Using E-mail as Performance Feedback to Teach Paraprofessionals to Implement Constant Time Delay with Braille Words

By

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CHAPTER 1

INTRODUCTION

Literacy can be defined as the ability to read and write. According to survey data reported by the American Printing House for the Blind, 25.2% of K-12 students defined as legally blind who are in inclusive or specialty school settings are considered nonreaders (American Printing House for the Blind, 2017). When comparing the reading rates between readers with visual impairment (VI) and their typically sighted peers, Mohammed and Omar (2011) found that students with VI had significantly slower reading rates on average. Such findings suggest that students with VI have literacy needs that are currently not being met.

As a whole, students with VI are a low-incidence and heterogeneous group of children. Approximately 39% to 68% of students with uncorrectable VI have additional disabilities (Hatton, Ivy, & Boyer, 2013; Hatton, Schwietz, Boyer, & Rychwalski, 2007; Kong, Fry, Al-Samarraie, Gilbert, & Steinkuller, 2012). Research has shown that the presence of additional disabilities places students with VI at even greater risk for becoming nonreaders (Wormsley, 2011). Despite the apparent literacy gap between sighted peers and students with VI, literacy goals for students with VI should be comparable to those of their sighted peers. Data-driven assessments and ongoing evaluations can help to close the gap (Holbrook, 2009; Koenig & Holbrook, 1995). Literacy plays a key role in the independent completion of both academic and nonacademic tasks for students with VI (Corn & Koenig, 2002). Additionally, there are long-term implications on future job prospects for students with VI involving difficulty finding gainful employment (Corn & Koenig, 2002).

In addition to teaching braille as a form of literacy being absolutely vital, educational

professionals are required by law to teach braille to students with VI. According to the Individuals with Disabilities Education Act Amendments of 1997, "the Individualized Education Plan (IEP) for a child who is blind or visually impaired must provide for instruction in braille unless, after an evaluation of the child's reading and writing skills, needs, and appropriate reading and writing media, the IEP team decides that such instruction is not appropriate for the child" [Sec. 614(d)(3)(B)(ii)]. Unless a student with VI has assessment and evaluation data showing he/she does not require braille instruction, the student must be given instruction in braille literacy, both reading and writing.

Additionally, the National Federation of the Blind reported that children with visual impairments are not being appropriately or adequately taught how to read and write braille (Frieman, 2004). They share that only about 10% of children with visual impairments in the United States are currently learning braille (Frieman, 2004). The American Foundation for the Blind (1996) has estimated that fewer than 10% of people who are legally blind in the United States and fewer than 40% of those who are functionally blind are braille readers, which indicates a need to increase braille literacy.

Constant Time Delay and Literacy

One potential way to teach braille to students with VI is to use constant time delay (CTD). CTD is an instructional strategy wherein systematic and repeated prompts are used to teach a target stimulus (Head, Collins, Schuster, & Ault, 2011). In each trial, a target stimulus (cue card or picture) is presented to the participant and paired with an instructional cue (e.g. "Read the word"; Appelman, Vail, & Lieberman-Betz, 2014). The instructional cue is followed by a controlling prompt (e.g. "This word is ____") (Ledford, Gast, Luscre, & Ayres, 2008); for children who are verbally imitative, a model prompt is often used. The amount of time between

the instructional cue and model prompt is systematically manipulated over the course of multiple sessions until a predetermined criterion is reached (Head et al., 2011).

CTD is an evidence-based practice (EBP) for teaching picture and sight word recognition to students with moderate to severe intellectual disabilities (Browder, Ahlgrim-Delzell, Spooner, Mims, & Baker, 2009; Ivy & Hatton, 2014). In their review of 22 studies, Browder and colleagues determined CTD to be an EBP using the criteria from the article published by Horner, Carr, Halle, McGee, and Odom (2005). Horner et al. determined the following criteria must be met for a practice to be considered an EBP: (a) the practice is described with precision and operationally defined; (b) the context and outcomes are clearly defined; (c) documentation of fidelity is provided; (d) the practice demonstrates a functional relation and is socially important; and (e) a plethora of studies, researchers, and participants have demonstrated experimental control with the specified intervention. Horner et al. asserted that in order to be considered an EBP an intervention must: (a) be implemented by three different research teams in various locations; (b) have a minimum of 5-single-case design research papers; (c) and include at least 20 different experiments (Horner et al.). CTD met each of the rigorous criteria from Horner et al. to qualify as an EBP for teaching picture and sight word recognition to students with moderate to severe intellectual disabilities.

The research supports the simplicity and adaptability with which CTD can be implemented (Jimenez, Browder, Spooner, & DiBiase, 2012; Saunders, Bethune, Spooner, & Browder, 2013; Saunders, Spooner, Browder, Wakeman, & Lee, 2013). Participants rarely commit errors during instruction, and Browder et al. (2009) considered CTD to be an errorless procedure. CTD has also been shown to be effective when implemented in different configurations such as dyads (Appelman et al., 2014; Ledford et al., 2008). CTD is also an

effective instructional strategy when implemented by peers (Jimenez et al.; Wolery & Gast, 1984). Additionally, CTD has been shown to be effective for teaching Common Core State Standards (CCSS) for English language arts and mathematics to students with moderate and severe disabilities (Saunders, Bethune et al.; Saunders, Spooner, et al.).

Currently most published studies using CTD (i.e., Browder, Ahlgrim-Delzell, Spooner, Mims, & Baker, 2009; Hooper, Ivy, & Hatton, 2014; Ivy, Guerra, & Hatton, 2017; Ivy & Hooper, 2015; Wilcox, 2014) involve the researchers, rather than educators, implementing the CTD intervention. Although CTD is effective when implemented by researchers, it is unclear how best to teach paraprofessionals to implement CTD with their students. Would these paraprofessionals be able to successfully implement CTD with fidelity? The current study examined this issue by looking specifically at training paraprofessionals to implement CTD with students with VI.

CTD and VI

Some literature provides support for using CTD with individuals with VI. In the field of VI, several studies have demonstrated the effectiveness of using CTD to teach braille words and contractions. Hooper et al. (2014) used CTD to teach highly motivating contracted English Braille American Edition (EBAE) words to four students, ages 10 to 11 years, with visual impairments and intellectual disability. Each student learned 9 to 12 new EBAE words, and the researchers established a functional relation between CTD and braille word identification. Wilcox (2014) also used CTD to teach 20 dot-five contractions to two students, aged 8 and 11 years, with visual impairments and no additional disabilities. A dot-five contraction is a type of braille contraction where a braille cell with just a dot-five proceeds the next braille cell; there are

22 possible dot-5 contractions including such words as “character” and “day.” For both students, a functional relation between CTD and braille contraction identification was established.

Ivy and Hooper (2015) extended the findings of Hooper et al. (2014) and used CTD to teach EBAE and Nemeth Code for Mathematics and Science Notation (Nemeth Code) to three students, ages 13 to 15 years, with visual impairments and no additional disabilities, who were making the transition from print to braille. Following the intervention, one student learned 26 of the 28 Nemeth Code symbols, and two students learned 30 to 37 new EBAE words. A functional relation was found between CTD and contraction identification for all participants. Moss (2015) also used CTD to teach dot-five braille contractions to one, nine-year-old, dual-media learner (i.e. a student who can read both print and braille) with a visual impairment. This student learned 18 new braille contractions, and a functional relation between CTD and contraction identification was established.

Ivy, Guerra, and Hatton (2017) conducted another systematic replication of the research from Hooper et al. (2014). The authors evaluated the effects of using CTD to teach highly motivating braille words to three students, ages 6 to 10 years, with visual impairments and developmental disabilities. Each student learned 9 to 12 new EBAE words, and the authors established a functional relation between CTD.

The results of these 5-studies recognize CTD as a potential EBP for teaching novel EBAE words, Nemeth Code symbols, and/or dot-five contractions to braille readers. Given these studies and related research with students with severe disabilities, I chose CTD as the strategy to teach to paraprofessionals of students with VI. Thus, there is an established base for both the use of CTD and, more specifically, the use of CTD for teaching braille to students with VI. Additionally, what is unique about this study was its use of the Unified English Braille (UEB)

code, which was exclusively used to teach braille words to the students. To date, studies have not examined the use of CTD to teach identification of UEB contractions or words.

Still, the question remains as to how it can be ensured that paraprofessionals can be taught to implement CTD with a high level of fidelity. One way to address this issue is through using e-mail as performance feedback.

Performance Feedback

Results of numerous school-based intervention studies consistently indicate that many, if not most, educational professionals struggle to maintain adequate levels of fidelity when implementing classroom-based interventions. More specifically, a vast majority of educational professionals displayed decreasing or low procedural fidelity levels (range. 0%–65% intervention steps implemented as planned) within 1 to 10 days after training (Noell, Witt, Gilbertson, Ranier, & Freeland, 1997; Sanetti & Kratochwill, 2009a, 2009b), which would indicate that training alone is not enough to support adults in implementing interventions. Results of these and other school-based intervention studies (e.g., O'Donnell, 2008; Pence, Justice, & Wiggins, 2008; Schulte, Easton, & Parker, 2009) indicate that many educational professionals require ongoing support to implement interventions consistently.

Results from this body of research suggest that lower levels of procedural fidelity may make an intervention less effective (e.g., Wilder, Atwell, & Wine, 2006), less efficient (e.g., Holcombe, Wolery, & Snyder, 1994), or produce less predictable responses (e.g., Noell, Gresham, & Gansle, 2002). Together, these results highlight that a majority of educational professionals are currently unable to independently maintain intervention-related behaviors for longer than 2 weeks and that poorly implemented interventions are detrimental to student

outcomes.

Although multiple strategies for supporting teachers in their implementation of classroom-based interventions have been evaluated (see Sanetti & Kratochwill, 2008), performance feedback is the only strategy with a large body of empirical support demonstrating its effectiveness (e.g., Noell et al., 1997, 2000, 2005). Performance feedback procedures typically consist of a consultant, expert, or coach (a) meeting with the educational professional for a brief period (e.g., 5–10 minutes), (b) presenting procedural fidelity data verbally and graphically, and (c) identifying and discussing the specific intervention steps the educational professional implemented incorrectly and their importance (e.g., Noell et al., 1997). Evaluations of performance feedback indicate that (a) it is effective when provided daily (e.g., Noell et al., 1997), weekly (e.g., Noell et al., 2005), or when procedural fidelity drops to a certain level (Gilbertson, Witt, Singletary, & Van Der Heyden, 2007); (b) it is more effective than general "check-in" meetings; and (c) verbal and graphic performance feedback can produce high, stable levels of procedural fidelity independently (Noell et al., 2002) but are more effective when combined (Sanetti, Luiselli, & Handler, 2007).

