess college degrees, routine workplace demands can prove more difficult for employees with learning disabilities than for their coworkers, diminishing their productivity and value to employers (Dickenson & Verbeek, 2002).

Lange, S.M., & Thompson, B. (2006). Early identification and interventions for children at risk for learning disabilities. *International Journal of Special Education, 21*(3), 108-119. Retrieved October 19, from http://www.internationalsped.com/documents/92%20Lange.doc

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Proficient readers seem unconsciously to use initial letters plus prior knowledge and context to predict what a word might be, before focusing on more of the word or the following context to confirm or correct. This strategy seems to come naturally for many children, but others may need instructional assistance in first using the strategy consciously.

"First, have faith in children as learners." They can and usually will develop a grasp of letter/sound relationships with little direct instruction, just as they learned to talk without direct instruction in the rules of the English language.

(2) by repeatedly encouraging children to think "what would make sense here" before trying to sound out a word.

Weaver, C. (1995). Phonics in whole language classrooms. Bloomington IN: ERIC Clearinghouse on Reading English and Communication. Retrieved October 17, from http://www.ericdigests.org/1995-1/phonics.htm

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"Bishop says the PISA tests highlight serious gaps in Australian standards, with 30 per cent of Australian students failing to reach the standard of literacy that would be required to meet the demands of lifelong learning."

Livingstone, T. (2006, 14 Oct). Rating the system. The Courier Mail, p.53.

Since comparatively few young adults in OECD countries have not acquired technical reading skills, PISA does not seek to measure such things as the extent to which 15-year-old students are fluent readers or how well they spell or recognise words. In line with most contemporary views about reading literacy, PISA focuses on measuring the extent to which individuals are able to construct, expand and reflect on the meaning of what they have read in a wide range of texts common both within and beyond school (p.279).

Organisation for Economic Co-operation and Development (2004). Learning for Tomorrow's World: First Results from PISA 2003. Paris, France: Programme for International Student Assessment.

A Roy Morgan poll published yesterday found 69 per cent of Australians supported a national curriculum. States and territory governments have opposed the plan.

Bellamy, E. (2006, October 12). Undertrained maths teachers ill-equipped to inspire next generation: research. Canberra Times, p.3.

Research proves that effective reading teachers know how students learn to read (acquisition), how to teach students to read (instruction), how to judge how well students read (assessment), and how to strengthen students' reading skills (remediation).

Salvato, N. (2006). Battling the education hydra. EdNews.org. http://www.ednews.org/articles/1877/1/Battling-the-Education-Hydra/Page1.html

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"When trouble is solved before it forms, who calls that clever?" Sun Tzu

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I'm still trying to teach my kinesthetic learners how to change 1/9 into a decimal. NYC Math Teacher on blog http://instructivist.blogspot.com/2006/02/revised-whole-language-golf.html#113917806617234699

Programs for Students with Special Learning Needs – 2012
http://www.audit.vic.gov.au/reports_and_publications/latest_reports/2009/20090204_literacy_numeracy.aspx

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The effect of poor quality teaching on student outcomes is debilitating and cumulative. …The effects of quality teaching on educational outcomes are greater than those that arise from students' backgrounds. …A reliance on curriculum standards and statewide assessment strategies without paying due attention to teacher quality appears to be insufficient to gain the improvements in student outcomes sought. …The quality of teacher education and teaching appear to be more strongly related to student achievement than class sizes, overall spending levels or teacher salaries (Darling-Hammond, 2000, p. 3).
Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1). Retrieved from http://epaa.asu.edu/epaa/v8n1.

Three-quarters of employers would be put off a job candidate by poor spelling or grammar, a survey suggests. Hertfordshire University found bad English alienated 77% of the 515 companies it spoke to - more than twice the 34% annoyed by CV exaggerations.
BBC News. (2006). Bad spelling 'puts off employers'. BBC News. *Friday, August 4.* Retrieved from http://news.bbc.co.uk/1/hi/education/5243098.stm

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Judging from the results of testing released this week by Educational Assessment Australia at the University of NSW, our schools are not doing the job. On the whole, our children don't spell English as well as Mandarin-speaking children in Singapore. … These results cannot be a surprise since we stopped serious teaching of spelling, grammar and sentence construction decades ago, with the consequence that most teachers cannot analyse errors in speech and writing.
Wheeldon, J. (2006). Why teachers should be spellbound. The Australian, July 29. Retrieved, August 11, from http://www.theaustralian.news.com.au/story/0,20867,19941621-13881,00.html

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LESS than half of all Year 7 students could identify verbs or adjectives and only 7 per cent could spell "definitely" in a literacy test sat by all NSW students entering high school this year. NSW English Language and Literacy Assessment (2006) show that a majority of students have difficulty with spelling, punctuation and grammar.
Ferrari, J. (2006). Words failing Year 7 students. The Australian, Aug 11. Retrieved, August 11, from http://www.theaustralian.news.com.au/story/0,20867,20077692-13881,00.html

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In 2005, the American Institutes for Research reviewed 800 studies of student achievement and of the 22 reform models examined, Direct Instruction and Success for All received the highest rating for quality and effectiveness. http://www.csrq.org/reports.asp

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"Some people expect educational research to be like a group of engineers working on the fastest, cheapest, and safest way of traveling to Chicago, when in fact it is a bunch of people arguing about whether to go to Chicago or St. Louis." -- *Gene Glass, former president of the American Educational Research Association*
http://www.illinoisloop.org/research.html

Texas standards are not grade-level specific, most of them are noise. They can't be measured and are just a bunch of fuzzy words.
Don McLeroy. How English is taught in Texas likely to change. Houston Chronicle July 4, 2006.

These data reafirm that among preliterate children, as among nonliterate adults, explicit awareness of phonemes is not acquired spontaneously and typically depends on explicit instruction in the alphabetic code (Bentin, Hammer, & Cahan, 1991; Bentin & Leshem, 1993; Bowey, 1994; Bowey & Francis, 1991; Liberman et al., 1974; Morais et al., 1987; Wallach & Wallach, 1979). … The current study adds to a

growing body of evidence across a variety of languages that the special status of onset–rime units in children's early phonological awareness has been greatly exaggerated.

Share, D.L., & Blum, P. (2005). Syllable splitting in literate and preliterate Hebrew speakers: Onsets and rimes or bodies and codas? *Journal of Experimental Child Psychology, 92*(2), 182-202.

"In scripts where at least some phonemes have alternative spellings, spelling accuracy indexes the strength of orthographic representations (Cunningham et al., 2002, Share, 1999; 2004). However, a spelling task is conservative in relation to reading in that it requires recall rather than recognition of orthographic information (Ehri & Saltmarsh, 1996)."

Bowey, J.A., & Muller, D. (2005). Phonological recoding and rapid orthographic learning in third-grade children's silent reading: a critical test of the self-teaching hypothesis, *Journal of Experimental Child Psychology, 92*, 203–219.

These findings provide strong support for Share's (1995) self-teaching through phonological recoding hypothesis and add strength to claims regarding the central place of instruction in phonological recoding within the reading curriculum, particularly in beginners (Adams, 1990; Ehri et al., 2001).

Bowey, J.A., & Muller, D. (2005). Phonological recoding and rapid orthographic learning in third-grade children's silent reading: a critical test of the self-teaching hypothesis, *Journal of Experimental Child Psychology, 92*, 203–219.

… children's involvement in activities that led to practice in reading and writing most consistently predicted the development of emerging literacy skills, including understanding of the conventions of the English writing system. Little relation between print knowledge and the frequency of storybook reading by adults was observed. … prior to knowing how to read words, young children must closely examine the print and develop an understanding of written letters and how they encode words in the English writing system. This learning begins informally before instruction through encounters with print during the preschool years.

"Finally, the study addressed the early experiences that relate to children's understanding of written English. Sénéchal and LeFevre, 2002 and Sénéchal et al., 1998 and Evans and colleagues (2000) showed that storybook reading relates to oral language development but not to written language development. Instead, parental coaching in printing, letter names and sounds, and reading is critical to the development of written language concepts. The current study offers clear support to these ideas. It was literacy activities in which the children actively participated with and focused on print (e.g., using letters, using alphabet books and picture dictionaries, printing, reading out loud, learning letter names) that best related to all of the emerging literacy skills, including the development of visual/orthographic skills".

Levy, B.A., Gong, Z., Hessels, S., Evans, M.A., & Jared, D. (2006). Understanding print: Early reading development and the contributions of home literacy experiences. *Journal of Experimental Child Psychology, 93*(1), 63-93.

This study investigated knowledge of letter names and letter sounds, their learning, and their contributions to word recognition. … children learned more easily to associate letters with sounds than with names. … Learning sounds facilitated later learning of the same letters' names, but not vice versa. Training either on names or on sounds improved word recognition and explanation of printed words.

Levin, I., Shatil-Carmon, S., & Asif-Rave, O. (2006). Learning of letter names and sounds and their contribution to word recognition. *Journal of Experimental Child Psychology, 93*(2), 139-165.

Current cognitive theory can be used to identify a number of methods for reducing working memory loads that could readily be applied to classroom practice (Gathercole & Alloway, 2004). For example, task instructions should be short and syntactically simple and should be repeated as required. In activities such as holding a sentence in mind while writing it down, the heavy storage and processing could be reduced by keeping sentences short and redundant and by using a highly familiar vocabulary. External memory aids, such as useful spellings and number lines, should be provided for children's use where possible, and children should be encouraged to practise them under conditions of low working memory load. Tasks with complex structures could be simplified into component parts as a means of reducing the burden of

monitoring children's current place within the task. In addition, children might benefit from receiving training in self-help strategies for situations in which working memory fails.

Gathercole, S.E., Alloway, T.P., Willis, C., & Adams, A. (2006). Working memory in children with reading disabilities. *Journal of Experimental Child Psychology, 93*(3), 265-281.

The presence of significant unique associations between phonological processing skills and mathematics abilities in this sample is, however, worthy of note, and it is consistent with other evidence that skills in manipulating the phonological structure of language play an important role in both arithmetic computation skills (Hecht, Torgesen, Wagner, & Rashotte, 2001) and mathematical problem solving (Swanson & Sachse-Lee, 2001).

Gathercole, S.E., Alloway, T.P., Willis, C., & Adams, A. (2006). Working memory in children with reading disabilities. Journal of Experimental Child Psychology, 93(3), 265-281.

This prediction was made on the basis of our recent findings that children classified by their schools as having problems in both reading and mathematics had depressed performance on complex memory tasks, whereas individuals with difficulties restricted to reading did not (Pickering & Gathercole, 2004). Impairments of working memory deficits, therefore, appear to be associated with learning disabilities that extend beyond reading.

Gathercole, S.E., Alloway, T.P., Willis, C., & Adams, A. (2006). Working memory in children with reading disabilities. Journal of Experimental Child Psychology, 93(3), 265-281.

Behaviorally as well, more "effort" appears to be invested in decoding at the very first encounter with a novel string. When children read aloud the text passages in this study, the letter-by-letter sounding out and blending observed on the initial encounter with a new target would typically be replaced by a smooth uninterrupted pronunciation by the second or third exposure. … Clearly, there are also practical implications of single-trial learning. If "first impressions" are indeed the most potent, a decoding (or spelling) error on the very first attempt at a new word should be more detrimental to long-term orthographic learning than should an error committed at a later point. The common classroom practice of ignoring spelling errors in the early written products of beginning readers (when the primary focus of learning and instruction is the acquisition of the alphabetic principle and/or communicative intent) suggests that greater effort might need to be expended later to alter faulty orthographic representations created at the initial encounters with novel words.

Share, D. (2004). Orthographic learning at a glance: On the time course and developmental onset of self-teaching. *Journal of Experimental Child Psychology 87*(4), 267-298.

To acquire representations of printed words, children must attend to the written form of a word and link this form with the word's pronunciation. When words are read in context, they may be read with less attention to these features, and this can lead to poorer word form retention. Two experiments with young children (ages 5–8 years) confirmed this hypothesis. … We believe that the benefit of learning a new word form in isolation is caused by increased attention to the word's orthographic and phonological representations that is necessary for encoding. When beginning readers read words in context, they may fail to attend sufficiently to orthographic and phonological features of the words and instead rely on context to bolster their reading of unfamiliar words. Less skilled readers benefited from learning in the isolated condition to a greater extent than did more skilled readers. … young readers, while they are in the early stages of learning to read many new words, can benefit from reading that draws attention to word form and word decoding (e.g., the fingerpoint reading technique used by Ehri & Sweet, 1991). We do not, however, suggest that isolated word learning should replace learning words in stories; rather, we suggest that it should complement such learning, especially for less skilled and beginning readers.

Landi, N., Perfetti, C.A., Bolger, D.G., Dunlap, S. & Foorman, B.R. (2006). The role of discourse context in developing word form representations: A paradoxical relation between reading and learning. Journal of Experimental Child Psychology, 94(2), 114-133.

"Right posterior inferior temporal sulcus in hyperlexic reading This extra-striate region has been implicated in visual form recognition (Tanaka, 1997), and our normative developmental study revealed that children developmentally disengage this area over the course of reading acquisition (Turkeltaub et al.,

2003). Young children probably recruit these right extrastriate regions for early phases of reading, during which they use visual patterns or visual context to recognize words (e.g., a small word with a tail is "dog," a word in a red hexagonal sign is "stop") (Ehri, 1999; Frith, 1985; Hoien and Lundberg, 1988). Then, these areas are likely disengaged as children rely more on letter-to-sound correspondences and less on visual configural analysis to identify words. … the fMRI data do not support a memory-based mechanism for reading

Turkeltaub, P.E., D. L. Flowers, A. Verbalis, M. Miranda, L.Gareau & G.F. Eden (2004). The neural basis of hyperlexic reading: an fMRI case study. *Neuron, 41*, 1-20.

Most people are right-handed and have a larger temporal plane in the left hemisphere of the brain, called left asymmetry. Left-handed people are more likely to have a larger temporal plane in the right hemisphere of the brain. In right-handed children, leftward brain asymmetry was related to strong recognition of speech sounds, and rightward asymmetry was related to poor recognition of speech sounds. Left-handed children with left asymmetry were at risk for reading failure.

Eckert, M., Leonard, C., & Lombardino, L. (1998). *Brain structure may play role in children's ability to learn to read.* Paper presented at annual meeting of the Society for Neuroscience in Los Angeles on Nov. 9, 1998.

The authors confirmed a relationship between lower motor ability and poor reading performance. However, the genetic effects on motor skill and reading ability appeared to be largely or wholly distinct, suggesting that the correlation between these traits may have arisen from environmental influences. Finally, the authors found no evidence that reading disability and/or low general cognitive ability were associated with ambidexterity.

Francks, C., Fisher, S.E., Marlow, A.J., MacPhie, L., Taylor, K.E., Richardson, A.J., Stein, J.F., & Monaco, A.P. (2003). Familial and genetic effects on motor coordination, laterality, and reading-related cognition *American Journal of Psychiatry, 160*, 1970-1977.

Research in education finds that students' assessments of their performance tend to agree only moderately with those of their teachers and mentors. Students seem largely unable to assess how well or poorly they have comprehended material they have just read. They also tend to be overconfident in newly learned skills, at times because the common educational practice of massed training appears to promote rapid acquisition of skill—as well as self-confidence—but not necessarily the retention of skill. Several interventions, however, can be introduced to prompt students to evaluate their skill and learning more accurately.

Dunning, D., Heath, C., &. Suls, J.M. (2004). Flawed self-assessment: Implications for health, education, and the workplace. *Psychological Science in the Public Interest, 5*(3), 69.

Functional MRI scans have shown that the area specifically activates when people read, as opposed to recognizing other objects, such as faces or houses. And people with lesions in the region lose the ability to recognize whole words--reduced to letter-by-letter reading.

Gaillard et al. (2006). Direct intracranial fMRI and lesion evidence for the causal role of left inferotemporal cortex in reading. Neuron, 50, 191-204.

The philosophy behind the core (curriculum) is that educated people are not those who have read many books and have learned many facts, but rather those who could analyze facts if they should ever encounter any, and who could 'approach' books if it were ever necessary to do so ." … "One cannot think like a physicist, for example, without actually knowing a great deal of physics."

Nelson, C. (1990). Harvard's hollow core. The Atlantic Monthly

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"After mastering decoding, a student who reads widely can indeed, under the right circumstances, gain greater knowledge and thence better reading comprehension. But such gains will only occur if the student already knows enough to comprehend the meaning of what he or she is decoding! Many specialists estimate that a child or an adult needs to understand around 90 percent of the words in a passage in order to learn to understand the other 10 percent of the words . Moreover, it's not just the words that the student has to grasp the meaning of; it's also the kind of reality that the words are referring to. When a child doesn't

understand those word meanings and those referred-to realities, being good at sounding out words is a dead end." (p. 25) Hirsch, E.D. (2006). The knowledge deficit. Houghton Mifflin.

"Cognitive psychologists have determined that when a text is being understood, the reader (or listener) is filling in a lot of the unstated connections between the words to create an imagined situation model based on domain-specific knowledge...To understand language, whether written or spoken, we need to construct a situation model consisting of meanings construed from the explicit words of the text as well as meanings inferred or constructed from relevant background knowledge. The spoken and the unspoken taken together constitute the meaning. Without this relevant, unspoken background knowledge, we can't understand the text." (p. 38). Hirsch, E.D. (2006). The knowledge deficit. Houghton Mifflin.

"The two ideologies or philosophies that dominate in the American educational world, which tend to corrupt scientific inferences, are naturalism and formalism. Naturalism is the notion that learning can and should be natural and that any unnatural or artificial approach to school learning should be rejected or deemphasized. This point of view favors many of the methods that are currently most praised and admired in early schooling - 'hands-on learning,' 'developmentally appropriate practice,' and the natural, whole-language method of learning to read. By contrast, methods that are unnatural are usually deplored, including 'drill,' 'rote learning,' and that analytical, phonics approach to teaching early reading. We call such naturalism an ideology rather than a theory because it is more a value system (based on the European Romantic movement) than an empirically based idea. If we adopt this ideology, we know in advance that the natural is good and the artificial is bad. We don't need analysis and evidence; we are certain, quite apart from the evidence, that children's education will be more productive if it is more natural. If the data do not show this, it is because we are using the wrong kinds of data, such as scores on standardized tests. That is naturalism.

"Formalism is the ideology that what counts in education is not the learning of things but rather learning how to learn . What counts is not gaining mere facts but gaining formal skills. Along with naturalism, it shares an antipathy to mere facts and the piling up of information. The facts, it says, are always changing. Children need to learn how to understand and interpret any new facts that come along. The skills that children need to learn in school are not how to follow mindless procedures but rather to understand what lies behind the procedures so they can apply them to new situations. In reading, instead of learning a lot of factual subject matter, which is potentially infinite, the child needs to learn strategies for dealing with any texts, such as 'questioning the author,' 'classifying,' and other 'critical thinking' skills." (p. 135) Hirsch, E.D. (2006). The knowledge deficit. Houghton Mifflin.

Direct Instruction was rated as one of just two programs of 22 total reform models showing evidence of positive effects on student achievement in a study by the American Institutes for Research's Comprehensive School Reform Quality Center, funded by the U.S. Department of Education http://www.air.org/news/documents/Release200511csr.htm

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Phonological decoding made a significant unique contribution to reading comprehension for the eighth/ninth-grade group, to spelling for the fourth/fifth- and eighth/ninth-grade groups, and to the decoding rate and accuracy measures for all three groups, with only three exceptions.
Nagy, W., Berninger, V.W., & Abbott, R.D. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of Educational Psychology, 98*(1), 134-147.

Ramey and Ramey's (1998) review of the research literature in this area found that, in general, "interventions that begin earlier in development and continue longer afford greater benefits to participants than those that begin later and do not last as long" (p. 115).
Ramey, C. T. & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist*, 53, 109-120.

FSIQ accounts for 32% of the variance in reading comprehension and 8% of the variance in word recognition, whereas phonological awareness accounts for 20% and 39% of reading comprehension and

word recognition respectively. Niolon, R. (2005). Introduction to the WAIS III. Resources for students and professionals. Retrieved 20/8/2005 from www.psychpage.com

Could he be dyslexic or SEN (with special educational needs)? Not a bit of it: he is, to borrow an American acronym, ABT — ain't being taught. Ruth Miskin

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The richest 5% of Australian students were on average at least three years of schooling ahead of the bottom 5% in reading literacy. The top 25% of students are at least 1.5 years ahead of the bottom 25% in reading literacy. But the OECD test results showed countries such as South Korea, Finland and Canada have education systems that ameliorate the differences in home background.
Professor Barry McGaw, OECD Education Director in School system failing the poor, The Australian, 23/3/2006
http://www.theaustralian.news.com.au/common/story_page/0,5744,18571007%5E13881,00.html

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' one only has to scratch the surface of any criterion-referenced assessment system in order to find a norm-referenced set of assumptions lying underneath
Angoff, W. H. (1974). Criterion-referencing, norm-referencing and the SAT. College Board Review, 92, 2-5)

Error analyses indicated links between teachers' patterns of word structure knowledge and children's patterns of word decoding progress. The study suggests that word structure knowledge is important to effective teaching of word decoding and underscores the need to include this information in teacher preparation (p.332).
Spear-Swerling, L., & Brucker, P.O. (2004). Preparing novice teachers to develop basic reading and spelling skills in children. *Annals of Dyslexia, 54*(2), 332-364.

Learning disabled students who are performing below the 10th percentile on measures of reading, written expression, and math in elementary school demonstrate a leveling off at about 4th to 5th grade level, creating a considerable gap by the time they reach high school. Schumaker, J.B., & Deschler, D.D. (1988). Implementing regular education initiative in secondary schools: A different ballgame. Reading & Writing: An Interdisciplinary Journal, 8, 267-294.

More research on the phenomenon of letter reversals is needed, especially when it occurs in children beyond first grade.
Badian, N.A. (2005). Does a visual-orthographic deficit contribute to reading disability? Annals of Dyslexia, 55(1), 28-52.

"Many students have difficulty not just in structuring a sentence, but in structuring paragraphs or essays as a whole," the report says. "They seem to have had very little experience of writing. In consequence, their essays are often incoherent not only at the level of the sentence but also in their overall argument. Absent, in many cases, is any sense of confident fluency, of knowing how to mount an argument, how to articulate it with clarity and consistency and how to see it through to a decent conclusion." The Royal Literary Fund study (2006) reported in http://telegraph.co.uk/news/main.jhtml?xml=/news/2006/03/12/nwriting12.xml

Literacy And Behavior Poor literacy achievement in the first and third grades predicted relatively high aggressive behavior in the third and fifth grades, respectively.

Behavior problems were more strongly associated with reading achievement than with mathematics achievement in a sample of children in early elementary school (Adams, Snowling, Hennessy, & Kind, 1999).

Poor readers who were also identified as having behavioral problems in childhood were much more likely to drop out of school and to have unstable work patterns, low job skills, and delinquent behavior in adulthood than children with either behavior problems or poor reading skills in childhood (Maughan, Gray, & Rutter, 1985).

Academic skills could, however, also affect children's behavior. Children who have difficulty learning to read, for example, may become frustrated or unhappy in school and express their frustration and unhappiness by acting aggressively toward the teacher or classmates. This proposal is based on the basic notion that frustration (defined as the state that emerges when circumstances interfere with a goal response) leads to aggression (Dollard, Doob, Miller, Mowrer, & Sears, 1939). Berkowitz (1968) expanded the theory beyond simple frustration to posit that aggression can be the consequence of any unpleasant emotions and feelings, such as anxiety, anger, annoyance, or pain. This negative affect can trigger either "fight or flight." The theory has been tested in a variety of social psychological studies. Buss (1963), for example, had college students experience one of three types of frustration (failure to win money, failure to earn a better grade, or failure on a task). All three groups showed more subsequent aggression than a control group that was not frustrated. In another study, Berkowitz (1978) found that subjects who were frustrated by not being able to keep up with a confederate in a stationary bicycle competition (when the confederate's pedaling suddenly picked up speed) were more likely to punish their partners in a subsequent learning task than nonfrustrated subjects.

