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The Effects of "Handwriting without Tears®" on the Handwriting Skills of Appropriate Size, Form, and Tool for a Four Year-Old Boy with a Developmental Delay

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The ability to write one's own name legibly is a critical lifelong skill for academic success. The purpose of the present study was to evaluate the effects of the Handwriting Without Tears® program on teaching a four year-old how to write his first name using proper size, form, and tool. The participant was a four year-old boy in a self-contained preschool setting. A multiple baseline design across letters was employed. The overall outcomes indicated improvement through the use of Handwriting without Tears® materials. The participant enjoyed the procedure and improved his academic skills.

Keywords: Handwriting without Tears®, developmental delay, self-contained preschool, letters, handwriting, written communication, name

Handwriting is an important skill that is taught typically in early primary years when children have the developmentally appropriate fine motor skills (Graham, 1999; Graham, Harris, & Fink, 2000; Graham, Harris, Mason, Fink-Chorzempa, Moran, & Saddler, 2008). Handwriting is also a necessary skill to the success of children because much of the work in elementary school that is required of students must be handwritten. Therefore, teaching pre-academic handwriting to preschoolers is important. (Delegato, McLaughlin, Derby, & Schuster, 2013). Handwriting involves many skills that intertwine cognitive and visual motor skills, and hand strength and fine motor ability (Donica, Larson, & Zinn, 2012). According to several authors, handwriting remains a highly functional skill that is implemented in many educational settings (Berninger, Vaughn, Abbott, Abbott, Rogan, Brooks, Reed, & Graham, 1997; Graham, 1999, 2010; Graham, Harris, & Fink-Chorzempa, 2002). It has been suggested for the learner to be able to appropriately size and form his letters with the proper tool.

Various procedures have been employed to improve the handwriting of

students and these have varied from extra time for instruction in handwriting, tracing, prompting and consequences, as well as tracing, modeling and worksheets (Caletti, McLaughlin, Derby, & Rinaldi, 2012; Graham, Harris, & Fink, 2000; Gutting-McKee, McLaughlin, Neyman, & Toone, 2013; Maricich, McLaughlin, Derby, & Conley, 2012; Thompson, McLaughlin, Derby, & Conley, 2012). These have included such curricula in part or whole, as Handwriting Without Tears® (HWT®) (Olsen, 1998, 2003). HWT® is a structured program that has been developed to teach handwriting using the procedures and pedagogy from occupational therapy. It is a self-contained program that has been widely employed for both general as well as special education by teachers (Donica et al., 2012). Finally, HWT® can be appropriate for all learning styles and is able to engage children in an exciting way to teach them handwriting.

There have been several recent evaluations of HWT® in the peer-reviewed literature. McLaughlin and colleagues have evaluated the efficacy of HWT® in several reports. For example, Cosby, McLaughlin, Derby, and Huewe (2009) employed tracing and modeling derived from the HWT® program. They also permitted their participant to use with a HWT ® student worksheet. They found that their package of procedures was effective when increasing a preschool aged student's handwriting. By the end of data collection, their participant was able to correctly write all the letters in her name. Coussens, McLaughlin, Derby, and McKenzie (2012) reported the use of the HWT® program increased in their participant's letter writing legibility. Although not directly assessed, the authors subjectively felt that instruction in handwriting led to the improvement for their participant in other academic areas as well. Because the participant was unable to properly size and form his letters with the appropriate tool, the HWT® curriculum reinforced and adequately supported the target goal of writing his first name with proper size, form, and tool. Lebrun, McLaughlin, Derby, and McKenzie (2012) were also able to implement HWT with 31 preschools enrolled in an integrated preschool. All of the students were able to improve their handwriting abilities.

Griffiths, McLaughlin, Donica, Neyman, and Robison (2013) evaluated and measured the effectiveness of HWT® modified gray block paper with letter writing on two preschool students diagnosed with developmental delays in pre-academics. Both of these students were chosen from a self-contained special education preschool setting. The gray block paper intervention was used to teach both students how to write the letters in their first names. By the end of data collection, both participants were able to write the letters in their names with increased legibility.