Performance feedback can be an effective strategy for increasing educational professionals' procedural fidelity levels and is widely recommended as a first-line intervention for teachers demonstrating low levels of procedural fidelity (e.g., Noell, 2010). One example is a case study that utilized a special education coordinator as an internal consultant to facilitate a class-wide self-monitoring intervention with a group contingency reward system in four middle-school classrooms (Sanetti et al., 2014). The internal consultant conducted weekly check-in meetings and provided performance feedback to teachers when implementation of the intervention fell below 80% twice in a week. Although the collection and review of intervention

materials as well as the determination of performance feedback eligibility was facilitated by researchers, performance feedback delivered by the internal consultant did increase the teachers' implementation.

In light of these findings, one of the main purposes of the current dissertation study was to further extend the line of research on performance feedback as a strategy to increase educational professionals' procedural fidelity when implementing an intervention. Specifically, this study examines providing performance feedback via e-mail to paraprofessionals implementing CTD.

E-mail Feedback

There are multiple ways to use performance feedback to support educational professionals. One way to deliver performance feedback is to use e-mail. E-mail feedback is a viable choice because it is potentially more cost-effective, efficient, and feasible than frequent face-to-face meetings which are more typical of in-person coaching (Barton, Pribble, & Chen, 2013). A small body of literature has evaluated e-mail as a performance feedback tool. Oborn and Johnson (2015) used it as part of a multicomponent professional development intervention. This study involved a professional development intervention that systematically tested the effects of two brief workshops followed by 6 weeks of coaching via performance feedback that was based on videotaped home visits and delivered via email. The findings from the study provide support for the use of individualized coaching via performance feedback delivered in electronic format as a means to enhance home visitors' use of caregiver coaching strategies during home visits.

Barton, Fuller, and Schnitz (2016) used e-mail feedback to increase preservice teachers'

use of recommended practices within inclusive early childhood classrooms. A multiple-baseline-design-across-behaviors was used to examine the relation between performance feedback delivered via email and practicum students' use of target-recommended practices (i.e. practices chosen by the participants) across settings and over time. The results indicated that performance feedback delivered via email is an effective method for increasing practicum teachers' use of target behaviors.

Artman-Meeker, Hemmeter, and Snyder (2014) used e-mail feedback as a follow-up after a brief training. The purpose of Artman-Meeker et al.'s pilot study was to compare the effects of two professional development approaches on teachers' implementation of the Pyramid model, a classroom-wide approach for fostering social–emotional development and addressing challenging behavior. The study had two goals: (a) to examine the differential effects of workshop training plus distance coaching versus workshop training alone on teachers' implementation of Pyramid model practices and (b) to examine factors related to teachers' participation in distance coaching. Participants were 33 Head Start teachers from 9 centers. All teachers participated in workshop training on the Pyramid model and created individualized action plans to support their implementation of the Pyramid model practices. Following workshop training, the workshop plus distance coaching group (n = 16) received weekly distance coaching on their individualized action plans. The workshop only group (n = 17) did not receive follow-up support on its plans. Workshop training plus distance coaching was associated with small but statistically significant improvements in emotional, organizational, and instructional classroom interactions. Evidence from this study suggests that implementation outcomes were influenced by differential participation in distance coaching.

Overall, it has been demonstrated that ongoing performance feedback is an essential

component of professional development (Artman-Meeker et al., 2014). Given the current literature, e-mail feedback as a form of performance feedback was used for this study. The current study extends this approach seeks to a new population, paraprofessionals.

The Current Study

The current study expands on the CTD research (e.g. Ivy et al., 2017), and the e-mail feedback research (e.g. Artman-Meeker et al., 2014; Barton et al., 2016; Oborn & Johnson, 2015) to investigate the effects of an e-mail feedback intervention on paraprofessionals who have been trained to use CTD when teaching braille words to students with VI. The following research question guided this study:

1. Is there a functional relation between e-mail feedback and accurate implementation of CTD?
2. Does the use of CTD increase recognition of braille words for braille readers?
3. After email feedback is withdrawn, do paraprofessionals maintain high levels of fidelity?
4. How do paraprofessionals view the feasibility and acceptability of e-mail feedback?

CHAPTER 2

METHOD

Participants

All procedures used in this study were approved by the Institutional Review Board at Vanderbilt University. Written informed consent from the paraprofessionals was acquired prior to beginning the study.

Inclusion criteria. Three dyads participated in this study. Each dyad was made up of a paraprofessional and a qualifying student, both recruited from the Tennessee School for the Blind (TSB). For inclusion in this study, the paraprofessionals had to: (a) work at TSB; (b) work with a student who qualifies for the study; (c) be interested in learning CTD to teach braille words; (d) report no knowledge of CTD; and (e) indicate they checked and responded to e-mails daily. To be included in this study, the students must have: (a) used English as the primary language; (b) been between 4-21 years of age; (c) had a documented visual impairment, as shown via an eye report; (d) used braille as their primary literacy medium (to meet this criteria, the student must demonstrate the ability to understand that a braille cell represents a letter; inability to correctly identify letters and words do not necessarily mean the student was excluded); (e) been able to wait 5-s and attend to a task; (f) been able to track braille line and identify a symbol that was different; (g) been able to find braille lead-in and lead-out lines; (h) been verbally imitative; (i) been able to scan and find differences in a line of braille; and (j) had hearing ability within a developmentally appropriate range.

The following descriptive information for each student was collected through record review and/or direct assessment (see Appendix A): sex, age, race/ethnicity, visual condition, presence of additional diagnoses, results from functional vision assessments and eye reports to describe the onset and stability of functional vision, and results of hearing assessments. In addition, informal interviews with the students' current classroom teachers and braille teacher were conducted prior to the training of the paraprofessionals to assess students' ability to wait 5-s and attend to a task, their ability to verbally imitate, and their ability to track a line of braille.

For the students, I and a research assistant used a record review form (see Appendix A) to collect essential information regarding visual condition, prognosis, and literacy skills of the students by examining individualized education programs (IEPs), eye reports, psychological assessments, and through informal interviews with the participants' teachers.

Recruitment. The school's principal recruited three paraprofessionals currently employed by the local residential school for students with visual impairments for this study. The original plan for recruitment consisted of my reaching out to employees at TSB via email and recruiting qualifying adults for the study. Instead, the principal of TSB chose to select three paraprofessionals and the three students with whom the paraprofessionals would work. In addition, the original plan was to involve six paraprofessionals who had established relationships with students who had intellectual disabilities. Instead, the principal limited the study to three dyads. The paraprofessionals knew the students who were in the study, but did not otherwise work with them regularly. However, the study was conducted during regular literacy instruction time in the students' regular classrooms, as originally planned. An honorarium was given to each of the participating adults in the amount of $200.

The school principal was given the inclusion criteria for the paraprofessionals and accordingly chose which paraprofessionals would best suit the needs of the study. She shared study information with the paraprofessionals, who then agreed to attend the training. On the day of the training, the adults were asked if they still wished to participate in the study and signed consent forms (see Appendix B). After signing the consent form and going through the training, the paraprofessionals filled out a demographic questionnaire (see Appendix C).

Monica and Nina. Monica, a female paraprofessional, was white and 54 years of age. Monica had a high school diploma and 25 total years of educational professional experience. She had worked at TSB for 8 years. Monica reported knowing little to no braille. The student, Nina, was female and African American. Nina was 10 years of age and in the fourth grade. Her visual condition was Leber's Congenital Amaurosis with no light perception in both eyes. Nina also had an additional diagnosis of a learning disability and intellectual disability. Her hearing was in the normal range. Although not stated in the records, informal interviews with Nina's classroom and braille teachers revealed that at the start of the study, she was reading braille at about a second-grade level and had been learning braille for the last four years. Additionally, as with all of the student participants, Nina had solely learned UEB, and did not have to make a switch in learning EBAE to UEB.

Janet and Peter. Janet, a female paraprofessional, was white and 55 years of age. Janet had a high school diploma and 28 total years of educational professional experience. All of this experience was at TSB. Janet reported having extensive braille experience and often served as a braille editor for one of the school's math teachers. Peter, a white male student, was 12 years of

age and in the sixth grade. His visual condition was congenital retinoschisis with bilateral retinal detachment in both eyes with a visual acuity of 10/120. He had an additional diagnosis of attention-deficit/hyperactivity disorder (ADHD) and Tourette's syndrome. Peter also wore glasses and his hearing was in the normal range. Informal interviews with Peter's classroom and braille teachers revealed that Peter preferred print for his literacy medium, but due to decreasing visual acuity, had started learning braille last school year. His current braille reading level was at about the second-grade level.

Kathy and Keith. Kathy, a female paraprofessional, was white and 54 years of age. Kathy had a high school diploma and 24 total years of educational professional experience. All of this experience was at TSB. Kathy reported having no braille knowledge. The student, Keith, was male and Hispanic. He was 14 years of age and in the eighth grade. His visual condition was described as nystagmus, legally blind, and unspecified with onset at age 4. Keith's visual acuity was light perception. Although not diagnosed with other disabilities, it was noted that he had not received any formal education until the age of 10, so it cannot currently be adequately ascertained if he had any learning disabilities or was simply "behind." Keith spoke Spanish. However, his primary language was English, which he spoke both at home and at school. His hearing was also in the normal range. Informal interviews with Keith's classroom and braille teachers revealed that while braille was Keith's only literacy media, his progress had been very slow over the last four years and he could read braille around a second-grade level.

Setting

All experimental procedures took place at a residential school for visually impaired students, located in the southeast region of the United States. I observed all sessions as the

paraprofessional worked with her selected student within the student's regular classroom. Two different classrooms were used for the three dyads. The room was approximately 8 x 12 m in size, had ample lighting, and was free from visual distractions. The students sat in appropriately-sized chairs that allowed their feet to be flat on the floor. When sitting upright, the table reached the area between the participants' waist and chest. During both baseline and intervention sessions, the paraprofessionals consistently sat directly across from each participant at the same table. The primary interventionist and secondary observer sat or stood within 1 m of the dyad so as to hear and see all necessary responses. In addition to the study participants, interventionist, and secondary observer, the classroom teacher and other classroom students (range, 3-6) were present in the classroom throughout the course of the study.