The negative effect of poor reading skills on children's behavior is likely to increase over the elementary grades for several reasons. Research on social comparison indicates that as children get older, they become more aware of their performance compared with peers and assess their relative skills more accurately (see Eccles, Midgley, & Adler, 1984, and Stipek & Mac Iver, 1989, for reviews; Wigfield et al., 1997). As a consequence, poor skills should become more humiliating and a greater cause of anxiety and other negative emotions. Previous studies suggest that social comparison, particularly for the purposes of self-assessment of academic achievement, is well developed by the third grade (Frey & Ruble, 1985; Pomerantz, Ruble, Frey, & Greulich, 1995). Accordingly, we predicted that the association between literacy skills and aggression would be higher in the third and fifth grades than in the earlier grades. Studies have likewise found that poor academic skills predicted later aggression. For example, in a study of Australian children, Jorm, Share, Matthews, and Maclean (1986) found no differences in children's antisocial behavior in kindergarten as a function of reading skills, but the children with reading difficulties were significantly more antisocial than the normal readers by the end of grade 1 and in grade 2. Williams and McGee (1994) similarly found that boys with reading disabilities at age 9 were more likely to develop conduct disorder at age 15. McGee et al. (1986) found that children who were having considerable difficulty learning to read at the beginning of school already showed behavior problems; behavior problems increased from ages 5 to 9 at a much faster pace for children who had serious reading difficulties than for other children. In a longitudinal study of African American boys, IQ measured at age 7 (which was presumably associated with academic achievement) was a stronger predictor of conduct disorder at age 17 than was either aggression or parent psychopathology at age 7 (Schonfeld, Shaffer, O'Connor, & Portnoy, 1988).

Miles, S.B., & Stipek, D. (2006). Contemporaneous and longitudinal associations between social behavior and literacy achievement in a sample of low-income elementary school children. Child Development, 77(1), 103-117.

There is a robust association between reading achievement and antisocial behavior. This association was investigated using the Environmental Risk (E-Risk) Longitudinal Twin Study, a nationally representative 1994–1995 birth cohort of 5- and 7-year-olds. For boys the best explanation was a reciprocal causation model: poor reading led to antisocial behavior, and vice versa.

Trzesniewski, K.H., Moffitt, T.E., Caspi, A., Taylor, A., & Maughan, B. (2006). Revisiting the association between reading achievement and antisocial behavior: New evidence of an environmental explanation from a twin study. *Child Development*, 77(1), 72-88.

"Material read by high school students contain over 100,000 words (Nagy & Anderson, 1984). There is no way to teach that many. …Extensive independent reading is the primary means for increasing vocabulary knowledge (Nagy, 1998). Students who read more learn more about words and their meanings. Although direct, explicit teaching of word meanings is effective and important, it cannot produce the needed growth in students' vocabulary knowledge that should occur in the fourth grade".

Nagy, W. (1998). Increasing students' reading vocabularies. Presentation at the Commissioner's Reading Day Conference, Austin, Texas.

The plural of anecdote is not data. Alison Clarke, *Crikey Daily - 9 December 2005*
http://www.crikey.com.au/articles/2005/12/09-0919-61.html

This NIEER study of high-quality prekindergarten programs in five states reveals significant improvement in children's early language, literacy and mathematical development, improvement far greater than found in a recent national study of the federal Head Start program. Children who attended state-funded preschool showed gains in vocabulary scores that were about 31 percent greater than gains of children without the program. This translates into an additional three months of progress in vocabulary growth due to the preschool program at age 4. This outcome is particularly important because the measure is strongly predictive of general cognitive abilities and later reading success, the researchers said. State-funded preschool increased children's gains in math skills by 44 percent compared to children's growth without the program. Skills tested included basic number concepts, simple addition and subtraction, telling time and counting money. State-funded preschool produced an 85 percent increase in growth in print awareness (knew more letters, more letter-sound associations, more familiar with words and book concepts) among children enrolled compared to growth of children without the program. Children who attended a state-funded preschool program before entering kindergarten.

Hot Topic: The effects of state prekindergarten programs on young children's school readiness in five states National Institute for Early Education Research By W. Steven Barnett, Cynthia Lamy and Kwanghee Jung December 2005 http://nieer.org/docs/index.php?DocID=129

There may be rhetoric about the socially constructed nature of Western science, but wherever it matters there are no satellites based on feminist alternatives to quantum theory. Even that great public sceptic about the value of science, Prince Charles, never flies a helicopter burning homeopathically diluted petrol, that is, water with only a memory of benzine molecules, maintained by a schedule derived from reading tea leaves, and navigated by a crystal ball. (p. 196)

Blackburn, S. (2005). Truth: A guide. New York: Oxford University Press.

Australia, Dec 2005. Recommendations of the Nelson Enquiry into the teaching of literacy 1. The Committee recommends that teachers be equipped with teaching strategies based on findings from rigorous, evidence-based research that are shown to be effective in enhancing the literacy development of all children.

2. The Committee recommends that teachers provide systematic, direct and explicit phonics instruction so that children master the essential alphabetic code-breaking skills required for foundational reading proficiency. Equally, that teachers provide an integrated approach to reading that supports the development of oral language, vocabulary, grammar, reading fluency, comprehension and the literacies of new technologies.

3. The Committee recommends that literacy teaching continue throughout schooling (K-12) in all areas of the curriculum. Literacy must be the responsibility of all teachers across the curriculum, to provide an educationally sound program meeting the specific skill and knowledge needs of individual children from diverse backgrounds and locations.

4. The Committee recommends that programs, guides, and workshops be provided for parents and carers to support their children's literacy development. These should acknowledge and build on the language and literacy that children learn in their homes and communities.

5. The Committee recommends that all education authorities and school leaders examine their approaches to the teaching of literacy and put in place an explicit, whole-school literacy planning, monitoring and reviewing process in collaboration with school communities and parents.

6. The Committee recommends that all schools identify a highly trained specialist literacy teacher with specialised skills in teaching reading, to be responsible for linking the whole-school literacy planning process with classroom teaching and learning, and supporting school staff in developing, implementing and monitoring progress against individual literacy plans particularly for those children experiencing reading and literacy difficulties.

7. The Committee recommends that specialist postgraduate studies in literacy (especially in teaching reading) be provided by universities to support the skill base and knowledge of teachers, including the specialist literacy teachers.

8. The Committee recommends that the National Institute for Quality Teaching and School Leadership (NIQTSL), in consultation with relevant professional associations, employers from government, Catholic and independent school authorities, together with the State and Territory Institutes for Teaching, develop and implement national standards for literacy teaching, initial teacher registration, and for accomplished teaching, consistent with evidence-based guides for practice. It is further recommended that these standards form a basis for the accreditation of teacher preparation courses.

9. The Committee recommends that the teaching of literacy throughout schooling be informed by comprehensive, diagnostic and developmentally appropriate assessments of every child, mapped on common scales. Further, it is recommended that: • nationally consistent assessments on-entry to school be undertaken for every child, including regular monitoring of decoding skills and word reading accuracy using objective testing of specific skills, and that these link to future • education authorities and schools be responsible for the measurement of individual progress in literacy by regularly monitoring the development of each child and reporting progress twice each year for the first three years of schooling; and • the Years 3, 5, 7 and 9 national literacy testing program be refocused to make available diagnostic information on individual student performance, to assist teachers to plan for the most effective teaching strategies.

10. The Committee recommends that a confidential mechanism such as a unique student identifier be established to enable information on an individual child's performance to follow the child regardless of location, and to monitor a child's progress throughout schooling and across assessment occasions.

11. The Committee recommends that the key objective of primary teacher education courses be to prepare student teachers to teach reading, and that the content of coursework in primary literacy education focus on contemporary understandings of: • evidence-based findings and an integrated approach to the teaching of reading, including instruction on how to teach phonemic awareness, phonics, fluency, vocabulary knowledge • child and adolescent development; and • inclusive approaches to literacy teaching.

12. The Committee recommends that literacy teaching within subject areas be included in the coursework of secondary teachers so that they are well prepared to continue the literacy development of their students throughout secondary schooling in all areas of the curriculum

13. The Committee recommends that significant national 'lighthouse' projects in teacher preparation and education be established to link theory and practice that effectively prepare pre-service teachers to teach literacy, and especially reading, to diverse groups of children.

14. The Committee recommends that the conditions for teacher registration of all primary and secondary graduates include a demonstrated command of personal literacy skills necessary for effective teaching, and a demonstrated ability to teach literacy within the framework of their employment/teaching program.

15. The Committee recommends that schools and employing authorities, working with appropriate professional organisations and higher education institutions, provide all teachers with appropriate induction and mentoring throughout their careers, and with on-going opportunities for evidence-based professional learning about effective literacy teaching.

16. The Committee recommends that a national program of literacy • design a series of evidence-based teacher professional learning programs focused on effective classroom teaching, and later interventions for those children experiencing reading • produce a series of evidence-based guides for effective teaching practice, the first of which should be on reading; • evaluate the effectiveness of approaches to early literacy teaching (especially for early reading) and professional learning programs • investigate ways of integrating the literacies of information and communication technologies with traditional literacies in the classroom•

establish networks of literacy/reading specialist practitioners to facilitate the application of research to practice; and • promote research into the most effective teaching practices to be used when preparing pre-service teachers to teach reading.

17. The Committee recommends that Australian and State and Territory governments' approaches to literacy improvement be aligned to achieve improved outcomes for all Australian children.

18. The Committee recommends that the Australian Government, together with State and Territory government and non-government education authorities, jointly support the proposed national program for literacy action.

19. The Australian Government Minister for Education, Science and Training raise these recommendations as issues for attention and action by MCEETYA, and other bodies, agencies and authorities, that will have responsibility to take account of, and implement the recommendations.

20. Progress in implementing these recommendations, and on the state of literacy in Australia, be reviewed and reported every two years.

National Inquiry into the Teaching of Literacy (2005). Teaching reading - A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties. *Australian Government: Department of Education, Science and Training*. Retrieved November 1, 2007, from www.dest.gov.au/nitl/documents/literature_review.pdf.

English vowels are misread twice as frequently as consonants (Fowler, Liberman, & Shankweiler, 1977). Fowler, C. A., Liberman, l. Y., & Shankweiler, D. (1977). On interpreting the error pattern of the beginning reader. *Language and Speech, 20,* 162-173.

80% of all words readers encounter have one or more affixes (Cunningham, 1998). Cunningham, P. M. (1998). The multisyllabic word dilemma: Helping students build meaning, spell, and read "big" words. *Reading and Writing Quarterly: Overcoming Learning Difficulties,* 14, 189-218.

"My statistical tabulation of the graphemes of /u/[(zoo)] has provide clear evidence for the chaotic graphemic abundance representing just this single phoneme. The phoneme-grapheme correspondences for English orthography are reflected in the following statistics: 40 phonemes represented by 1120 graphemes which occur in common words -- 882 of them in first-pronunciation variants" (Nyikos, 1988, p. 159). …. But there is no need to expose ANY student at ANY age to ANY of those words until a basic code and the alphabetic principle is well established. Nyikos, J. (1988). A linguistic perspective of functional literacy. *The fourteenth Lacus forum 1987*. Lake Bluff, Ill: S. Embleton.

Thouless Law of Certainty: "If statements are made again and again in a confident manner, then their hearers will tend to believe them quite independently of their soundness and of the presence or absence of evidence for their truth." Thouless, R.H. (1953). Straight and crooked thinking. London: Pan Books.

"For example, Direct Instruction (DI), a behaviorally oriented teaching procedure based on an explicit step-by-step strategy (ES=.93) is six-and-one-half times more effective than the intuitively appealing modality matched instruction (ES=.14) that attempts to capitalize on learning style differences. Students with Specific Learning Disabilities who are instructed with DI would be better off than 87% of students not receiving DI and would gain over 11 months credit on an achievement measure compared to about one month for modality-matched instruction." Kavale K. (2005). Effective intervention for students with specific learning disability: The nature of special education. *Learning Disabilities*, *13*(4), 127-138.

Occurrences of oral reading errors, regardless of their effect on text meaning, were negatively related to comprehension … Speed of oral reading measured as words per minute for the entire passage was positively related to comprehension as measured by average score on the main NAEP assessment. Daane, M.C., Campbell, J.R., Grigg, W.S., Goodman, M.J., and Oranje, A. (2005). Fourth-Grade Students Reading Aloud: NAEP 2002 Special Study of Oral Reading (NCES 2006-469). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Washington, DC: Government Printing Office. Retrieved 5/11/2005 from

http://nces.ed.gov/nationsreportcard/pdf/studies/2006469.pdf

" ...if you think you know the truth without having to collect any data, that saves a lot of time" (Stanovich, 2000, p. 382).
Stanovich, K. E. (2000). Progress in understanding reading: Scientific foundations and new frontiers. New York: Guilford Press.

"Understanding more often than not follows doing rather than precedes it. If I'm going to teach you how to drive, I don't lecture you on the theory of the internal-combustion engine. I get you behind the wheel of the car and drive around the block." *John Saxon,* author of the Saxon Math books. Wave Publications "Where's the Evidence" Series Nov. 1995
http://www.robinsoncurriculum.com/view/rc/s31p655.htm#Message3339

"Teachers' effectiveness appears strongly related to the preparation they have received for teaching".
Darling-Hammond, L., Holtzman, D. J., Gatlin, S. J., & Heilig, J. V. (2005, October 12). Does teacher preparation matter? Evidence about teacher certification, Teach for America, and teacher effectiveness. Education Policy Analysis Archives, 13(42). Retrieved [date] from http://epaa.asu.edu/epaa/v13n42/

"The collective results of our studies suggest that improvements in language abilities after FFW training did not result from changes in temporal processing. It is possible that similar improvements in language may be obtained from a variety of interventions that are presented on an intensive schedule, that focus the child's auditory and visual attention, that present multiple trials that vary task complexity as a function of response accuracy, and that reward progress." Looking back: A summary of five exploratory studies of Fast ForWord Ronald B. Gillam, Diane Frome Loeb, Sandy Friel-Patti
http://professional.asha.org/continuing_ed/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=13678

"The most common type of reading problem for students with reading disabilities, or dyslexia, is their inability to accurately and fluently identify printed words" (p. 47)
Arbor, N. P. (2002). The relationship of phonemic awareness and rapid naming to reading development. *Learning Disabilities Quarterly, 25*, 47-57.

"To understand almost all speech that is intended for us, say the experts, the speech must be at least 15 decibels louder than other interfering sounds. Most classrooms exceed this level by 10 times".
Milstone, C. (2005). *Classroom acoustics - Sometimes the answer to 'are you listening?' is 'I can't'.* Canadian Language and Literacy Research Network. Retrieved 20/9/2005 from http://www.cllrnet.ca/

"Halfon, Schulman & Hochstein (2001) acknowledge that brain development is the result of a complex interaction between nature and nurture and have presented a number of key findings that have "important implications for parenting, policy makers and efforts to support optimal brain development during early childhood" especially the finding that "a child's brain is changed by experience" (p. 2). Whereas brain centres that control critical survival functions such as breathing and heart rate are already sophisticated before birth, higher cortical functions that have to do with learning and memory are sculpted and modified by experience" (Halfon et al., 2001 p. 4). Gottlieb, Wahlsten and Lickliter (1998) similarly describe the brain as a "plastic self organising organ which develops and maintains nerve connections that are based on experiential demands and are not strictly predetermined". Learning is thus viewed as the process by which the brain responds adaptively to the environment in which a child is reared. Halfon et al (2001) describe the use dependent manner in which experiences that stimulate activity in particular regions of the brain facilitate the growth of connections in those regions".
Gottlieb, G., Wahlsten, D., & Lickhter, R. (1998). The significance of biology for human development: A developmental psychobiological systems view. In W. Damon (Series Ed.) and R. Lerner (Vol. Ed.) Handbook of Child Psychology: Vol 1. Theoretical models of human development (pp. 233-273). New York: Wiley.
Halfon, N., Schulman, E., & Hochstein, M. (2001). Brain development in early childhood. In N. Halfon, E, Schulman, & M. Hochstein (Ed.), Building community systems for young children (pp. 1-24). UCLA Center for Healthier Children Families and Communities.

One of the "The Nation's Report Cards" shows how U.S. students are doing in math and reading over time, starting from when the test was first administered in 1969. The latest results show some positive signs! The average reading score was higher in 2004 than in any previous year; the gender gap between boys and girls was smaller in 2004 than in 1971; the gap between African American and White students

decreased from 44 points in 1971 to 26 points in 2004; and the gap between Hispanic and White students decreased from 34 points in 1975 to 21 points in 2004. **Nine-year-olds**. The average reading score was higher in 2004 than in any previous assessment year. **Thirteen-year-olds**. The average score in 2004 was higher than the average score in 1971, but no difference from the average score in 1999 was found. **Seventeen-year-olds**. There was no statistically significant difference between average scores in 1999 and 2004.

National Center for Education Statistics (2005). National Assessment of Educational Progress. Washington, DC: Institute of Education Sciences, U.S. Dept. of Education. Retrieved 14/9/2005 from http://nces.ed.gov/nationsreportcard/ltt/results2004/nat-reading-scalescore.asp

"First-grade students' growth in oral reading fluency (ORF) was predicted by their kindergarten letter-naming and letter-sound fluency using growth curve analysis. Both skills significantly predicted first-grade reading growth. Students who made limited growth in first-grade ORF produced only eight letter names per minute in kindergarten."

Stage, S.A., Sheppard, J., Davidson, M.M., & Browning, M.M. (2001). Prediction of first-graders' growth in oral reading fluency using kindergarten letter fluency. Journal of School Psychology, 9(3), 225-237.

"(a) fluency instruction is generally effective, although it is unclear whether this is because of specific instructional features or because it involves children in reading increased amounts of text; (b) assisted approaches seem to be more effective than unassisted approaches; (c) repetitive approaches do not seem to hold a clear advantage over nonrepetitive approaches; and (d) effective fluency instruction moves beyond automatic word recognition to include rhythm and expression, or what linguists refer to as the prosodic features of language."

Kuhn, M.R., & Stahl, S.A. (2003). Fluency: A review of developmental and remedial practices. Journal of Educational Psychology, 95(1), 3-21.

2005

"Eckert et al. (2003) report on the basis of MRI scans of dyslexic and control children, that rapid digit and digit-letter naming was specifically associated with reduced right cerebellar anterior lobe and left and right pars triangularis."

Eckert, M. A., Leonard, C. M., Richards, T. L., Aylward, E. H., Thomson, J., & Berninger, V. W. (2003). Anatomical correlates of dyslexia: Frontal and cerebellar findings. *Brain, 126*, 482–494.

"The strongest single predictor of reading accuracy and comprehension was nonsense word reading. For reading rate, the strongest predictor was digit naming speed and vocabulary but picture naming speed was a very modest predictor of reading rate."

"Rapid alphanumeric naming is a highly specific predictor of reading rate. Rapid digit naming and phonological processing are distinct contributors to different aspects of reading in poor readers."

Savage, R., & Frederickson, N. (2005). Evidence of a highly specific relationship between rapid automatic naming of digits and text-reading speed. *Brain and Language, 93*, 152–159.

"Many children suffer adverse social and emotional outcomes, are at risk of mental health problems, and have a higher likelihood of delinquency and becoming part of the prison population (Brown, 1997; Jensen, Lindgren, Meurling, Ingvar & Levander, 1999)".

Brown, P. (1997). Co-existence of behavioural problems and literacy problems in young male schoolchildren: some issues for consideration. *The Weaver: A Forum for New Ideas in Education,* (1), Retrieved 23/8/2005 from http://www.latrobe.edu.au/www/graded/PBed1.html

Jensen, J., Lindgren, M., Meurling, A.W., Ingvar, D.H., & Levander, S. (1999). Dyslexia among Swedish prison inmates in relation to neuropsychology and personality. Journal of the International Neuropsychological Society, 5, 452-61.

Steven Strauss (The Linguistics, Neurology and Politics of Phonics). 'Can a group of 70,000 teachers and educators who have spent decades studying and debating all the complex issues in reading be converted overnight to an intensive phonics position? In the history of science, there is no precedent for such rapid change, even in the presence of overwhelmingly compelling empirical evidence. It takes time for professionals to restudy, redebate and digest. So, insofar as the classroom teaching of intensive phonics cannot be guaranteed by the internal conviction of teachers, it must, according to the government, be elicited by the external coercion of the state.'

In June 2005, the National Comorbidity Survey Replication study (supported by the National Institute of

Mental Health and by health research foundations and pharmaceutical companies) reported findings from a retrospective study of the prevalence and severity of specific mental disorders of children and youth. The investigators conclude that: "About half of Americans will meet the criteria for a DSM-IV disorder sometime in their life, with first onset usually in childhood or adolescence.
http://smhp.psych.ucla.edu/pdfdocs/prevalence/youthMH.pdf

"Policy makers generally take little notice of most of the research that is produced and teachers take even less notice of it … He said the system should be overhauled to focus on greater relevance and an evidence-based approach to research, covering areas such as how to improve student learning and teacher skills. Professor Peter Cuttance, director of Melbourne University's Centre for Applied Educational Research, *Education research 'irrelevant'* in The Age, p.5, 2/7/2005

Almost half of parents do not read to their children daily. Two-thirds blamed a lack of time for preventing them from reading more to their child. Thirty-three per cent of parents with toddlers read for an average of 10 minutes or less a day to their child. Dymocks Literacy Foundation

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Twenty children with mental retardation (MR), age 7-12, completed a phonological reading skills program over approximately 10 weeks. As a result of the instruction, they were better able to sound out learned and transfer words compared to a control group matched on age, IQ, nonword reading, language comprehension, and phonemic awareness. Final sounding out was predicted by beginning reading skill in both groups, by phonemic awareness and articulation speed in the control group only, and by general language ability in the instruction group only. Neither IQ nor verbal working memory correlated significantly with final sounding out ability in either group. It is suggested that the instruction succeeded in compensating for weaknesses in phonemic awareness and speech articulation, but favored those who had better language skills.
Conners, F.A., Rosenquist, C.J., Sligh, A.C., Atwell, J.A., & Kiser, T. (in press). Phonological reading skills acquisition by children with mental retardation. Research in Developmental Disabilities.

Background: A longitudinal study investigated the cognitive skills and scholastic attainments at 8 years of age of children selected on the basis of poor phonological loop skills at 5 years. Methods: Children with low and average performance at 5 years were tested three years later on measures of working memory, phonological awareness, vocabulary, language, reading, and number skill. Results: Two subgroups of children with poor early performance on phonological memory tests were identified. In one subgroup, the poor phonological memory skills persisted at 8 years. These children performed at comparable levels to the control group on measures of vocabulary, language and mathematics. They scored more poorly on literacy assessments, but this deficit was associated with group differences in complex memory span and phonological awareness performance. The second subgroup of children performed more highly on phonological memory tests at 8 years, but had enduring deficits in language assessments from 4 to 8 years. Conclusions: Persistently poor phonological memory skills do not appear to significantly constrain the acquisition of language, mathematics or number skills over the early school years. More general working memory skills do, however, appear to be crucial.
Gathercole, S.E., Tiffany, C., Briscoe, J., & Thorn, A. (2005). Developmental consequences of poor phonological short-term memory function in childhood: a longitudinal study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 46*, 598-611.

The findings of both the qualitative and quantitative analyses suggest that policy investments in the quality of teachers may be related to improvements in student performance. Quantitative analyses indicate that measures of teacher preparation and certification are by far the strongest correlates of student achievement in reading and mathematics, both before and after controlling for student poverty and language status.
Darling-Hammond, L. (2000) Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1). Retrieved 20/6/2005 from http://epaa.asu.edu/epaa/v8n1/

"The authors also found that the duration and intensity of interventions was also related to positive effect sizes—the more intensive intervention had greater impact. Programs that were short, but intense, had greater effect than longer, less-intense interventions."
Elbaum, B., Vaughn, S., Hughes, M. T., Moody, S. W. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of Educational Psychology*, 92, 605–619.