The overall purpose of this study was to evaluate the effects of the HWT® program on the correct size, form, and tool for the handwriting of letters with a four year-old boy with a developmental delay. Second, this would provide an additional replication as to the efficacy of implementing components of the HWT® program with additional preschool student (Olsen, 1998; Olsen & Knapton, 2012, 2013).

Methods

Participant and Setting

The participant was a four year-old preschool student identified with developmental delays in cognitive, fine motor, communication, social/emotional, and adaptive. The participant lived with his father and siblings. The participant had the ability to recognize, identify, and verbally express the letters of his name in the correct

order. However, he could not write the letters in his name involving appropriate size, form, and tool (pencil).

The first author made use of the participant's cooperation and desire to learn in a one-on-one setting. Because of the small class size, the first author was able to complete a lot of-one-on work with the participant and build a relationship with him prior to beginning the study. He was eager to learn something he valued, his name.

The study took place in a half-day self-contained special education preschool from 12:30-3:00 p.m. Monday thru Thursday in a low-income urban elementary school in the Pacific Northwest. There were a total of two children in his class for the part of the day the study was completed. The other half of the day was spent in collaboration with another preschool classroom with four other boys. The study was conducted initially from 12:30 to 12:45 p.m. four days a week. At this time, the author and participant remained a part of the classroom environment but worked at a table that was further removed from the rest of the class. Additionally, the author seated the participant so that his back was to the free play activities.

Materials

The materials used in this study included a pre-test and post-test. The participant was given a strip of paper and prompted with the instructional cue "Write name." (Figure 1) The Handwriting without Tears® box-controlled chalkboards were also used in this procedure. The participant was provided with a chalkboard, chalk, and a sponge to erase as part of the intervention. (Figure 2) Worksheets were also used during this intervention. The worksheets contained five gray-shaded blocks for the participant to practice the letter he was working (Figure 3). The first box contained a model for him, and the four following allowed him to write the letter himself with appropriate size, form, and tool.