On six days, the session had to take place in a slightly different setting because other students needed to take a test, or a substitute teacher was in the classroom. This occurred once during baseline and five times during intervention, for two of the dyads. The student and paraprofessional participants still conducted the exact same procedures, including using an appropriately sized table and chair. Four of these sessions were held in a different classroom full of other students (range, 4-7), and two sessions were held in empty classrooms.

Materials

Braille words. Twelve target words (4 sets of 3) were chosen for each student participant. The braille teacher at the school identified the words and contractions the students already knew prior to the study. She also identified 12 words that each student did not currently know that could be used within the study. The same 12 words were used for each student; word

set A (about, better, carry), B (bring, clean, done), C (cut, draw, fall), and D (far, got, hurt). These words were chosen from the third-grade level of the American Printing House for the Blind's sight word assessment list. The braille teacher reported that all three students were at similar braille-reading levels (i.e., around grades two and three for literacy). The selected words were of varying lengths as well as tactually distinct, meaning that braille letters that are very similar to each other were avoided across words (e.g., not having two words that both start with the exact same letter).

Braille index cards. For the study, the secondary observer and I created flashcards using 7.62 x 12.7 cm index cards (differentially color-coded by set), clear self-adhesive label sheets, and a Perkins Brailler®. The top right corner of each index card was snipped at a 45-degree angle to help participants orient the card correctly. Target words were brailled onto the clear labels and placed in the center of an index card with a space on either side. The labels were added so that the paraprofessionals who did not know braille could still accurately administered the index cards and know if their student gave a correct response. Additionally, a lead-in line (i.e., three consecutive dot 2-5 cells) preceded the space before the word, and a lead-out line (i.e., three consecutive dot 2-5 cells) followed the space after the word. A total of 48 braille index cards (48 cards per participant) were created for this study—four copies for each of the three target words (i.e., 12 cards) for each sets A, B, C, and D. The students also used a 24.15 x 31.75 cm non-slip rubber mat while reading to reduce movement of the cards.

Other materials. In addition to the braille index cards and rubber mat, the paraprofessionals used a data collection form (see Appendix D) and pen or pencil to record data.

Experimental Design and Procedures

I used a multiple probe across participants design (Gast & Ledford, 2014). During the baseline phase, observations were staggered and took place at least three times per week for each dyad. I graphed procedural fidelity data for the paraprofessionals (see Figure 1) and used visual analysis to examine changes in level, trend, and variability (Gast & Ledford, 2014).

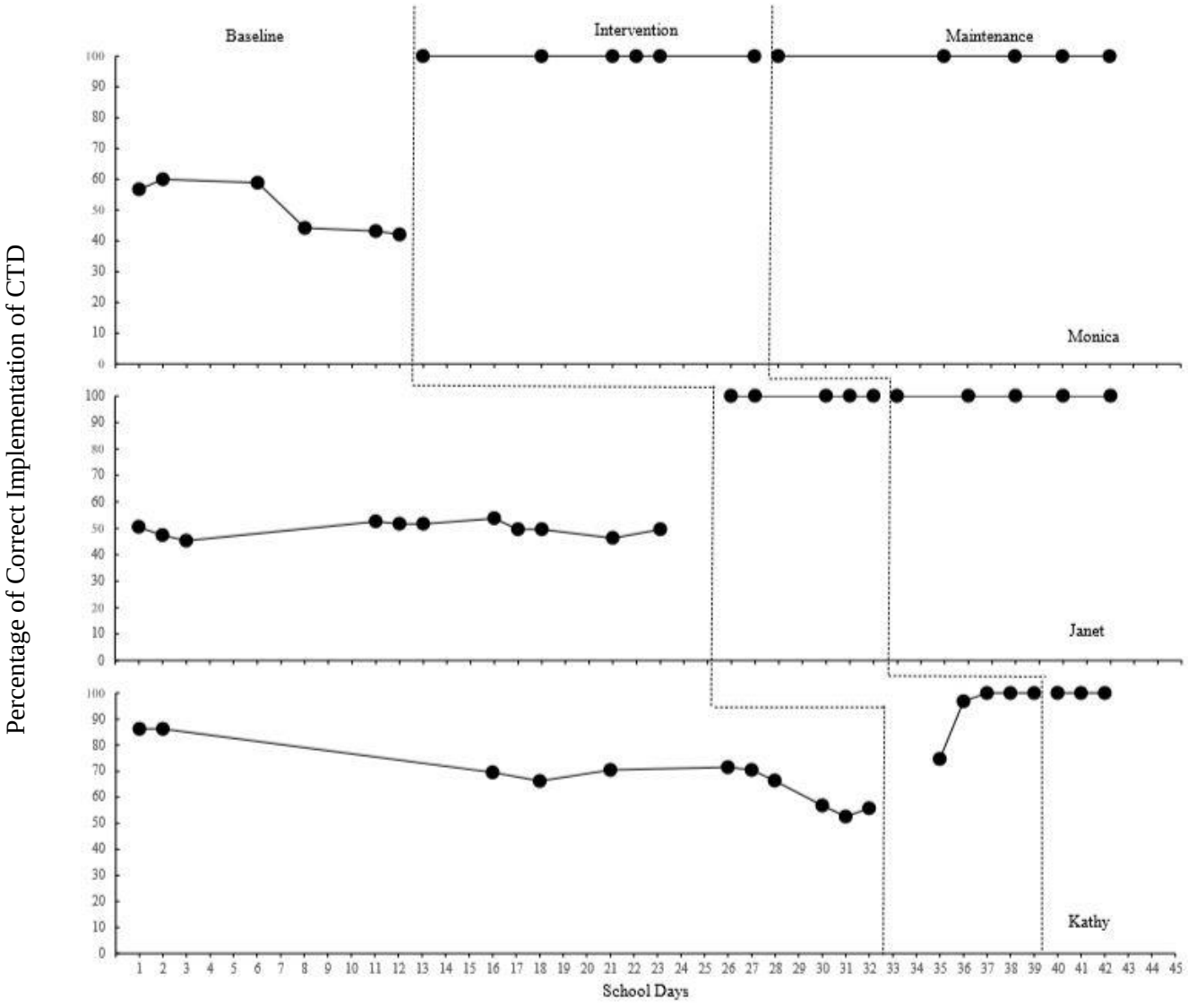

Figure 1. Graph of the adult participants (Monica, Janet, and Kathy) and their percentages of procedural fidelity of implementation of constant time delay. Intervention indicates the presence of e-mail feedback.

I ensured a minimum of five data points during each phase for each participant. I made decisions about phase changes using procedural fidelity data. I also graphed data for the students (see Figure 2).

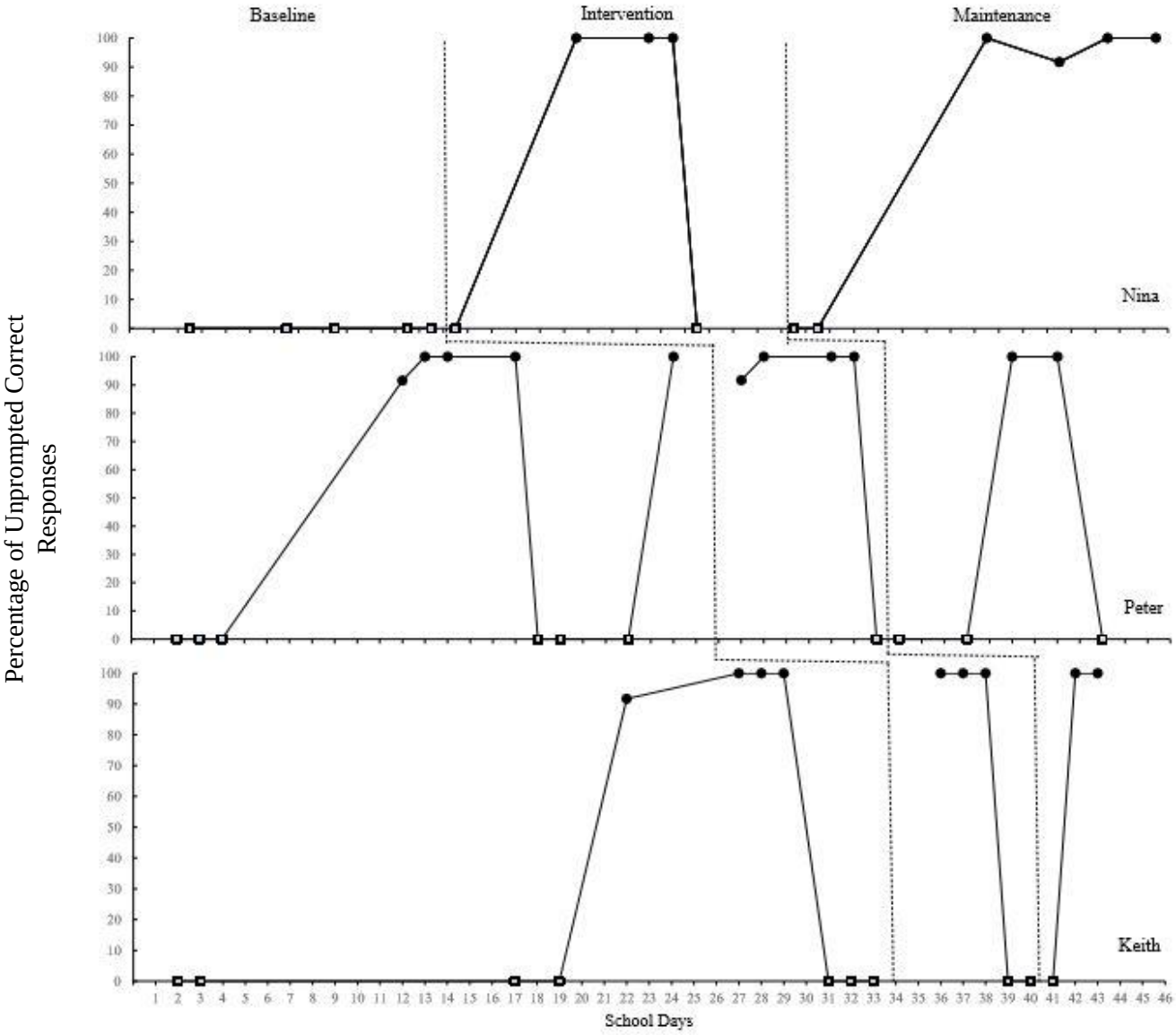

Figure 2. Graph of the student participants (Nina, Peter, Keith) and their percentages of unprompted correct responses. Open squares represent data collected during 0-s. Solid circles represent data collected during 5-s.

