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Effects of Direct Instruction on Telling Time by Students with Autism

Abstract: This study used a single-subject multiple probe design to investigate the use of Direct Instruction (DI) to teach students with autism to tell time to the five-minute increment. Exercises from *Connecting Math Concepts* were used as the DI component during intervention. All students increased their telling-time skills to the five-minute increment with scores falling within the range of their same-age, typically-developing peers. Implications for future research and practice are discussed.

***Keywords:* Direct Instruction, autism, telling time**

Children with autism spectrum disorders (ASD) have behavioral characteristics (e.g., impaired social skills, communication difficulties, restricted patterns of behavior) that significantly impact their ability to acquire academic skills (Zager & Shamow, 2005). Recently, the National Autism Center (NAC) published their National Standards Report (NAC, 2009) based on an extensive review of interventions for individuals with ASD. The report identified several evidence-based practices (e.g., comprehensive behavioral treatment, pivotal response training, self-management); however, academic interventions for students with ASD were found to have an "unestablished level of evidence" (p.70). As a result, there is a need for more research on academic interventions to support students with ASD (NAC, 2009; Simpson, 2005; Watkins, 2008).

One important academic area with a limited research base for individuals with ASD is mathematics. While a number of researchers have addressed mathematics and students with disabilities (e.g., Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, 2008; Butler, Miller, Lee, & Pierce, 2001; Horn, Schuster & Collins, 2006; Kroesbergen & Van Luit, 2003; McKenzie, Marchand-Martella, Moore, & Martella, 2004; & Przychodzin, Marchand-Martella, Martella, & Azim, 2004), only a few have included mathematics research with students with ASD. For example, Przychodzin et al.(2004) reviewed 12 studies that examined the effectiveness of DI on math skills and found that 11 of the 12 interventions were successful. However, only three of the studies included students with disabilities and none included students with ASD. Browder et al.(2008) reviewed effective instructional approaches for individuals with moderate to severe disabilities and found most studies addressed a limited number of math skills (e.g., calculations and money). The authors recommended that students with severe disabilities learn a broader set of math skills relevant to post-school outcomes.

One skill that addresses both academic and functional math skills is telling time (Krustchinsky & Larner, 1988; National Council of Teachers of Mathematics, 2010). Telling time provides a career and life readiness skill that enables individuals to read a clock and to follow a schedule to successfully navigate school, work, and home environments (Krustchinsky & Larner, 1988). Several researchers have focused on teaching individuals with disabilities to tell time using an analog clock (e.g., Horn et al.,2006; Partington, Sundberg, Iwata, & Mountjoy, 1979; Polychronis, McDonnell, Johnson, Reisen, & Jameson, 2004; Smeets, Van Lieshout, & Striefel, 1986; Sowers, Rusch, Connis, & Cummings, 1980; Thurlow & Turnure, 1977) and in all but one of the studies, participants were identified as having an intellectual disability (Polychronis et al., 2004). A limitation among these studies was a lack of instruction to teach the full range of times.

In a study by Sowers et al. (1980), individuals learned two specific times related to the start and end of break time during work. Horn et al. (2006) evaluated instruction on telling time for middle school students with moderate to severe disabilities. Horn and colleagues used an ABAB design to evaluate response cards on participants' active responding, on-task behavior, inappropriate behavior, and response accuracy of telling time. All three students' on-task and appropriate behavior and response rates increased during the intervention. Two of the three students had higher acquisition rates during the intervention, while the third student showed similar acquisition rates in baseline and intervention conditions. One limitation is the intervention did not teach the full range of telling time. The students were taught to tell time up to 25 minutes after each hour (i.e., 1:00, 1:05, 1:10, 1:15, 1:25) and did not have the opportunity to receive instruction on the remaining five-minute increments.

The only study to include an individual diagnosed with ASD was Polychronis et al. (2004). They used an alternating treatments design to determine the effects of two distributed trial schedules to teach students to identify numbers and tell time. The teacher embedded instructional trials into the inclusion portion of the students' day. Both of the distributed trial strategies were successful in teaching the student with autism the telling-time skill. A limitation to this study is that the student only received instruction on 10 specific analog times (five in each of the phases).