"Raskind and Wijsman said they used three different analytic approaches to search for genetic influences affecting how fast and accurately people could pronounce nonwords. For accuracy alone, they found five different potential contributing locations on four different chromosomes. When they examined influences on speed and accuracy, they found three other locations on different chromosomes. However, the signal from chromosome 2 was the most robust, particularly when the researchers only looked at speed and not accuracy in decoding. They said evidence points to a possible combination of genes on chromosomes 2, 10 and 11 affecting speed".

Raskind, W.H., Igo, R., Jr., Chapman, N.H., Berninger, V.W., Matsushita, M., Brkanac, Z., Holzman, T., Brown, M., Thomson, J., & Wijsman, E.M. (in press). A genome scan in multigenerational families with dyslexia: Identification of a novel locus on chromosome 2q that contributes to phonological decoding efficiency. *Molecular Psychiatry.*

"We function as advocates for the children, with the understanding that if we fail, the children will be seriously pre-empted from doing things with their lives, such as having important career options and achieving some potential values for society.

We should respond to inadequate teaching as we would to problems of physical abuse. Just as our sense of humanity would not permit us to allow child abuse in the physical sense, we should not tolerate it in the cognitive setting. We should be intolerant, because we KNOW what can be achieved if children are taught appropriately. We know that the intellectual crippling of children is caused overwhelmingly by faulty instruction -- not by faulty children.

Because of these convictions, we have little tolerance for traditional educational establishments. We feel that they must be changed so they achieve the goals of actually HELPING ALL CHILDREN.

This call for humanity can be expressed on two levels. On that of society: Let's stop wasting incredible human potential through unenlightened practices and theories. On the level of children: Let's recognize the incredible potential for being intelligent and creative possessed by even the least impressive children, and with unyielding passion, let's pursue the goal of assuring that this potential becomes reality" (p.376). Engelmann, S., & Carnine, D. (1982). Theory of instruction.

Results from a recent Boston study of the effects teachers have on learning are fairly typical (Boston Public Schools, 1998). In just one academic year, the top third of teachers produced as much as six times the learning growth as the bottom third of teachers. In fact, 10th graders taught by the least effective teachers made nearly no gains in reading and even lost ground in math. Boston Public Schools. (1998, March 9). *High school restructuring*. Boston: Author.

Groundbreaking research in Tennessee and Texas shows that these effects are cumulative and hold up regardless of race, class, or prior achievement levels. Some of the classrooms showing the greatest gains are filled with low-income students, some with well-to-do students. And the same is true with the small-gain classrooms. It's not the kids after all: Something very different is going on with the teaching (Sanders & Rivers, 1996).

The data strongly indicate that if the interventions used in these studies were available to all children at risk for reading failure, less than six percent of the population would be in need of specialized interventions, such as those typically provided through special or compensatory education, for reading difficulties later in school. Lyon, G.R., & Fletcher, J.M. (2001, Oct). Early identification, prevention, and early intervention for children at-risk for reading failure. Basic Education, Center for Development and Learning. Retrieved from http://www.cdl.org/resource-library/articles/early_id.php?type=subject&id=10

"Because decoding works, children will rely on a decoding strategy. Decoding makes learning sight words roughly nine times easier than rote memorization; children can learn about nine sight words by decoding with the same effort it takes to learn a single word by rote (Gates, 1931; Reitsma, 1983)". B. Murray http://www.auburn.edu/%7Emurraba/decodable.html

"Reading failure is a major problem for society. Leaders in this field emphasize the downstream

consequences of poor reading are so much greater than the reading failure itself. The consequences include poor self-esteem, difficulty in social development, and interference with future employment."
Lyon, G.R. (2004). Address to the 55th International Dyslexia Association Conference in November 2004 in Philadelphia.

" …a successsful learning experience is itself a major contribution to mental health" (p.153)
Steinberg, Z., & Knitzer, J. (1992). Classrooms for emotionally and behaviourally disordered students: Facing the challenge. *Behavioural Disorders, 17*, 145-15.

Time is running out to address the needs of struggling adolescent readers. "This is more than a crisis for high school kids," said Michael Kamil, a professor of psychological studies in education and learning at Stanford University and one of the panelists. "We almost need a trauma center to take care of this problem, it's that serious for kids that can't read. … It's the number-one factor standing in the way of their graduating."
Manzo, K.K. (2004, Oct.20). Reading researchers outline elements needed to achieve adolescent literacy. *Education Week, 24*(8), 10.

The sheer volume of words that children are expected to read quickly and accurately is daunting. According to Carroll, Davies, and Richman (1971) and Adams (1990), if children successfully negotiate all the texts normally encountered by the end of third grade, they are expected to recognize and know well over 80,000 different words. A child is quickly faced with an orthographic avalanche of printed words. From the start, children will be expected to read words they have never before seen in print. Only a few thousand words usually receive direct instruction in the primary grades. It would be impossible to directly teach children all the words they will encounter in print. It is also impossible to directly teach children all the letter-sound correspondences which they will need to be able to "sound out" novel words. Even the most comprehensive phonics programs rarely provide direct instruction for more than about 90 phonics "rules." Yet, over 500 different spelling-sound "rules" are needed to read (Gough & Juel, 1990; Juel, 1994).
Juel, C., & Minden-Cupp, C. (1999). *Learning to read words: Linguistic units and strategies*. CIERA Report #1-008. University of Michigan: Center for the Improvement of Early Reading Instruction Retrieved 12/2/03 from http://www.ciera.org/library/reports/inquiry-1/1-008/1-008.pdf

English consonants are highly regular (initial 96%, final 91%) and vowels are highly irregular (isolated 52%, vowels linked to consonants in rimes 77%) (Treiman, Mullenix, Bijejac-Babic, & Richmond-Welty, 1995). English has 200, 000 commonly used words (Bryson, 1990)
Bryson, B. (1990). Mother tongue. London: Penguin Books.
Treiman, R., Mullenix, J., Bijejac-Babic, R., & Richmond-Welty, E.D. (1995). The special role of rimes in the description, use and acquisition of English orthography. Journal of Experimental Child Psychology, 124(2), 107-136.

Wolf and Bowers (Bowers & Wolf, 1993; Wolf, 1999; Wolf & Bowers, 1999) proposed that either phonological processing deficits or deficits in automatic naming speed or deficits in both can compromise the acquisition of fluent reading skills in children with dyslexia. Wolf and Bowers have therefore advanced the hypothesis that these deficits identify two independent sources of reading dysfunction and that phonological processing is associated primarily with decoding, whereas naming speed is associated primarily with fluency. Bowers, P. G., & Wolf, M. (1993). Theoretical links among naming speed, precise timing mechanisms and orthographic skill in dyslexia. Reading and Writing, 5, 69-85. Wolf, M. (1999). What time may tell: Towards a new conceptualization of developmental dyslexia. Annals of Dyslexia, 49, 3-28. Wolf, M., & Bowers, P. G. (1999). The double-deficit hypothesis for the developmental dyslexias. Journal of Educational Psychology, 91, 415-438.

Fuchs, Fuchs, Hosp, and Jenkins (2001) reported evidence that a very brief measure of oral reading fluency was a better predictor of performance on a reading comprehension outcome measure than was a brief measure of reading comprehension itself. In this study, with middle and junior high school students with reading disabilities, the correlation between oral reading fluency and the reading comprehension measure was a nearly perfect .91. More recently, researchers comparing third graders' performance on the Dynamic Indicators of Basic Early Literacy Skills measure of Oral Reading Fluency to their scores on state assessments of reading comprehension have found correlations of .70 with the Florida Comprehensive

Assessment Test (Buck and Torgesen, 2003) and .73 with the North Carolina end-of-grade assessment (Barger, 2003).

Barger, J. (2003). *Comparing the DIBELS Oral Reading Fluency indicator and the North Carolina end-of-grade reading assessment.* Asheville, N.C.: North Carolina Teacher Academy. Buck, J. and Torgesen, J. (2003). *The relationship between performance on a measure of oral reading fluency and performance on the Florida Comprehensive Assessment Test.* Tallahassee, Fla.: Florida Center for Reading Research. Fuchs, L.S., Fuchs, D., Hosp, M.K., and Jenkins, J.R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading, 5,* 239-256.

2004 Oral reading fluency rates correlate better with other reading comprehension tests than those same tests correlate with each other (Fuchs & Fuchs, 1992; Fuchs, Fuchs, & Deno, 1982; Fuchs, Fuchs & Maxwell, 1988; Kranzler, Brownell, & Miller, 1998) (p.20).
Crawford, D. (2004). Automaticity in decoding. *Direct Instruction News, 4*(2), 20-22.

The authors examined the views of parents and teachers regarding beginning reading instruction using the questionnaire Approaches to Beginning Reading and Reading Instruction (ABRRI). Parents also rated the importance of 9 developmental areas, including literacy, and the extent to which home and school were responsible for each. Two components emerged on the ABRRI reflecting decoding or graphophonemic aspects and broader knowledge or constructivist aspects. Parents more frequently endorsed a bottom-up description of reading than teachers and gave higher ratings to the graphophonemic component than the constructivist component, whereas the reverse was true for teachers. Parents rated literacy development second only to character-moral development but were divided as to the responsibility of the school versus the home in literacy development.
Evans, M.A., Fox, M., Cremaso, L., & McKinnon, L. (2004). Beginning reading: The views of parents and teachers of young children. *Journal of Educational Psychology, 96*, 130-141.

"Hospitals are complaining that their clinics are being filled with kids who are being referred for things like Attention Deficit/Hyperactivity Disorder (ADHD)," said Dr Rowe, who was last week appointed by the federal Education Minister to run the inquiry. "But once the pediatricians sort out the children's literacy problems, the behaviour problems disappear. What is essentially an education issue has become a health issue."
Milburn, C. (2004, Dec 6). *Children in crisis: The real diagnosis*. The Age, P.1

The intensive small group work must be frequent; in the studies my colleagues and I have reviewed, success has been produced when groups met 20 to 45 minutes per day, 4 to 5 days per week.
Torgesen, J. (2004, Fall). Preventing early reading failure. *American Educator*. Retrieved 25/11/2004 from http://www.aft.org/pubs-reports/american_educator/issues/fall04/reading.htm

It is my belief that individual case studies of teaching, provided they include data about student experience and learning that can be directly connected to observations of specific classroom activities, can provide invaluable insights into the processes that lie behind the teaching-learning relationship. I would argue that they are more likely to lead to a valid, evidential base for discovering teaching-learning processes than large-scale studies. But in themselves, case studies, like teacher-action studies, are not complete. They need to be replicated in a variety of different contexts, with different curriculum content, different kinds of students, and so on, for them to lead to the kind of generalizable explanatory theory that teachers need to guide their own practice in their own specific contexts (p.294-5).
Nuthall, G. (2004). Relating classroom teaching to student learning: A critical analysis of why research has failed to bridge the theory-practice gap. Harvard Educational Review, 74, 273-306.

When does program adaptation become a lethal mutation? Design-based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. Educational Researcher, 32, 5-8.

"Teachers themselves are not always good at rating student achievement, as their ratings tend to be strongly affected by student behavior and motivation, crediting the most attentive and interested with higher achievement."
Goldenberg, C., Gallimore, R., Reese, L., & Garnier, H. (2001). Cause or effect? A longitudinal study of immigrant Latino parents' aspirations and expectations and their children's school performance. *American Educational Research Journal, 38*, 547-582.

"Within the professional culture of teaching, it is commonly believed that if something is taught (which usually means explained or demonstrated), it is automatically learned (Gess-Newsome & Lederman, 1999; Nuthall, 2001a; Oser & Baeriswyl, 2001). If it is not learned, then the problem lies in the inadequacy of the student's ability, motivation, or persistence, not in the ineffectiveness of the instruction (Fischler, 1994; Floden, 1996)" (p.277).

Nuthall, G. (2004). Relating classroom teaching to student learning: A critical analysis of why research has failed to bridge the theory-practice gap. *Harvard Educational Review, 74*, 273-306.

Teachers commonly believe that "student interest and involvement constitutes both a necessary and sufficient condition for worthwhile learning" (p. 389).

Prawat, R. S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. American Journal of Education, 100, 354-395.

Of 272 Victorian teachers (P-2), 77 % relied on whole language, and 6% followed a structured program. 51% had no specific teaching of phonics in their program, 22 per cent indicated that they included teaching of phonics as and when necessary (implicit phonics), while 27 per cent of teachers indicated that they included systematic teaching of phonics as a part of their teaching program. de Lemos, M. (2002). *Closing the gap between research and practice: Foundations for the acquisition of literacy*. Camberwell: Australian Council for Educational Research

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Approximately 10-15% of 7 to 9 year olds in the UK have been found to have reading comprehension deficits with normal word recognition skill. These children have normal phonological abilities but significant problems with vocabulary, listening and reading comprehension (Nation & Snowling, 1998). When assessed N & S found that poor comprehenders were also less effective at using context to facilitate word recognition in comparison with controls. These deficits are similar to hyperlexics, although there is no evidence of a preoccupation with reading at a young age.

Nation, K., & Snowling, M. J. (1998). Semantic processing and the development of word recognition skills: Evidence from children with reading comprehension difficulties. Journal of Memory and Language, 39, 85-101

Literacy Standards in Australia noted that 27 per cent of Year 3 and 29 per cent of Year 5 students did not meet the required standards in reading while the corresponding figures for writing were 28 per cent and 33 per cent. Australian Council for Educational Research, Literacy Standards in Australia, Canberra, 1997.

Gains in the ability to perceive auditory durations did not generalize to changes in skills related to reading. Agnew, J., Dorn, D., Eden, G.F. (2004). Effect of intensive training on rapid temporal processing. *Brain and Language, 88*(1), 21-25.

Together, these findings provide evidence that dyslexic adults are not, as may have been assumed, unable to profit from remedial practice," wrote the researchers. "In fact, the same strategies that are effective in teaching children phonological awareness skills are helpful in adults. Further, they are accompanied by neural changes known to underlie reading remediation of developmental dyslexia in childhood combined with those previously observed during the rehabilitation of adults with acquired dyslexia [due to brain damage].

Eden, G. F., Jones, K.M., Cappell, K., Gareau, L., Wood, F.B., Zeffiro, T.A., Dietz, N.A.E., Agnew, J.A. and Flowers, D.L. (2004). Neurophysiological recovery and compensation after remediation in adult developmental dyslexia, *Neuron, 44*, 411–422.

In this group of high school students who have been continuously and prospectively monitored since kindergarten, our findings indicate that difficulty with phonologic awareness represents the most robust characteristic of reading disability. Shaywitz, S. E., Fletcher, J. M., Holahan, J. M., Shneider, A.E., Marchione, K., Stuebing, K. K., Francis, D. J., Pugh K.R., Shaywitz, B. (1999). Persistence of dyslexia: The Connecticut longitudinal study at adolescence. Pediatrics, 104, 1351-1359.

"In a study of students from the Connecticut Longitudinal Study, Shaywitz et al found a research-identified incidence of reading disability of 8.7% of boys and 6.9% of girls. However, a teacher-identified incidence of the same population identified 13.6% of boys and only 3.2% of girls. The authors suggested that greater reports of behavioral difficulties among boys in the classroom may have lead to this bias."

Shaywitz, S.E., Shaywitz, B.A., Fletcher, J.M., & Escobar, M.D. (1990). Prevalence of reading disability in boys and girls. *Journal of the American Medical Association, 264*, 998-1002.

In seven experiments, we investigated whether compensated and uncompensated adults with dyslexia

show different patterns of deficits in magnocellular visual processing and in language processing tasks. In four visual tasks, we failed to find evidence of magnocellular deficits in either group. However, both groups of adults with dyslexia showed deficits in component language skills, and the degree of reading impairment predicted the nature and extent of these deficits. Uncompensated readers showed deficits in orthographic and especially phonological coding and awareness and were slower on rapid naming. Compensated readers showed word and nonword performance below controls but better than the uncompensated readers. The compensated group was not significantly less accurate than controls on phonological awareness, nor significantly worse overall on rapid naming.

Birch, S & Chase, C.H. (2004). Visual and language processing deficits in compensated and impaired dyslexic college students. Journal of Learning Disabilities, 37, 389 412.

But it was not until October 1996, with the release of the ACER (Australian Council for Educational Research) Report from the National Literacy Survey that the issues really became the subject of widespread discussion and scrutiny. The scandal documented by the 1996 report - that around third of all high school students were leaving school in a condition described as functionally illiterate.

http://www.users.on.net/~glynnesutcliffe/debate.html

During the 1980s, the Ministry of Education in Victoria instituted professional development programmes in literacy and numeracy (BLIPS Basic Learning in Primary Schools), along with an Australian federal government-funded programme (ELIC Early Literacy In-service Course). These programmes were given high priority and primary school practice was informed by these initiatives. Rowe, K.J. (1987). An evaluation of the Early Literacy Inservice Course (ELIC) in Victorian schools. Summary report on behalf of the Victorian ELIC Steering Committee. Melbourne, Vic: Research and Curriculum Development Branch, Ministry of Education.

Rowe, K.J. & Sykes, J. (1989). The impact of professional development on teachers' self-perceptions. Teaching and Teacher Education, 5, 129-141.

In Australian schools, unacceptably low levels of literacy occur for 20-50% of students in schools serving educationally disadvantaged areas.

Hill, P. & Russell, J. (1994). Resource levels for primary schools. Report prepared as part of a review by the Commonwealth Government of recurrent funding for government primary schools. The University of Melbourne, Vic: Centre for Applied Educational Research.

The gap between achievement levels of different groups of students increases during the subsequent years of schooling. Hill, P.W. (1995). School effectiveness and improvement: Present realities and future possibilities. Inaugural Professorial Lecture in Dean's Lecture Series Faculty of Education, Parkville, Vic: The University of Melbourne.

Rowe, K.J. & Hill, P.W. (1996). Assessing and recording and reporting students' educational progress: The case for 'student profiles'. Assessment in Education, 3, 309-352.

A wealth of research conducted over the years has consistently shown that perceptual and motor processing skills are poor predictors of reading and that training in these skills is not useful for remediating reading problems (e.g., Kavale, 1982; Larsen & Hammill, 1975; Mann, 1979). Therefore, one is not surprised to learn that such abilities proved to be poor predictors of reading in the meta-analyses reviewed. Hammill, D.D. (2004). What we know about correlates of reading. *Exceptional Children, 70*, 453-469.

This study provides a meta-analysis of the correlational literature on measures of phonological awareness, rapid naming, reading, and related abilities. Correlations (N = 2,257) were corrected for sample size, restriction in range, and attenuation from 49 independent samples. Correlations between phonological awareness (PA) and rapid naming (RAN) were low (.38) and loaded on different factors. PA and RAN were moderately correlated with real-word reading (.48 and .46, respectively). Other findings were that (a) real-word reading was correlated best (r values were. 60 to. 80) with spelling and pseudoword reading, but correlations with RAN, PA, vocabulary, orthography, IQ, and memory measures were in the low-to-moderate range (.37 to.43); and (b) correlations between reading and RAN/PA varied minimally across age groups but were weaker in poor readers than in skilled readers. The results suggested that the importance of RAN and PA measures in accounting for reading performance has been overstated. Swanson, H. L., Trainin, G., Necoechea, D. M., & Hammill, D. D. (2003). Rapid naming, phonological awareness, and reading. A meta-analysis of the correlational evidence. *Review of Educational Research, 73,* 407-444.

In their 5-factor Maximum Likelihood with Varimax and Promax Rotations, Swanson et al.'s (2003) spoken language cluster (vocabulary) failed to load to any degree of usefulness on the three reading factors (i.e., Pseudoword Reading, .11; Real Word Reading, .16; Comprehension, .16).

Swanson, H. L., Trainin, G., Necoechea, D. M., & Hammill, D. D. (2003). Rapid naming, phonological awareness, and reading. A meta-analysis of the correlational evidence. *Review of Educational Research, 73,* 407-444.

The two best known examples of sound research-based practices coming to scale are Direct Instruction (Carnine, Silbert, & Kameenui, 1997) and Success for All (Slavin, Madden, Dolan, & Wasik, 1996).

Foorman, B.R., & Moats, L.C. (2004). Conditions for sustaining research-based practices in early reading instruction. *Remedial and Special Education, 25,* 51-60.

This study showed that phonics instruction was equally effective for all children regardless of their initial ability, as opposed to the conclusion of the NRP report that such instruction is more effective for at-risk children (Ehri et al., 2001). … When family SES, other child characteristics, and phonics instruction were held constant, children with lower entering literacy skills and knowledge did not benefit greatly from integrated language arts instruction.

Xue, Y., & Meisels, S.J. (2004). Early literacy instruction and learning in kindergarten: Evidence from the early Childhood Longitudinal Study-Kindergarten Class of 1998-1999. *American Educational Research Journal, 41*, 191-229.

Socioeconomic background is often considered the most important influence on educational outcomes and an important element in the funding of schools. However, its influence on early school leaving, Year 12 completion and University entrance performance is considerably smaller than that of achievement in literacy … (Marks & Fleming, 1998a; Marks et al., 2000; Marks et al., 2001). Marks, G., McMillan, J., Ainley, J., (2004, April 20). Policy issues for Australia's education systems: Evidence from international and Australian research. *Education Policy Analysis Archives, 12*(17). Retrieved [Date] from http://epaa.asu.edu/epaa/v12n17

Indigenous students remain the most educationally disadvantaged group of young Australians.

Marks, G., McMillan, J., Ainley, J., (2004, April 20). Policy issues for Australia's education systems: Evidence from international and Australian research. *Education Policy Analysis Archives, 12*(17). Retrieved [Date] from http://epaa.asu.edu/epaa/v12n17

Only 40% of indigenous students achieved at least proficiency Level 3 in reading.

Lokan, J., Greenwood, L., & Cresswell, J. (2001). 15-up and counting, reading, writing, reasoning : How literate are Australian students? The PISA 2000 survey of students' reading, mathematical and scientific literacy skills. Melbourne, Australia: ACER Press.

30% of Australian students fail to become effective readers.

Louden, W., Chan, L.K.S., Elkins, J., Greaves, D., House, H., Milton, M., Nichols, S., Rivalland, J., Rohl, M., & van Kraayenoord, C. (2000). Mapping the territory—Primary students with learning difficulties: Literacy and numeracy (Vols. 1-3). Canberra: Department of Education Training and Youth Affairs

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Within the professional culture of teaching, it is commonly believed that if something is taught (which usually means explained or demonstrated), it is automatically learned (Gess-Newsome & Lederman, 1999; Nuthall, 2001a; Oser & Baeriswyl, 2001). If it is not learned, then the problem lies in the inadequacy of the student's ability, motivation, or persistence, not in the ineffectiveness of the instruction (Fischler, 1994; Floden, 1996).

Nuthall, G. (2004). Relating classroom teaching to student learning: A critical analysis of why research has failed to bridge the theory-practice gap**.** Harvard Educational Review, 74, 273-306.

Teachers commonly believe that "student interest and involvement constitutes both a necessary and sufficient condition for worthwhile learning" (Prawat, 1992, p. 389).

Prawat, R. S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. American Journal of Education, 100, 354-395.

The spelling measure proved to be more sensitive than other measures for documenting generalization, because spelling reflects "linguistic understanding of speech sounds" (Edwards, 2003, p. 137).

Edwards, L. (2003). Writing instruction in kindergarten: Examining an emerging area of research for children with writing and reading difficulties. *Journal of Learning Disabilities, 36,* 136-148.

Typically, instruction for children who are at risk of reading failure must be more explicit, more

comprehensive, more supportive, and more intensive than reading instruction required by average readers (Foorman & Torgesen, 2001; Snow, Burns, & Griffin, 1998).

Foorman, B. R., & Torgesen, J. (2001). Critical elements of classroom and small-group instruction promote reading success in all children. *Learning Disabilities Research & Practice, 16*(4), 203-212.

"If you were an aggressive, disruptive 1st. grader and you were in a poorly managed classroom, the risk of being aggressive later on was 59 times that of average kids. In well managed classrooms, the same child's risk was only three times that of the average children."

