THE DIFFERENTIAL EFFECTS OF THE USE OF HANDWRITING WITHOUT TEARS ® MODIFIED GRAY BLOCK PAPER TO TEACH TWO PRESCHOOL STUDENTS WITH DEVELOPMENTAL DELAYS CAPITAL LETTER WRITING SKILLS

By

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ABSTRACT

The purpose of this study was to evaluate and measure the effectiveness of Handwriting Without Tears (HWT) modified gray block paper with letter writing on two preschool students diagnosed with developmental delays in pre-academics. Two students were selected from a self-contained special education preschool classroom in the Pacific Northwest. All the students in the classroom were diagnosed with Developmental Delays. The gray block paper intervention was used to teach both students how to write the letters in their first names. In baseline, both students were instructed to, "Write the letters of your name." During baseline, both students were able to write some of the letters in their names. However, both students did so inconsistently and with many errors in orientation and formation of the letters. The final outcomes showed improvement in both students in their ability to write the letters of their name. The gray block paper proved to be an inexpensive and easy to implement technique for instructing students with developmental delays to learn and refine writing the letters of their names. Suggestions for alterations to the study were discussed.

Keywords: Handwriting Without Tears, Preschool, Gray Block Paper, Single Case Research, Developmental Delay, Handwriting, Letter Formation.

INTRODUCTION

Handwriting is a principle skill for student success in school, but limited instruction is provided in the classroom. Approximately 30% to 60% of a typical school day is devoted to fine motor related activities primarily involved with writing tasks (Graham, 1999; McHale & Cermak, 1992). However, the skill is rarely taught consistently from school to school or classroom to classroom (Asher, 2006). Formal handwriting instruction can begin as early as preschool (Graham Harris, Mason, Fink-Chorzempa, Moran, & Saddler, 2007). However, often children are expected to come into school with some knowledge of letter writing (Graham, 1999; Graham et al., 2007; Donica, 2010b).

When considering techniques for handwriting instruction, various studies have been conducted using different teaching strategies to improve handwriting skills with children. Explicit and systematic instruction with prompts, tracing, descriptive praise, and rewards have been shown to be effective for teaching children with disabilities to increase letter writing skills (Caletti, McLaughlin, Derby, & Rinaldi, 2012; McLaughlin & Walsh, 1996; Park, Weber, & McLaughlin, 2007). The use of consequences such as token reinforcement (McLaughlin, 1981), free time (Hopkins, Garton, & Schutte, 1971), as well as response cost (McLaughlin, Mabee, Reiter, & Byram, 1987) have been show to be effective to improve handwriting skills.

More specifically, multisensory developmentally-based handwriting curriculums have been developed out of the field of occupational therapy in efforts to improve handwriting skills of children regardless of level of ability. One such program, Handwriting Without Tears® (HWT) (Olsen, 2013) has been implemented in schools both in general and special education classrooms. Donica

(2010a, 2010b) has provided a well-documented history of handwriting instruction for use by occupational therapists and classroom teachers. In addition, Donica, Larson, and Zinn, (2012) recently published the results from an excellent survey of actual handwriting practices employed in the schools. This paper is similar to that published by Graham and colleagues (Graham, et al., 2007). Both research groups found that handwriting is an important skill for success in school but instruction is not a priority in some classrooms and it is taught in very different ways.

Handwriting Without Tears® (HWT) is a developmentally-based handwriting program that has been used both individually and in entire classroom settings in the schools. This handwriting program has continued to evolve and the most current edition aligns with common core state standards to improve written communication in K-5 classrooms (Olsen, 2013; Olsen & Knapton, 2013). According to Olsen and Knapton (2013), HWT provides all the necessary materials to successfully teach handwriting readiness, printing, and cursive skills. This program elicits student engagement through interactive activities and the use of specialized materials to teach the appropriate skills necessary for handwriting, and it has been designed for and implemented in preschool to 5th grade. A vast training network has been developed to disseminate HWT to the schools. School administrators, general and special education teachers, occupational therapists, as well as parents attend these workshops. The individuals receive training in implementing the program at all levels and can continue to complete a certification in the program so they can then begin training local educators in their respective school districts.