Browder et al. (2008) and Przychodzin et al. (2004) suggested future research should examine the effects of addressing specific characteristics of disabilities, such as autism, on math achievement. Simpson's (2005) review suggested the field of ASD is still young, but there is emerging evidence for effective educational strategies for students with ASD. Direct Instruction (DI) has substantial research supporting its effectiveness for students with disabilities (Adams & Engelmann, 1996; Kinder, Kubina, & Marchand-Martella, 2005), and its instructional design may be ideal for students with ASD (Watkins, 2008).

Watkins (2008) described five components of DI well suited to the instructional needs of students with autism: (a) general case programming, (b) track organization, (c) scripted presentation, (d) predictable formats, and (e) pacing. General case programming promotes generalization through the careful selection of stimulus features common to a range of settings and situations, and can be effective for students with autism who demonstrate difficulties with generalization (Anderson et al., 2009; Lovaas, 1993). Watkins suggested track organization is used to intersperse academic skills to promote maintenance and integration of concepts over time. Students with autism benefit from interspersed trials through increased correct responses (Benavides & Poulson, 2009; Volkert, Lerman, Trosclair, Addison, & Kodak, 2008). Further, Watkins explained that scripts and formats are used to increase consistency of instruction and to provide predictability for students. Heflin and Alberto (2001) and Bennet, Reichow, and Wolery (2011) emphasized that children with autism need systematic, predictable, and consistent instruction and have shown increased engagement, speed, and accuracy of responding when provided with these supports.

Finally, Watkins noted DI uses brisk pacing that maximizes student engagement and decreases off-task behavior. Students with autism respond more appropriately and accurately when pacing increases because of a reduction in time between instructional trials (Dunlap, Dyer, & Koegel, 1983; Koegel, Dunlap, & Dyer, 1980).

Although limited research has shown DI to be effective for teaching language and reading skills to individuals with ASD (Flores & Ganz, 2009; Ganz & Flores, 2009; Peterson, McLaughlin, Weber, & Anderson, 2008), none have examined DI to teach specific math skills. In addition, there is limited research on teaching telling time to students with ASD. Therefore, the purpose of this study was to examine the effects of using DI to teach students with ASD to tell time to the five-minute increment on analog clocks.

Method

Participants and Setting

This study was conducted in a special education classroom for students with ASD in a suburban elementary school in the southeastern United States. During the study, students received lessons individually in a tutoring room located next to their classroom. Participants included three elementary students diagnosed with ASD based on the Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Renner, 1988) who met the following criteria: (a) demonstrated vocal-verbal behavior, (b) demonstrated understanding of the concept "before," (c) identified numbers to 12, (d) counted fluently by five to 60, and (e) had a diagnosis of autism Pseudonyms were assigned to all paraticipants.

Kevin was an 8-year-old African-American male in third grade. His IQ fell in the moderate range for intellectual disabilities and he scored 32.5 on the CARS, which falls in the moderate range of autism. Although Kevin received previous instruction in telling time to the hour and half hour, he had not mastered these skills.

Zack was an 8-year-old African-American male in the third grade. His IQ fell in the moderate range for intellectual disabilities and he scored 42.5 on the CARS, which falls in the severe range of autism. He received no previous instruction in telling time.

Troy was a 6-year-old African-American male in the first grade. His IQ fell in the moderate range for intellectual disabilities and he scored 34 on the CARS, which falls in the moderate range of autism. He received no previous instruction in telling time. Troy began this study while in the special education classroom and his services were changed before the intervention began. His placement for the remainder of the study was in general education with pull out for language arts in a resource classroom.

Experimenter

The experimenter (first author) for this study was a graduate student in special education at a local university, a special education teacher of students with autism, and served as the teacher throughout the study. She was previously trained in DI and had used it to teach students with autism for the past four years.

Materials

Materials included (a) portions of lessons and student materials pertaining to telling time from *Connecting Math Concepts Level B* (Engelmann, Carnine, Kelly, & Engelmann 2003a, 2003b), (b) classroom, personal, and other varied analog clocks, and (c) probe sheets with nine analog clock faces including varied times in increments no smaller than five minutes.