Kellam, S.G. (1999). *The influence of the first-grade classroom on the development of aggressive behavior*. Research Bulletin No. 25: Phi Delta Kappa Center for Evaluation, Development, and Research December. Retrieved from http://www.pdkintl.org/edres/resbul25.htm

"Taken together, these results provide evidence for the role of mastery of reading achievement in aggressive behavior, particularly in boys, and in depression, particularly in girls. The preventive trials provide evidence of the direction of effects, and the reversibility of the aggressive behavior and depressive symptoms in some children by raising the level of reading achievement."

Kellam, S.G. (1999). Developmental epidemiologically-based prevention research: From efficacy to effectiveness. National Institute of Mental Health Fifth Annual National Conference on Prevention Research. Retrieved from http://www.oslc.org/spr/ecpn/nckellam.html

Pupils need to meet a concept or idea on four separate occasions if they are to learn and remember it and that these occasions should not be separated by more than two days.

Nuthall, G., & Alton-Lee, A. (1994). How pupils learn. Item 3, SET No 2. Wellington, New Zealand: New Zealand Council for Educational Research.

A proper theory of speech is essential to an understanding of how people read—the most relevant consideration arises out of the deep biological gulf that separates the two processes. Speech, on the one side, is a product of biological evolution, standing as the most obvious, and arguably the most important, of our species-typical behaviors. Reading/writing, on the other, did not evolve biologically, but rather developed (in some cultures) as a secondary response to that which evolution had already produced. A consequence is that we are biologically destined to speak, not to read or write. Accordingly, we are all good at speech, but disabled as readers and writers; the difference among us in reading/writing is simply that some are fairly easy to cure and some are not.

Liberman, A.M. (1997). How theories of speech affect research in reading and writing. In B. Blachman, (Ed.), Foundations of reading acquisition and dyslexia: Implications for early intervention (pp.4-5). Mahwah, N.J.: Lawrence Erlbaum.

Regard no practice as immutable. Change and be ready to change again. Accept no eternal verity. Experiment (p. 346). Skinner, B. F. (1984). *A matter of consequences: Part three of an autobiography*. Washington Square, New York: New York University Press. (Original work published 1983)

It is recommended that educators use a variety of learning methods and encourage students to be receptive to different learning methods rather than try to link specific learning methods to specific learning styles.

Loo, R. (2004). Kolb's learning styles and learning preferences: is there a linkage? *Educational Psychology, 24*(1), 99-108.

Research reviews facilitate the process of evaluating the evidence behind a broad range of programs … we should look at multiple reviews because researchers differ in their review criteria, conclusions, and recommendations.

Slavin, R. (2003). A reader's guide to scientifically based research. *Educational Leadership, 60*(5), 12-16. Retrieved May 13, 2004, from http://www.ascd.org/publications/ed_lead/200302/toc.html

The National Reading Panel (1999) identified these (5) elements as having been established in rigorous research, especially in randomized experiments. Yet there is a big difference between a program based on such elements and a program that has itself been compared with matched or randomly assigned control groups.

Slavin, R. (2003). A reader's guide to scientifically based research. Educational Leadership, 60(5), 12-16. Retrieved May 13, 2004, from http://www.ascd.org/publications/ed_lead/200302/toc.html

A single study involving a small number of schools or classes may not be conclusive in itself, but many such studies, preferably done by many researchers in a variety of locations, can add confidence that a program's effects are valid. In fact, experimental research in education usually develops in this way. Rather than evaluate one large, definitive study, researchers must usually look at many small studies that may be

flawed in various (unbiased) ways. But if these studies tend to find consistent effects, the entire set of studies may produce a meaningful conclusion.

Slavin, R. (2003). A reader's guide to scientifically based research. Educational Leadership, 60(5), 12-16. Retrieved May 13, 2004, from http://www.ascd.org/publications/ed_lead/200302/toc.html

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In education experiments, an effect size of +0.20 (20 percent of a standard deviation) is often considered a minimum for significance; effect sizes above +0.50 would be considered very strong.

Slavin, R. (2003). A reader's guide to scientifically based research. Educational Leadership, 60(5), 12-16. Retrieved May 13, 2004, from http://www.ascd.org/publications/ed_lead/200302/toc.html

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Of particular concern, however, were the 10% of low progress readers who were not identified as such by their classroom teachers, and the 18% of teachers who identified, as low progress readers, students who were not in fact, very different from the lowest of the readers regarded as average (p.4). Madelaine, A. & Wheldall, K. (2003). Can teachers discriminate low-progress readers from average readers in regular classes? Australian Journal of Learning Disabilities, 8(3), 4-7.

By grade 6, students know the meanings of more than 7,500 root words. By grade 8, that number has grown to at least 11,000, and by grade 12, it has been estimated to be around 15,000 or more. Curtis, M.E. (2002, May). Adolescent reading: A synthesis of research. Paper presented at the U.S. Department of Education and the National Institute of Child Health and Human Development conference on adolescent literacy, Baltimore, MD. Retrieved May 3, 2004, from http://216.26.160.105/conf/nichd/synthesis.asp

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"The speed of naming pronounceable nonwords is one of the tasks that most clearly differentiates good from poor readers."

Stanovich, K.E. (2000). Progress in understanding reading: Scientific foundations and new frontiers. New York: Guilford Press.

One accidental finding cropped up when people coding the videos had a "What the hell was that?" reaction to noises on the tapes. Those noises were mostly interruptions by the intercom, visitors, etc. More than 30% of American classes suffered interruptions. Zero percent of Japanese classes suffered an intrusion.

Bracey, G.W. (2003). Research: Teachers around the world. *Phi Delta Kappan, 85*, 253-254. Retrieved 2/5/2004 from http://www.educationnews.org/research1.htm

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In my sample of 340 teachers, both pre service and in service, only 54% knew what a syllable was and only 24% could correctly count the number of phonemes in a word. As for knowledge of schwas, diphthongs, voiced versus unvoiced sounds, forget it!

Fielding-Barnsley, R., and Purdie, N. (2005). Teacher's attitude to and knowledge of metalinguistics in the process of learning to read. *Asia-Pacific Journal of Teacher Education, 33*(1), 65-76.

A survey by Rohl and Greaves (2005) reported that 36% of beginning primary teachers felt unprepared to teach reading and 57% unprepared to teach phonics. Senior staff at their schools were more pessimistic, considering that 49% of these beginning teachers were unprepared to teach reading, and 65% unprepared to teach phonics. These figures on unpreparedness rose dramatically (77% - 89%) when the beginning teachers were confronted with diverse learners (those with disabilities or learning difficulties, indigenous and low SES students, and students whose initial language was not English).

Rohl, M., & Greaves, D. (2005). How are pre-service teachers in Australia being prepared for teaching literacy and numeracy to a diverse range of students? *Australian Journal of Learning Disabilities, 10*(1), 3-8.

"Taken together, these results indicate that for this cohort of pre-service teachers, entry knowledge of graphological/phonological rules and terminology tends to be fragmentary, suggesting that without further instruction in domain-specific knowledge in the area of phonological awareness and phonics, they may have difficulty providing systematic and explicit beginning reading instruction. This supports findings from previous studies which found that many pre-service and in-service teachers have limited knowledge of phonological awareness and phonics (e.g. Fielding-Barnsley & Purdue, 2005; Moats & Foorman, 2003; Rennie & Harper, 2006; Rohl & Greaves, 2005)" (P. 82-3)

"The written comments have also highlighted, unintentionally, the fact that a number of the pre-service teachers in the present study, like those in reported by Zipin and Brennan (2006), showed deficiencies in

personal literacy skills with regard to grammar, punctuation, and sentence structure" (p.85). Fisher, B.J., Bruce, M.E., & Greive, C. (2007). The entry knowledge of Australian pre-service teachers in the area of phonological awareness and phonics. In A Simpson (Ed.). *Future directions in literacy: International conversations 2007*. University of Sydney. Retrieved from http://ses.library.usyd.edu.au/bitstream/2123/2330/1/FutureDirections_Ch5.pdf

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In the recent 2000 PISA study of 15 year olds in over 30 industrialised countries, Australian students performed well above the OECD average in the domain of reading.
Marks, G., McMillan, J., Ainley, J., (2004, April 20). Policy issues for Australia's education systems: Evidence from international and Australian research. *Education Policy Analysis Archives, 12*(17). Retrieved 20/4/2004 from http://epaa.asu.edu/epaa/v12n17.

In Australia efforts to improve student performance need to be directed to less-successful students within schools rather than to improving particular schools.
Marks, G., McMillan, J., Ainley, J., (2004, April 20). Policy issues for Australia's education systems: Evidence from international and Australian research. Education Policy Analysis Archives, 12(17). Retrieved 20/4/2004 from http://epaa.asu.edu/epaa/v12n17.

A more recent review of the literature concluded that research on effective schools identifies five factors: strong educational leadership; emphasis on acquiring basic skills; an orderly and secure environment; high expectations of student achievement; and frequent assessment of student progress.
Scheerens, J., & Bosker, R. (1997). *The foundations of educational effectiveness*. Oxford: Pergamon.

In Victorian primary schools, differences among classrooms within schools were greater than differences among schools. Differences between classrooms are important, and it is what individual teachers do that is crucial for student learning.
Hill, P., & Rowe, K. J. (1996). Multilevel modelling in school effectiveness research. *School Effectiveness and School Improvement*, *7*(1), 1-34.

For a given investment, alternative to smaller classes, such as time for teacher professional development, devoting resources to students with learning difficulties, developing better curriculum resources, and varying the time students spend in groups of different size should be seen as better use of resources.
Prais, S. (1996). Class size and learning: The Tennessee experiment - What follows? *Oxford Review of Education*, *22*(4), 399-415.

Education productivity studies typically measure the size of the relationship between various quantifiable education factors and student achievement. Goldhaber, Brewer, and Anderson (1999), for example, investigate the contributions of school, teacher, and class characteristics on student achievement. They find only about 3 percent of the contribution teachers make toward explaining student achievement is associated with teacher experience, degree level, and other readily observable characteristics. The remaining 97 percent is made up of teacher qualities or behaviors that could not be separately isolated and identified.
Goldhaber, D., Brewer, D.J., & Anderson, D. (1999). A three-way error components analysis of educational productivity. *Education Economics 7*(3), 199–208.

A growing body of research shows that the quality of the teacher in the classroom is the most important schooling factor predicting student outcomes (see, for instance, Ferguson 1998; Goldhaber 2002; Goldhaber et al. 1999; Hanushek et al. 1999; Wright et al. 1997). The impact of having a high-quality teacher can be profound. Hanushek (1992), for instance, finds that, all else equal, a student with a very high quality teacher will achieve a learning gain of 1.5 grade level equivalents, while a student with a low-quality teacher achieves a gain of only 0.5 grade level equivalents. Thus, *the quality of a teacher can make the difference of a full year's learning growth.*
Ferguson, R. (1998). Teachers' perceptions and expectations and the Black-White test Score gap. In C. Jencks and M. Phillips (Eds.). *The black-white test score gap,* pp.273–317. Washington, DC: Brookings Institution Press. Goldhaber, D. (2002). The mystery of good teaching: Surveying the evidence on student achievement and teachers' characteristics. *Education Next, 2*(1), 50–55. Goldhaber, D., Brewer, D.J., & Anderson, D. (1999). A three-way error components analysis of educational productivity. *Education Economics 7*(3), 199–208. Hanushek, E. A. (1992). The trade-off between child quantity and quality. *Journal of Political Economy 100*(1), 84–117. Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (1999). *Do higher salaries buy better teachers?* Working Paper No. 7082. Cambridge: National Bureau of Economic

Research. Wright, P., Horn, S., & Sanders, W. (1997). Teachers and classroom heterogeneity: Their effects on educational outcomes. *Journal of Personnel Evaluation in Education, 11*(1), 57–67.

Our findings for various student subgroups are consistent with previous findings that teacher quality has a larger impact on poor students than on higher income students (Coleman, 1990).
Coleman, J. S. (1990). *Equality and achievement in education.* Boulder, Co: Westview Press. Goldhaber, D. D., & Anthony, E. (2004). *Can teacher quality be effec*tively assessed? Washington, DC: Urban Institute Press. Retrieved 21/3/2004 from
http://www.urban.org/UploadedPDF/410958_NBPTSOutcomes.pdf

Receiving small rewards for doing something well involves activation of the orbitofrontal cortex, which elevates mood and leads to brain changes that correspond to feeling happier.
Jack Nitschke, UW-Madison current issue of NeuroImage, 2004-03-01,
http://www.sciencedaily.com/releases/2004/02/040229231659.htm

Wealth and power are much more likely to be the result of breeding than they are of reading
Fran Lebowitz (1946-)

The results showed some slight positive relationship between small class size and achievement gain, and a positive relationship between full-day program and the gain scores. It is also found that these effects are more pronounced for children from minority, low-income backgrounds.
Yan, W. & Lin, Q. (2004, February 24). The effect of kindergarten program types and class size on early academic performance. Education Policy Analysis Archives, 12(7). Retrieved [Date] from
http://epaa.asu.edu/epaa/v12n7/

"Teachers have been content to follow the methods in which they themselves were taught ...."
James Johonnot, Principles and Practice of Teaching. 1881, p. 51.

Although letter-name knowledge is the strongest predictor of future reading ability, past research has suggested that letter-name accuracy may not be enough to facilitate reading. For example, previous experiments on letter-name training did not produce increased reading achievement (Jenkins, Bausell, & Jenkins, 1972; Samuels, 1971).
Speece, D.L., Mills, C., Ritchey, K.D., & Hillman, E. (2003). Initial evidence that letter fluency tasks are valid indicators of early reading skill. *Journal of Special Education, 36*, 223-233.

Language of instruction must be seen as only one aspect, however, of instructional programming for English language learners. As many previous reviewers have concluded, quality of instruction is at least as important as language of instruction. This synthesis identified a number of specific, replicable programs that have strong evidence of effectiveness. Particularly well supported are Success for All and Direct Instruction, two well-structured, phonetic reading approaches that provide appropriate English language development adaptations for ELLs.

The beginning reading programs with the strongest evidence of effectiveness in this review made use of systematic phonics, such as Success for All, Direct Instruction, and Jolly Phonics, but systematic phonics has been identified as a component of effective beginning reading programs for English proficient students as well (see National Reading Panel, 2000; Gersten & Geva, 2003). It may be that programs that are quite different from these exist but have not been adequately evaluated, or could be developed. The observation, however, that currently available reading methods known to be effective for English proficient students also accelerate the achievement of English language learners implies that a broader range of interventions also known to be effective with children in general may likewise be effective with English language learners, with appropriate adaptations (see Slavin & Calderón, 2001).

Slavin, R.E., & Cheung, A. (2003). Effective reading programs for English language learners: A best-evidence synthesis. Baltimore, MD: Johns Hopkins University, Center for Research on the Education of Students Placed at Risk. Retrieved 5/2/2004 from www.csos.jhu.edu/crespar/techReports/Report66.pdf

Statistically, more American children suffer long-term life-harm from the process of learning to read than from parental abuse, accidents, and all other childhood diseases and disorders *combined***. In purely economic terms, reading-related difficulties cost our nation more than the war on terrorism, crime, and drugs** *combined***.** "We need to reconceptualize what it means to learn to read and who's responsible for its success if we're going to deal with the problem."

Dr. Grover Whitehurst, Director Institute of Education Sciences, Assistant Secretary of Education, U.S. Department of Education (9-10-03 Children of the Code interview).
http://www.childrenofthecode.org/cotcintro.htm

"Reading is absolutely fundamental. It's almost trite to say that. But in our society, the inability to be fluent consigns children to failure in school and consigns adults to the lowest strata of job and life opportunities". –
Dr. Grover Whitehurst, Assistant Secretary, U.S. Department of Education - Director, Institute of Education Sciences (9-10-03 Children of the Code interview).
http://www.childrenofthecode.org/cotcintro.htm

Cohen (1988) pointed out that the relatively small effects of around d = .20 were most representative of fields closely aligned with education, such as personality, social, and clinical psychology. Similarly, Lipsey and Wilson's (1993) more recent compendium of meta-analyses concluded that psychological, educational, and behavioral treatment effects of modest values of even d = .10 to d = .20 should not be interpreted as trivial.
Lipsey, M. W, & Wilson, D. B. (2001). Practical meta-analysis. Thousand Oaks, CA: Sage.

Before the switch was flipped, the marks on the page had been opaque. Now they were affecting my heart rate. It is fun to have fun, but you have to know how.
Menand, L. (2002). Cat people: What Dr. Seuss really taught us. The New Yorker, 23/12/2002.

Approximately 20 per cent of Australians aged 15-74 years have been identified as having 'very poor' literacy skills, with an additional 28 per cent who '… could be expected to experience some difficulties in using many of the printed materials that may be encountered in daily life' (ABS 1997, p. 7). Evidence from the 1996 National School English Literacy Survey (Masters & Forster, 1997) indicated that the proportion of Year 3 and Year 5 students in Australian schools who did not meet minimum performance standards of literacy required for effective participation in further schooling was found to be as high as 27 per cent for Year 3 students and 29 per cent for Year 5 students Masters, G.N., & Forster, M. (1997a). Mapping literacy achievement: Results of the 1996 National School English Literacy Survey. A report on behalf of the Management Committee for the National School English Literacy Survey. Canberra, ACT: Commonwealth Department of Employment, Education, Training and Youth Affairs. Masters, G.N., & Forster, M. (1997b). Literacy standards in Australia. Canberra, ACT: Commonwealth of Australia.

Independent research estimates that more than 700,000 (or 22%) of Australia's young people aged between 5 & 18 are from families living below the poverty line. In Year 3, 88% of Australian children reach a satisfactory standard in literacy tests. Of children from disadvantaged families, only 61% reach this standard and by Year 5 the gap is even wider – 48% for disadvantaged children versus 87% for children of higher socio-economic status. (The Smith Family)

Australian Bureau of Statistics has reported a 16 per cent unemployment rate for people with poor literacy skills compared to a 4 per cent rate for those with very high literacy levels.
Craig Ashdown and AAP, 'Literacy crisis denied', Education Review, vol. 2, no. 6, July 1998, p. 1.

At pre-school age, no clear differences emerged in motivational orientations. … all analyses revealed distinctly different developmental patterns of motivation as a function of reading career … the regressive reading groups displayed lower task orientation, and higher ego-defensiveness and social dependency over age than progressive reading career groups. P.171
Lepola, J., Salonen, P., & Vauras, M. (2000). The development of motivational orientations as a function of divergent reading careers from pre-school to the second grade. Learning and Instruction, 10, 153–177.

By the secondary grades, struggling readers have little confidence in their ability to succeed in reading and little sense of themselves as readers (Collins, 1996). Guthrie, Alao, and Rinehart (1997) noted an "eroding sense of confidence" in these students. They are acutely aware of their reading problems (Wigfield & Eccles, 1994) and likely to suffer serious psychological consequences, including anxiety, low motivation for learning, and lack of self-efficacy.
Peterson, C.L., Caverly, D.C., Nicholson, S.A.,.O'Neal, S., & Cusenbary, S. (2003). Building reading proficiency at the secondary level: A guide to resources. Austin, TX: Southwest Educational Development Laboratory. Retrieved 2/2/2004 from

The relevant references were: Collins, N. D. (1996). Motivating low performing adolescent readers. ERIC Digest. (ERIC Document Reproduction Service No. ED 396 265). Guthrie, J. T., Alao, S., & Rinehart, J.

M. (1997). Engagement in reading for young adolescents. *Journal of Adolescent & Adult Literacy, 40*(6), 438–446. Wigfield, A., & Eccles, J. S. (1994). Children's competence beliefs, achievement values, and general self-esteem: Change across elementary and middle school. *Journal of Early Adolescence, 14*(2), 107–138.

National longitudinal studies show that approximately 75% of those with reading problems in third grade still experience reading difficulties in the ninth grade (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher 1996; Shaywitz, Fletcher, Holahan, & Shaywitz, 1992).

Behaviour problems among children with learning disorders are about 3 times than the norm by 8 years of age (Mash & Wolfe, 2002, p.295).
Mash, E.J., & Wolfe, D.A. (2002). *Abnormal child psychology.* Belmont, CA: Wadsworth Thomson Learning.

First graders know an average of 24,000 words.
Seashore, R.H. (1947). How many words do children know? *The Packet, II,* 3-17.

A recent synthesis examining the effects of intervention research on the *self-concept* of students with LD indicates at the elementary level that academic interventions are the most effective means of improving self-concept (Elbaum & Vaughn, 1999).

"Children learn spelling without direct instruction if they read and write." (p. 212).
Goodman, K. S. (1989). Whole-language research: Foundations and development. *The Elementary School Journal, 90*, 207-221.

Heritability of IQ at the low end of the wealth spectrum was just 0.10 on a scale of zero to one, while it was 0.72 for families of high socioeconomic status. The emerging view allows that genes can influence the impact of experiences and experiences can influence the "expression," or activity levels, of genes. … Results demonstrate that the proportions of IQ variance attributable to genes and environment vary nonlinearly with SES. The models suggest that in impoverished families, 60% of the variance in IQ is accounted for by the shared environment, and the contribution of genes is close to zero; in affluent families, the result is almost exactly the reverse.
Turkheimer, E., Haley, A. Waldron, M., D'Onofrio, B., Gottesman, I.I. (2003). Socioeconomic status modifies heritability of IQ in young children. *Psychological Science, 14*, 623-628.

So how many levels of the Corrective Reading program do we have to put our students through? The early levels begin to retrain students to attend to word parts (letters, letter groups) and this takes time, as does the overcoming of previously entrenched though unsuccessful strategies, such as guessing from context or from the first letter or so. The stories in the Corrective Reading program are intentionally constructed to scaffold the students' developing decoding ability.

However, these decodable-text stories, though developmentally important, do not reflect the inconsiderate text associated with age-related interest level reading or school texts. Those sources are uncontrolled for regularity, usually employing many irregular words that are likely to trouble our developing reader.

Thus students may not show great improvement on texts outside the program despite the dramatic development in the skills of reading. It is not until Level C: Decoding that students begin to accelerate the growth of their store of irregular words. To enable a student to cope with the complexity of secondary school texts, completion of Level C: Decoding is advisable.
Engelmann, S., Carnine, L., Johnson, & G., Meyer, L. (1988). Corrective Reading: Decoding C. Chicago: Science Research Associates.

Seven percent of students are "Borderline Deficient" (IQs 70-79), two percent of students are classified as mentally deficient (IQs below 70).
Clark, F.J. (2003). A response to the proposed elimination of discrepancy criteria. Communiqué, 31(5), 44. Retrieved 11/8/2003 from http://www.ldonline.org/news/discrepancy_criteria.html

Between the ages of four and nine, your child will have to master some 100 phonics rules, learn to recognize 3,000 words with just a glance, and develop a comfortable reading speed approaching 100 words a minute. He must learn to combine words on the page with a half-dozen squiggles called punctuation into something – a voice or image in his mind that gives back meaning. (Paul Kropp, 1996)

"Research and theory (e.g., Ehri, 1992) suggested that the most effective way to remember how to read sight words is not the way suggested by conventional wisdom, which is to memorise shapes or other strictly visual features of words. Rather the most effective way involves bonding the letters to the word's pronunciation held in memory so that sight of the word immediately activates its spoken form and meaning. Letter-sound correspondences are the tools that the mind uses to form the bond. However, the process of sight word reading is different from that of using letters and sounds to decode unknown words. In sight word reading, the words are read from memory, not from decoding and blending operations, because the words are familiar. As a result, the act of reading them is carried on by memory processes, not by decoding processes.

Gaskins, I. W., Ehri, L. C., Cress, C., O'Hara, C., Donnelly, K. (1996). Procedures for word learning: Making discoveries about words. *The Reading Teacher, 50*, 312-327.