Once the first adult participant (i.e., the first tier) had at least five data points and stable

data in baseline, I introduced the e-mail feedback component. I used visual analysis to determine whether a functional relation existed between the introduction of the e-mail feedback and improvements in the paraprofessionals' fidelity of implementation. Using maintenance probes at the end of the intervention phase for each adult participant, I assessed the extent to which adults maintained the accurate use of CTD when email feedback has been withdrawn.

Procedures of the Study

The study consisted of four phases: Initial CTD Training, Baseline, Intervention, and Maintenance.

Initial CTD Training. Paraprofessionals participated in a brief training in the form of a voiceover PowerPoint to explain how to implement CTD. The training was presented this way for two reasons. First, a voiceover PowerPoint allows adults with and without disabilities, such as a visual impairment, to access it. Second, it allowed the PowerPoint to be easily reused and disseminated in the future even if the primary interventionist is unavailable to give the PowerPoint with a lecture. I used a PowerPoint training created by a master's student from Vanderbilt University on the topic of progressive time delay, as a model for my own training. I created a script, recorded my PowerPoint, and solicited feedback from two faculty members. Also, by having the training in this format, the training is now usable by the school for future trainings even when I am no longer able to be there as the PowerPoint is recorded with voiceover on each slide.

Additionally, I introduced the training to the paraprofessionals before baseline began because the paraprofessionals lacked any knowledge of CTD. If baseline data were taken before

the training, all adults would all be performing at 0% fidelity across all participants. The paraprofessionals did not have access to the PowerPoint after this initial training session. The following task analysis was used for this training:

- Greet participants and sign in (5 min).
- Voiceover PowerPoint; This PowerPoint consisted of a lecture on constant time delay implementation steps with voiceover and embedded videos. The PowerPoint included a brief introduction to terminology and systematic instruction, which lasted about 10 mins. This was covered in the first nine slides of the PowerPoint, where the terms of CTD were expressly defined (i.e. instructional cue, model prompt), the two types of CTD sessions were explained (0-s and 5-s), and the different types of response definitions were explained (unprompted correct, prompt correct, unprompted incorrect, prompted incorrect, and no response). During the two slides that explain the different types of CTD sessions, explicit directions were given that the adults were assessed on, such as having the braille mat on the table and placing the braille card centered on the mat. These explicit directions were given so the paraprofessionals would know exactly what procedural fidelity steps they would be assessed on during a CTD session. For the videos, two specific videos were used, each showing either a 0-s or 5-s session with 100% fidelity of CTD. Additionally, the paraprofessionals were shown a data sheet they could use to take their own data, which is another step they are assessed on and are explicitly told about within the context of the training. The procedural fidelity steps that the adults were asked to use (see Appendix H) were clearly and systematically embedded throughout the PowerPoint, so the adults learned exactly what steps they needed to perform during a CTD session. The e-mail feedback piece was also explained within the

PowerPoint. The adults were also encouraged to provide positive verbal reinforcement throughout the sessions and generally follow typical behavior plans for their target students. (45 min).

- Questions; The paraprofessionals were invited to ask questions about the training. They did not actually have any questions at the time and only asked a few procedural questions such as when the study would officially begin and which students they would be assigned. Ten minutes were allotted for this time, but the entire ten minutes were not needed. (10 min).

See Appendix E for an outline of the PowerPoint slides. Additionally, the secondary observer and myself took procedural fidelity data on the training session, to ensure that all steps needed to ensure a complete training were offered. For this data form, see Appendix F.

Baseline. Once the initial training on CTD was completed, the baseline phase started. The paraprofessionals implemented CTD to the best of their ability with no outside assistance; they were given a data collection form (Appendix D), which was given to the paraprofessionals to use to collect data.

I chose not to offer scripts of what exactly to say as it was meant to replicate how training is sometimes given to teachers and paraprofessionals. Educational professionals often attend a workshop and then are not given follow up support in any form, while still expected to implement the strategies they have briefly learned. Observers collected procedural fidelity data on the adults' implementation of CTD as well as on student outcome data. The adults were given pre-made cards of braille words that had been sorted into sets. Paraprofessionals were instructed to start with zero-second sessions. After being instructed to start with a zero-second session, the

paraprofessionals did not receive any feedback. During baseline, if the paraprofessionals requested aid, they were reminded to "recall the training session" and to implement to the best of their ability. Paraprofessionals were expected to implement CTD with their target student at least three times per week, barring any unexpected situations such as student illness or fire drills. Each session typically lasted between 3 and 5 min.

Intervention. Intervention sessions were almost entirely identical to baseline with one exception. After each observation was complete, I sent an e-mail to the adult containing feedback about what was done correctly and incorrectly in the implementation of CTD. An example of such an e-mail is included in Appendix G and was based on the e-mail feedback form used by Barton et al. (2013). The following components made up each e-mail, in order: greeting with positive comment, data with supportive feedback, corrective feedback, response request, and closing encouraging statement.

The e-mail was sent within one hour after the observed session. E-mail feedback was sent three times per week to each paraprofessional in the intervention phase. To confirm receipt and that the e-mail had been read, adults were prompted to send a response e-mail to the feedback e-mail. If fidelity did not improve or declined for two data points or more, I planned to schedule an in-person coaching session, until each paraprofessional demonstrated proficiency. However, this step was unnecessary. The intervention continued for each tier until at least three stable data points, with an overall total of at least five data points, had been collected.

Maintenance. The e-mail feedback component was withdrawn and the paraprofessionals were asked to continue implementing CTD with their target student. Ideally, the

paraprofessionals would have been consistently implementing the intervention even when not being observed. However, as these adults did not typically work with these students, the adults only implemented CTD during scheduled observation times. At least three maintenance data points were collected for each tier.

Data Collection

We measured the primary variables using live observations with pencil-and-paper data collection forms (see Appendices H and I). One data form (Appendix H) was for collecting procedural fidelity data on the paraprofessionals, and the other data form (Appendix I) was for collecting data on the students. Direct observations took place at least three times per week when possible during the baseline phase and during each intervention session. The length of the observations was roughly 3-5 min, depending on if the participants were in zero- or five-second sessions. The primary interventionist was present during all intervention sessions to collect primary data and a secondary observer. A trained second year master's student from Vanderbilt, was present for 33.4% of sessions in which she collected reliability data. The secondary observer had five years of experience as a general education classroom teacher, had successfully completed the braille course at Vanderbilt, and had one year of experience working with students with visual impairments in practicum settings. This secondary observer also collected data on the training sessions and on 100% of the e-mail feedback.

During each observation, observers entered the setting prior to the start time and observed throughout its duration. Observers sat or stood quietly to the side where the focus student and responses could be clearly seen and heard, but where they were not obtrusive. Observers did not interact with students or paraprofessionals during the observations.

Response Definitions: Procedural Fidelity. The primary dependent variable was the fidelity with which the paraprofessionals implemented CTD with their target student. Procedural fidelity data was gathered via a form (see Appendix G) and was taken on the following steps:

1. Word card centered on rubber mat
2. Attending cue (paraprofessional states: “find end of lead-in line”)
3. Instructional cue (paraprofessional states: “read the word”)
4. Physical controlling prompt (paraprofessional places his/her hand over the word, but allowing student to find lead-in line)
5. Appropriate time delay and mental count (paraprofessional chooses the appropriate time delay for the session; for example, if it is a five-second session, the student is given up to exactly five-seconds to respond)
6. Verbal controlling prompt (paraprofessional states: “This word is…”)
7. Appropriate instructional feedback (paraprofessional gives the correct response based on whether student gave a response that was an unprompted corrected, unprompted incorrect, prompted correct, prompted incorrect, or no response)

The following one-time per session behaviors were also recorded for fidelity purposes.

Procedure Initial

1. Randomized Contraction Card Order (the word cards have been shuffled prior to the start of the session, so the student is not presented with the same order of words each time)
2. Word Set Correct and Complete (the set of word cards are correct and complete)
3. Proper Placement of Rubber Mat (the rubber mat is placed centered in front of the student)

4. Appropriate Desk Height (the desk is the correct height to allow the student to comfortable read the braille cards with proper braille-reading technique)
5. Braille Intact (the braille on the word cards is intact and has not been rubbed off or damaged)
6. Correct phase (0-s, 5-s) has been selected for the session

Procedure Intervention

1. Student Greeted
2. Appropriate Scripted Directions (example, the paraprofessional tells the student that they will be asked to read the word and then given time to read the word if they are currently in a five-second session)
3. Student's Feet Flat on the Floor
4. Student Dismissal

Percentage of procedural fidelity was calculated by adding all of the successfully demonstrated behaviors in a session and dividing by the complete total of behaviors possible in the session times 100%. For each session, there were a total of 11 one-time occurring steps and a total of seven multiple-occurring steps that could occur up to 12 times each, for a total of 84 steps per session. These steps, when added together, meant that a total of 95-steps could occur per each session.

Response Definitions: Student outcomes with CTD. The CTD response definitions from Neitzel and Wolery (2009) were used to structure student responses. Each response was classified as: unprompted correct, prompted correct, unprompted incorrect, prompted incorrect, or no response.

Observers used trial-based event recording to collect frequency data for all response definitions. Data were collected across all conditions, during one session per day and during three days per week. Typically, there is a probe condition prior to introducing a new word set, to ensure the participants do not already know the words. However, to cut down on potential confusion for the paraprofessionals and because the braille teacher chose unknown words, I decided not to include a probe condition. During 0-s and 5-s delay conditions, there were 12 trials, or four exposures of each of the three target words, in each session. The paraprofessional and observer(s) documented the percentage of prompted correct and unprompted correct responses that occurred within each word set. However, only unprompted correct responses were used to make decisions about moving the student onto the next word set, and served as the primary indicator of students' progress. Students needed to have three consecutive sessions of 100% unprompted correct responses during a 5-s delay condition before introducing a new word set.

Unprompted correct. An unprompted correct was recorded when the student independently tracked the braille word written on the index card and read the correct word aloud within 5-s of the instructional cue (i.e., "Read the word"). This type of response can only occur during a 5-s session. The student needed to track and read the correct word aloud *before* the controlling prompt is provided. An example of an unprompted correct response is if the student, when given an index card with the word "clean," tracked the entire line and read "clean" aloud within 5-s of the instructional cue. A non-example is if the student, when given an index card with the word "clean," tracked the entire line but read an incorrect word (e.g., "clung") aloud within 5-s. Another non-example is if the student, when given an index card with the word

"clean," did not track the line but read the correct word "clean" aloud within 5-s of the instructional cue.