Data Collection

Dependent variable. The dependent variable was student scores on telling-time probes measured by number of correct responses. Each probe consisted of a worksheet with nine analog faces with a mix of five-minute increments. Probes were randomly generated using an online math worksheet creator (Bryce, n.d.). Students independently wrote responses below each clock face and used standard notation of time, which included the hour and minutes connected by a colon (e.g., 6:15, 3:05).

Generalization data. To assess generalization, each student was asked to verbally state the times on nine different analog clocks located at various places in the school. A variety of analog clock faces were used, including wristwatches, alarm clocks, and wall clocks. All clocks were set to different five-minute increments and included times from all four quadrants of the clock face. The clocks also differed in size and style (e.g., clocks without numbers, clocks using Roman numerals, clocks with second hands).

Interobserver Agreement

For the dependent variable, the experimenter and a doctoral student from a local university independently scored 30% of probes across each condition for each student. Scores were compared item-by-item. Interobserver agreement was scored by dividing the number of agreements by the number of agreements plus disagreements multiplied by 100. Interobserver agreement was 100% for all probes.

Social Validity Data

Upon completing the intervention, the experimenter provided a three-item social validity questionnaire to parents of the participants and two classroom teachers. Statements on the questionnaire addressed goals, specific procedures, and proximal outcomes (Test, 1994). Specifically, the statements addressed opinions about the importance of time- telling (goals), whether the students benefitted from the instruction (proximal outcomes), and if this type of instruction might be used to teach other skills (specific procedures). All statements were rated using a 4-point Likert-type scale from 1=strongly agree to 4=strongly disagree. The teacher statements were as follows: (a) I feel that time telling is an important skill for my students to learn, (b) My student(s) benefited from the instruction he/she received, and (c) I would like to add this type of instruction to my repertoire. The parent statements were as follows: (a) I feel that time telling is an important skill for my child to learn, (b) My child benefited from the instruction he/she received, and (c) I would like for my child to receive this type of instruction to teach him/her other skills also.

Social Comparison Data

According to the standard course of study for the state in which the research was implemented, telling time to the five-minute increment on an analog clock is taught in the second grade. Therefore, the experimenter asked a second-grade teacher in the same school to identify the five "highest telling-time performers" in her class and administered the probe and generalization measures to these students. This was done to compare the performance of the students with autism to the performance of their typically-developing peers.

Experimental Design

We used a multiple probe across participants design (Horner & Baer, 1978). This design uses intermittent measures (i.e., probes) during baseline instead of continuous measures used in a typical multiple baseline design, and is ideal when (a) an untaught skill is likely to remain at a low level, (b) repeated measures can be time-consuming, and (c) repeated measures prior to intervention may be aversive to students (Cooper, Heron, & Heward, 2007; Tawney & Gast, 1984). Typically, the student with the greatest need (i.e., most consistent low scores compared to the other students) is chosen first to begin intervention. Once the initial student's scores show an increasing trend or change in level, intervention for another student begins while other students remain in baseline. This pattern continues until all students receive the intervention. This design builds confidence that student performance changes only when the independent variable is introduced, and like the multiple baseline design, allows for replication and verification of effects across students, settings, or other skills (Cooper et al., 2007; Tawney & Gast, 1984).

Procedures

The researchers followed the local university's Institutional Review Board process and gained approval from the local school system before starting the study. Parents received and signed informed consent for their children to participate in this research study. Students also received and signed informed assent to participate in the study.

Baseline. Each day for five consecutive days, participants were given a pretest consisting of nine analog clocks and asked to state and write the correct time. Once intervention began, the remaining students were probed after the student in intervention achieved a predetermined level of accuracy. Prior to intervention, a generalization probe for each student also was conducted.

Direct Instruction. The intervention followed the *Connecting Math Concepts Level B* (CMC) DI exercises pertaining to telling time. All lesson components on telling time were taught sequentially as scripted within the curriculum. One CMC exercise was implemented per session in a one-to-one teaching format. Student materials corresponded with the telling time portion of the lessons and 16 lessons were used in the study.

The intervention was implemented in two phases. The first intervention phase (labeled as DI-1 in Figure 1) consisted of the first 10 lessons and included instruction on prerequisite skills necessary to tell time to the five-minute increment. These skills included identifying the hour hand, identifying the minute hand, telling time to the hour, and identifying the minutes by counting by five. The second intervention phase (labeled as DI-2 in Figure 1) consisted of the final six lessons. These lessons combined the skills and taught students how to identify hour and minutes together, write them in standard notation, and say them correctly.