The large-scale data do seem to confirm some of the findings from small-scale research but not others. Some practices, namely metacognition, using trade books and a measure of integrating reading and writing, did prove positively related to reading comprehension. Other practices, however, such as having students work in groups, increasing parental involvement, and the use of authentic assessment, did not. And time spent reading in class actually had a negative relationship to student performance. The addition of classroom practices to large-scale models seems to make the overall impact of teachers comparable to that of student background. As with typical production functions, the teacher background model revealed only a single modest teacher effect. The classroom practice model, however, revealed multiple teacher effects, some of them quite strong. The total standardized effect for the four teacher variables (.70) is actually somewhat larger than the total standard effect of the two student background measures (.56).

Wenglinsky, H. (June 30, 2003). Using large-scale research to gauge the impact of instructional practices on student reading comprehension: An exploratory study. *Education Policy Analysis Archives, 11*(19). Retrieved http://epaa.asu.edu/epaa/v11n19/

The seven "hottest" topics for 2003 are as follows: direct instruction, early intervention, fluency, high-stakes assessment, phonemic awareness, phonics, and scientific reading research and practice.

Cassidy, J & Cassidy, D. (2002, Dec). What's hot, what's not for 2003; seventh annual survey examines key topics in reading research and practice. Reading Today.

Young boys with reading problems were three times more likely to report high levels of depressed mood than their peers. The reading problems influenced boys' risk of depressed mood.

Maugban, B. (2003). Reading problems and depressed mood. Journal of Abnormal Child Psychology, 31, 210-229.

On phoneme counting tasks, participants evidenced the most confusion about words where the number of letters did not correspond directly to the number of speech sounds. Only 2% of the preservice and 19% of the inservice teachers knew that the word box is composed of four speech sounds, although it contains only three letters (x corresponds to /k/ + /s/). On a similar item, Moats (1994) found that 25% of experienced teachers knew that the word ox was composed of three speech sounds. About half of the preservice teachers had difficulty reversing the phonemes in a given word to produce a new word (Item 21, 48% correct; Item 22, 59%; see Table 5). As noted by McCutchen et al. (in press), this conscious dissociation of sounds from knowledge of word spellings is critical if teachers are to understand how children think about words and sounds before they learn to read and spell.

80% of the preservice teachers and 74% of the inservice teachers agreed that the most beneficial strategy for identifying an unknown word was to use the context to figure it out. Both groups agreed that a teacher should not be concerned when early readers' miscues do not alter meaning (76% preservice; 79% inservice). Only 22% of the preservice and 36% of the inservice teachers recognized that phonological awareness involves oral language and is not a method of reading instruction.

Mather, N., Bos, C., & Babur, N. (2001). Perceptions and knowledge of preservice and inservice teachers about early literacy instruction. Journal of Learning Disabilities, 34, 472-482.

"The following tasks are ordered from easy (1) to difficult (6) based on findings of Schatschneider, Francis, Foorman, Fletcher, & Mehta (1999): 1. First sound comparison: identifying the names of pictures beginning with the same sound 2. Blending onset-rime units into real words 3. Blending phonemes into real words 4. Deleting a phoneme and saying the word that remains 5. Segmenting words into phonemes 6. Blending phonemes into nonwords."

Ehri, L.C., Nunes, S.R., Willows, D.M., Schuster, B.V., Yaghoub-Zadeh, Z., Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36,* 250- 287.

"By age three, children from privileged families have heard 30 million more words than children from poor families. By kindergarten the gap is even greater. The consequences are catastrophic". Meaningful Differences in the Everyday Experiences of Young American Children (1995)

Not only is the left planum temporale atypical in developmental dyslexia but so is the right planum temporale; the greater symmetry of the two being the most typical finding in developmental dyslexia. Daigneault, S. (2002). Pure severe dyslexia after a perinatal focal lesion: Evidence of a specific module for acquisition of reading. Journal of Developmental & Behavioral Pediatrics, 23, 256-265.

The brain images reveal that children use a region in the back of the brain called the left extrastriate cortex, when processing language. The region is located in area where visual information is processed. Adults tended to have much less activity in the extrastriate cortex and more activity in the frontal cortex. This part of the brain seems to be involved in coordinating many different parts of the brain, Schlaggar said. (Washington University) The results could mean that children use a more visual approach to language than adults do, Schlaggar said. Another possibility is that other parts of the brain may take control in children's brains until the frontal cortex matures, he said.
http://www.stltoday.com/stltoday/news/stories.nsf/News/B82EE5D7059435BF86256BC3000C16C3?OpenDocument&Headline=Children%20use%20brain%20differently%20for%20language%20tasks,%20study%20says

"We would also wish to emphasise that there is perhaps unnecessary pessimism concerning the prognosis for older low-progress readers. We support the desirability of a preventative early intervention approach to reading difficulties but some low-progress readers will still slip through the net and early intervention is not always effective. Similarly, the often heard view that remedial instruction for students beyond Year 2 is ineffective may have been true, but this is a criticism of the ineffectiveness of past programs, not a necessary truth. We can rehabilitate older low-progress readers, as we have shown, with effective programs based on contemporary, empirically validated best practice, if we have the will and the resources to do so." Wheldall, K., & Beaman, R. (2000). An evaluation of MULTILIT: 'Making Up Lost Time In Literacy'. Canberra: Department of Education, Training and Youth Affairs. Retrieved from http://www.dest.gov.au/schools/literacy&numeracy/publications/multilit/summary.htm

We have not found evidence that boosting self-esteem (by therapeutic interventions or school programs) causes benefits. Our findings do not support continued widespread efforts to boost self-esteem in the hope that it will by itself foster improved outcomes. In view of the heterogeneity of high self-esteem, indiscriminate praise might just as easily promote narcissism, with its less desirable consequences. Instead, we recommend using praise to boost self-esteem as a reward for socially desirable behavior and self-improvement. Baumeister, R. F. Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? Psychological Science in the Public Interest, 4(1), 1-44. http://www.psychologicalscience.org/journals/pspi/4_1.html

Speech, on the one side, is a product of biological evolution, standing as the most obvious, and arguably the most important, of our species-typical behaviors. Reading/writing, on the other, did not evolve biologically, but rather developed (in some cultures) as a secondary response to that which evolution had already produced. A consequence is that we are biologically destined to speak, not to read or write.

Speech has been around for 200,000 years or more, although the idea that it could be rendered alphabetically was born no more than 4,000 years ago. Liberman, A. (1997). How theories of speech affect research in reading and writing. In B. Blachman (Ed.) Foundations of reading acquisition and dyslexia. pp.3-19. Mahwah, NJ: Lawrence Erlbaum Associates.

The early identification of children at-risk for reading failure coupled with the provision of comprehensive early reading interventions can reduce the percentage of children reading below the basic level in the fourth grade (i.e., 38%) to six percent or less. Lyon, G. R. (2003). Why do some children have difficulty learning to read? What can be done about it? Perspectives, 29(2). Retrieved 3/6/2003 from http://www.educationnews.org/Reading-Disabilities-Why-Do-Some-Children.htm.

"The proportion of no-treatment students who did not respond to classroom instruction was 25-30%, the percentage of treatment students who were unresponsive was 7.0 Markers associated with unresponsiveness to treatment included slow letter naming, poor verbal ability and phonological memory, and poor attention. Most children (i.e., 92%) who were unresponsive in kindergarten remained unresponsive in first grade. Students who do not respond to kindergarten treatment may require more intensive and individualized intervention than is offered by classwide peer-mediated approaches or by large-group phonological awareness training. Some students may also need treatment with additional treatment components (e.g., fluency training, behavioral training, or vocabulary instruction). The results also highlight the importance of conducting treatment with fidelity" (p.343).

Al Otaiba, S. (2001). Children who do not respond to early literacy instruction: A longitudinal study across kindergarten and first grade Reading Research Quarterly, 36, 344-346.

An adult reader knows that the initial sound of leap is the same as the final sound of took though the first is a clear, tongue-tip lateral consonant and the second may be a dark, vocalized glide without any tongue-tip contact. This is the result of a phonemic analysis of English that identifies the first as the allophone of the phoneme /l/ that occurs initially before a high front vowel and the second as the allophone that occurs finally after a high back vowel.

For every word a child learns, we estimate that there are an average of one to three additional related words that should also be understandable to the child, the exact number depending on how well the child is able to utilize context and morphology to induce meanings. (Nagy & Anderson, 1984, p. 304)

Some adult speakers believe that there is an /l/ in talk even though it has long since disappeared from the language, and many are quite uncertain as to whether there is an /l/ in palm and salmon.

Labov, L. (2003). When ordinary children fail to read. *Reading Research Quarterly, 38*, 128-131.

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1. The average child has little difficulty with the alphabetic principle. Success rates in decoding single, lone consonants are consistently above 95%, and success is relatively high for single-vowel nuclei and single-consonant codas. 2. It is the combinatory aspect of sound-to-letter correspondences that lies at the heart of the decoding problem. Relations that are one-to-many or many-to-one lead to dramatic declines in success rates, even when they are quite regular. 3. Rules of limited regularity can be absorbed and utilized if the exceptional cases are presented explicitly and in close proximity to the generalization. 4. Complex and abstract rules like the silent-e rule can be mastered with direct instruction and applied consistently to the decoding task.

Labov, L. (2003). When ordinary children fail to read. Reading Research Quarterly, 38, 128-131.

Most new readers have an active vocabulary of some 10,000 words.

Labov, L. (2003). When ordinary children fail to read. *Reading Research Quarterly, 38,* 128-131.

The rate at which trained children achieved phonemic awareness in preschool is important in addition to the actual level of phonemic awareness achieved. Those who became poor readers in Year 5 had made slow progress in achieving phonemic awareness in preschool even though they were eventually successful.

Byrne, B., Fielding-Barnsley, R, & Ashley, L. (2000). Effects of preschool phoneme identity training after six years: Outcome level distinguished from rate of response. *Journal of Educational Psychology, 92*, 659-667.

This article reviews the research literature that describes children who are unresponsive to generally effective early literacy interventions. A majority of unresponsive students had phonological awareness deficits. Additional characteristics included phonological retrieval or encoding deficits, low verbal ability, behavior problems, and developmental delays.

Al Otaiba, S. & Fuchs, D. (2002). Characteristics of children who are unresponsive to early literacy intervention: A review of the literature. Remedial and Special Education, 23, 300-316.

Direct instruction in phonological awareness and the alphabetic principle improved the reading performance of children with reading difficulties over time. However, direct instruction in phonological awareness in conjunction with explicit training in specific metalinguistic concepts and metacognitive strategies was more advantageous overall

Wright, J., & Jacobs, B. (2003). Teaching phonological awareness and metacognitive strategies to children with reading difficulties: A comparison of the two instructional methods. Educational Psychology, 23(1), 17-45.

Before intervention, all children with dyslexia showed distinctly aberrant spatiotemporal brain activation profiles featuring little or no activation of the posterior portion of the superior temporal gyrus (STGp), an area normally involved in phonologic processing, and increased activation of the corresponding right hemisphere area. After intervention that produced significant improvement in reading skills, activity in the left STGp increased by several orders of magnitude in every participant. No systematic changes were obtained in the activation profiles of the children without dyslexia as a function of time.

Simos, P., Fletcher, J., Bergman, E., Breier, J., Foorman, B., Castillo, E., Davis, R., Fitzgerald, M., & Papanicolaou, A. (2002). Dyslexia-specific brain activation profile becomes normal following successful remedial training. Neurology, 58, 1203-1212.

Experiments on letter-name training did not produce increased reading achievement (Jenkins, Bausell, & Jenkins, 1972; Samuels, 1971). Jenkins, J. R., Bausell, R. B., & Jenkins, L. M. (1972). Comparisons of letter name and letter sound training as transfer variables. American Educational Research Journal, 74, 75-86.

Samuels, S. J. (1971). Letter name versus letter sound knowledge in learning to read. Reading Teacher, 24, 604-609, 662.

Letter-name knowledge and phonological awareness as the two best predictors of how well children will read in their first 2 years of schooling.

Scarborough, H. S. (1998). Early identification of children at risk for reading disabilities: Phonological awareness and some other promising predictors. In B. K. Shaprio, P. J. Accardo, & A. J. Capute (Eds.), Specific reading disability: A view of the spectrum (pp. 75-119). Timonium, MD: York Press.

"...children will differ in their PA and some will need more instruction than others. In kindergarten, most children will be nonreaders and will have little PA, therefore PA instruction should benefit everyone. In first grade, some children will be reading and spelling while others may know only a few letters and have no reading skills. The nonreaders will need much more PA and letter instruction than those already reading" (National Reading Panel, 2000, P. 2-33).

"The PA skill thought to be important for developing word memory is being able to segment pronunciations into phonemes that link to graphemes" (National Reading Panel, 2000, p. 2-13).

"Teaching children to manipulate phonemes using letters produced greater effects than teaching without letters (National Reading Panel, 2000, p.2-4).

Although the need for early identification is not controversial, identifying valid measures that can be used with pre-readers has yet to be accomplished. One promising approach is the use of fluency tasks that measure subword skills (e.g., letter names and letter sounds; Kame'enui & Simmons, 2001; Kaminski & Good, 1996; Olson, Wise, Johnson, & Ring, 1997). By fluency, we mean the speed and accuracy with which multiple exemplars can be produced orally. From this perspective, fluency tasks are distinguished from Rapid Automatized Naming tasks (RAN; Denckla & Rudel, 1976; Wolf & Bowers, 1999) in that the latter use only a few presumably known stimuli (e.g., five letters), whereas fluency measures use many exemplars (e.g., all or most letters of the alphabet).

Speece, D.L., Mills, C., Ritchey, K.D., & Hillman, E. (2003). Initial evidence that letter fluency tasks are valid indicators of early reading skill. *Journal of Special Education, 36*, 223-233.

Juel (1988) found that the probability of a poor reader in first grade remaining a poor reader at the end of fourth grade was .88. Satz, Fletcher, Clark, and Morris (1981) found that 93.9% of severely poor readers in second grade continued to be poor readers in fifth grade. Scarborough (1998b) found similar results for students from second grade to eighth grade.

Satz, P., Fletcher, J. M., Clark, W., & Morris, R. (1981). Lag, deficit, rate and delay constructs in specific learning disabilities: A re-examination. In A. Ansara, N. Geschwind, A. Galaburda, M. Albert, & N. Gartrell (Eds.), Sex differences in dyslexia (pp. 129-150). Towson, MD: The Orton Dyslexia Society.

Scarborough, H. S. (1998b). Predicting the future achievement of second graders with reading disabilities: Contributions of phonemic awareness, verbal memory, rapid naming, and IQ. Annals of Dyslexia, 48, 114-136.

Two larger questions arise from this analysis. First, are standard scores too strict an index for measuring the progress of very disabled readers? Not only do these readers need to make progress commensurate with

the amount of time elapsed between pre- and posttesting, but they also need to gain above and beyond this to effect a change in standard score. In other words, a standard score that remains unchanged in actuality may represent a gain in skill for the very severely impaired reader. It is important, then, in discussing the progress of students with disabilities, that raw scores be presented along with standard scores, or that criterion-referenced and experimental tasks be used along with standardized measures. This does not obviate the need to know, report, and work to change standardized scores. Indeed, as Torgesen (2001) has recently noted, one of the most important indices of an intervention's efficacy is whether it can raise a child's performance in standardized scores.

Deeney, T., Wolf, M., & Goldberg O'Rourke, A. (2001). "I like to take my own sweet time": Case study of a child with naming-speed deficits and reading disabilities. *The Journal of Special Education, 35*, 145-155.

Learning to read is not just one of the goals of schooling. It is essential if students are to succeed in any grade, in any subject. According to the National Reading Panel, only about 5% of children learn to read effortlessly. About 60% find early reading difficult, and of that number, 20-30% really struggle. By fourth grade, the seriousness of the problem for these children becomes obvious (National Reading Panel, 2000, p.34).

All children with dyslexia showed distinctly aberrant activation profiles featuring little or no activation of the posterior portion of the superior temporal gyrus (STGp), an area normally involved in phonologic processing, and increased activation of the corresponding right hemisphere area. … After intervention that produced significant improvement in reading skills, activity in the left STGp increased by several orders of magnitude in every participant. No systematic changes were obtained in the activation profiles of the children without dyslexia as a function of time.

Simos, P., Fletcher, J., Bergman, E., Breier, J., Foorman, B., Castillo, E., Davis, R., Fitzgerald, M., & Papanicolaou, A. (2002). Dyslexia-specific brain activation profile becomes normal following successful remedial training. Neurology, 58, 1203-1212.

Research has demonstrated consistently that the number of words students read correctly in 1 minute provides a reliable and valid measure of overall reading ability (Fuchs, Fuchs, & Maxwell, 1988; Potter & Wamre, 1990; Shinn, Good, Knutson, Tilly, & Collins, 1992)

Baker, S., Gersten, R., & Keating, T. (2000). When less may be more: A 2-year longitudinal evaluation of a volunteer tutoring program requiring minimal training. Reading Research Quarterly, 35, 494-514.

Shinn et al. (1992) conducted a confirmatory factor analysis of Oral Reading Fluency and concluded that in the early grades the measure was as valid an indicator of reading comprehension as it was an indicator of decoding ability.

Shinn, M.R., Good, R.H., Knutson, N., Tilly, W.D., & Collins, V. (1992). Curriculum-based measurement of oral reading fluency: A confirmatory analysis of its relation to reading. School Psychology Review, 21, 459-479.

Findings are consistent with previous studies showing the value of Corrective Reading and Reading Mastery for overall improvement of early elementary school students' reading skill (Adams & Engelmann, 1996). Improvements in decoding skills (i.e., letter-word identification and word attack) significantly predicted improvements in oral reading fluency. Students who initially spoke little English benefited from the program as much as other Hispanic Students.

Gunn, G., Biglan, A., Smolkowski, K., & Ary, D. (2000). The efficacy of supplemental instruction in decoding skills for Hispanic and non-Hispanic students in early elementary school. The Journal of Special Education, 34, 90-103.

"If pressed to provide an estimate of the likely progress of older low-progress readers (Years 5 to 8) who are at least two years behind in terms of reading skill, and who are offered either no or only limited non-intensive remedial support, then we would conclude that progress of about half normal rate is probably typical".

Wheldall, K., & Beaman, R. (2000). An evaluation of MULTILIT: 'Making Up Lost Time In Literacy'. Canberra: Department of Education, Training and Youth Affairs.

We would also wish to emphasise that there is perhaps unnecessary pessimism concerning the prognosis for older low-progress readers. We support the desirability of a preventative early intervention approach to reading difficulties but some low-progress readers will still slip through the net and early intervention is not always effective. Similarly, the often heard view that remedial instruction for students beyond Year 2

is ineffective may have been true, but this is a criticism of the ineffectiveness of past programs, not a necessary truth. We can rehabilitate older low-progress readers, as we have shown, with effective programs based on contemporary, empirically validated best practice, if we have the will and the resources to do so.
Wheldall, K., & Beaman, R. (2000). An evaluation of MULTILIT: 'Making Up Lost Time In Literacy'. Canberra: Department of Education, Training and Youth Affairs.

The meaning of being functionally literate in the mainstream The term 'functional literacy' refers to the minimum levels of reading and writing skill necessary to get by in the everyday world of work and social activities and represents, crudely, performance at the level of the average 10-11 year old, say, in Year 5. We suggest that this be regarded as the absolute minimum level to which we should aspire for all primary students, including low-progress readers, by the time they leave primary school in Year 6. The data we have available on the WARP at this stage suggests that mid-Year 5 level approximately equates to around 135 words read correctly per minute which may be regarded as an appropriate minimum target for low-progress readers to reach.
Wheldall, K., & Beaman, R. (2000). An evaluation of MULTILIT: 'Making Up Lost Time In Literacy'. Canberra: Department of Education, Training and Youth Affairs.

What then is this minimum level of competence? Wheldall and Madelaine (1997) found little guidance from the literature apart from a study on adult literacy by Goyen in 1977. She estimated that functional literacy corresponds to a reading age of approximately 10 years 3 months. Since a reading age range is probably more appropriate than a precise reading age, we may make a best guess that a functional level of literacy is reflected in a reading age of around ten to ten and a half years, and is achieved by most students by the end of Year 5. … Text at a functional level of literacy, therefore, can be said to contain on average 135 syllables per 100 words and have sentences which contain, on average, 10 words. Stacey, S., & Wheldall, K. (1999). Essential constituents of effective reading instruction for low progress readers. Special Education Perspectives, 8(1), 44-58.

Even the decoding of irregular words is assisted by phonic mediation because no English word is completely phonologically opaque (Tunmer et al., 1998).
Stacey, S., & Wheldall, K. (1999). Essential constituents of effective reading instruction for low progress readers. Special Education Perspectives, 8(1), 44-58.

By age three, children from privileged families have heard 30 million more words than children from poor families. By kindergarten the gap is even greater. The consequences are catastrophic.
Hart, B., & Risley, T.R. (2003, Spring). The early catastrophe: The 30 million word gap. American Educator. Retrieved April 11, 2003 from
http://www.aft.org/american_educator/spring2003/catastrophe.html

Thirty-two percent of U.S. fourth-graders report that they never or almost never read for fun outside of school, a significantly higher percentage than the international average of 18 percent. Fourth-graders who regularly read for fun have higher average reading scores than those who never or almost never read for fun.
Ogle, L., Sen, A., Pahlke, E., Jocelyn, L., Kastberg, D., Roey, S., and Williams, T. (2003). International Comparisons in Fourth-Grade Reading Literacy: Findings from the Progress in International Reading Literacy Study (PIRLS) of 2001 (NCES 2003—073). U.S. Department of Education, NCES. Washington, DC: U.S. Government Printing Office.

Direct instruction in phonological awareness improved the reading performance of children with reading difficulties over time. However, direct instruction in phonological awareness in conjunction with explicit training in specific metalinguistic concepts and metacognitive strategies was more advantageous overall
Wright, J., & Jacobs, B. (2003). Teaching phonological awareness and metacognitive strategies to children with reading difficulties: A comparison of the two instructional methods. Educational Psychology, 23(1), 17-45.

For Direct Instruction there were 49 studies with 182 outcomes. DI had the largest effect size of the three models included in the group displaying the Strongest Evidence of Effectiveness. It is a model that is clearly established across varying contexts and varying study designs; its effects are relatively robust and the model can be expected to improve students' test scores. The model certainly deserves continued dissemination and federal support

Borman, G.D., Hewes, G.M., Overman, L.T., Brown, S. (2002). *Comprehensive school reform and student achievement: A meta-analysis*. Report No. 59. Center for Research on the Education of Students Placed At Risk, U.S. Department of Education. Retrieved 28/3/03 from: http://www.csos.jhu.edu./crespar/techReports/report59.pdf

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Third grade, even fourth grade is the criteria because, in the past, investigators have found a drop-off in standardized test scores as FRL students moved from first grade to third and fourth grade. Jeanne Chall has labeled this phenomenon "the 4th grade slump." Standardized tests in reading begin with a focus on decoding in 1st grade and shift to a focus on reading comprehension in 3rd grade and higher. So success, for a program with students from poor families must involve nothing less than helping students read at grade level, on standardized tests, at the end of 3rd grade and higher.
Rosenshine, B. (2002). Helping students from low-income homes read at grade level. *Journal for Students Placed at Risk, 7*. Retrieved 19/3/03 from http://faculty.ed.uiuc.edu/rosenshi/Helping%20at-risk%20readers.htm

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Reading Mastery is an extremely effective program for teaching decoding to all children. The mean score for 171 students across six DI schools, who began the program in kindergarten and who remained in the program for four years was at the 49th percentile. I think this is a wonderful finding.
Rosenshine, B. (2002). Helping students from low-income homes read at grade level. *Journal for Students Placed at Risk, 7*. Retrieved 19/3/03 from http://faculty.ed.uiuc.edu/rosenshi/Helping%20at-risk%20readers.htm

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Australia's rate of early school leaving has not improved over the last decade poor literacy and numeracy skills are factors accounting for early school leaving
Business Council of Australia. (2003). *The cost of dropping out: The economic impact of early school leaving*. Retrieved 12/2/03 from http://www.bca.com.au/upload/The_Cost_of_Dropping_Out.pdf

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"If the role of inadequate instruction is taken seriously, and more aggressive attempts are made to teach all children to read, the meaning of disability could change in the future. In this scenario, the actual diagnosis of LD could be reserved for children whose reading or other academic problems are severe and intractable." Lyon, R. quoted in Rethinking Special Education report
Johnson, K.A. (2003). Time to refocus special education on reading achievement. Mackinac Center for Public Policy. Retrieved 26/2/2003 from http://www.mackinac.org/5000

The vocabulary of the average American 14-year-old has dropped from 25,000 words to 10,000.
Roberts, P.C. (2003, Feb 18). Education's nemesis. Washington Times. Retrieved 20/3/2003 from http://dynamic.washtimes.com/twt-print.cfm?ArticleID=20030218-73449555

At pre-school age, no clear differences emerged in motivational orientations. … all analyses revealed distinctly different developmental patterns of motivation as a function of reading career … the regressive reading groups displayed lower task orientation, and higher ego-defensiveness and social dependency over age than progressive reading career groups. P.171
Lepola, J., Salonen, P., & Vauras, M. (2000). The development of motivational orientations as a function of divergent reading careers from pre-school to the second grade. Learning and Instruction, 10, 153–177.