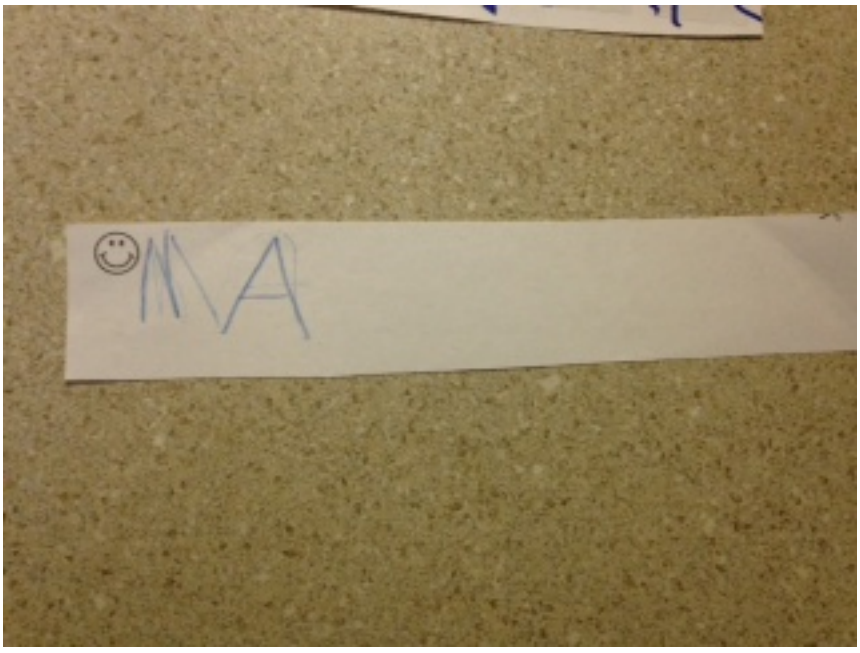

Figure 1: Permanent product of Marquis name when his name was scored for data

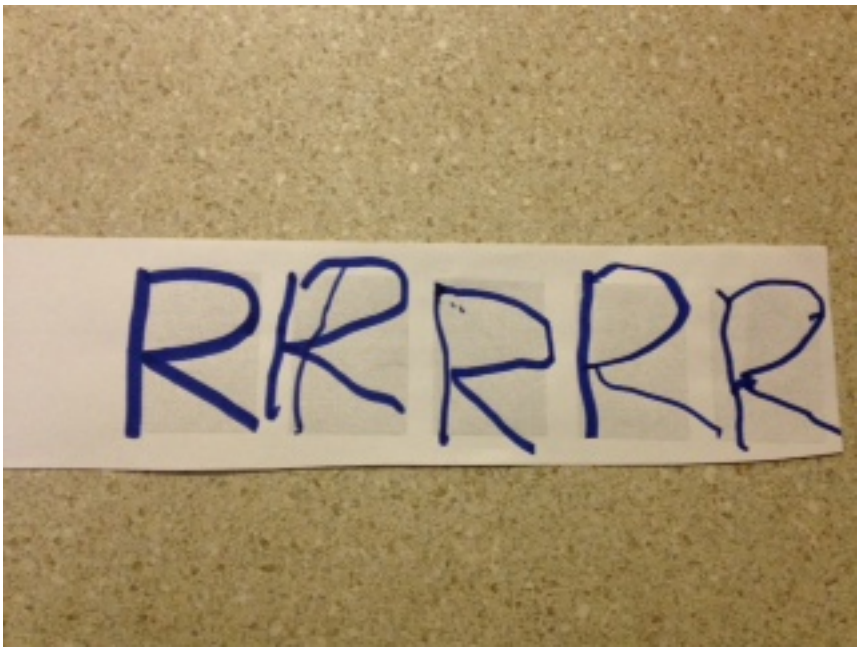

Figure 2: Gray blocked worksheet used during intervention

Figure 3: Chalkboard used during intervention

Dependent Variable and Measurement

The dependent variable for this study was number of handwriting points per letter using the capital letters in the participant's first name. These data were placed on a data collection sheet shown in Figure 4. One point was awarded for appropriate size, another point for appropriate form, and one for tool. Size and form were defined according to the kindergarten standards outlined in the HWT® program.

Data Collection and Interobserver Agreement

Following each session with the participant, the first author presented a piece of paper. The participant received one point each for appropriate size, form, and tool. The participant had seven letters in his name and had the opportnity to earn three points per letter. Interobserver agreement was conducted once during baseline and during each of the data collection times during the HWT® intervention. The data sheet in Figure 4 displays the scores given by the first author. Interobserver agreement was calculated by having a colleague of the first author independently determine the number of correct and incorrect responses. The colleague had his own data sheet separate from the first author's to record his scores. The first author's scores and the interobserver scares were compared to determine the percent of interobserver agreement. The percent of interobserver agreement was determined by dividing the smaller number of correct response from one observer by the larger number of correct response from the second observer and then multiplying by 100. Every session conducted with the participant involved both observers scoring the results. The percent of sessions that had interobserver agreement was 100%.

Data Collection: Primary Learning Target

Session	Lesson	Letter	Criterion: 1 point each		
1			Size:	Form:	Tool:
2			Size:	Form:	Tool:
3			Size:	Form:	Tool:
4			Size:	Form:	Tool:
5			Size:	Form:	Tool:
6			Size:	Form:	Tool:
7			Size:	Form:	Tool:
8			Size:	Form:	Tool:
9			Size:	Form:	Tool:
10			Size:	Form:	Tool:
11			Size:	Form:	Tool:
12			Size:	Form:	Tool:
13			Size:	Form:	Tool:
14			Size:	Form:	Tool:
15			Size:	Form:	Tool:

Figure 4: Data Collection Set

Experimental Design and Conditions

A multiple baseline design across seven sets of individual letters one letter per set was used to evaluate the effects of a *HWT®* intervention on correctly writing the letters in his name (Kazdin, 2011; McLaughlin, 1983). At least two days of baseline were taken with each set. The first author began intervention with the *HWT®* program using the gray-shaded worksheets. After 3 days of intervention for set 1, a phase change occurred in which the *HWT®* chalkboards were used. After session 4, intervention for Sets 1-3 included both strategies listed above. Set 1 had 7 days of intervention, Set 2 had 5 days of intervention using all the strategies listed above, set 3 had 4 days of intervention, and sets 4-7 had not yet met criteria for intervention. The decision for intervention of set 1 was shown after there were zero correct responses for two consecutive sessions. For set 2 and 3, the previous intervened set had to show three correct responses for three consecutive sessions.

Baseline. During baseline, the first author gave the participant a strip of paper and a pencil. The participant was prompted with the instructional cue, "Write name." No direct feedback regarding the participant's performance was given. Specific praise was given for overall effort and responding to the task.

Handwriting without Tears® on handwriting skills. *The Handwriting Without Tears®* program was utilized to teach the participant how to properly size and form the letters in his name using the proper tool. For each session, one letter was introduced. The teacher presented several writing tasks. The first was the HWT® worksheet with a model of the letter being introduced for that session. The worksheet provided 5 gray boxes on a strip of paper. The first box had a model of the letter. The second box had the same letter written in highlighter that the participant was to trace. The next three boxes were intended for the participant to write the letter individually three times. While the student was physically writing the letter, the teacher verbally said the step-by-step procedure for how to properly form the letter according to the HWT® verbiage. For example, for the letter R, the teacher said, "big line down, little curve, kick out." "Letters and Numbers for Me" (Olsen, 1998, 2002). The first author modeled the correct verbiage as she modeled the letter being introduced. The participant caught on quickly to the verbiage and said it as he was writing the letters as well.

After three days of just using the gray shaded worksheets, very little improvement was shown. The first author introduced the use of a size-controlling boxed chalkboard that followed the HWT® curriculum. The participant was provided with chalk and the chalkboard. The teacher modeled how to write the letter with chalk while saying the verbiage. A wet sponge was then used to erase the letter that was just written, leaving a visible mark of what the letter looks like for the participant to trace. The participant was then able to trace the letter and write it again himself. He would practice writing and erasing the letter on the chalkboard at least three times per session. This procedure continued as all other sets were introduced. Specific praise was given for appropriate responses in addition to a preferred task after the session.

Results

The results of this study are displayed in Figure 5. For Set 1, the mean number of correct responses during baseline was 0. The mean number of correct responses during the HWT® intervention on Set 1 was 2.14 (range was 1 to 3). The number of correct responses during Set 2 baseline was 0.The

mean average of correct responses during intervention on Set 2 was 2.6 (Range 2-3). The number of correct responses during Set 3 baseline was 0. The mean average of correct responses during intervention on Set 3 was 1.75 (range 1-2). The number of correct responses during Sets 4-7 baseline was 0.0, and intervention did not take place for these sets.

Discussion

Though the first author was unable to intervene on Sets 4-7, the participant made significant improvements in learning how to appropriately size and form the letters in his first name. More substantial improvements were seen when the use of the chalkboard was implemented into the intervention routine. Prior to the intervention, the participant was only able to recognize the first letter of his name. He would see the letter "M" and say "that's my name." He did not understand the concept that it was one letter of his name. He had no consistent ability to write his name with appropriate size, form, and tool. After conversations with the participant's special education teacher and considering the future educational setting of the child, it was determined that teaching the participant how to appropriately size and form his letters would be an ideal target skill. The results also provide an additional replication as to the efficacy of implementing and evaluating HWT in a new classroom setting (Delegato et al., 2013; Griffiths et al., 2013; Thompson et al., 2012). However, this classroom has been the setting for our earlier research (McBride, Pelto, McLaughlin, Barretto, Robison, & Mortenson, 2009). These outcomes add to the strength of several past research projects completed in another classroom by first authors in the same school district (Coussens et al., 2012; Lebrun et al., 2012; Morris et al., 2012).