CMC lessons have scripts indicating what the teacher should say and the expected student response. Cues such as clapping to guide the timing of choral responding, immediate error correction, and specific praise were used throughout each lesson. During a typical lesson in the DI-1 Phase, the teacher first directed students to locate and point to the minute hand and hour hand. Second, the teacher asked what number the minute hand was pointing to and cued students to respond. Third, the teacher taught the rule: "The hour is the number that comes just before the hour hand." Fourth, the teacher directed students to identify the hour. Fifth, the teacher instructed students, "Count by fives to reach the minute hand. Start with zero at the top." Finally, the teacher cued the students to count by fives by clapping for each number the students named. During DI-2 lessons, the teacher instructed students to put the skills together. She instructed students to "write the hour, two dots, and then the minutes" and then asked them to "read the whole time shown on the clock."

Based on the directions given in CMC, the teacher did not move on to the next section of the lesson until the student was firm on the component skill taught in that section. Due to weak performance during a lesson, both Zack and Troy repeated one lesson each to ensure they were firm on the content before moving on to the following lesson. Error correction followed a model-lead-test approach. As soon as an error was heard the teacher immediately corrected the error by saying the correct answer and repeating the task the student missed. Thus, the duration of the lessons varied from student to student or from lesson to lesson with the same student. For example, the lesson duration for Zack, Troy, and Kevin in CMC lesson 61 was 5 min, 15 min 30s, and 8 min 51s respectively.

Maintenance. Once a student completed 16 lessons or demonstrated mastery by correctly responding to 7 out of 9 clocks for three consecutive sessions, the second intervention phase ended. Maintenance data were collected one week from the date of the last probe session and continued once per week for three weeks. The maintenance probes were the same randomly generated analog clock worksheets used during intervention. Zach had four maintenance probes. Troy and Kevin had three maintenance probes.

Generalization. One generalization measure was taken with each student prior to intervention. Once the first student completed intervention, all students were given a generalization probe. The generalization probe required students to identify the time on 10 different clocks located throughout the school. These clocks varied in size, shape, font, type of numerals, and presence of a seconds hand. The time varied on all clocks during the probe, and on each subsequent probe, different times were set on the clocks. On the initial probe after the first intervention, the researchers determined it was necessary to provide a prompt for all subsequent generalization probes. The prompt consisted of providing paper and pencil to the student and asking him to "write the hour, two dots, and the minutes, just like you learned during the telling-time lessons" and then say the time.

Procedural Fidelity

Another graduate student from a local university observed 31% of the intervention sessions across each participant to determine procedural reliability. She had a copy of the teacher's lesson and checked off each portion of the lesson the teacher completed correctly. Correct implementation was defined as following each step of the scripted lesson including stating the scripted words, providing error correction, and repeating a section until the student's responses were firm. Procedural fidelity for each session was calculated by dividing the number of correctly implemented steps by the total number of scripted steps and multiplying by 100. Procedural fidelity for observed sessions was 100%