" … a number of studies have provided evidence that when direct comparisons are made between measures of onset–rime awareness and phoneme awareness taken at the same time, phoneme awareness proves to be the more powerful predictor of children's reading skills."
Hulme, C., Hatcher, P.J., Nation, K., Brown, A., Adams, J., & Stuart, G. (2002). Phoneme awareness is a better predictor of early reading skill than onset–rime awareness. *Journal of Experimental Child Psychology, 82*, 2–28.

Early in development, however, spelling is thought by some researchers to be easier than reading, based on their experiences with older pre-school children who were using invented spellings (Bissex, 1980; Chomsky, 1971, 1979; Montessori, 1964), and to be a facilitator (Frith, 1985) or contributor (Cataldo & Ellis, 1990; Shanahan, 1984) to reading development in normal progress children. p.179
Fletcher-Flinna, C.M., & Thompson. G. B. (2000). Learning to read with underdeveloped phonemic awareness but lexicalized phonological recoding: A case study of a 3-year-old. *Cognition, 74*, 177-208.

We propose that relations between phonemic awareness and spelling skills are bidirectional: Spelling influenced growth in phonemic awareness and phonemic awareness contributed to growth in spelling skills.

Hecht, S.A, & Close, L. (2002). Emergent literacy skills and training time uniquely predict variability in responses to phonemic awareness training in disadvantaged kindergartners. *J. Experimental Child Psychology, 82*, 93–115.

For the novice alphabetic reader, the ability of analyzing syllables into phonemes provides the background from which initial reading skills develop; for the more experienced alphabetic reader, such an ability fine tunes his/her sensitivity to syllable construction and helps improve pronunciation accuracy.
Cheung, H. (1999). Improving phonological awareness and word reading in a later learned alphabetic script. *Cognition, 70*(1), 1-26.

40% of the errors on math achievement tests are reading errors (Barton, 2003)

"At third grade, we can predict 75% of those who will graduate and 70% of those who will drop out of high school primarily from their high and low reading and language skills."
Lloyd, D.N. (1978). Prediction of school failure from third grade data. *Educational and Psychological Measurement, 38*, 1193-1200.

".....as the last of the primary grades, the third grade is the point at which basic reading skills have been taught (and hopefully learned), as well as the grade in which it has been estimated that 50% of future achievement patterns have been set." (Predictive factors other than reading include IQ, retention, and GPA.)
Lloyd, D.N. (1978). Prediction of school failure from third grade data. *Educational and Psychological Measurement, 38*, 1193-1200.

Dysfluent reading in the absence of spelling difficulties was associated only with a naming speed deficit—assessed at school entrance—but not with phonological memory or phonological awareness deficits. In contrast, a specific spelling deficit was preceded by phonological deficits.
Wimmer, H., & Mayringer, H. (2002). Dysfluent reading in the absence of spelling difficulties. *Journal of Educational Psychology, 94*, 272-277.

"The authors compared the influence of text difficulty—reading-level matched or grade-level matched—on the growth of poor readers' reading ability over 18 weeks of 1-to-1 tutoring. Forty-six 3rd–5th graders, including 25 with disabilities, were assigned randomly to 1 of 2 tutoring approaches or a control condition. Significant differences favored tutored children. Between approaches, the only significant difference was oral reading fluency, which favored students who read material at their reading level. Students who began with lower fluency made stronger gains in text matched to reading level; students with higher fluency profited from both treatments. When the 3 groups were combined, fluency was the strongest contributor to reading comprehension outcomes."
O'Connor, R.E., Bell, K.M., Harty, K.R., Larkin, L.K., Sackor, S.M., & Zigmond, N. (2002). Teaching reading to poor readers in the intermediate grades: A comparison of text difficulty. *Journal of Educational Psychology, 94*, 474-485.

" … the latest brain research for education policy is basically not ready for prime time. On the other hand, a lot of what some of the more exciting brain research being done today is reinforcing behavioral and developmental research. ... In fact, behavioral research is brain research. We know about brain function by looking at behavior. All this behavior and development we've been studying for decades is not coming from the pancreas".
Shonkoff, J.P. & Phillips, D.A. (Eds). (2000). From neurons to neighborhoods: The science of early childhood development. [On-Line]. Available at: http://www.nap.edu/catalog/9824.html

A combined analysis of all 208 UK families confirmed that chromosome 18 is probably a general risk factor for dyslexia, influencing several reading-related processes, such as single word–reading, but most strongly - phonemic awareness.
Fisher, S.E., Francks, C., Marlow, A.J., MacPhie, I.L., Newbury, D.F., Cardon, L.R., Ishikawa-Brush, Y., Richardson, A.J., Talcott, J.B., Gayán, J., Olson, R.K., Pennington, B.F., Smith, S.D., DeFries, J.C., Stein, J.F. & Monaco, A.P. (2001). Independent genome-wide scans identify a chromosome 18 quantitative-trait locus influencing dyslexia, *Nature Genetics, 30*, 86 – 91.

Results obtained from behavioral genetic model–fitting analyses of data from parents and their children tested at age 16 are consistent with results of studies of twins and siblings indicating that individual differences in reading performance are due substantially to genetic influences.
Wadsworth, S.J., Corley, R.P., Hewitt, J.K., Plomin, R., DeFries, J.C. (2002). Parent-offspring resemblance for reading performance at 7, 12 and 16 years of age in the Colorado Adoption Project.

"Thus, a first recommendation to educators who want to improve students' comprehension skills is to teach them to decode well. Explicit instruction in sounding out words, which has been so well validated as helping many children to recognize words more certainly (e.g., Snow, Burns, & Griffin, 1998, online document), is a start in developing good comprehenders - but it is just a start. Word-recognition skills must be developed to the point of fluency if comprehension benefits are to be maximized."

Pressley, M. (2000). Comprehension instruction: What makes sense now, what might make sense soon. In M.L. Kamil, P. Mosenthal, P.D. Pearson, & R. Barr (Eds.) *Handbook of Reading Research: Volume III.* New York: Longman. Retrieved from http://www.readingrockets.org/articles/researchbytopic/4957

Scaffolding error – when an error shares some or most of the sounds of the target word (e.g., 'bark' misread as 'bank') is a strong predictor of reading success. Errors that retain meaning but not initial and final phonemes ("people" for "crowd") were not correlated with accurate word reading ability. Savage, R., Stuart, M. & Hill, V. (2001). The role of scaffolding errors in reading development: Evidence from a longitudinal and a correlational study. *The British Journal of Educational Psychology, 71*, 1-13.

"The way you interpret what the child does will reflect what you understand reading to be. For instance, if she reads the word *feather* for *father*, a phonics-oriented teacher might be pleased because she's come close to sounding the word out. However, if you believe reading is a meaning-seeking process, you may be concerned that she's overly dependent on phonics at the expense of meaning. You'd be happier with a miscue such as *daddy*, even though it doesn't look or sound anything like the word in the text. At least the meaning would be intact" (Baskwill & Whitman, 1988, p.19).

Baskwill, J., & Whitman, P. (1988). Evaluation: Whole Language, Whole Child. New York: Scholastic.

"It is intolerable that around 1 in 5 people in the world still do not have access to literacy skills. In a world constructed around the assumption that everyone has the basic skills of literacy and where literacy and freedom are indissolubly linked, to be illiterate is to be unfree."

Koïchiro Matsuura, Director-General of UNESCO, Message for International Literacy Day

During reading, the decoding of words always takes place before the understanding of words, sentences or whole texts. Sophisticated eye movement and brain research [event related potential (ERP) studies] have convincingly demonstrated this. The eyes fixate on a word for about 250 milliseconds. During this time, a number of processes occur close together in time, but nevertheless, in a set sequence. The visual shape of each letter is recognised, each letter is translated into its sound equivalent, the sounds are assembled together to arrive at a mental sound equivalent for the whole word, and finally, the meaning of the word is accessed.

Semantic processing occurs last (e.g. Lee, Rayner & Pollatsek, 1999: Sereno, Rayner, & Posner, 1998; Perry & Ziegler, 2002). As readers become more adept, instead of letter-by-letter symbol-to-sound translation occurring in a series, it has been shown that this process speeds up, and gradually groups of letters, common spelling patterns, and high frequency words begin to be recognised all at once, in parallel (Aghababian & Nazir, 2000; Jared, Levy & Rayner, 1999).

Pictures and guessing play no part in any of the word reading processes that occur. Nor is the use of context among the processes that occurs during an initial eye fixation. Only after an initial eye fixation occurs, and only on the occasions where word meaning is in doubt, do the eyes regress back over the preceding text to use context as an aid to meaning. These particular regressions constitute a post reading strategy that may occur afterwards: in effect, a non-reading strategy used to confirm meaning, not to extract it in the first place.

Macmillan, B. (2002). An evaluation of the Government's Early Intervention Initiative: The Early Literacy Support programme. *Reading Reform Foundation Newsletter, 49.* [On-Line]. Available: http://www.rrf.org.uk/49%20Bonnie%20MacMillan%20Article.htm

Regarding the reading comprehension issue, one should bear in mind the following: "Crowley et al. have demonstrated the relationship between automation of cognitive processes and the emergence of metacognitive thinking. They found that kindergarten children were most likely to think "metacognitively" when a lower level cognitive skill became automated."

Crowley, K., Shrager, J. & Siegler, R. S. (1997). Strategy discovery as a competitive negotiation between metacognitive and associative mechanisms. Developmental Review, 17, 462-489.

"The 96 lowest-achieving 2nd grade readers from 7 schools were randomly assigned to time-equated treatments over 4 months: word reading; comprehension; combined word reading and comprehension; and repeated reading. Of the treatments, combined was the most superior to the control (effect sizes, 1.24, real word, 1.1, pseudoword reading). All treatments improved in word reading and comprehension, and accuracy and rate of word reading (or text reading) uniquely predicted each of 5 measures selected for text-based and situation-based comprehension, which loaded on one factor (cf1=1.00). Conclusion: Word reading accuracy and rate constrain comprehension, but word reading and comprehension also exert reciprocal influences that enable each other."

Berninger, V.W. (2001). *A simple story for the simple view of reading instruction.* Paper presented at the conference of the Society for the Scientific Study of Reading, May 31-June3, 2001, Regal Harvest House Hotel, Boulder, Colorado.

 A combination of direct instruction and wide reading is ideal for encouraging literacy in students.

Greenwood, S.C. (2002 May/Jun). Making words matter: Vocabulary study in the content areas. The Clearing House, 75(5), 258-263.

 Content area teachers cannot leave development of vocabulary to chance. The research is deceptively simple in that wide reading accounts for the bulk of vocabulary gain (Anderson and Freebody, 1983; Johnson, 2001).

Johnson, D.D. (2001). *Vocabulary in the elementary and middle school*. Needham Heights, MA: Allyn and Bacon.

Based on a recent review of 23 research reports on the characteristics of students who are unresponsive to early literacy intervention, Al-Otaiba and Fuchs (in press) found that most unresponsive students were characterized by deficits in phonological awareness. Other characteristics identified less consistently included deficits in phonological retrieval or encoding, verbal ability, behavior problems, or developmental delays. Al-Otaiba and Fuchs suggested that future research address a common definition of "treatment unresponsiveness" (e.g., reading fluency below 40 words per minute), and that more attention be given to characteristics such as phonological memory and low IQ, and to the training and fidelity of treatment implementation of trainers.

Al-Otaiba, S. D., & Fuchs, D. (2002). Characteristics of children who are unresponsive to early literacy intervention: A review of the literature. *Remedial and Special Education, 23*(5), 300-316.

 If we adopt the 30th percentile as a standard for adequate reading progress, then the proportion of the total population remaining at risk in spite of the best interventions tested to date ranges from 5 percent to 7 percent (Torgesen, 1998).

Torgesen, J.K. (1998, Spring/Summer). Catch them before they fall: Identification and assessment to prevent reading failure in young children. *American Educator*. Retrieved from http://www.ldonline.org/ld_indepth/reading/torgeson_catchthem.html.

 "although the evidence for a visual deficit appears strong and convincing, a coherent theory is required to make the case that it is more than an accidental concomitant, or a marker for, reading disability" (Hogben, 1997, p.68).

Hogben, J. (1997). How does a visual transient deficit affect reading? In Charles Hulme & Margaret Snowling (Eds.). Dyslexia: Cognition and intervention. London: Whurr.

 It is estimated that an adult writer knows how to spell between 10,000 and 20,000 words. By way of contrast, in the most conscientious spelling curriculum (i.e., weekly "spelling lists" of words to be memorized), a child is explicitly taught approximately 3,800 words during the elementary years (Graham, Harris, & Loynachan, 1996). In this discrepancy lies the crux of much of the debate on spelling instruction. How much of spelling is "taught" and how much is "caught"?

Scott, C.M. (2000). Principles and methods of spelling instruction: Applications for poor spellers. Topics in Language Disorders, 20, 66- 79.

 "Only two possible escapes can save us from the organized mayhem of our dark potentialities--the side that has given us crusades, witch hunts, enslavements, and holocausts. Moral decency provides one necessary ingredient, but not nearly enough. The second foundation must come from the rational side of our mentality. For, unless we rigorously use human reason both to discover and acknowledge nature's

factuality, and to follow the logical implications for efficacious human action that such knowledge entails, we will lose out to the frightening forces of irrationality, romanticism, uncompromising "true" belief, and the apparent resulting inevitability of mob action. Reason is not only a large part of our essence; reason is also our potential salvation from the vicious and precipitous mass action that rule by emotionalism always seems to entail. Skepticism is the agent of reason against organized irrationalism--and is therefore one of the keys to human social and civic decency."

Gould, S. J. (1997). The positive power of skepticism. Foreword in M. Shermer, Why people believe weird things: Pseudoscience, superstition, and other confusions of our time. New York: W. H. Freeman, p. x.

"We have already noted that this model of the reading process is now considered wrong by many researchers (e.g., Stanovich, 1986, 1992). What distinguishes good readers is not their ability to read better in context, but their ability to read words even in isolation. Poor readers do not read words well in isolation. They rely on context to help them read (Nicholson, 1991). Good readers read words well in isolation because they use their knowledge of letter-sound rules, a skill that poor readers lack. For good readers, eye movement data show fairly complete processing of the words on the page (Rayner & Pollatsek, 1989). Very few words are skipped, and if they are, they tend to be words like the. In all, it seems that the good reader processes almost all the print, does it very quickly, and tries to make decisions about meaning at the same time (Matthei & Roeper, 1983)." (p.

Nicholson, T. (1998). Reading comprehension processes. In G. B. Thompson & T. Nicholson (eds.) *Learning to read: Beyond phonics and whole language*. New York: Teachers College Press.

Rayner, K., & Pollatsek, A. (1989). *The psychology of reading.* Englewood Cliffs, NJ: Prentice Hall.

Matthei, E., & Roeper, T. (1983). *Understanding and producing speech.* Bungay, Suffolk, England: Fontana.

Inference and prediction make it possible to leap toward meaning without fully completing the optical, perceptual and syntactic cycles. Yet the reader, once sense is achieved, has the sense of having seen every graphic feature, identified every pattern and word, assigned every syntactic pattern. (p. 835)

Goodman, K.S. (1985). Unity in reading. In H. Singer & R.B. Ruddell (Eds.), Theoretical models and processes of reading (pp. 813-840). Newark, DE: International Reading Association

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"Thus, we believe that given perfection in decoding, the quality of reading will depend entirely on the quality of the reader's comprehension; if a child's listening comprehension of a text is poor, then his reading comprehension will be poor, no matter how good his decoding" (p. 244) Juel, C., Griffith, P.L., & Gough, P.B. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. Journal of Educational Psychology, 78, 243-255.

In Reading in Junior Classes, (Department of Education, 1985) it was argued that children sample the text, predict what will happen, confirm their predictions and self-correct if their predictions don't fit with the sampled text. Advice of teaching children how to sample was given: "Helping beginning readers to sample effectively means showing them how to attend only to those details of meaning and print which are necessary to make predictions, and to confirm or correct them." (p. 32)

Department of Education (1985). Reading in junior classes: With guidelines to the revised Ready to Read Series. Wellington: Author.

In a book published for the Ministry of Education Mooney (1988) argued that "Children do not learn to read in order to be able to read a book, they learn to read by reading books." (p. 3)

Mooney, M. (1988). Developing life-long readers. Wellington, New Zealand: Learning Media.

In the United States, survey data show that the vast majority (90%) of teachers perceive themselves to be "eclectic", in that they use both whole language and phonics (Baumann, Hoffman, Moon, & Duffy-Hester, 1998). On the other hand, it's not clear what teachers think "phonics" is. The survey found that 2 out of 3 K-2 (kindergarten through second grade) teachers reported that they taught phonics by teaching letter-sound correspondences and "word families (e.g., cat, mat, hat, sat, fat). This is phonics teaching. The same number also reported that they used whole language techniques, for example, encouraging children to "invent" spellings, reading to children, using Big Books for instruction, providing children's literature for their pupils to read.

Baumann, J. F., Hoffman, J. V., Moon, J., & Duffyhester, A. M. (1998). Where are teachers' voices in the phonics/whole language debate? Results from a survey of US elementary classroom teachers. *The Reading Teacher, 51*, 636-650.

Australian survey data also indicate that 30% of Australian teenagers have "not attained mastery in the important area of reading." (p. 17)

Marks, G. N., & Ainley, J. (1997). *Reading comprehension and numeracy among junior secondary school students in Australia*. Melbourne: Australian Council for Educational research.

These findings extend into adolescence data previously reported on the persistence of reading disability,[18] that is, that children who were initially poor readers in the early school years remain poor readers relative to other children. Conclusions. Deficits in phonological coding continue to characterize dyslexic readers even in adolescence.

Shaywitz, S.E., Fletcher, J.M., Holahan, J.M., Shneider, A.E., Marchione, K.E., Stuebing, K.K., Francis, D.J., Pugh, K.R., & Shaywitz, B.A. (1999). *Persistence of dyslexia: The Connecticut longitudinal study at adolescence*. *Pediatrics, 104*, 1351-1339.

"From grades 2 to 6 there is no evidence of a developmental window beyond which phonological deficits cannot be effectively remediated with intensive phonological training".

Lovett, M.W., & Steinbach, K.A. (1997). The effectiveness of remedial programs for reading disabled children of different ages: Does the benefit decrease for older children? *Learning Disability Quarterly, 20*, 189-209.

"In surgery, as in anything else, skill, judgment, and confidence are learned through experience, haltingly and humiliatingly. Like the tennis player and the oboist and the guy who fixes hard drives, we need practice to get good at what we do. There is one difference in medicine, though: we practise on people." (p. 55). Atul Gawande, 2002: "Annals of Medicine: The Learning Curve" The New Yorker, January 28.

These fMRI findings demonstrate that overt pseudoword reading activates brain areas common to performance of other phonological awareness tasks.

Dietz, N., Jones, K., Zeffiro, T, & Eden, G. (2000). Phonological processing investigated with overt pseudoword reading. Poster session (No. 348) presented at the NeuroImage Human Brain Mapping 2000 Meeting. [On-Line]. Available at: http://www.apnet.com/www/journal/hbm2000/7033.html

Consider this statement from Timothy Shanahan, a member of the National Reading Panel: "It has been suggested that the NRP will consider only research drawn from a single paradigm. There is some truth in this accusation, as our major determinations will require clear experimental or quasi-experimental evidence. This, however, is not because we do not recognize the value of qualitative studies or of other quantitative methodologies, but rather because of the nature of the determinations we have been charged with making. Our job is to decide what works -- what instructional methods, procedures, or programs can be used successfully to improve reading achievement. Experiments and quasi-experiments are the only research methods that try out a technique under real classroom conditions to determine their impact on learning, and it seemed to us unreasonable to indicate that any approach "worked" if such evidence was lacking." You can read Shanahan's entire statement at www.readingonline.org/critical/shanahan/panel.html.

In the September 1955 Gates blasted Flesch, accusing him of trying to "discredit American education." In the October 1955 issue of the NEA Journal, an article by Nila Banton Smith, then professor of education at NYU, reminded teachers of the important social purposes behind reading. Professor Smith wrote: "We are on the brink of a new epoch in reading instruction ... In the future, reading instruction must concern itself with much more than pedagogy. It must mesh more directly with the gears of vital social problems and needs."

National Institute of Child Health and Human Development (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. National Reading Panel. [On-Line]. Available at: www.nationalreadingpanel.org/Publications/publications.htm

Two inescapable conclusions emerge: (a) Mastering the alphabetic principle (that written symbols are associated with phonemes) is essential to becoming proficient in the skill of reading, and (b) methods that teach this principle are more effective than those that do not (especially for children who are at risk in some way for having difficulty learning to read).

Rayner, K., Foorman, B.R., Perfetti, C.A., Pesetsky, D., & Seidenberg, M.S. (2001). How psychological science informs the teaching of reading. Psychological Science in the Public Interest, 2, 31-74. [On-Line]. Available at www.psychologicalscience.org/newsresearch/publications/journals/pspi2_2.html.

Educators have long argued over the best way to teach reading to children. The research, however, indicates that a highly popular method is inadequate on its own. Many teachers adopted the whole-language approach because of its intuitive appeal.
Rayner, K., Foorman, B.R., Perfetti, C.A., Pesetsky, D., & Seidenberg, M.S. (2002, March). How should reading be taught? Scientific American, 286, 84-91.

Some eye-movement studies have used homophones to demonstrate that the process of sounding out words mentally begins very rapidly after a reader's gaze first fixes on a particular word. And recent brain studies show that the primary motor cortex is active during reading, presumably because it is involved with mouth movements used in reading aloud. The process of mentally sounding out words is an integral part of silent reading, even for the highly skilled.
Rayner, K., Foorman, B.R., Perfetti, C.A., Pesetsky, D., & Seidenberg, M.S. (2002, March). How should reading be taught? *Scientific American, 286*, 84-91.

Morphological Awareness Morphological awareness involves the ability to be conscious of, talk about, and manipulate the morphological units of a language (Carlisle, 1995). It involves the ability to identify root words and their inflected or derived forms. Awareness of morphological structure plays an important role in decoding (Carlisle). Morphological awareness is crucial for recognizing unfamiliar words that cannot be decoded phonetically, allowing readers to access meaning based on their knowledge of root words, inflections, and derived forms. For example, knowledge of the derivation "-ette" allows a reader to deduce the meaning of words containing that form, such as dinette and kitchenette.