Prompted correct. A prompted correct was recorded when, following a controlling prompt (i.e., "This word is ____"), the student tracked the braille word written on the index card and repeated the correct word aloud; this response can only occur *after* a controlling prompt was provided. An example of a prompted correct response is if the student, when given an index card with the word "done" and a controlling prompt (i.e., "This word is done"), tracked the entire line and repeated "done" aloud. A non-example is if the student, when given an index card with the word "bring" and a controlling prompt (i.e., "This word is bring"), tracked the entire line (or didn't) and read an incorrect word (e.g., "burn") aloud within 5-s. Another non-example is if the student, when given an index card with the word "about," tracked the entire line (or didn't) and read a correct or incorrect word (e.g., "again" or "awhile") aloud, before a controlling prompt was given (during a 0-s delay session).

Unprompted incorrect. An unprompted incorrect was recorded when the student tracked the braille word written on the index card but reads an incorrect word aloud within 5-s of the instructional cue (i.e., "Read the word"), did not track the braille word written on the index card and reads an incorrect word aloud, or the student did not track the braille word written on the index card but reads the correct word aloud within 5-s of the instructional prompt. This response can only occur *before* a controlling prompt was provided. An example of an unprompted incorrect response is if the student, when given an index card with the word "pound" and an instructional prompt (i.e., "Read the word"), tracks the entire line (or didn't) and reads an

incorrect word (e.g., “carry”) aloud. Another example is if the student, when given an index card with the word “cut,” doesn’t track the line but reads the correct word “cut” aloud. A non-example is if the student participant, when given an index card with the word “draw,” continues to sit at the table, rubbing his/her eyes, but does not say anything aloud.

Prompted incorrect. A prompted incorrect was recorded when, following a controlling prompt (i.e., “This word is ____”), the student tracked the braille word written on the index card but reads an incorrect word aloud, or the student did not track the braille word written on the index card but reads the correct word aloud. This response can only occur *after* a controlling prompt is provided. An example of a prompted incorrect response is if the student, when given an index card with the word “better” and a controlling prompt (i.e., “This word is better”), tracks the line and reads an incorrect word (e.g., “butter”) aloud. A non-example is if the student, when given an index card with the word “fall” and a controlling prompt (i.e., “This word is fall”), tracks the line and reads the correct word aloud. Another non-example is if the student, when given an index card with the word “better” and an instructional cue (i.e., “Read the word”), picks up the index card to closely examine it while saying, “I think it’s ‘better” aloud.

No response. A no response was recorded when the student did not provide a response within 5-s of the controlling prompt (i.e., “This word is ____”) during 0-s or 5-s delay sessions. An example of no response is if the student participant, when given an index card with the word “got,” does not verbally respond within 5-s. Another example is if the student participant, when given an index card with the word “hurt,” tracks the entire line and says, “I don’t know.” A non-example is if the student participant, when given an index card with the word “far,” tracks the

entire line and says, “I don’t want to do this anymore.”

Observer Training and IOA

Prior to the start of the study, I trained a secondary observer on the measurement system. First, the secondary observer participated in an initial 1 hr training. The focus of this training was to explain the observational data collection manual, including operational definitions, examples, and non-examples for each variable. The training included guided practice using scenarios, modeled examples, and video clips. Additionally, the secondary observer collected data on the procedural fidelity of the e-mail feedback (see Appendix J); she was given example e-mails to practice coding fidelity on until she reached 100% accuracy. The secondary observer also watched four videos, two 0-s sessions and two 5-s sessions, and was required to accurately code the videos with at least 80% accuracy to be deemed trained. The secondary observer very quickly reached above 90% fidelity with the videos and data forms.

IOA data were collected during observations for each student and paraprofessional across all study phases. For a minimum of one third of the observations, a second observer joined the primary observer. IOA observations were scheduled randomly while balancing across participants and phases. When two observers conducted an IOA observation, they collected data independently for each of the dependent variables. IOA was calculated for each variable through point-by-point agreement by dividing the total agreements by the total agreements plus disagreements and multiplying by 100%. For the variables collected with event recording, point-by-point agreement was calculated by comparing each recorded response. If IOA had fallen below 80% for implementation, I would have met with the secondary observer to hold a discrepancy discussion and re-training that will include reviewing the coding manual, identifying

coding discrepancies, and practicing with additional examples. However, IOA never fell below 90% and this measure was unnecessary.

For baseline, the secondary observer collected IOA data on 11 sessions (40.7% of all baseline sessions). IOA ranged from 93.7-100% with an average of 97.1%. For intervention, the secondary observer collected IOA data on nine sessions (60% of all intervention sessions). IOA ranged from 92.6-100% with an average of 99.1%. For maintenance, the secondary observer collected IOA data on 5-sessions (42.8% of all maintenance sessions). IOA ranged from 96.8-100% with an average of 99.4%.

Fidelity of Implementation

To ensure that I, as the primary interventionist, was adhering to all steps for all procedures, we took data on fidelity of implementation of the one-time training and the e-mail feedback. For the e-mail feedback, the secondary observer reviewed the e-mails to ensure they were consistent and contained all necessary pieces. My secondary observer used the data form in Appendix J to ensure that I included all necessary components of the e-mail feedback. She collected data on 100% of all e-mail feedback sessions and found the fidelity to be at 100% across all e-mails sent. For the one-time training session that the paraprofessionals attended, both myself and the secondary observer took fidelity of implementation data, to ensure I performed all steps necessary (see Appendix F). My secondary observer and I both recorded 100% of all steps implemented with fidelity, and so were in 100% agreement.

Social Validity

Social validity was assessed by examining stakeholder perspectives of the acceptability,

feasibility, and impact of the intervention at the end of the study. Each paraprofessional completed a social validity questionnaire which was given to them by myself, which they were then allowed to fill out in private and anonymously, and the survey was then put into a folder to ensure confidentiality (see Table 1 for items).

Table 1. Social Validity Responses from Adult Participants

	Strongly agree	Agree	Disagree	Strong disagree
I found e-mail feedback to be effective in my ability to implement constant time delay.	3	0	0	0
I felt that the training I received, along with the e-mail feedback, was adequate for me to learn how to implement constant time delay by using all of the correct steps.	1	2	0	0
I felt that my students were able to successfully learn new braille words with my use of constant time delay.	2	1	0	0
Without e-mail feedback, I would not have been able to implement constant time delay while using all of the correct steps.	3	0	0	0
If asked by an administrator, I would recommend the e-mail feedback for school-wide coaching.	2	1	0	0
The e-mail feedback I received to learn to use constant time delay was more effective than other trainings on instructional strategies I have received in the past.	2	1	0	0

The questionnaire consisted of six questions with responses on a scale consisting of strongly agree, agree, disagree, and strongly disagree. There were additionally two open-ended response questions, where the paraprofessionals answered about what “the best part of getting this coaching was,” and “something that could improve the training and coaching.”

CHAPTER 3

RESULTS

Is There a Functional Relation Between E-mail Feedback and Accurate Implementation of CTD?

A functional relation was demonstrated between the introduction of e-mail feedback and increased percentage of procedural fidelity in which the adults implemented constant time delay (see Figure 1). Across adults, data in the baseline phase demonstrated a steady decline in percentage of procedural fidelity; as sessions occurred, Monica and Kathy implemented with less fidelity over time. During the baseline phase, Monica's fidelity ranged between 42.1 and 58.9% (*M* = 52.5%), Janet's fidelity ranged between 45.3 and 53.7% (*M* = 50.7%), and Kathy's fidelity was much more variable, starting at a high percentage of 86.3%, ranging between 52.6-86.3% and a mean of 68.4%.

During baseline, the errors that the paraprofessionals made were also variable (see Table 2 for a breakdown of each paraprofessional's errors across baseline).

Table 2. Total Implementation Errors During Baseline for Paraprofessionals

Implementation fidelity steps	Monica	Janet	Kathy
Procedures Occurring One-Time			
Procedure *Initial*			
Randomized Card Order (Shuffle)	0 (0%)	0 (0%)	0 (0%)
Card Set Correct and Complete	0 (0%)	0 (0%)	0 (0%)
Proper Placement of Rubber Mat	0 (0%)	0 (0%)	0 (0%)
Appropriate Desk Height	0 (0%)	0 (0%)	0 (0%)
Braille Intact	0 (0%)	0 (0%)	0 (0%)
Correct phase (0-s, 5-s) has been selected for the session	0 (0%)	0 (0%)	0 (0%)
Has data sheet present and ready	0 (0%)	0 (0%)	0 (0%)
Procedure *Intervention*			

Student Greeted	0 (0%)	0 (0%)	0 (0%)
Appropriate Directions are Given for the Session	0 (0%)	0 (0%)	1 (9.1%)
Student's Feet Flat on the Floor	0 (0%)	0 (0%)	0 (0%)
Collects data on the target student's performance	0 (0%)	0 (0%)	0 (0%)
Procedures Occurring Multiple Times			
1. Card Centered on Rubber Mat	0 (0%)	0 (0%)	0 (0%)
2. Attending Cue (find end of lead-in line)	57 (95%)	126 (95.4%)	3 (2.3%)
3. Instructional Cue (read the word/letter)	60 (100%)	131 (99.2%)	132 (100%)
4. Physical Controlling Prompt (placing hand over the word, but allowing student to find lead-in line)	51 (85%)	132 (100%)	120 (90.9%)
5. Appropriate Time Delay and Mental Count	24 (40%)	0 (0%)	0 (0%)
6. Verbal Controlling Prompt (This word/letter is…)	19 (31.7%)	11 (8.3%)	35 (26.5%)
7. Appropriate Instructional Feedback (based on whether student gave UC, UI, PC, PI, or NR)	14 (23.3%)	111 (84.1%)	40 (30.3%)

Note. Number of errors (percentage of all opportunities)

Generally, all three adults were able to consistently maintain 100% fidelity with the one-time occurring behaviors, except once for "Appropriate Directions are Given for the Session" with Kathy. All three were also able to maintain 100% fidelity with step one of the multiple-occurring steps. From there, the adults had some variability with what steps they typically missed during baseline, but there were some steps they shared in common for the bulk of their errors. For example, within the multiple-occurring steps, Monica tended to miss steps 2 (Attending Cue (find end of lead-in line)) at 57 errors (95%), 3 (Instructional Cue (read the word/letter)) at 60 errors (100%), and 4 (Physical Controlling Prompt (placing hand over the word, but allowing student to find lead-in line)) at 51 errors (85%). Janet also tended to miss steps 2 (126 errors or 95.4%), 3 (131 errors or 99.2%), and 4 (132 errors or 100%) while Kathy mostly missed steps 3 (132 errors or 100%) and 4 (120 errors or 90.9%). Additionally, the paraprofessionals had varying numbers of baseline sessions. Monica had 5-sessions. Janet and Kathy had 11 sessions. These varying sessions numbers account for the opportunities given to each paraprofessional to

make errors. The common pattern within the errors seems to generally be missing steps 2 (total of 183 errors), 3 (total of 323 errors), and 4 (total of 303 errors).