Results

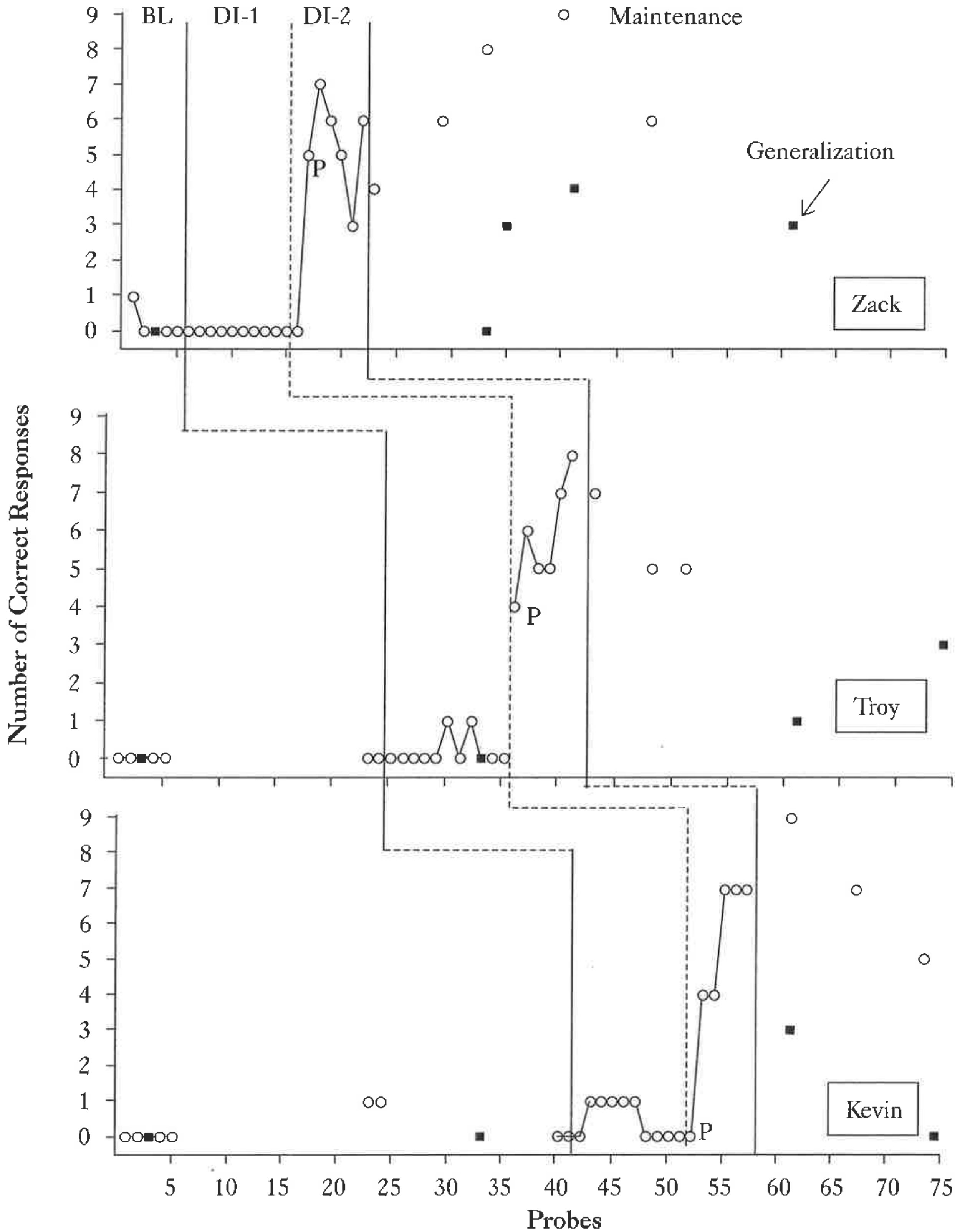
Students' results are displayed in Figure 1. Students had the opportunity to correctly identify 9 analog clocks on each probe. The DI-1 Phase included instruction on prerequisite time-telling skills. The DI-2 Phase included instruction on identifying time to the 5-minute increment. Table 1 shows social comparison data.

Zack

During baseline Zack's performance ranged from 0 to 1 with a mean of 0.2. In DI-1 his performance remained at 0. In DI-2 his performance ranged from 0 to 7 with a mean of 4.6. During DI-2 a change in level and trend occurred. After the first DI-2 lesson, Zack scored a 0 on the probe. Prior to the second probe, the experimenter gave Zack a prompt to "find the time like you learned in the lesson by writing the hour, two dots, and then the minutes." An immediate change in level was demonstrated on the second probe and those following it. During maintenance, Zack's performance on the probes demonstrated some variability (M=6.6 range 4 to 9) but continued to remain above baseline levels. On the first generalization probe Zack scored 0 correct on 9 various analog clocks. Prior to the next generalization probe, the examiner prompted Zack to "find the time like you learned in the lesson by writing the hour, two dots, then the

Figure 1

Number correct on worksheet with nine clocks indicating times to the five-minute interval



Note. DI-1, DI-2=Two-part intervention using *Connecting Math Concepts* to teach telling time. P=-prompt to "find the time like you did in the lesson" given prior to probe.

minutes, and then say the time." Following the prompt, Zack's generalization data showed a slight increase in level. Overall, his generalization data ranged from 0-4 of correctly identified times (M=2.5).