The first author began using the HWT® worksheets containing the gray shaded boxes to teach the participant appropriate size and form according to the kindergarten standards, identified from the HWT® curriculum. After 3 sessions, the first author noticed very little improvement in the participant's letter writing for Set 1. The first author reevaluated the intervention and decided to add the additional component of a size-controlling boxed chalkboard that followed the HWT® curriculum. Within four sessions after session 3, the participant had mastered Set 1. Intervention then began on Set 2. This also illustrates the importance of employing single case research designs to assess intervention effects and they flexibility they provide classroom personnel (Kazdin, 2011).

The participant often was the only child in the classroom during the time of the intervention. This allowed him to be focused on the tasks being presented to him by the first author. Specific verbal praise, high fives, and access to a preferred task were used as reinforcers for the participant. Enthusiasm and specific praise gave the participant immediate feedback and this contributed to his success as well. It also allowed him to identify and understand correct responses.

One strength of this study was the rapport and positive relationship the first author established with the participant. Prior to the start of the study, the first author made a particular effort to interact with the participant in various learning environments within the school day. The participant was often the only student in the classroom on most days, so much of the days were spent one-on-one for half of the day, and with another group of preschoolers for the other half. This one-on-one time allowed for the relationship between the participant and the

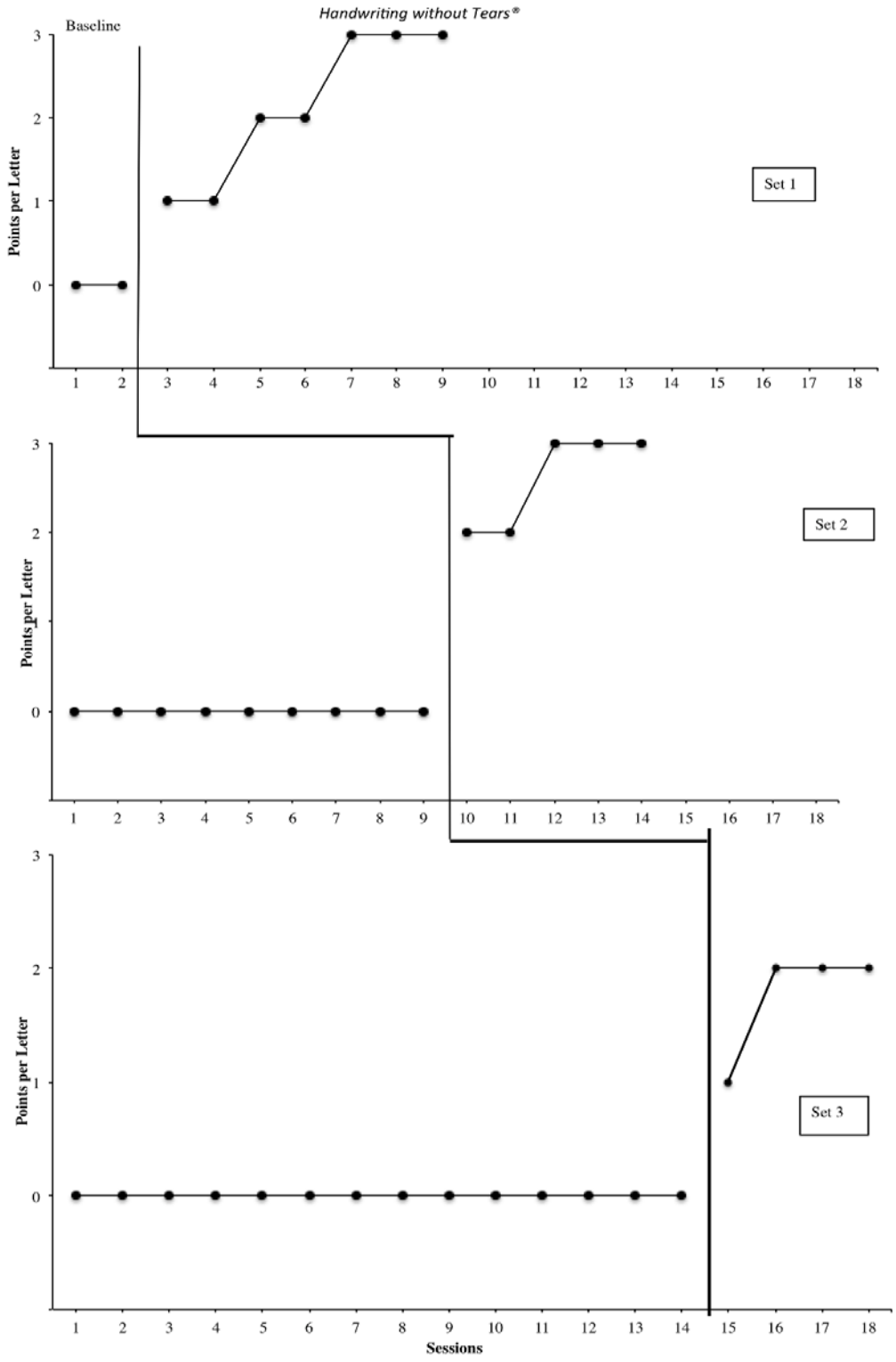

Figure 5: Results of the Study

first author to strengthen. Because there were often no other students in the room, this allowed for a quiet learning environment for instruction to take place.

Another strength was the social behaviors of the participant. He was eager to learn and to work on learning something he considered important to himself, his name. An additional strength was the implementation of maintenance on previously mastered sets. Each day during intervention, the first author and the participant practiced previously mastered sets using the same intervention tools for a brief amount of time before working on the current set.