Research has explored the use of HWT within full classrooms and specific populations. Lust and Donica (2011) measured skill improvement for prewriting skills, kindergarten readiness, first-name writing, and handwriting-nonspecific fine motor skills of students at Head Start. This classroom of students was taught using the pre-K Handwriting Without Tears-Get Set for School® (HWT-GSS) curriculum. A two-group, nonrandomized controlled trial using a pretest-posttest design was employed to assess the effectiveness of HWT-GSS. The effectiveness of adding the HWT-GSS curriculum in one preschool classroom two times per week was compared with that of a control classroom. The outcomes at post testing indicated that the experimental group (HWT-GSS) made significant improvements compared with the control group in prewriting, kindergarten readiness, and fine motor skills. However, both groups made significant improvements between pretesting and post testing in prewriting, first name writing, and school readiness. Outcomes suggested that adding the HWT-GSS to the Head Start program would be beneficial in improving handwriting readiness skills.

Several additional articles have appeared where portions of the HWT program have been evaluated in preschool special education settings. Cosby, McLaughlin, Derby and Huewe (2009) employed modeling, tracing, and a HWT-GSS activity page to improve the handwriting for a single preschool student with autism. Using a multiple baseline across pairs of letters, increases in legibility were found. Carlson, McLaughlin, Derby, and Blecher (2009) employed portions of the HWT (chalk board, worksheets, and a highlighted letter and start point), and to teach preschool students with autism and developmental delays to write. Carlson et al. found that when each aspect of HWT was employed, size and legibility for each letter increased. By the end of data collection the first participant was writing letters independently. McBride, Pelto, McLaughlin, Barretto, Robison, and Mortenson, (2009) implemented HWT to teach two students with severe disabilities to write their names. Using a multiple baseline across participants, they found that adding tracing to a HWT worksheet was effective. Prior to this technique, each participant failed to improve handwriting skills. Thompson, McLaughlin, Derby, and Conley (2012) employed a HWT worksheet and copying to improve the handwriting skills of two preschool students with developmental delays. The tracing and copying procedure from the HWT program produced improved handwriting. Overall, both participants showed an increase in their ability to write the letters in their name legibly. Coussens, McLaughlin, Derby, and McKenzie

(2012) implemented and evaluated HWT to teach two preschool students with developmental delays to write letters. One participant wrote letters in his name while the other wrote developmentally appropriate letters. Using the HWT chalkboard, wood pieces, and workbook procedures along with the added steps of highlight, model and start point improved the participants' ability to legibly produce those letters. LeBrun, McLaughlin, Derby, and McKenzie (2012) employed portions of the HWT to teach 31 preschool students with and without disabilities enrolled in an Early Childhood Education Assistance Program (ECEAP) to write their names. The effects of HWT were evaluated in an AB single case design across three groups of students. A student could earn three points for each letter (1 = size, 1 = formation, 1 = slant). Statistically different increases in all three measures were found when HWT was employed.

With recent advancements in technology, several applications for the iPad have appeared and been used in the classroom (Murray & Olcese, 2011). Different apps can function as prompts for teaching requesting (Armstrong, McLaughlin, Clark, & Neyman, 2012) and prompts to teach tracing with pre handwriting skills or letter recognition (Boreaal, 2012) are starting to be very common in many special education preschool classrooms (Murray & Olcese, 2011). Combining apps to assist in the teaching of pre-handwriting as well as handwriting should be of interest to educators interested in improving written communication for students in general as well as special education. Within this study, the use of an app was introduced as a reward for participation in the handwriting activities which had the potential to continue to enhance the handwriting skills.

The purpose of this study was to evaluate and measure the effectiveness of using modified Handwriting Without Tears® gray block paper with capital letter writing for two preschool students diagnosed with developmental delays in pre-academics. The research question being explored in this study was if individual capital letter practice using a modified gray block paper for the letters of the name would enhance orientation and formation of the letters when printing the name independently. The goal of this study was to improve independent capital name printing skills. The use of single case research design methodology (Kazdin, 2011) to evaluate the efficacy of the procedures for two participants was used.