Troy

During baseline, Troy's performance remained at 0. In DI-1 his performance ranged from 0 to 1 with a mean of 0.2. In DI-2 his performance ranged from 4 to 8 with a mean of 5.8. Prior to the first probe in DI-2 the examiner gave Troy a prompt to "find the time like you learned in the lesson by writing the hour, two dots, and then the minutes." During DI-2 a change in level and trend occurred. During maintenance, Troy's performance on the probes demonstrated some variability (range 5 to 7) but continued to remain above baseline levels (M=5.7). Prior to the first generalization probe the examiner prompted Troy to "find the time like you learned in the lesson by writing the hour, two dots, then the minutes, and then say the time." Troy's generalization data showed a slight increase in level (range 1 to 3) of correctly identified times (M=2).

Table 1

Social Comparison Data

Student	Probe	Generalization
A	4	1
B	8	4
C	9	5
D	4	2
E	7	3
Zack	6.6	2.5
Troy	5.7	2
Kevin	7	1.5

Note. Based on the North Carolina Standard Course of Study, time should be taught to the five-minute increment in second grade. Five "highest performers" (A through E) from a second grade class received a probe and generalization measure (number correct out of 9 trials). Probe and generalization scores are shown as means from the Maintenance and Generalization Phases for target students (Zack, Troy, Kevin).

Kevin

During baseline Kevin's performance ranged from 0 to 1 with a mean of 0.2. In DI-1 his performance ranged from 0 to 1 with a mean of 0.5. In DI-2 his performance ranged from 0 to 7 with a mean of 4.8. Prior to the first probe in DI-2 the examiner gave Kevin a prompt to "find the time like you learned in the lesson by writing the hour, two dots, and then the minutes." During DI-2 a change in level and trend occurred. During maintenance, Kevin's performance on the probes demonstrated a decreasing trend (range 5 to 9) but continued to remain above baseline levels (M=7). Prior to the first generalization probe the examiner prompted Kevin to "find the time like you learned in the lesson by writing the hour, two dots, then the minutes, and then say the time." Kevin's generalization data began at 3 but decreased to 0 with a mean of 1.5.

Social Comparison Data

Table 1 shows the results of the social comparison data collected from the five "highest telling-time performers" identified by the second grade teacher and data from the three target students. The range for the social comparison students' performance on the probe was 4 to 9 with a mean of 6.4. The range for the target students' performance on the probe was 4 to 9 with a mean of 6.5. The range for the social comparison students' performance on the generalization measure was 1 to 5 with a mean of 3. The range for the target students' performance on the generalization measure was 0 to 4 with a mean of 2.1.

Social Validity Results

Results from the brief social validity questionnaires given to teachers and parents indicated high levels of satisfaction with the goals, outcomes, and procedures of the study. The two teachers reported strongly agreeing that (a) telling time is an important skill for their students, (b) students benefitted from the instruction they received, and (c) they would like to add this type of skill to their repertoire. Three parents reported strongly agreeing that (a) their child benefitted from the instruction they received, and (b) they would like their child to receive this type of instruction to teach him other skills also. For the statement "I feel that telling time is an important skill for my child to learn," parents either agreed or strongly agreed.

Discussion

The purpose of this study was to examine the effects of DI on teaching students with ASD to tell time to the five-minute increment. Results demonstrated a functional relation between DI and students' ability to tell time to the five-minute increment using analog clocks. In addition, all three students maintained and generalized these skills at a level within the range of their typically developing peers.

Because previous research on telling time involved older students with disabilities (Horn et al., 2006; Partington et al., 1979), this study extends the literature by teaching (younger) students with ASD to tell time comparable to the performance of their typically developing peers. Previous studies have demonstrated the effectiveness of DI to increase language and reading skills (Flores & Ganz, 2009; Ganz & Flores, 2009; Peterson et al., 2008) and Browder et al. (2008) and Przychodzin et al. (2004) have suggested the need for further research demonstrating effective instructional strategies for subgroups within the overall population of individuals with severe disabilities. This study demonstrated DI might also be effective in teaching a specific math skill (telling time) to young students with ASD.