The use of the HWT® worksheets were effective because of the prompts used to teach the participant how to form the letters in his name. The participant independently stated the HWT® prompts to help facilitate his own learning and progress. The size-controlling chalkboard that supplemented the HWT® worksheets helped teach proper size and form for letter writing and allowed the participant to write his name in a different medium. This has been a strength of employing HWT® (Donica 2010b).

The percentage of non-overlapping data points (NDP) between baseline and HWT were not overlapping (Scruggs & Mastropieri, 2007, 2013: Scruggs, Mastropieri, & Casto, 1987) was 100%. Using this methodology it would suggest the HWT® was highly effective intervention for each of our three sets of letters.

The limitations of this study included the time needed to fully teach the participant how to appropriately form and size all the letters in his first name. The preschool setting of the participant only ran Monday-Thursday. Often times the participant was the only student in the class and would be assigned to another room for the day so he could be with other peers. This made it difficult for the first author to be able to implement the intervention. The use of one participant is an issue that one finds in behavioral research. However, with the addition of the requirement of the edTPA (EdTPA, 2013), we have had reduce the number of participants that our students can work. Prior to the edTPA, our students would typically employ two or more students (See Coussens et al., 2012; Delegato et al., 2013; Griffin, 2013; Morris et al., 2012).

To continue the study, the first author would recommend that intervention occur twice in one day. Since the participant required daily practice for previously taught letters, we would recommend that data collection and along with this procedure be implemented twice a day with each session lasting no more than 15 minutes. The first author would also recommend creating packets the participant could work on at home or in his other preschool using the HWT® worksheets and additional practice for writing his name. After the course of this study, the first author met with the father of the participant and the father was more interested in his child's success at school and would be willing to help with his education. As mentioned previously, the repetition and added practice is necessary for the participant to fully maintain this skill.

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Author Note

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