Although some authors suggest that students are more likely to use morphological awareness to decode words after second grade (Fowler & Lieberman, 1998), there is some evidence that children as young as 6 and 7 may tap into their emerging knowledge of morphemes for written language (Treiman & Cassar, 1997). By the fourth grade, most children have basic knowledge of derived forms (Windsor & Hwang, 1997). By the fifth grade, a substantial portion of a child's orthographic representations consists of forms that are derivations of root words (Anglin, 1993). Thus, morphological awareness appears to be a crucial reading tool as students encounter increasingly complex texts beyond the primary grades (Shankweiler, Lundquist, Dreyer, & Dickinson, 1998).
Apel, K., & Swank, L.K. (1999). Second chances: Improving decoding skills in the older student. *Language, Speech & Hearing Services in Schools, 30*, 231-243.

"Past research has shown that developing readers require as little as four exposures to a word to develop a VOI (Ehri & Saltmarsh, 1995; Reitsma, 1983). Once VOIs are established, readers bypass the relatively slower act of decoding and more quickly access the mental representation of a word to comprehend its meaning (Bruck. 1990; Ehri, 1997; Kamhi & Catts, 1999). Relying on VOIs to read words decreases the need for decoding, leading to better comprehension. Also, these mental images stored in memory may be used during future decoding attempts, serving as analogs when reading other unfamiliar, yet orthographically similar words (Ehri, 1997)."
Ehri, L. C. (1997). Learning to read and learning to spell are one and same, almost. In C. A. Perfetti, L. Rieben, & M. Fayol (Eds.). Learning to spell: Research, theory and practice across languages (pp. 237-270). Mahwah, NJ: Erlbaum.
Apel, K. & Swank, L.K. (1999). Second chances: Improving decoding skills in the older student. Language, Speech & Hearing Services in Schools, 30, 231-243.

'The first alternative and preference is - to skip over the puzzling word. The second alternative is to guess what the unknown word might be. And the final and least preferred alternative is to sound the word out. Phonics, in other words, comes last.' (p.66).
Smith, F. (1979). Reading without nonsense. New York: Teachers College Press.

'Unpredictability is not the exception in English spelling-sound correspondences, it is the rule' (p.152).
Smith, F. (1999). Why systematic phonics and phonemic awareness instruction constitute an educational hazard. Language Arts, 77, 150-155.

Initial consonants and consonant clusters, used with syntactic and semantic information, usually provide sufficient information for word recognition and reading for meaning. Teaching children to sound out words letter by letter is unnecessary and confusing. In learning phonics children best acquire phonic and related knowledge through rich experiences with using print for real purposes.

Emmitt, M. (1996). Have I got my head in the sand? - Literacy matters. In 'Keys to life' Conference proceedings, Early Years of Schooling Conference, Sunday 26 & Monday 27 May 1996, World Congress Centre, Melbourne' pp. 69- 75. Melbourne: Directorate of School Education. [On-Line]. Available: http://www.sofweb.vic.edu.au/eys/pdf/Proc96.pdf

"Learning to read is not just one of the goals of schooling. It is essential if students are to succeed in any grade, in any subject. According to the National Reading Panel, only about 5% of children learn to read effortlessly. About 60% find early reading difficult, and of that number, 20-30% really struggle. By fourth grade, the seriousness of the problem for these children becomes obvious" p.34.

Lewis, L. & Paik, S. (2001). Add it up: Using research to improve education for low-income and minority students. Washington: Poverty & Race Research Action Council. Retrieved from

http://www.prrac.org/additup.pdf

"Beginning readers need explicit instruction and practice that lead to an appreciation that spoken words are made up of smaller units of sounds, familiarity with spelling-sound correspondences and common spelling conventions and their use in identifying printed words, "sight" recognition of frequent words, and independent reading, including reading aloud. Fluency should be promoted through practice with a wide variety of well-written and engaging texts at the child's own comfortable reading level" (Snow, Burns, & Griffin, 1998, p.7).

Snow, M., Burns, S., & Griffin, P. *Preventing Reading Difficulties in Young Children - Executive Summary - March 1998.* Committee on the Prevention of Reading Difficulties in Young Children, National Research Council. Retrieved from http://www.nap.edu/catalog/6023.html

Children with phonemic awareness are able to discern that camp and soap end with the same sound, that blood and brown begin with the same sound, or, more advanced still, that removing the /m/ from smell leaves sell.

Snow, C.E., Burns, S., & Griffin, P. (Eds.) (1998). Preventing reading difficulties in young children. Report of the National Research Council. [On-Line]. Available at:

http://www.nap.edu/readingroom/books/reading/.

According to Carroll, Davies, and Richman (1971) and Adams (1990), if children successfully negotiate all the texts normally encountered by the end of third grade, they are expected to recognize and know well over 80,000 different words.

Hiebert, E. H., & Pearson, P. D. (2000). Building on the past, bridging to the future: A research agenda for the Center For The Improvement Of Early Reading Achievement. Journal of Educational Research, 93(3): 133-144. [On-Line]. Available: http://www.ciera.org/ciera/publications/online-at-ciera/99-03/art-online-99-03.html

The Australian Bureau of Statistics has reported a 16 per cent unemployment rate for people with poor literacy skills compared to a 4 per cent rate for those with very high literacy levels

Australian Bureau of Statistics (1998). Education and training in Australia. Canberra: ABS Cat. no. 4224.0.

Low literacy is strongly related to unemployment, poverty, and crime. About 43 percent of those with the

lowest literacy skills live in poverty, and 70 percent of the prison population falls into the two lowest levels of reading proficiency.

1998 National Institute for Literacy Fact Sheet.

What better proof that children are being wrongly labelled as needing special education than in rural Wilkes County? At Washington-Wilkes Elementary, the number of pupils referred to special education programs dropped an estimated 30 percent after Reading First, a reading-intensive program, was implemented.

Beverley H Johns Atlanta Journal-Constitution Monday, October 29, 2001

"Children had on average acquired about 5,200 root words in their vocabulary by the end of grade 2 and an average 3,200 additional root words in grades 3-5 and that advantaged children had acquired 6,200 root words by the end of grade 2 and an additional 2,500 thereafter. Thus, large differences in root word vocabulary had occurred by grade 2".

Biemiller, A., & Slonim, N. (2001). Estimating root word vocabulary growth in normative and advantaged populations: Evidence for a common sequence of vocabulary acquisition. *Journal of Educational Psychology, 93*, 498-520.

"The average number of new words learned in a year - about 3,000 to 4,000. The average number of new words taught directly in a year - about 300 to 500".

Osborn, J.H. & Armbruster, B.B. (2001). Vocabulary acquisition: Direct teaching and indirect learning. *Basic Education Online Edition, 46*(3). Retrieved 5/8/2003 from http://www.c-b-e.org/be/iss0111/a2osborn.htm

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According to the National Reading Panel (2000), estimates of students' vocabulary size imply that most of a student's vocabulary is learned in contexts other than formal learning, especially independent reading.

Osborn, J.H. & Armbruster, B.B. (2001). Vocabulary acquisition: Direct teaching and indirect learning. Basic Education Online Edition, 46(3). [On-Line]. Available: http://www.c-b-e.org/be/iss0111/a2osborn.htm

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"Dynamic/interactive assessment was more accurate in reflecting the learning potential of children than static tests, particularly with learning-disabled and minority children."

Tzuriel, D. (2000). Dynamic assessment of young children: Educational and intervention perspectives Educational Psychology Review, 12, 385-435.

"The vast majority of English schools have now moved to an acceptance that phonics needs to be taught, both for reading and for spelling." The less successful schools lacked a consistent approach to phonics, with too many different methods in use in classrooms. "There is still much further to go before the quality of the teaching is good enough". OFSTED said teachers had not had enough training Phonics teaching 'not sound enough'

BBC News Monday, 29 October, 2001

http://news.bbc.co.uk/hi/english/education/newsid_1626000/1626512.stm

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"… the phonic aspect of word level work is not always being systematically taught or given the emphasis that it requires" (p. 3).

Office for Standards in Education. (1998). Her Majesty's Chief Inspector of Schools in England. http://www.standards.dfes.gov.uk/literacy/publications/?pub_id=119&atcl_id=643

Scaffolding error – when an error shares some or most of the sounds of the target word (e.g., 'bark' misread as 'bank') is a strong predictor of reading success. Errors that retain meaning but not initial and final phonemes ("people" for "crowd") were not correlated with accurate word reading ability. Savage, R., Stuart, M. & Hill, V. (2001). The role of scaffolding errors in reading development: Evidence from a longitudinal and a correlational study. *The British Journal of Educational Psychology, 71*, 1-13.

Independent reading – 90th percentile 21 minutes per day or 4.4 million words per year, 50th percentile 4.6 minutes per day or 280, 000 words per year, 10th percentile 0.1 minutes per day or 8000 words per year. Anderson, R.C., Wilson, P.T., & Fielding, L.G. (1988). Growth in reading and how children spend their time outside of school. Reading Research Quarterly, 23, 285-303.

There are about 87000 different word forms in English. Speech is lexically impoverished - the average frequency in all oral language situations is in the 400-600 range. In children's books the average word is at 627th in frequency.
Cunningham, A.E., & Stanovich, K.E. (2001). What reading does for the mind. Journal of Direct Instruction, 1, 137-149.

By adolescence, less than 25% of Victorian students who struggled in Year 2 had recovered.
Prior, M. (2001). Preparing early for success. The Age, Education Age, p.12-13.

In a major longitudinal study (Project Follow Through - $1 billion over nearly three decades) of more than 15,000 students, Direct Instruction showed the greatest positive impact on all three types of development assessed – basic skills, problem solving, and self esteem.
Association of American Educators. (2001). Project Follow Through. Retrieved from http://www.aaeteachers.org/follow.html

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Phonological coding is defined by Swank [1994] as "the ability to code abstract representations of the sound attribute of spoken and written words in the form of individual units of speech known as phonemes". Swank, L. K. (1994). Phonological coding abilities: Identification of impairments related to phonologically based reading problems. Topics in Language Disorders, 14(2), 56-71.

Our writing system is an amalgam of Anglo-Saxon, Latin, and Greek, and to a lesser extent, includes spellings from French, German, Italian, and Spanish. Each of these languages contributed spelling conventions that within the language of origin were predictable but that violate the patterns of another. For example, ch is used to spell /ch/ in Anglo-Saxon words such as chair; is used to spell /k/ in Greek-derived words such as chorus; and spells /sh/ in French-derived words such as charade and Charlotte.
Moats, L.C. (1998, Spring/Summer). Teaching decoding. *American Educator,* 1-9.

About 60 percent of the words in English running text are of Latin or Greek origin (Henry, 1997). Moats,

L.C. (1998, Spring/Summer). Teaching decoding. *American Educator*, 1-9.

Deficits in phonological coding continue to characterize dyslexic readers even in adolescence; performance on phonological processing measures contributes most to discriminating dyslexic and average readers, and average and superior readers as well. These data support and extend the findings of previous investigators indicating the continuing contribution of phonological processing to decoding words, reading rate, and accuracy and spelling. Children with dyslexia neither spontaneously remit nor do they demonstrate a lag mechanism for catching up in the development of reading skills. In adolescents, the rate of reading as well as facility with spelling may be most useful clinically in differentiating average from poor readers.

Shaywitz, S.E., Fletcher, J.M., Holahan, J.M., Shneider, A.E., Marchione, K.E., Stuebing, K.K., Francis, D.J., Pugh, K.R., Shaywitz, B.A. (1999). Persistence of dyslexia: The Connecticut longitudinal study at adolescence. Pediatrics, 104, 1351-9.

"When your child is reading a book, use the 3 P's: Pause, Prompt and Praise. Pause if your child is unsure; wait a moment. Let your child look at the pictures and words to work out the meaning. Give a prompt or cue to encourage them to look more closely and have a go. Ask a question such as: What word might make sense? What would sound right? What does it start with? Praise all efforts. If your child is still unsure after trying, tell them the word so they don't lose the meaning of the story."

Department of Education, Employment and Training. In The Age, Literacy Week Supplement, p.3 29/8/01.

The study found that a student who had the good fortune to have effective teachers three years in a row averaged 50% more learning than one having poor teachers over a three-year span.

Sanders, W. & Rivers, J. (1996). *Cumulative and residual effects of teachers on future student academic achievement*. Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center.

The letter "p" in "pin" (which is aspirated and released) sounds different to the letter "p" in "spin" (which is neither aspirated nor released); likewise, the letter "k" in "keep" versus the "k" in "stack."

When we gave this Auditory Analysis Test and other tests of phonemic awareness to a group of 15-year-olds in our Connecticut Longitudinal Study, the results were the same: even in high school students, phonological awareness was the best predictor of reading ability.

Shaywitz, S (No date). Dyslexia. [On-Line]. Available:
http://www.sciam.com/1196issue/1196shaywitz.html

66% of Australian employers consider that high-school leavers are not sufficiently literate to enter the workforce.

Croucher, J.S. (2001, July 21). Number crunch. The Age, p.13.

"The scientific evidence is simply overwhelming that letter-sound cues are more important in recognizing words than either semantic or syntactic cues." (p. 16).

Pressley, M. (1998). *Reading instruction that works: The case for balanced teaching*. New York: Guilford.

A central part of text processing involves reading the words. Four different ways can be distinguished (Ehri, 1991, 1994): 1. Decoding: Readers convert letters into sounds and blend them to form recognizable words; the letters might be individual letters, or digraphs such as TH, SH, OI, or phonograms such as ER, IGH, OW, or spellings of common rimes such as -AP, -OT, -ICK. Ability to convert letter subunits into sounds comes from readers' knowledge of the alphabetic system. 2. Sight: Readers retrieve words they have already learned to read from memory. 3. Analogy: Readers access in memory words they have already learned and use parts of the spellings to read new words having the same spellings (e.g., using -

ottle in bottle to read throttle). 4. Prediction: Readers use context cues, their linguistic and background knowledge, and memory for the text to anticipate or guess the identities of unknown words.

Text reading is easiest when readers have learned to read most of the words in the text automatically by sight because little attention or effort is required to process the words. When written words are unfamiliar, readers may decode them or read them by analogy or predict the words, but these steps take added time and shift attention at least momentarily from the meaning of text to figuring out the words. Readers need to learn how to read words in the various ways to develop reading skill. The primary way to build a sight vocabulary is to apply decoding or analogizing strategies to read unfamiliar words. These ways of reading words help the words to become familiar.

Processing letter-sound relations in the words through decoding or analogizing creates alphabetic connections that establish the words in memory as sight words (Ehri, 1992; Share, 1995). Systematic phonics instruction is thought to contribute to the process of learning to read words in these various ways by teaching readers use of the alphabetic system. Alphabetic knowledge is needed to decode words, to retain sight words in memory, and to call on sight word memory to read words by analogy. In addition, the process of predicting words from context benefits from alphabetic knowledge. Word prediction is made more accurate when readers can combine context cues with letter-sound cues in guessing unfamiliar words in text (Tunmer & Chapman, 1998)."

National Institute of Child Health and Human Development (2000). National Reading Panel: Teaching children to read. [On-Line]. Available: http://www.nationalreadingpanel.org.

For children with learning disabilities and children who are low achievers, systematic phonics instruction, combined with synthetic phonics instruction produced the greatest gains.

National Institute of Child Health and Human Development (2000). National Reading Panel: Teaching children to read. [On-Line]. Available: http://www.nationalreadingpanel.org.

The panel recommended that if silent reading is used as a classroom technique, intended to develop reading skills and fluency, it should be done in combination with other types of reading instruction, such as guided oral reading.

National Institute of Child Health and Human Development (2000). National Reading Panel: Teaching children to read. Available: http://www.nationalreadingpanel.org.

Although their handicapping condition may be invisible to educators, nonetheless there is a physical basis for dyslexia--in genes (e.g., Cardon et al., 1994; De Fries, Fulker, & LaBuda, 1987; Grigorenko et al., 1997; Olson, Forsberg, & Wise, 1994; Pennington et al., 1991; Smith, Kimberling, Pennington, & Lubs, 1983) and in the metabolic activity of the brain (e.g., Shaywitz, Shaywitz et al., 1998; Richards et al., 1999). There are also behavioral signs very early in the process of learning to read that educators should take seriously and not dismiss, that is, assume that the problems will go away with maturation. These are inordinate difficulty (not just the typical learning curves) in learning to name and write alphabet letters and in learning to associate sounds with letters. All the boys in this study demonstrated these early warning signs, which should prompt educators to refer children for evaluation. Berninger, V.W. (2000). Dyslexia, the invisible, treatable disorder: The story of Einstein's NINJA turtles. Learning Disability Quarterly, 23, 175- 198.

We found that extended practice was particularly important toward increasing the magnitude of treatment outcomes.

Swanson, H.L. (2001). Research on interventions for adolescents with learning disabilities: A meta-analysis of outcomes related to higher-order processing. *The Elementary School Journal, 101*, 331-348.

Extensive independent reading is the primary means for increasing vocabulary knowledge (Nagy, 1998). Students who read more learn more about words and their meanings. Although direct, explicit teaching of word meanings is effective and important, it cannot produce the needed growth in students' vocabulary knowledge that should occur in the fourth grade.

Nagy, W. (1998). *Increasing students' reading vocabularies.* Presentation at the Commissioner's Reading Day Conference, Austin, Texas.

It has long been assumed that once a student is past the primary grades, phonological processing is no longer critical to word identification and to reading. Our data support the view that across the life span, from childhood to adolescence, decoding words reflects primarily, phonological, rather than orthographic

coding. Such findings are consonant with what is becoming overwhelming evidence that phonological mechanisms mediate word identification in all readers, whether beginners or experienced readers[46,47]. Shaywitz, S.E., Fletcher, J.M., Holahan, J.M., Shneider, A.E., Marchione, K.E., Stuebing, K.K., Francis, D.J., Pugh, K.R., & Shaywitz, B.A. (1999). Persistence of dyslexia: The Connecticut longitudinal study at adolescence. *Pediatrics, 104*, 1351-1339.

These findings extend into adolescence data previously reported on the persistence of reading disability [18] that is, that children who were initially poor readers in the early school years remain poor readers relative to other children in the sample. This finding suggests that shortly after school entry, the reading achievement of children changes very little relative to their peers. These special services, however, consisted of eclectic approaches to teaching reading that were provided in an inconsistent fashion and for relatively brief periods. Shaywitz, S.E., Fletcher, J.M., Holahan, J.M., Shneider, A.E., Marchione, K.E., Stuebing, K.K., Francis, D.J., Pugh, K.R., & Shaywitz, B.A. (1999). Persistence of dyslexia: The Connecticut longitudinal study at adolescence. Pediatrics, 104, 1351-1339.

English and French are more complex than Italian. English has 1,120 ways of representing 40 sounds, whereas there are only 25 sounds in Italian and they are represented in 33 combinations of letters. The disorder is more common in the United States than in Italy. In Any Language, Dyslexia. (2001). The Washington Post 19/3/2001. [On-Line]. Available: http://www.washingtonpost.com/ac2/wp-dyn/A23845-2001Mar18?language=printer
Paulesu, E., Demonet, J-F., Fazio, F., McCrory, E., Chanoine, V., Brunswick, N., Cappa, S.F., Cossu, G., Habib, M., Frith, C.D., & Frith, U. (2001). Dyslexia: Cultural diversity and biological unity. Science, 291, 2165-2167.

Because of their underlying insensitivity to word structure at the level of speech sounds, they may not easily learn the differences between words such as goal and gold, boost and boast, unanimous and anonymous. Their weak sense of word structure undermines their ability to learn the code of written English (Stanovich, 1991; Vellutino, 1991; Wagner, 1988). As time goes on, this core problem in turn compromises the learning of word meanings, comprehension of text, spelling, written expression, and motivation for language-based learning (Juel, 1994; Stanovich, 1986). Obviously, students with language-based reading disabilities are at high risk for school failure. Moats, L.C. (1996). Implementing effective instruction for students with LD: A challenge for the future. In Shirley C. Cramer & William Ellis (Eds.), *Learning disabilities: Lifelong issues*. pp. 87-93. Baltimore, MD: Brookes Publishing Co.

Many children with difficulty in learning to read develop a negative self concept within their first two years of schooling. Chapman, J.W., Tunmer, W.E., & Prochnow, J.E. (2000). Early reading-related skills and performance, reading self-concept, and the development of academic self-concept: A longitudinal study. *Journal of Educational Psychology, 92*, 4, 703–708.

"If you identify very-high-risk poor readers (bottom 20 percent of reading ability) in kindergarten and first grade and give them effective, evidence-based instruction, at least 75 percent of this 20 percent will read (Lyon, 2000)". Landauer, R. (2000). Facing up to infirmities in special ed. *The Oregonian,* December 2.

A recent meta-analysis (Swanson, Hoskyn, & Lee, 1999) indicated that: Instructional interventions that included the following instructional components produced the strongest impact on student learning across numerous academic areas: Control of task difficulty (i.e., sequencing examples and problems to maintain high levels of student success). Teaching students with LD in small interactive groups of six or fewer students. Directed response questioning. It involves the use of procedures that teach students to generate questions while reading or working on a scientific or mathematical problem. Swanson, H. L., Hoskyn, M., & Lee, C. (1999). Interventions for students with learning disabilities: A meta-analysis of treatment outcomes. New York: Guilford.

Up to 85% of the children categorized as LD in fact have disorders of language (Kavale & Forness, 1985; Kamhi, 1989; Tallal, 1988). These language-related disorders include reading and writing disabilities. Kamhi, A. G. (1989). Causes and consequences of reading disabilities. In A.G. Kamhi and H. Catts (Eds.), Reading disabilities: A developmental language perspective. (pp. 67-99) Boston: College Hill Press. Kavale, K.A., & Forness, S.R. (1985). The science of learning disabilities. San Diego: College Hill Press. Tallal, P. (1988). Developmental language disorders. In J.F. Kavanagh and T. J. Truss (Eds.), Learning disabilities: Proceedings of the national conference (pp. 181-272). Parkton, MD: York Press.

"Readers, asked to imagine "cat" without the "kah" sound, readily summon "at." And the MRI photographs show their brains lighting up like pinball machines. When the brain gets it, the light bulbs

really do go on. Conversely, the brains of people who can't sound out words often look different on MRI pictures. There is less blood flow to the language centers of the brain and, in some cases, not much activity evident at all. But simply put, without the ability to sound out words, the brain is stumped." Lally, K. & Price, D.M. (1997). The brain reads sound by sound: 1997 SDX Awards. The Sun. On-Line at: http://www.sunspot.net/readingby9/initial.shtml

To examine the relationship between word decoding and reading comprehension, Shankweiler et al. (1999) assembled 361 English-speaking children aged 7.5 to 9.5, of whom 168 had reading disabilities. They found the simple ability to read aloud a list of English words accounted for 79% of the variance in reading comprehension (r = .89, p < .0001). Even the ability to do the same thing with non-words (e.g., skirm, bant) correlated very highly with reading comprehension, accounting for 62% of the variance (r = .79, p < .0001). Shankweiler, D., Lundquist, E., Katz, L., Stuebing, K. K., Fletcher, J. M., Brady, S., Fowler, A., Dreyer, L. G., Marchione, K. E., Shaywitz, S. E., & Shaywitz, B. A. (1999). Comprehension and decoding: Patterns of association in children with reading difficulties. Scientific Studies of Reading, 3, 69-94.

From a recent meta-analysis: Instructional interventions that included the following instructional components produced the strongest impact on student learning across numerous academic areas: Control of task difficulty (i.e., sequencing examples and problems to maintain high levels of student success. Teaching students with LD in small interactive groups of six or fewer students. Directed response questioning. It involves the use of procedures that teach students to generate questions while reading or working on a scientific or mathematical problem. In the case of teaching adolescents with LD, extended practice with feedback was the instructional component that contributed to the size of the effect. Swanson, H. L., Hoskyn, M., & Lee, C. (1999). Interventions for students with learning disabilities: A meta-analysis of treatment outcomes. New York: Guilford.

A recent synthesis examining the effects of intervention research on the self-concept of students with LD indicates at the elementary level that academic interventions are the most effective means to improved self-concept. Elbaum, B. E., & Vaughn, S. (1999, May). A meta-analysis of intervention studies for students with LD and their effects on self-concept. Paper presented at the National Council for Learning Disabilities Summit, Washington, DC.