Method

Setting and Participants

The study took place during the afternoon sessions in a self-contained special education preschool classroom in a public elementary school in the Pacific Northwest. The preschool was focused on pre-academic and social skills for students identified as having mild developmental delays, with students attending for 2 1/2 hours per class period, four days per week. Typically, 6 students, ranging from 4 to 6 years old, including the participants, the master teacher and two instructional assistants were present during each session. Additionally, the district speech and language pathologist and a practicum student were intermittently present on Tuesdays and Thursdays each week throughout the duration of the study. The participants were, individually, brought to a one-on-one worktable within the classroom, which faced a wall to prevent unnecessary distractions during the session. This study took place over a nine-week period, with a total of 16 sessions, lasting 10 to 20 minutes per session for Participant 1, and 18 sessions, lasting 15 to 40 minutes per session for Participant 2.

The first participant in this study was a four-year-old boy at the time the study began. The student was identified as having Developmental Delays (DD) and was placed in the setting for growth in pre-academic and social/behavior skills. The student came from a small family consisting only of himself, his mother and father. The master teacher recommended the student for the study due to his expected advancement to a general education kindergarten the following year. The master teacher and the first author felt that name writing was an important skill to have going into kindergarten. No prior interventions were used to teach this student name writing. Throughout the study, the student was cooperative and enthusiastic in participation.

The second student in this study was a five-year-old boy at

the time the study began. The student was identified as having Developmental Delays, and was placed in the setting for growth in pre-academic and communication skills. The student was adopted into a large family when he was a small child and lived with his mother, father and elder adult siblings. The master teacher recommended the student for the study due to his expected advancement to kindergarten the next year. Prior to this study, another intervention for name writing skills was attempted, but proved to be ineffective for the student (Chung, McLaughlin, Neyman & Robison, 2013). Throughout the study, the student's participation fluctuated, ranging from noncompliant to cooperative and enthusiastic.

Materials

The materials used in this study were as follows: Vis-à-vis markers, Crayola markers, sheet protectors, modified gray block paper modeled after that used in the Handwriting Without Tears curriculum materials (Figure. 1), wet and dry cloths, and data collection sheets (Figure 2). An iPad with the electronic application (app) LetterSchool (Boreaal, 2012) was used for reinforcement after the completion of the letter lesson.

Figure 1. This is an example of the gray block worksheet used during the intervention. The instructor would write in highlighter on each block the correct formation of the letter to be traced

Dependent Variable and Measurement Procedures

The target of this study was given a piece of paper, pen, and the instructions to write the letters of his name, the student would be able to write the capital letters of his name using accurate and consistent orientation and formation as modeled by the Handwriting Without Tears curriculum on 3 of 3 consecutive trials. All data was scored using the same measurement procedure. Each capital letter of the students' name could be awarded two points. The first point was given based on successful orientation of the letter. Orientation is facing the letter in the correct direction without reversal (Olsen & Knapton, 2006). The second point was given depending on the formation of the letter based on the Handwriting Without Tears standard on letter formation. The data was scored using permanent products that the student completed at the end of each session. Each permanent product contained the previously learned letters, the current letter, and the future letters to be learned.

Experimental Design

A multiple baseline design (Kazdin, 2011) was used to evaluate the effectiveness of the HWT gray block paper on letter writing. The number of letters varied for each of the participants due to the different number of letters in their names. In the present research, each set consisted of one letter to be mastered. There were six sets for the first participant, three of which were moved into intervention. There were seven sets for the second participant, three of

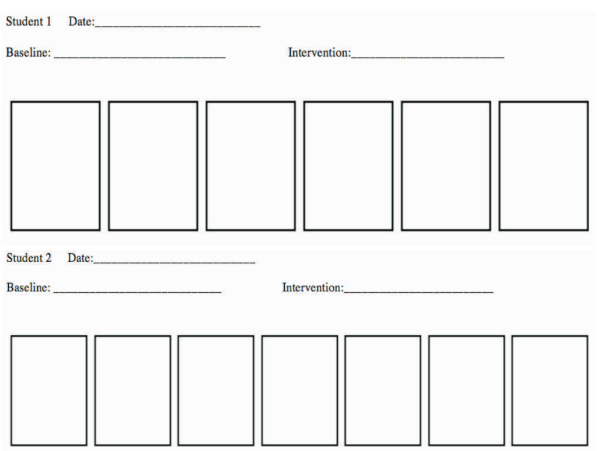

Figure 2. This is the template the first author used as a data collection sheet for each of the participants. It was printed on horizontal oriented paper for a larger size

which were moved into intervention. Throughout the study, the teaching strategy model, lead, test (Marchand-Martella, Slocum, & Martella, 2004) was also employed.