The introduction of the e-mail feedback corresponded with increased procedural fidelity. All three adults showed an immediate increase with no overlapping data points with the baseline phase. Janet and Monica showed an immediate and substantial level change, increasing to 100% immediately upon introduction of the e-mail feedback and maintaining this level throughout the rest of the study. After a steady decline and ending baseline at 52.6%, Kathy increased her fidelity to 74.7%, then 96.8%, and then achieved 100% which was then maintained until the conclusion of the study.

Does the Use of CTD Increase Recognition of Braille Words for Braille Readers?

A pattern was not demonstrated between the students' ability to learn braille words and the introduction of e-mail feedback with the adults. Throughout the duration of the study, the students received the same intervention which alternated between 0-s and 5-s sessions during all phases, appearing to learn the words regardless of the phase. The student data is reported via unprompted correct responses (see Figure 2), which could only occur during 5-s sessions, meaning that all data reported at 0% were during 0-s sessions and anything above that was during a 5-s session. Clearly, the students were able to demonstrate three 100% unprompted correct data points, which allowed them to move onto the next word set. Students were able to quickly go through the 0-s sessions and the move onto the 5-s sessions with only one small dip for each student during a 5-s session. For Nina, this decrease occurred during maintenance. For Peter, this decrease occurred during intervention. For Keith, this decrease occurred during baseline. After each decrease, in which all of the students incorrectly read one word, they were

all able to increase to 100% unprompted correct responses. It is clear from the data that the students were able to identify the braille words, as shown by mastery with three data points at 100% in a 5-s session. The learning seemed to occur regardless of the introduction of e-mail feedback and without needing the adults to implement the intervention with 100% fidelity. So, while it can be stated that the sessions were successful in terms of braille word identification, I could not examine the relation between implementation fidelity and recognition of braille words.

Social Validity

Table 1 displays the adults' anonymous responses on the first six questions. Overall, the adults reported that the e-mail feedback was very beneficial and seemed to agree that the intervention was suitable, easy, and that they would recommend it as a school-wide tool.

When asked to write about the best part of receiving the coaching, one participant reported that the e-mail feedback was very helpful and it "helps me to be reminded of what I normally forget when watching training videos." Another participant said the e-mails were helpful as a reference tool and a third participant stated that the e-mails helped reinforce proper technique which increased the student's success rate at learning braille words.

When asked for recommendations for improvements, two participants said that having handouts directly from the training session would be helpful. One participant felt the e-mail feedback was perfect for the CTD intervention and did not feel any improvement were necessary.

CHAPTER 4

DISCUSSION

The main purpose of this study was to expand on the findings of Ivy et al. (2017), which focused on using CTD as a braille literacy tool, and the e-mail feedback studies of Artman-Meeker et al., 2014; Barton et al. (2016); and Oborn and Johnson (2015). Previous studies have proven that CTD is a successful intervention with a wide-range of population types for students with visual impairments (Hooper et al., 2014; Ivy & Hooper, 2015; Ivy et al., 2017; Wilcox, 2014), which the current study expands upon by using CTD with students with a variety of additional disabilities. The current study also expands upon the word of Artman-Meeker et al., 2014; Barton et al. (2016); and Oborn and Johnson, 2015 by using e-mail feedback as a tool for performance feedback, but with a previously unresearched population of paraprofessionals. This study has united these two lines of research to extend the research literature by addressing (a) the effectiveness of e-mail feedback in increasing procedural fidelity in a constant time delay intervention, (b) the use of CTD for teaching braille word recognition for students with visual impairments, and (c) the feasibility and acceptability of this intervention.

E-mail Feedback and Accurate Implementation

All three adults in the study increased their fidelity either immediately or quickly to 100% implementation when given performance feedback via e-mail. During baseline, the paraprofessionals often consistently missed steps within the multiple-occurring procedures (i.e. steps that occurred multiple times within one session), quite often forgetting to do an entire step

all 12 times it was possible during a session. Typically, steps 2 (Attending Cue (find end of lead-in line)), 3 (Instructional Cue (read the word/letter)), and 4 (Physical Controlling Prompt (placing hand over the word, but allowing student to find lead-in line)) were missed the most by the paraprofessionals. Once e-mail feedback was introduced, the paraprofessionals were able to quickly rectify these errors and reach 100% fidelity.

It is interesting to note that two paraprofessionals immediately increased their fidelity to 100% and were able to stay at that high fidelity. The other adult gradually increased over three sessions up to 100% implementation. When comparing to other studies, such as Barton et al. (2016), the immediate jump appears to be a bit of an anomaly. It is much more common for adults to gradually improve instead of instantly improving to 100%. Some potential explanations for this may be the simplicity of CTD, meaning the short task analysis of easy-to-follow steps needed for mastery of the intervention. The principal anecdotally stated that she selected "high-achieving and experienced" paraprofessionals, which may have had an impact on the paraprofessionals' ability to quickly reach and then maintain 100% fidelity. She also selected paraprofessionals who were "floaters" and not assigned a specific placement within the school, which would make it easier to schedule observations.

Additionally, the paraprofessionals did not have a huge range of variable mistakes. Typically, they would forget one or two of the multiple-occurring steps, but in doing so, would forget the step for the entire session which would significantly bring down their overall fidelity percentage. Once the single or two steps were brought to their attention via the e-mail, they were able to quickly correct and achieve high levels of fidelity.

Another area in which these paraprofessionals excelled was in actually reading and responding to each e-mail with feedback that was sent to them. Throughout the study, the

paraprofessionals had a 100% response rate to the e-mails. I emphasized in the training that they would need to read and respond to each of the e-mails, and the e-mails themselves included a reminder that a response was required. Other studies using e-mail feedback have not had a 100% response rate (e.g. Barton et al, 2013). This high response rate indicates that the paraprofessionals were in fact reading each of the e-mails and implementing the feedback, which may have contributed to their high rates of fidelity.

It should also be noted that the adult who did not immediately reach 100% implementation during intervention initially started at high fidelity (in the 80% range) during baseline, but over time, her fidelity steadily declined, which has some potential implications for the need for follow-up and coaching. Without intermittent supports, educational professionals in general cannot sustain high levels of fidelity with intervention implementation, which has some real implications for how they are supported in the classroom. As a result, it would seem that it is not sufficient to have adults sit through a one-time professional development workshop and expect them to implement an intervention in perpetuity with 100% fidelity and also without any type of support.

CTD for Teaching Braille Word Recognition

A small body of research supports using CTD to teach both braille words and contractions to a wide range of population types of students with visual impairments (Hooper et al., 2014; Ivy & Hooper, 2015; Ivy et al., 2017; Wilcox, 2014). In the present study, the students seemed to excel with identifying the braille words with each student experiencing only one small dip during a 5-s session that he/she was then able to recover and prove mastery with three 100% sessions during consecutive 5-s sessions. Although the students themselves did not have any

mistakes in common, the mistakes were all very similar – they would read the first letter of the word and if it was the same beginning letter as a previously learned word from a previous word set, the student would identify that word as a previously learned word. For example, one student incorrectly read a word as "better," a word from word set A, but should have read "bring," a word from word set B. If time had permitted, it would have been beneficial to obtain maintenance and generalization data to see if the students could in fact read all learned words when presented with them.

It is also worth noting that the students did appear to be learning words even in baseline when the paraprofessionals were not implementing CTD with 100% fidelity (see Figure 2). Although the paraprofessionals were not implementing all of the steps as presented in the training, they still seemed to understand the basic structure enough to present the words to the students and have them read the words. Perhaps exposure alone was enough for the students to learn the words within the context of the intervention. Future research is needed to examine what level of fidelity is needed with CTD or even other interventions in order to improve student outcomes. It is often automatically assumed that 100% fidelity is needed for an intervention to have an impact on students, but that may not in fact always be the case. Student dips in learning words seemed to occur in both baseline and intervention, lending some evidence that perhaps high fidelity is not strictly necessary for implementation of CTD.

Maintenance of Fidelity

Findings indicate that once intervention of the e-mail feedback was withdrawn, the adults were able to maintain high levels of fidelity. As previously mentioned, two of the adult participants only needed e-mail feedback once before jumping up to 100% fidelity, which they

were then able to maintain for the rest of the study. Once the third adult reached 100% fidelity, she was also able to maintain that percentage all through maintenance until the end of the study. It should be noted that this study had paraprofessionals as the adult participants. Previous studies typically included preservice and typical educators. It is unique that the paraprofessionals, who are often an undertrained population that often deals most directly with students, were used for this study. This study offers an approach in ensuring that paraprofessionals are adequately supported.

Acceptability and Feasibility

Overall, the adults indicated that the e-mail feedback was extremely helpful in implementing CTD. Anecdotally, during the course of the study, I was able to record some off-the-cuff remarks about the intervention that were very positive. For example, one adult stated that she "loved the e-mails" and wished "other administrators used them too." This finding seems to be consistent with previous studies in which the adults typically report high levels of satisfaction with the e-mail feedback (e.g., Barton et al., 2016).

Within the social validity surveys, there was a recurring theme for improvement that had to do with the training portion of the intervention, which occurred before baseline. It was almost unanimous through the open-ended responses that the paraprofessionals would have liked to have been able to reference the PowerPoint from the training as well as have physical handouts with something like a task analysis of the steps. It would be interesting to tweak the training and conduct further research to ascertain the best method for implementing the training portion of the study in future, similar studies.

Limitations

There were several limitations to this study. First, the student participants selected for the study differed from the original design. When the study was initially proposed, I had hoped to focus on students with intellectual disabilities. However, only Nina had an intellectual disability.

Second, I was not able to select paraprofessionals and students as originally planned. As a result, the paraprofessionals only worked with their target students and used CTD when observed by the research team. Ideally, it would be beneficial to see if over time, the adults are able to maintain high fidelity with the intervention after significant time has passed, but due to the unnatural conditions of intervention implementation, these data could not be collected.

Third, I did not collect generalization and maintenance data on the students' braille word recognition. In the CTD intervention condition, it appeared that the students learned the braille words. However, the true test would be generalization (i.e. reading the braille words within passages and not in CTD isolation) and maintenance (i.e. reading the braille words over time).