This study also extended previous research by collecting data on student skill generalization. While previous research (e.g., Partington et al., 1979) taught concepts of time to individuals with intellectual disabilities, none collected generalization data to determine if the skill could generalize to a variety of stimuli, settings, and individuals. The current study adds to the literature by assessing students' ability to generalize the skill to one or more different analog clocks, in different settings, and telling time to different individuals. Although two of the three students scored within the range of the social comparison group on all post-intervention generalization measures, the scores were not high. As a result, the ability to tell time on only a few clock types limits its functional utility.

Finally, we found only one study that evaluated the teaching of telling time to a student with ASD using analog clocks (Polychronis et al., 2004). The researchers taught only 10 specific times to one student. The current study extends the literature by teaching three different individuals with ASD the skill of telling time to all possible variations of five-minute increments.

Limitations

The current study has several limitations. First, instruction used only one type of analog clock to teach time. The probe used in the study had features different from the clocks used in the instructional sessions including hash marks between the hour numerals and longer hour and minute hands. Zach's performance in DI-2 and his first probe score of 0, followed by an immediate increase once he was reminded of the similarities, suggested that a prompt was needed. Second, students' performance was probed between 15 and 19 times prior to DI-2. It is possible that this repeated practice of responding incorrectly impacted the students' ability to generalize the skills to the probes. Third, DI-2 included only six lessons and only one of the students reached criterion of 7 correct responses for three consecutive sessions. Students with autism may require more opportunities for repeated practice in order to master this skill. Fourth, based on the decreased level of accuracy between generalization and maintenance probes, all three students had difficulty generalizing their skills to the new clocks, settings, and different individuals. As noted previously, the intervention only used one type of analog clock as a teaching stimulus and this may have resulted in students' inability to effectively generalize the skill to different stimuli. In addition, students may need more than the six lessons provided in the DI-2 Phase to reach mastery. CMC is designed for typically developing students and might not include the sufficient practice for students with disabilities to master either the prerequisite skills or telling time to the nearest five-minute increment. Given the limited number of instructional sessions in this study, it was not surprising students had difficulty maintaining and generalizing the skill. Fifth, none of the students demonstrated 100% accuracy on telling time to the five-minute increment for more than one probe, which reduces the functional utility of the skill. Furthermore, generalization data for students with ASD and data for the "highest performers" social comparison were low. The extent to which the social comparison data are typical for second graders is unclear. Their performance may have been the result of ineffective mathematics curriculum and instruction in the general curriculum (Engelmann, 2010). Finally, it is important students not only learn to tell time, but also to apply that skill to managing their own time (Smeets et al., 1986). The current study did not measure whether students began to use their knowledge of telling time to assist them in managing their time in daily activities (e.g., responding to a teacher's request to log off the computer in five minutes).

Suggestions for Future Research

The current study only focused on one mathematic skill. Future research should investigate the use of DI to teach other mathematic skills and concepts to students with ASD. Also, extension of this study could provide more repeated practice and judicious review of time telling in DI-2. To address the lack of generalization, future research could add general case programming (Becker & Engelmann, 1978, Engelmann & Carnine, 1991) using a variety of analog clocks as additional practice for the CMC lessons. In addition, research on telling time could include the use of telling time to manage daily activities as the dependent variable.

Future studies should limit the number of probes given prior to DI-2 and the analog clocks used for probes could be more similar to those used during instruction. Additionally, to help maintain the skill, future research should have students receive instruction until they demonstrate 100% accuracy.

Implications for Practice

DI may be an effective method to teach academic skills to students with ASD. Teachers can use CMC or DI strategies (e.g., Stein, Kinder, Silbert, & Carnine, 2006; Watkins & Slocum, 2004) to teach students with ASD to tell time. To ensure mastery, teachers may need to provide additional practice for telling time to the five-minute increment beyond the lessons provided by CMC. Furthermore, teachers should use analog clocks that differ in features (e.g., size, font, hash marks for minutes) to promote generalization.

In conclusion, DI appears to be a promising approach to teach students with ASD to tell time comparable to the performance of their typically developing peers. While students did not demonstrate 100% mastery, their scores fell within the performance range of their peers who were identified by their teacher as the "highest telling time performers." As a result, DI has potential to be an effective model to teach academics to students with ASD.

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