Baseline

Baseline was taken for each student separately. During baseline, the student was given the data sheet and a marker in the color of his choice, along with the instructions, "you're going to write the letters of your name now." Each student was then told the specific letters to write, one by one, until each letter of the name was written within a box without a model on the data sheet. Each student was given positive feedback on his effort in completing the activity. However, no specific feedback was given on the orientation or formation of the letters. This baseline condition lasted for 5 sessions for each of the students. However, baseline measurements continued every session throughout the study for letters that were not specifically taught. The student wrote his name daily as a measure and one letter was the focus of intervention for that day. Baseline data determined both students had some prior knowledge of how to write their names. However, many letters, for each student, had inconsistent orientation and formation.

Letter writing using gray block paper

The first letter to be modified for each student was printed in highlighter twenty times, using the Handwriting Without Tears formation, on a modified gray block paper (Figure 1) and placed inside a sheet protector. The first author, using the HWT letter formation terminology, modeled the formation of the letter, (e.g. "first big line down, and turn. Little line across," while tracing/writing the letter J,) using a Vis-à-vis marker. These demonstrations occurred on the gray block paper. The participants then traced the letter on the paper in the sheet protector twenty times, using the Vis-à-vis marker, in the color of their choosing. While the student traced the letters, the first author would repeat the HWT terminology for each letter. Upon completion of tracing, the first author would turn the sheet protector over and model the formation of the letter between lines of varying heights, (e.g. 1/2", 1", 4") again using the HWT terminology. Then the student would copy this procedure. Lastly, the student would complete the data sheet procedure explained above.

Each session, the students were given specific praise and feedback on the formation of their letters and the effort they put forth in completing the activity. In the event the student produced an illegible version of the letter, the first author would erase the student's attempt using wet and dry cloths, and the student would be instructed to try again with explanation of why the letter was unacceptable, (e.g. "This line is too small, let's try that one again," etc.) Additionally, at the end of each intervention session, participants were awarded with the opportunity to access LetterSchool, an electronic application designed for the Apple iPad used for practice on letter formation. This application was used as a reward to increase motivation for the first participant, but the second participant was not motivated by access to the application. Instead, access to his "friends" after each session became motivating over the course of the study.

A maintenance procedure was also used during this study, as per the suggestion of the master teacher in the classroom. At the beginning of each session, the maintenance procedure consisted of having our participants trace previously mastered letters five times and writing the letter independently two times each.

Reliability of Measurement

Interobserver agreement was conducted on each session of the study, using the permanent product. The percent of interobserver agreement was calculated by dividing the smaller number of correct orientation and formation points recorded by one observer by the larger number of correct orientation and formation points recorded by the second observer and then multiplying by one-hundred. The average percent of interobserver agreement for correct orientation and formation was for Participant 1 is 92.7% (range: 83.3-100%). The average percent of interobserver agreement for correct orientation and formation was for Participant 2 is 96.8% (range: 85.7-100%).

Results

The number of points given for correctly oriented and

formed letters is shown for each session on each letter in Figures 3-9.

Participant 1

Figures 3-6 show the points awarded to Participant 1 for correct orientation and formation of his three letters. The average points given for each letter for Participant 1 during baseline are as follows: J-1, O-1.81, R-0, D-1.08, A-.41, and N-.59. The average points given for each letter of Participant 1 during intervention are as follows: J-1.62, R-1.71, and D-2. This indicates that Participant 1 received an average of 1.1 points higher each session on intervened letters than he had during baseline.