Whereas in the previous field test only 30% of tutors were observed to implement the majority of the lesson activities consistent with program protocols (Vadasy et al., 1997b), in this field test 71 % of tutors were observed to be high implementors. Moreover, anecdotal evidence (e.g., tutors who increasingly followed program elements and implemented them with greater skill) suggests that the frequent supervision and technical assistance contributed to improved implementation. Obtaining more accurate program implementation was important because a previous finding had indicated a relation between fidelity of implementation and reading outcomes (Vadasy et al., 1997b) honological and early reading skills
Vadasy, P. F., Jenkins, J. R., & Pool, K. (2000). Effects of tutoring in phonological and early reading skills on students at risk for reading disabilities. *Journal of Learning Disabilities, 33*, 579-590.

By the end of first grade, children having difficulty learning to read begin to feel less positive about themselves than when they started school. Consider that by middle school, children who read well read at least 10,000,000 words during the school year. On the other hand, children with reading difficulties read less than 100,000 words during the same period. Of the ten to 15 percent of children who will eventually drop out of school, over 75% will report difficulties learning to read. Likewise, only two percent of students receiving special or compensatory education for difficulties learning to read will complete a four-year college program. Surveys of adolescents and young adults with criminal records indicate that at least half have reading difficulties, and in some states the size of prisons a decade in the future is predicted by fourth grade reading failure rates. Approximately half of children and adolescents with a history of substance abuse have reading problems. . We know for example, that the average middle class child is exposed to approximately 500,000 words by kindergarten; an economically disadvantaged child is exposed to half as many, at best. They approach the reading of words and text in a laborious manner, demonstrating difficulties linking sounds (phonemes) to letters and letter patterns. Their reading is hesitant and characterized by frequent starts and stops and mispronunciations. Comprehension of the material being read is usually extremely poor. Lyon, G.R. (2001). Measuring success: Using assessments and accountability to raise student achievement. Subcommittee on Education Reform Committee on Education and the Workforce U.S. House of Representatives Washington, D.C. [On Line]. Available:

Can Children With Reading Problems Overcome Their Difficulties? Yes, the majority of children who enter kindergarten and elementary school at-risk for reading failure can learn to read at average or above levels, but only if they are identified early and provided with systematic, explicit, and intensive instruction in phonemic awareness, phonics, reading fluency, vocabulary, and reading comprehension strategies. Failure to develop basic reading skills by age nine predicts a lifetime of illiteracy. Unless these children receive the appropriate instruction, over 70 percent of the children entering first grade who are at risk for reading failure will continue to have reading problems into adulthood. On the other hand, the early identification of children at-risk for reading failure coupled with the provision of comprehensive early reading interventions can reduce the percentage of children reading below the basic level in the fourth grade (e.g., 38 percent) to six percent or less. The NRP found that children as young as four years of age benefited from instruction in phonemic awareness and the alphabetic principle when the instruction was presented in an interesting and entertaining, albeit systematic manner. Youngsters who attended more academically oriented preschool programs had significantly higher scores in reading, math, and general knowledge when tested in the fall of their kindergarten year than children attending less academically oriented preschools. 20 million children today suffering from reading failure could be reduced by approximately two-thirds.

Lyon, G.R. (2001). Measuring success: Using assessments and accountability to raise student achievement. Subcommittee on Education Reform Committee on Education and the Workforce U.S. House of Representatives Washington, D.CRetrieved from http://www.reidlyon.com/edpolicy/10-measuring-success-using-assessments-and-accountability-to-raise-student-achievement.pdf.

What about the early years? Educational experiences in preschool cannot completely compensate for the educational deprivation that can occur during the first 3 years. Early vocabulary development is particularly critical. Parents with professional jobs spoke about 2,000 words an hour to toddlers. For working-class parents it was 1,200 words an hour, and for those on welfare only 600 words an hour.

It may be that all that is required to improve the intellectual functioning and academic success of children in low SES areas is for their parents to interact with them differently: Talk to them more, Ask more questions, Explain things more fully, and Make more positive comments on their child's behavior. The problem is to help all parents provide the kinds of educational experiences that many professional parents routinely provide.

Hart, B., & Risley, T. (1995). Meaningful differences in the everyday experiences of young American children. Baltimore: Paul H. Brookes.

"Between 1986 and 1996, Farkas & Beron collected data on the vocabulary skills of about 7,000 children, ages 3 to 14. The study found: Preschool children who live in poverty and are not developing their vocabularies are at a significant risk of struggling academically throughout elementary and middle school specific reading instruction for preschoolers—such as letter, sound, and word recognition—can help close the learning gap between disadvantaged children and their more affluent peers."

Farkas, G., & Beron, K. (2001). Family linguistic culture and social reproduction: Verbal skill from parent to child in the preschool and school years. Presentation at the session on Consequences of Child Poverty and Deprivation, at the Annual Meetings of the Population Association of America, Washington, D.C., March 31. http://www.pop.psu.edu/general/pubs/working_papers/psu-pri/wp0105.pdf

First Lady Laura Bush launched the first White House summit on early childhood education Thursday with a call for a national effort to begin teaching children learning skills even before they are old enough to read. Policies will be changed to emphasize prereading skills that can be gained through: shared book reading with parents, exposure to the alphabet, memorizing the sounds of letters and words, and the use of stories to draw very young children to words and books. Schools will be urged to screen children for a lack of early learning skills as they screen for hearing and vision problems. Houston Chronicle. (2001, July 26). First lady stresses preschool learning skills. [On-Line]. Available: http://www.HoustonChronicle.com

Word reading is a crucial part of our ability to comprehend written texts. However, how word meanings are extracted from print remains a topic of active research. Behavioral studies have yielded data supporting at least two contrasting hypotheses: Phonological processing is a necessary part of the perception of word meaning (the mediation hypothesis), and Perception of word meaning can bypass phonological processes (the direct perception hypothesis). Results of our MRI study suggest that active processing of word

meaning engages neural systems associated with phonological processes. The results are consistent with the mediation hypothesis and suggest functional coupling of phonological processing during the perception of word meaning. Xu, B., et al., (1999). Functional coupling of phonological processes during the activation of word meaning: an fMRI study of visual word perception. Fifth International Conference on Functional Mapping of the Human Brain. Retrieved 11/10/2003 from
http://www.apnet.com/hbm99/2548.html

The National Institute of Child Health and Human Development reports that it takes four times as much assistance to improve a child's reading skills if help is delayed until Year Four than if it is begun in the Prep year (p.4).
Pfeiffer, S., Davis, R., Kellog, E., Hern, C., McLaughlin, T.F., & Curry, G. (2001). The effect of the Davis Learning Strategies on First Grade word recognition and subsequent special education referrals. *Reading Improvement, 38*(2), 1-19.

"What, then, are future challenges for CAI and early literacy? One immediate challenge is for computer software designers to include components or branching in their programs to accommodate at-risk children who do not respond readily to treatment, dubbed by Torgesen as "treatment resisters" who surface in every early intervention study. Their instructional needs appear to include more intensive practice than that given to their at-risk or reading-disabled peers, further breakdown of the phonological tasks given in training, and longer duration of training. Figuring out ways to build into the software program accommodations for more severe reading-disabled children appears to be the challenge for future successful CAI programs targeting increases in phonological awareness".
Lyon, G.R. (2001). Measuring success: Using assessments and accountability to raise student achievement. Subcommittee on Education Reform Committee on Education and the Workforce U.S. House of Representatives Washington, D.C. Retrieved from http://www.nrrf.org/lyon_statement3-01.htm
Wong, B.Y.L. (2001). Commentary: Pointers for literacy instruction from educational technology and research on writing instruction. *The Elementary School Journal, 101*, 359-369.

Effective programs make highly effective use of instructional time and provide multiple reading opportunities. Schacter J. (1999). Reading programs that work: A review of programs for Pre-Kindergarten to 4th Grade. [On-Line]. Available at:
http://www.mff.org/edtech/publication.taf?_function=detail&Content_uid1=279

Best results are generally achieved by providing instruction every day, rather than lengthy periods with days between sessions.
Horowitz, J. (2000). Teaching older nonreaders how to read. *The Reading Teacher, 54*, 24-26.

The National Literacy Strategy (1998) involves a daily "literacy hour" to attempt to address the problem of reading failure. Department for Education and Employment. (1998). The National Literacy Strategy: Framework for Teaching. London: Crown.

If reading assistance fails to exert a significant impact on the reading performance of low-achieving older readers one reason is that the instruction provided is not sufficiently intense. National Institute of Child Health and Human Development (2000). National Reading Panel: Teaching children to read http://www.nationalreadingpanel.org.

We found that extended practice was particularly important toward increasing the magnitude of treatment outcomes. Swanson, H.L. (2001). Research on interventions for adolescents with learning disabilities: A meta-analysis of outcomes related to higher-order processing. The Elementary School Journal, 101, 331-348.

By Year 10, students at the 10th percentile in reading had progressed no further than Year 3 students at the 50th percentile. Hill, P. (1995). School effectiveness and improvement: Present realities and future possibilities. Dean's Lecture: Paper presented at Melbourne University, May 24. Retrieved 1/3/1998 from http://www.edfac.unimelb.edu.au/Seminars/dean_lec/list.htm

According to the National Research Council (1998) report, reading instructional practices should highlight ample explicit instruction and practice with sound letter correspondences. Snow, C.E., Burns, S., & Griffin, P. (Eds.) (1998). Preventing reading difficulties in young children. Report of the National Research Council. [On-Line]. Available at: http://www.nap.edu/readingroom/books/reading/.

Below are lifted from Jennifer Chew, RRF, Britain http://www.rrf.org.uk/index.htm The study for which the OST detailed results are given compared three groups of Scottish Primary 1 (i.e. Reception) children: the first group was taught by `a systematic but gradual analytic method' (one letter-sound per week in the

initial position of words). The second group had this same teaching plus separate training in the `analysis and synthesis of sounds in spoken words without reference to print'. The third group (synthetic phonics) was taught at the rate of six letter-sounds in eight days and was taught to read simple words by producing sounds for all letters and blending the sounds. By March of Primary 1, the synthetic phonics group was reading and spelling about seven months ahead of the other groups.

Watson, J.E., & Johnston, R.S. (1998). Accelerating reading attainment: The effectiveness of synthetic phonics. *Interchange, 57*. Edinburgh: SOEID.

The authors investigated `(i) whether overall reading standards can be improved and (ii) the extent to which reading difficulties can be prevented'. While many researchers focus on the Natural development of phonological skills, Solity et al. focus on the role of teaching. In this study, children taught by their Early Reading Research (ERR) approach were taught small units (graphemes and phonemes), blending and segmenting. The results were compared with results in schools using a more eclectic approach. At the end of reception, when both groups had an average chronological age of 5 years 4 months, the ERR children had an average reading age of 5 years 9 months while the comparison group had an average reading age of 5 years 3 months. Of particular interest is the fact that the ERR schools had far fewer problem readers than the comparison schools.

Solity, J., Deavers, R., Kerfoot, S., Crane, G., and Cannon, K., (1999). Raising literacy attainments in the early years: The impact of instructional psychology. *Educational Psychology, 19*, No. 4, 1999, pp. 373-397.

The researchers compared three groups of six-year-olds. One group was following the ERR approach (see above). The second group was following the National Literacy Project Literacy Hour (the forerunner of the NLS Literacy Hour), which put more emphasis on `large units' (particularly onset and rime). The third group received a mixture of small- and large-unit instruction. The ERR group had the best nonword reading skills. [Note: nonword reading ensures that the skill being tested really is decoding rather than sight-word recognition.]

Deavers, R., Solity, J. and Kerfoot, S, 2000. The effect of instruction on early nonword reading. *Journal of Research in Reading, 23*(3), 267-286.

Landerl followed up an earlier experiment by Wimmer and Goswami. She found that English children taught synthetic phonics were much better at reading non-words than the eclectically-taught children in the original experiment. She notes that the English phonics school, like German schools but unlike many English schools, emphasised blending as well as letter-sound correspondences. She notes, too, that even with good phonics teaching, the complexity of English letter-sound correspondences makes decoding harder for English children than for German children, but suggests that systematic phonics teaching is all the more important in English, as children are less likely to crack the code by themselves.

Landerl, K. 2000. Influences of orthographic consistency and reading instruction on the development of nonword reading skills. *European Journal of Psychology of Education, XV*, No.3, pp. 239-257.

This study is part of the continuing debate about the theory that beginning readers can work out a pronunciation for an unfamiliar printed word by seeing that its spelling, or orthography, is similar to the spelling of a familiar word. The study shows that children are not really seeing orthographic similarities but relying on 'phonological priming' – i.e. it is hearing a 'clue word' pronounced by an adult, rather than seeing it printed, which cause them to produce a similar-sounding word. Nation et al. ran some analogy experiments with children whose average age was 6.0 years. They found that 'an equivalent number of "analogy" responses were made regardless of whether the clue word was seen or just heard'. These findings are yet another challenge to the view that young children make analogies in a way that is useful for reading: *the analogy strategy is not useful as a way of reading unfamiliar words* if it requires that an adult is on hand to pronounce the clue word for the child. Nation et al. conclude that 'the extent to which beginning readers make orthographic analogies is overestimated and as a consequence, theories that emphasise the importance of orthographic analogy as a mechanism for driving the development of early reading skills need to be questioned'.

Nation, K., Allen, R., & Hulme, C. (2001). The limitations of orthographic analogy in early reading development: Performance on the clue-word task depends on phonological priming and elementary decoding skill, not the use of orthographic analogy. *Journal of Experimental Child Psychology, 80*, 75-94.

The researchers worked with French children who had an average age of 5 years 4 months and had received no formal reading instruction. They found that the children attempted to read words by treating

some (but not all) of the letters in them as distinguishing features. The children did not, however, pay attention to the order in which letters appeared. The authors conclude that young children do tend to recognise words 'logographically' before they receive formal instruction, but only in the sense outlined here – i.e. their recognition is letter-based. The researchers found no evidence that children recognise words 'globally' or by their general shape. Bastien-Toniazzo, M., and Jullien, S., 2001. Nature and importance of the logographic phase in learning to read. *Reading and Writing: An Interdisciplinary Journal, 14,* 119-143.

Savage et al. define 'scaffolding errors' as errors 'preserving both initial and final phonemes (e.g 'bark' misread as 'bank')'. These are distinguished from errors which preserve 'either initial or final phonemes (e.g. 'bark' misread as 'bed' or 'like')', 'distant or unrelated errors (e.g. 'bark' misread as 'can' or 'men')' and 'refusals' (children unable to make any attempt at reading a word). The researchers found that when the four types of errors were considered, the proportion of scaffolding errors made at the age of 6 was the best predictor of reading achievement at the age of 8. One finding which the researchers refer to as 'possibly surprising' was that 'errors preserving only initial letters were not good predictors of reading ability'. *The study is consistent with the view that the more attention children are paying to the letters in words at the age of 6, the better they are likely to be reading at 8,* although this conclusion is not explicitly stated in the article. Savage, R., Stuart, M., & Hill, V. (2001). The role of scaffolding errors in reading development: Evidence from a longitudinal and a correlational study. *British Journal of Educational Psychology, 71*, 1-13.

The researchers administered a standardised reading test (the NFER Primary Reading Test) to a sample of Year 6 children each year from 1989 to 1998. After the national tests started in 1995, the researchers were able to compare the Key Stage 2 test results of the children in their sample with their NFER test results. The Key Stage 2 results suggested rising standards: the percentages of children nationally who reached Level 4 or above in 1995, 1996, 1997 and 1998 were 48%, 58%, 63% and 65%; the children in the research sample performed rather better, at 51%, 71%, 71% and 75%. By contrast, the Primary Reading Test results for these children showed no statistically-significant improvement: the average standard scores for the four years in question were 96.78, 98.41, 97.73 and 99.57. The researchers warn that their evidence does not support the government's claims of rising standards. Their findings are in line with the recently-reported findings from the University of Durham. Davies, J., & Brember, I. (2001). A decade of change? Monitoring reading and mathematical attainment in Year 6 over the first ten years of the Education Reform Act. *Research in Education, 65*, May 2001.

This study was carried out in Australia. The reading accuracy and comprehension scores (Neale, 1988) from 108 school children aged 6-8 years were compared with their teachers' judgements of their reading ability. It was found that most teachers made *inaccurate* judgements, and, in particular, that among teachers in state schools, '*the extent of over-estimation among students with low achievement scores ... was in excess of 1 year of reading age'* (the picture in private schools was slightly better). The researchers point out that the implications are serious: ' ... it is therefore possible that those needing most help do not receive the intervention necessary to maximise their learning opportunities'. This study is yet another which highlights the need for teachers to rely on objective measurement rather than purely subjective judgement. Bates, C., & Nettlebeck, T. (2001). Primary school teachers' judgements of reading achievement. *Educational Psychology, 21*(2), 179-189.

An old but influential study by Clymer (published in 1963) has persuaded many people that the phonic generalizations commonly taught to young children are not very useful. Francine Johnston (University of North Carolina) re-examined the data and reached rather different conclusions, in spite of the fact that she set herself a hard task in focusing only on vowel patterns, which are recognised as more difficult than consonant patterns. She found that the rules could be restated to make them much more reliable. For example, the first vowel has its 'long' sound over 95% of the time with ay, ai and oa. Words with -air and –oar can be considered either separately as 'r-controlled' or, at least in American accents, as needing only minor adjustment in pronunciation if initially sounded out with the first vowel's `long' sound. With some digraphs for vowel sounds, the fact that the first letter does not 'do the talking' is compensated for by the near-100% reliability of the sounds in words (e.g. the -–aw, -oy and -oi in saw, boy and join) or else by the fact that there is usually only a two-way choice (e.g. the ow, ew, and oo in snow/how, blew/view, boot/book). Johnston recommends that children should be encouraged to adopt a 'flexible strategy...such as trying more than one sound and checking the results with their oral language and context'. Some of her

solutions work better in American accents than in British, but the general principles she offers would be easily adaptable.

Johnston, F.P. (2001). The utility of phonic generalizations: Let's take another look at Clymer's conclusions. *The Reading Teacher, 55* No 2,

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It is often claimed that whole-language teaching fosters better comprehension in children, even though phonics-taught children may be better at word-recognition. Connelly et al., however, found the reverse: phonics-taught children were better not only at word-recognition but also at comprehension. The researchers compared Scottish phonics-taught children with a group in New Zealand who were matched on word-recognition ability but were taught by the characteristic New Zealand 'book experience' method, which encouraged reliance on context rather than on sounding out and blending. A particularly interesting finding was that 'Phonics taught children produced more contextually appropriate errors, and in both single word and text reading made more attempts at reading unknown words' – *in other words, it seems that children actually make better use of context if they have first extracted all the information they can from the letters in the target word.* 'Compared with the non-phonics group, the phonics group spent more time in attempts at identifying unknown words and this included using contextual information, which apparently resulted in more rehearsal of the meaning and hence better reading comprehension performance'. Connelly, V., Johnston, R., & Thompson, G.B. (2001). The effect of phonics instruction on the reading comprehension of beginning readers. *Reading and Writing: An Interdisciplinary Journal, 14*, 423-57.

This article covers much the same ground as the relevant section in the USA's National Reading Panel Report (2000). Studies on phonemic awareness (PA) had to meet stringent criteria in order to be included. An interesting finding related to the socio-economic status (SES) of at-risk readers: 'only 27% were low in SES while 37% were middle to high SES' (the SES of the remainder was not specified). It was found that focusing on just one or two PA skills (e.g. segmenting or segmenting and blending) was more effective than focusing on more PA skills, that `Teaching PA effectively includes teaching the applications as well as the skill', that PA benefited comprehension as well as word-identification, and that '*PA instruction was more effective when it was taught with letters'*.

Ehri, L.C., Nunes, S.R., Willows, D.M., Schuster, B.V., Yaghoub-Zadeh, Z., Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36*(3), 250-287.

"That direct instruction in alphabetic coding facilitates early reading acquisition is one of the most well established conclusions in behavioural science" (p.285).

Stanovich, K. (1994). Romance and reality. *The Reading Teacher*, *47*(4), 280-291.

Bonnie Macmillan carried out a meticulous examination of the research evidence behind the influential claims that rhyme awareness promotes reading ability. Much of the article is very technical, but the first three and last three pages are quite accessible even to non-academics. A major point made by Macmillan is that many of the research studies, while claiming to have found a clear causal link between rhyming ability and reading ability, are equally open to the interpretation that the really crucial factor is alphabet knowledge – the researchers have often simply overlooked this possibility. Another important point is that 'The [rime analogy] strategy cannot, in fact, be considered a beginning reading strategy because some letter-sound decoding skill and a considerable sight vocabulary are needed first, in order to use it'. In the closing section of the article, Macmillan gives a very clear and simple account of what is necessary in order to read a cvc word: `letter-shape recognition, the left-to-right, letter-to-sound translation of each letter in turn, and the blending together of the three letter-sounds to pronounce the word'. This study raises some very serious questions about the thinking behind much of the National Literacy Strategy.

There is debate over whether children's early rhyme awareness has important implications for beginning reading instruction. The apparent finding that pre-readers are able to perform rhyme tasks much more readily than phoneme tasks has led some to propose that teaching children to read by drawing attention to rime units within words is 'a route into phonemes' (Goswami, 1999a, p. 233). Rhyme and analogy have been adopted as an integral part of the National Literacy Strategy (DfEE, 1998), a move which appears to have been influenced by three major research claims:1) rhyme awareness is related to reading ability, 2) rhyme awareness affects reading achievement, and 3) rhyme awareness leads to the development of

phoneme awareness. A critical examination of the experimental research evidence from a methodological viewpoint, however, shows that not one of the three claims is sufficiently supported. Instructional implications are discussed.

Macmillan, B.M. (2002). Rhyme and reading: A critical review of the research methodology. *Journal of Research in Reading, 25*(1), 4-42.

S. Deno (personal communication, February 7, 1997) suggested that children in first grade must be reading between 30 and 40 words per minute to be able to understand what they are reading at a very basic level.

Chard, D.J. & Kameenui, E.J. (2000). Struggling first-grade readers: The frequency and progress of their reading. *Journal of Special Education, 34*, 28-39.

Dowhower noted that students in second grade whose reading rates were higher than 45 words per minute appeared more able to practise reading independently.

Dowhower, S. L. (1987). *Effects of repeated reading on second-grade transitional readers' fluency and comprehension.* Reading Research Quarterly, 22*, 389-406.*

"Freedom is bullshit, discipline is the thing that really teaches you how to grow. It's learning how to be free within very strongly defined limits". Mike Nock (one of Australia's most creative jazz pianists). The Melbourne Age 30/8/1995

"He who has imagination without erudition has wings while he lacks legs". Joseph Joubert, 1754-1824

"Most educators have bought the myth that academic learning does not require discipline - that the best learning is easy and fun. They do not realize that it is fluent performance - that is fun. The process of learning, of changing performance, is most often stressful and painful".

Lindsley, O. (1992). Why aren't effective teaching tools widely adopted? *Journal of Applied Behaviour Analysis, 25,* 21-26.

"WHY MISTAKES MAKE SENSE There is no way to "make" a learner focus on the combination of stimuli (i.e., note the samenesses) that the teacher wants to teach. Moreover, a student who learns an unintended sameness will make mistakes — perhaps trivial, perhaps significant. How students mislearn by noting unintended samenesses illustrates the educational relevance of this basic brain activity. Incidents of such mislearning begin in preschool and continue through the elementary and secondary grades. Very young children know that the name of an object stays the same even after the orientation of the object has changed. For example, when a chair is turned to face the opposite direction, it remains a chair. Consequently, in pre-school, when a b is flipped to face the opposite direction, children often assume that it still goes by the name of b. Making this error doesn't necessarily imply that a student's visual brain function is weak or that the student would benefit from a kinesthetic approach to learning lower-case letters. Extensive research has shown that students are more likely to confuse objects and symbols that share visual and/or auditory samenesses, such as b and d". (p.373)

Carnine, D. (1990). New research on the brain: Implications for instruction. *Phi Delta Kappan, 71*(5), 372-377.