Future Research

Additional research regarding the use of e-mail feedback is needed. Although this study demonstrated the effectiveness of e-mail feedback, many questions remain. First, it is unclear whether performance feedback e-mail would be helpful for other more complex interventions. This study used CTD, but research could be done to see if a more complex intervention, such as increasing peer-to-peer interactions, could be effectively implemented with e-mail feedback as support. Second, the level of fidelity required for students to successfully identify braille words with CTD is unclear. Future research should include layered designs that evaluate e-mail feedback approaches to ascertain what interventions could be successfully supported, such as degree of difficulty or complexity of an intervention. Third, future research should examine the

feasibility and sustainability of implementation, as only a small pool of three adults were able to give social validity data on the topic. For example, a larger pool of adult participants could be used as well as adults with other job titles such as general and special education teachers. Fourth, further research is needed to address the student outcomes associated with CTD. No maintenance or generalization data was taken on the students' retention of the braille words that they learned during the CTD intervention. As a result, it cannot be said if the students learned and maintained the words outside of the very specific CTD setting.

Within the specific field of visual impairments, a wealth of potential research lies in wait to build upon this study. First, this study is very unique as it is the first of its kind to examine CTD with the use of UEB. The field needs more studies to examine how to adequately teach UEB to students. Second, this study looked at words used within the context of language arts. Future studies should use other subjects to mine words from, such as mathematics and science. Third, this study took place at a residential school for students with visual impairments. Future studies should look at other settings, such as in resource rooms or with the varying settings of itinerant teachers. A potential next step is to use the CTD training and e-mail feedback, but with science words in a science classroom. Another potential study is to replicate this study, but with struggling paraprofessionals, i.e. paraprofessionals who are struggling to implement interventions with fidelity, or students with severe disabilities.

Implications for Practice

First, this study lends credence to the fact that educational professionals, in this case paraprofessionals, must be given additional supports outside of professional development training. Training alone is not enough to ensure that paraprofessionals can learn and successfully

implement an intervention like CTD. For example, Kathy was able to initially achieve fairly high-fidelity percentages but decreased over time. So even if the training is initially successful, the paraprofessionals needed support. As a result, this study makes a very compelling case for making sure educational professionals are given both proper training and ongoing supports.

Furthermore, it is not known what level of fidelity is critical to ensure intervention implementation success. In this study, students were learning regardless of level of fidelity. The level of necessary fidelity may vary from student-to-student. For example, for a student with an intellectual disability, strict adherence to all of the steps of implementation may be necessary as he/she might need more structure and more cues on what to do. For other students, it may not be strictly necessary to adhere to every single step of the CTD intervention, such as being sure to cover the word with the adult's hand, for the student to learn.

Second, the versatility of the CTD intervention makes it a viable option for both teachers and paraprofessionals. Given the way that the braille index cards are created, with braille for the students and with a printed word for the adults, almost anyone would be able to administer this intervention. Such individuals would include paraprofessionals, who typically do not know braille, general education teachers, and even classroom peers, all of whom could be working on the students' braille skills without having to actually know braille themselves. This versality ensures that the students with visual impairments are working on and learning their braille, even if a braille expert is not there to administer the intervention.

Third, the effectiveness of e-mail feedback could be attractive to school districts as a support tool because it can be a simple tool to use. To use e-mail feedback, all one needs is a computer/phone/electronic device and an internet connection. It is a cost effective and simple way to convey feedback to adults on how to improve their practices. Additionally, e-mail offers a

way to convey feedback that is simple and available for later reference in the future. Two of the paraprofessionals anecdotally reported referring back to the e-mail feedback prior to CTD sessions during the course of the study.

Fourth, e-mail feedback could be a viable option for school districts due to its cost effectiveness. E-mail feedback was initially developed based on the rationale that offering a cost-effective solution that minimizes wasting of time would be attractive to school districts, allowing more support to actually be offered to educational professionals in the field. For example, I specifically created a voiceover PowerPoint, so that the training could be held in future without me personally needing to be there to conduct the training. Additionally, since e-mail feedback could be offered via distance, school districts could enlist the assistance of aid from coaches in other locales, thus not being restricted to personnel within their own districts. Observations could occur live via Skype or the adults could record and upload sessions for their coaches to observe. It negates the need to have schedule and have an in-person observation, which can be both time and cost consuming.

Conclusion

Findings from this study add to the growing literature on the effectiveness and feasibility of the use of performance feedback. Adults showed high levels of fidelity when receiving e-mail feedback and reported high levels of satisfaction with the intervention. Additionally, as a secondary measure and question, the students acquired braille word recognition skills. This intervention holds promise in helping adult professionals in education to successfully implement CTD with high fidelity, which will hopefully translate into success for the students that they work with.

Appendix A

Record Review

Date: _____ Participant ID: _____ Age: _____ Eligibility Status:_____

Sex:_____Race/ethnicty:_____Completed by: _____

Primary Visual Condition: _____

Does student read braille? _____

Is braille student's primary medium? _____

For which of the following activities does the student use braille? ☐ Academic subjects (list): _____

☐ Student uses Nemeth

☐ Reading for pleasure

☐ Orientation and mobility (list activities): _____

☐ Other: _____

Braille reading level: _____

Date of assessment: _____

Can the student recognize their name?_____

# of alphabet letters known at the start of the study: _____

# of known contractions at the start of the study: _____

Does student read print? _____

Is print student's primary medium? _____

For which of the following activities does the student use print?

☐ Academic subjects (list): _____

☐ Student uses print for math

☐ Reading for pleasure

☐ Orientation and mobility (list activities):
_____

☐ Other: _____

Print reading level: _____

Date of assessment: _____

Near Visual Acuity: _____ Distance Visual Acuity: _____
☐ Glasses or other aids

_____

Field Restrictions:

_____

Functional Vision:

_____
_____

☐ Hearing aids ☐ Hearing within normal limits

_____

Other Conditions:

Appendix B

Paraprofessional Consent

Dear Paraprofessional,

We invite you to participate in a research study examining the benefits of coaching to teach braille words to students using constant time delay. We hope to learn how providing support of teachers in the form of e-mail coaching directly impacts students in learning braille words. To this end, we are inviting youth with visual impairments, and the paraprofessionals who support them to participate.

What Will My Participation Involve?
We will work with you to provide training about constant time delay directly to you. Constant time delay involves systematic prompting procedures to teach braille words to students. We will arrange for a one-hour training that we will need you to participate in, to teach you how to use constant time delay. First, you will complete the training. Second, you will implement constant time delay in your classroom with a target student three times per week. Third, you will receive e-mail feedback about what you are doing well and could do differently. You will continue to implement constant time delay until the end of the semester in December of 2018.

Once we have received a signed consent form from you, we will give you two forms to complete regarding you and the child in your class who might benefit from participation in the study. The first form will ask you basic information, such as your teaching and education history. The second form will ask you about the child's age, gender, attendance history, disability status, and current skills.

If you and/or the child meet the requirements to be in the study, we will begin working with you three times per week for approximately 10 minutes per day. These sessions will take place in the classroom during your regularly scheduled literacy time. Participation, as stated above, will also involve a 60-minute training and e-mail feedback from the research team. The study should last about 3 months.

What Information Will You Collect?
A member of our research team will assist you during all training activities. We will keep track of how well you are following the training steps, providing you with any needed support.

Are There Any Benefits to Me?

As part of this project, you will learn a practical strategy for supporting students in learning braille words as well as how to implement an evidence-based practice.

What Compensation Will I Receive?
You will receive $200 for participating in this study.

Are There Any Risks?

As we publish or present findings from this study, the names of participating students, teachers, and schools will never be used. To minimize the risk that any information we gather could be connected back to individual participants, we store all data securely in our project offices and de-identify it using codes. The researchers will be the only ones who view this information and individual information will not be shared with administrators at the school. All efforts, within reason, will be made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed.

This project has been approved by your school; however, your participation is completely voluntary. If you decide not to participate—or to later withdraw from the study—it will have no effect on your employment status with the school.

What If I Want More Information?
We encourage your questions about the research at any time by contacting Carlie Rhoads at (615) 507-0684 or at carlie.r.rhoads@vanderbilt.edu. For additional information about giving consent or your rights as a participant in this study, to discuss problems, concerns, and questions, or to offer input, please feel free to contact the Vanderbilt University Institutional Review Board Office at (615) 322-2918 or toll free at (866) 224-8273.

Please return this form indicating whether you agree to participate in this project.

Sincerely,

Carlie Rhoads, M. Ed
Doctoral Student in Special Education
carlie.r.rhoads@vanderbilt.edu

☐ **YES**, I agree to participate in this study.

☐ **NO**, I do not wish to participate in this study.

If you checked **yes**, sign below to indicate that you have read the consent letter and freely and voluntarily choose to participate.

Name

_____ _____

Signature Date

Appendix C

Paraprofessional Questionnaire

Name: _____ **Date of birth**:_____

Gender: _____ Female _____ Male **Race/ethnicity**: _____

Education:

___ High School Diploma ___ Bachelor's degree___Master's degree

___Other (please specify) _____

Years of teaching experience:

_____ Total

_____ In current setting

Class information:

_____Number of children in your class

_____Age range of children

How often do you check your e-mail?