Participant 2

Figures 7-9 show the points awarded to Participant 2 for correct orientation and formation of the letters. The average points given for each letter of Participant 2 during baseline are as follows: G-1, A-1.83, and B-1.08. The

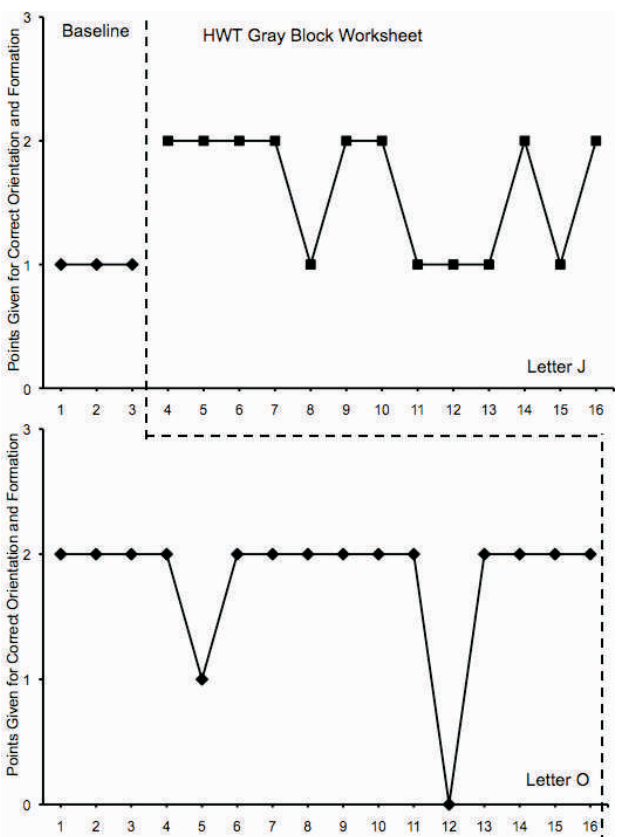

Figure 3. The baseline and intervention data for Participant 1 for letters J and O

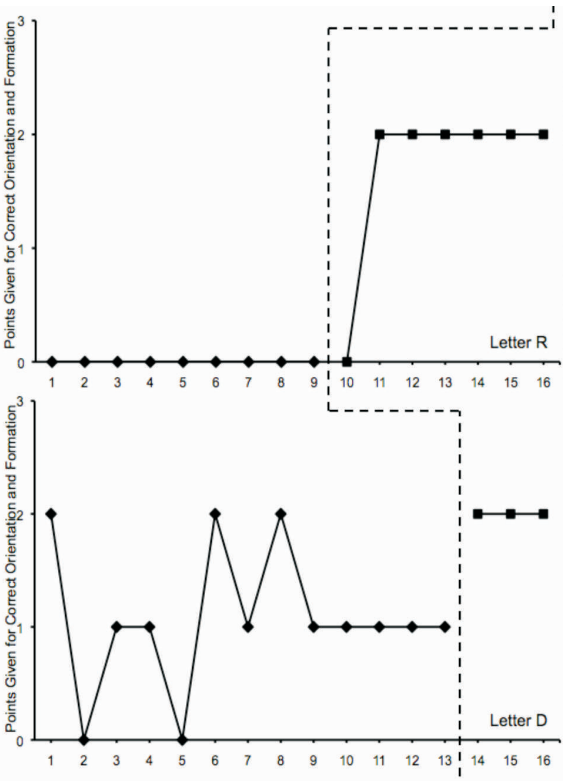

Figure 4. The baseline and intervention data for Participant 1 with letters R and D

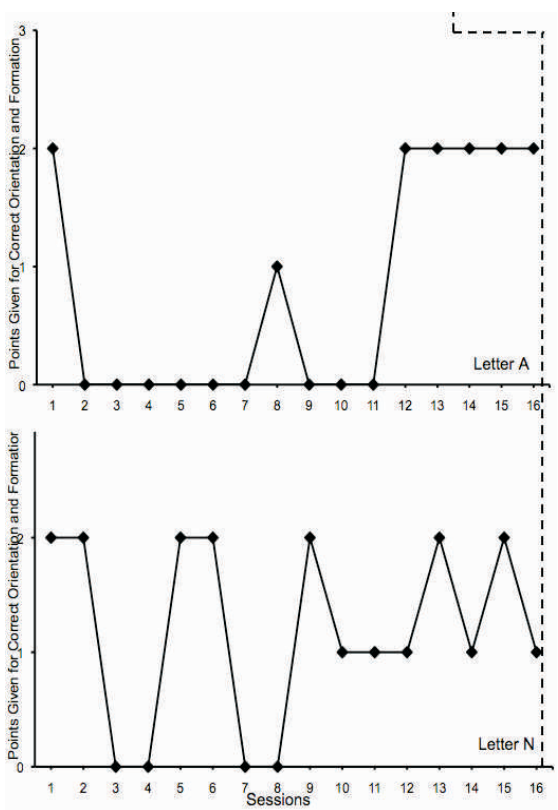

Figure 5. The baseline and intervention data for Participant 1 for letters A and N

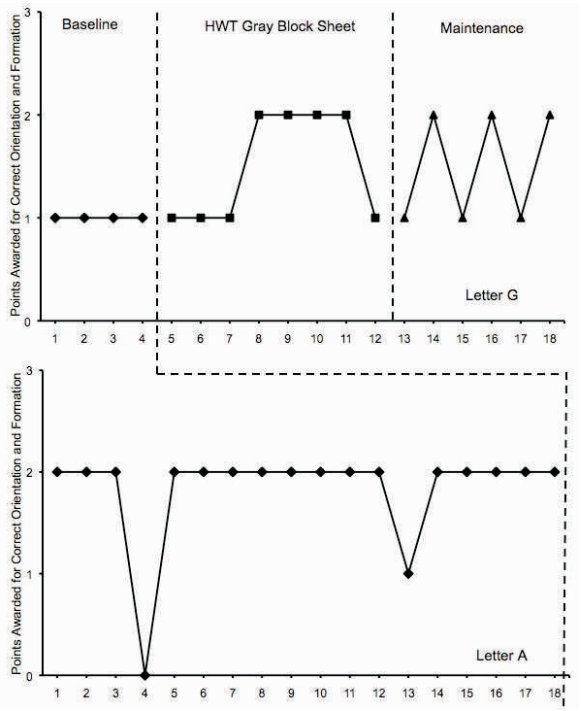

Figure 6. The baseline and intervention data for Participant 2 with letters G and A

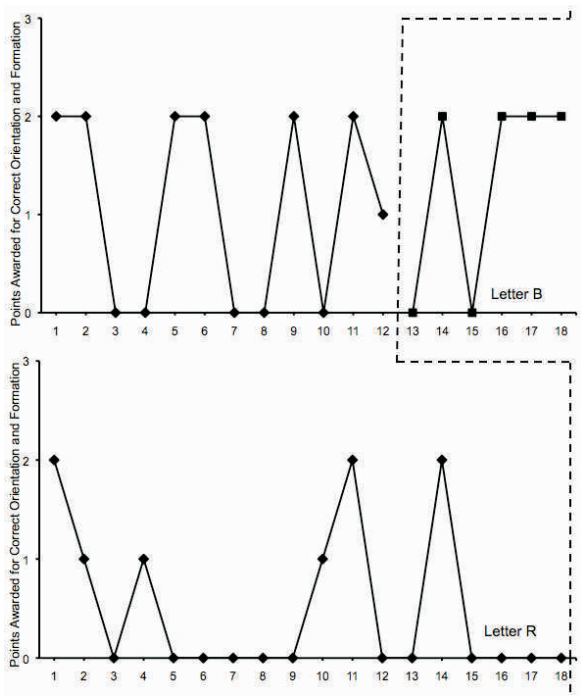

Figure 7. The baseline and intervention data for Participant 2 with letters B and R

average points given for each letter of Participant 2 during intervention are as follows: G-1.5 and B-1.33. This indicates that Participant 2 received an average of .38 points higher each session on intervened letters than