_____ Daily _____ Every other day _____ Once per week

Other (please describe): _____

Appendix D

Data Sheet Used by Paraprofessionals

Date: Session #:

Name:

Circle Contraction Set: **A B C D** Circle Condition: **0s 5s**

Trial #	**Word**	**Unprompted Correct (UC)**	**Prompted Correct (PC)**	**Unprompted Incorrect (UI)**	**Prompted Incorrect (PI)**	**No Response (NR)**
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Appendix E

Initial CTD Training PowerPoint Outline

- **Constant Time Delay: A Training**
- Carlie Rhoads
- Vanderbilt University
- Fall 2018
- **What is Constant Time Delay?**
- Explicit teaching of sight/braille words/letters/contractions on flashcards
- A screening is used to get a list of unknown target words (usually 15-20 words)
    - List is divided into word sets that are taught separately (usually 3- or 4-word sets)
- Systematic and repeated prompting
- Interventionist presents the flashcard and pairs it with the instructional cue (i.e., "Read the word")
- Followed by the model prompt (i.e., "This word is dog")
- First, there is a 0-second delay between instructional cue and model prompt
- "Time delay" gets introduced in subsequent sessions (this study will use 5-second delay)
    - Think of it like a shot clock in basketball or time running out on a timer or hourglass
- **0-Second Delay**
- 0-second delay sessions (0-s) are explicit teaching sessions.
    - There are 0-seconds between the instructional cue (i.e., "Read the word") and model prompt (i.e., "This word is ___")
- Instructions to student:
    - "Today, I am going to show you some words. First, I will read a word/letter and then you can read it after me. Do you understand? Let's get started."
- You will place flashcard on rubber mat in front of the participant, put hand over card (at end of lead in line), give attending cue and instructional cue; immediately after instructional cue is given, you will give the model prompt and removes your hand from word
- Ideal response:
    - Student repeats the correct word/letter aloud while fully tracking the braille

- **Video**: Zero-Second Session
- **5-Second Delay**
- During 5-second delay sessions (5-s), the student has an opportunity to independently read the word if they know it; if no response is given within 5-s, they are explicitly taught the word (similar to a 0-s session)
    - There are 5-seconds between the instructional cue (i.e., "Read the word/letter") and the model prompt (i.e., "This word/letter is ___)
- Instructions to student:
    - "Today, I am going to show you some words. If you know the word read it. If you do not know the word, wait and I will read the word to you. Then you can read the word after me. Do you understand? Let's get started."
- You will place flashcard on rubber mat in front of the student and place hand over card, gives attending cue (i.e., "Find the end of the lead-in line) and then instructional cue
- You will wait for 5-seconds, giving the student the opportunity to say the word.
    - If student reads word correctly:
        - You will provide appropriate feedback (i.e., "That's right, good reading!")
    - If student does not say the word within 5-seconds:
        - You give the model prompt and student repeats the word/letter aloud and tracks it
    - If student responds incorrectly within the allotted 5-seconds:
        - You will provide instructional feedback (e.g., "Remember to wait if you don't know the word/letter")
- **Video: Five-Second Session**
- **Response Definitions: Correct Answers**
- Unprompted Correct (UC): student tracks the entire braille contraction and reads the correct word out loud, without assistance, within 5-seconds of the task direction. This response is only recorded when the student tracks and provides the correct word *before* the model prompt is given ("This word is ____")
    - 5-s sessions
- Prompted Correct (PC): student waits for the model prompt ("This word is ____") and then tracks and repeats the correct word. PC can only occur *after* the model prompt
    - 0-s or 5-s sessions

- **Response Definitions: Incorrect Answers**
- Unprompted Incorrect (UI): student says the correct verbal response, but fails to track the word, or says the incorrect verbal response, either tracked or untracked *before* a model prompt is given. For example, if a student reads the correct word, "dog," but fails to track the word fully.
    - 5-s sessions
- Prompted Incorrect (PI): student provides incorrect response after the model prompt. These errors can only occur *after* the model prompt. For example, you say "child" and the student says "child," but does not track the word fully. Another example is if you say "doll," and the student says "doily" while tracking the word fully.
    - Can occur during 0-s or 5-s sessions
- No Response (NR): student does not verbally respond during a given trial.
    - 0-s or 5-s sessions
- **Example Data Collection Sheet**
- **Example Procedural Fidelity Form**
- **Scripted Feedback: 0-s Sessions**
- (PC) Correct Verbal, Tracked:
    - "That's right! Good reading!"
- (PI) Correct Verbal, Untracked:
    - "Remember to look at the whole word/letter when you are reading"
- (PI) Incorrect Verbal, Tracked or Untracked:
    - "Remember to read the word/letter after me"
- (NR) No Verbal, Tracked or Untracked:
    - "Remember to read the word/letter after me"
- **Scripted Feedback: 5-s Sessions**

Before the Model Prompt:

- (UC) Correct Verbal, Tracked:
    - "That's right! Good reading!"
- (UI) Correct Verbal, Untracked:
    - "Remember to look at the whole word or letter when you're reading"

After the Model Prompt:

- (PC) Correct Verbal, Tracked:
    - "That's right! Good reading!"
- (PI) Correct Verbal, Untracked:
    - "Remember to look at the whole word or letter when you're reading"
- (PI) Incorrect Verbal, Tracked or Untracked:
    - "Remember to read the word/letter after me"
- (NR) No Verbal, Tracked or Untracked:
    - "Remember to read the word/letter after me"
- **E-mail Feedback**
- One last component; e-mail feedback
- After this training and once you have started implementing the CTD intervention with your target student, I will be offering support in the form of e-mail feedback
- You will receive an e-mail that offers constructive feedback on your implementation of CTD
- You will need to carefully read and send a response to the e-mail, so I know that you have received and read it
- **Other Notes**
- If your student becomes frustrated while working with you during these sessions, please respond as you normally would during educational time
- Remember to provide positive verbal reinforcement in the form of behavior-specific praise, such as "Good job, I like how you are reading today!"
- I will often be observing your CTD sessions in person, but will be unobtrusive and will not disrupt the classroom or the students' learning; during one-third of my observation sessions, a second observer, who is a Vanderbilt graduate student, will accompany me
- Thank you!
- Questions?
- Comments?
- And if you think of something, please feel free to e-mail me carlie.r.rhoads@vanderbilt.edu

Appendix F

Supporting Best Practices for Teaching Braille through Performance Feedback Training Fidelity of Implementation Data Sheet

Observer Name:_____ Date:_____

Session Start Time:_____ Session End Time:_____

Procedures	**+ or -**	**Agreement**
1. Greet participants and sign in with names and e-mail addresses; ask participants if they are willing to participate in the study and have them sign the consent forms (approximately 5 min)		
2. Voiceover PowerPoint - lecture on constant time delay implementation steps with voiceover and embedded videos (approximately 45 min)		
3. Questions (approximately 10 min)		
4. Each participant fills out the Teacher/Paraprofessional Questionnaire.		
5. Dismiss (thank participants and reconfirm meeting times)		
Total Fidelity of Implementation Steps Occurring for the Session		/5 %

Appendix G

E-mail Feedback Example

Hi Mrs. XXX,

I really enjoyed observing you today! You are doing a great job!

Today when I observed you during CTD implementation, you were in a zero-second session. You taught the following words: bring, clean, and done.

You presented each of the words, followed most of the directions for CTD sessions appropriately, and taught the words. The CTD intervention was used successfully!

Here are a couple other ways you can increase implementation fidelity when using CTD:

- After you place the word card on the mat, you need to cover the word with your hand (doing this prompts the student to find the beginning of the lead-in line) and tell the student to "find the end of the lead in-line."
- After you say "find the end of the lead in-line," you need to say "read the word" so the student knows to begin reading. In zero-second sessions, as soon as you say "read the word," you then need to immediately say "this word is…." If you were in five-second sessions, you would give up to 5-seconds pause time to allow the student to read the word, but since you are currently in zero-second, you must tell the student what the word is right away.
- Remember to always give feedback after each word to the student. If the student successfully reads the word, you give positive praise. If the student does not track the word properly, you must correct this, such as by saying, "remember to track the whole word." If the student does not respond, you must say "remember to read the word."

Please send me a quick e-mail back at carlie.r.rhoads@vanderbilt.edu and let me know that you received this message. The next observation will be after Thanksgiving break on Tuesday. November 27th. Please be sure to read these instructions carefully and implement during the next study session.

I look forward to observing again and seeing you increase your use of CTD!

Thank you and let me know what your questions are! Have a great day!!!

Best wishes,

Carlie R. Rhoads

Appendix H

Procedural Fidelity Collection Form

Date: _____ **Educator ID: _____**

Time: _____ **Student ID: _____**

Form completed by: _____

Procedures Occurring One-Time:

Procedure *Initial*	**Yes/No**
Randomized Card Order (Shuffle)	
Card Set Correct and Complete	
Proper Placement of Rubber Mat	
Appropriate Desk Height	
Braille Intact	
Correct phase (0-s, 5-s) has been selected for the session	
Has data sheet present and ready	
Procedure *Intervention*	
Student Greeted	
Appropriate Directions are Given for the Session	
Student's Feet Flat on the Floor	
Collects data on the target student's performance	

Procedures Occurring Multiple Times:

Procedures	**Trial #**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1. Card Centered on Rubber Mat												
2. Attending Cue (find end of lead-in line)												
3. Instructional Cue (read the word/letter)												
4. Physical Controlling Prompt (placing hand over												

the word, but allowing student to find lead-in line)												
5. Appropriate Time Delay and Mental Count												
6. Verbal Controlling Prompt (This word/letter is…)												
7. Appropriate Instructional Feedback (based on whether student gave UC, UI, PC, PI, or NR)												

Appendix I

Observer Data Collection Form for Student Data

Date: Session#: Participant ID: Interventionist: Observer: Circle Contraction Set: **A B C D** Circle Condition: **0s 5s** Start time: End time: Total time:											
Trial #	**Word**	**0s**			**5s**					**Agreement**	**Error**
1		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
2		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
3		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
4		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
5		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
6		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
7		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
8		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
9		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
10		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
11		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T
12		PC	PI	NR	UC	UI	PC	PI	NR	A D	V T

Appendix J

E-mail Feedback Procedural Fidelity Data Collection Form

Date of Observation	Participant	Session Type (baseline, intervention, maintenance)	E-mail sent day of observation?	E-mail Includes:					Did the teacher response to the e-mail? Yes/No	Procedural Fidelity Percentage
				Positive Comments	Data with Supportive Feedback	Corrective Feedback	Request for Response	Closing response		

Appendix K

Social Validity Questionnaire

Please complete this questionnaire. Please do not put your name on it. Please indicate your perceptions using the following scale.

Strongly Agree Agree Disagree Strongly Disagree

1. I found e-mail feedback to be effective in my ability to implement constant time delay.

   Strongly Agree Agree Disagree Strongly Disagree

2. I felt that the training I received, along with the e-mail feedback, was adequate for me to learn how to implement constant time delay by using all of the correct steps.

   Strongly Agree Agree Disagree Strongly Disagree

3. I felt that my students were able to successfully learn new braille words with my use of constant time delay.

   Strongly Agree Agree Disagree Strongly Disagree

4. Without e-mail feedback, I would not have been able to implement constant time delay while using all of the correct steps.

   Strongly Agree Agree Disagree Strongly Disagree

5. If asked by an administrator, I would recommend the e-mail feedback for school-wide coaching.

   Strongly Agree Agree Disagree Strongly Disagree

6. The e-mail feedback I received to learn to use constant time delay was more effective than other trainings on instructional strategies I have received in the past.

   Strongly Agree Agree Disagree Strongly Disagree

7. The best part of getting this coaching was:

8. Something that could improve the training and coaching is:

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