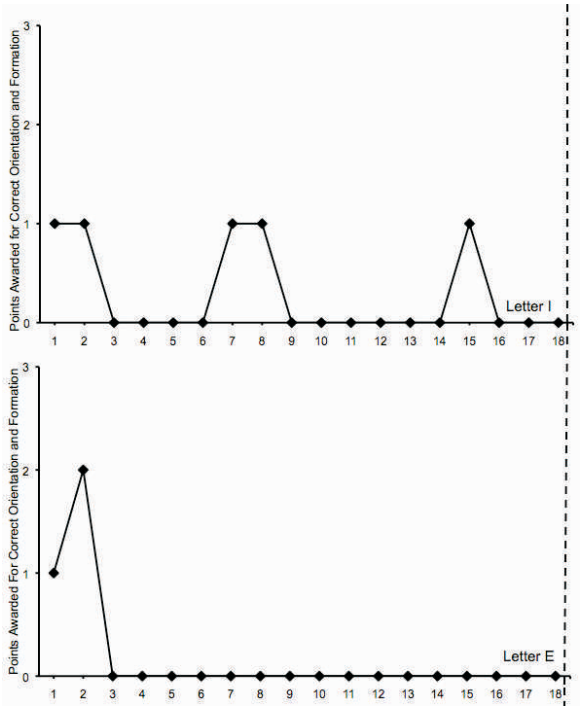

Figure 8. The baseline and intervention data for Participant 2 with letters I and E

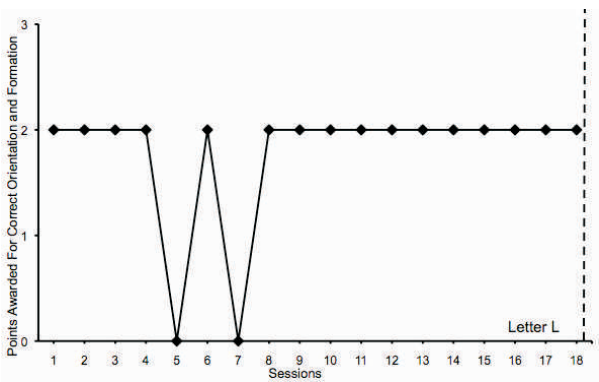

Figure 9. The baseline and intervention data for Participant 2 for the letter L

during baseline. Only two letters were practiced by this participant.

Discussion

The goal of this study was when given a piece of paper, pen, and the instructions to write the letters of his name, the students would be able to write the letters of their names using accurate and consistent orientation and formation as modeled by the Handwriting Without Tears curriculum on 3 of 3 consecutive trials. Overall, this study and the HWT materials employed were effective in progressing the students toward that goal. Both students' average of points earned during intervention sessions

increased. This would indicate that learning did take place, with the use of the modified gray block paper to practice the letters of their names.

The results appear to be also socially significant (Wolf, 1978) as both students would inevitably be moving onto some form of kindergarten in the following year. Having a more advanced knowledge of letters in their names and how to form them would be necessary for their success in the future. Due to Participant 2's prior family commitments and time constraints of this study, unfortunately, the first author was not able to intervene on all letters of the students' names that posed concern. However, further work would be continued by the master teacher or future volunteers due to the inexpensive nature and easy implementation of the intervention in the classroom. The lack of powerful effects warrants further analysis and research.

The outcomes of this study support and extend previous research evaluating the effects of HWT (Coussens et al., 2012; Cosby et al. 2009; McBride et al., 2009; LeBrun et al. 2012). In the present case report, the reward of using a handwriting-related app was added to HWT methods. Additional research could explore the use of letter formation apps such as the LetterSchool (Boreaal, 2012) or the newly released HWT Wet-Dry-Try App (Handwriting Without Tears & Get Set for School, 2012).

The intervention was inexpensive and easy to implement, making it possible for most teachers to use it in the classroom. On average each session would take only 15 minutes. Once the student understood the new formation and wording for the letters, greater independence for the student to complete the activity would be allowed, making it possible for a teacher implementing this intervention to move around the classroom as necessary while the student continued to work and still be able to check for errors with the student. This provides some evidence that a single preschool special education teacher and staff could employ HWT with an entire class (LeBrun et al., 2012).

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