

THE DIFFERENTIAL EFFECTS OF HANDWRITING WITHOUT TEARS® CHALKBOARD, WOODEN LETTERS, AND WORKSHEET USING HIGHLIGHT, MODEL AND START POINT ON LEGIBILITY FOR TWO PRESCHOOL STUDENTS WITH DISABILITIES

Megan Coussen¹
T. F. McLaughlin², Ph. D.
K. Mark Derby³, Ph. D.
Gonzaga University
Michelle McKenzie⁴, M. Ed.
Spokane Public Schools

Abstract

The purpose of this study was to evaluate empirically the effects of the *Handwriting without Tears*® (Olsen, 1998) program for teaching two preschool students with developmental delays to write letters legibly. Participants were enrolled in a self-contained special education classroom and four letters were targeted for intervention. Specifically, letters in the child's name for one participant and developmentally appropriate letters were chosen for the other participant. For baseline, each participant displayed little or no skills to write targeted letters legibly. Use of the *Handwriting without Tears*® ® chalkboard, wooden letters, and worksheet procedures along with the added steps of highlight, model and start point resulted in the participants' ability to legibly write letters. The *Handwriting without Tears*® materials and its application are discussed.

Keywords: preschool students; with disabilities, Handwriting without Tears® ®, handwriting, multiple baseline design;

Introduction

Handwriting is a functional skill used across multiple educational settings. Whether children are writing their names, drawing pictures, figuring out math problems, or conducting science experiments, handwriting is an essential skill. The development of this skill is generally seen in the primary grades and is very useful for all students with and without disabilities (Graham, 1999; Grenot-Scheyer & Falvey, 1986; McLaughlin, 1981). Furthermore, handwriting instruction can result in the improvement of many other academic skills such as spelling, writing, and reading (Berninger, Vaughn, Abbott, Abbott, Rogan, Brooks, Reed, & Graham, 1997; Graham, Harris, & Fink-Chorzempa, 2002).

Review of Literature

Various approaches for teaching handwriting have proven to be successful in the classroom setting (Cipani & Spooner, 1994; Cooper, Heron, & Heward, 2007; Graham & Harris, 2002; Park, Weber, & McLaughlin, 2007). It has been shown, for example, that systematic instruction including prompts, praise, and task analysis is effective for teaching children with disabilities to write their names (Park et al., 2007). Similarly, error, drill and practice (Ladenberg, McLaughlin, & Sweeney, 1994), token reinforcement (McLaughlin, 1981), and contingent free time (Hopkins, Schutte, & Garton, 1971) have also been shown to improve handwriting legibility. The fact that handwriting can be taught using multiple approaches allows educators to meet the needs of all students whether they are visual, auditory, or kinesthetic learners.

Occupational therapists often assist teachers in teaching handwriting with typical developing and students with special needs (Clarke-Smith, 2002; Denton, Cope & Moser, 2006; Feder, Majnemer, & Synnes, 2000). The *Handwriting without Tears*® program, with its chalkboards, sponges, wooden letter pieces, clay, songs, and specific directions appeals to all learning styles. Furthermore, *Handwriting without Tears*® provides a fun and exciting approach to learning handwriting skills.

Recent research employing tracing and the *Handwriting without Tears*® procedures reported that preschoolers with autism and developmental delays can improve their legibility using developmentally appropriate letters (Carlson, McLaughlin, Derby, & Belcher, 2009; Morris, McLaughlin, Derby, & McKenzie, 2012). These researchers also indicated that the students enjoyed this method of teaching handwriting. McBride, Pelto, McLaughlin, Derby, Mortenson, and Robison (2009) employed the *Handwriting without Tears*® procedures with tracing to teach two preschoolers with disabilities to write their first names. Both students and staff enjoyed these procedures and their ability to improve the printing of one's first name. Cosby, McLaughlin, Derby, and Huewe (2009) were able to add modeling to tracing and *Handwriting without Tears*® worksheets to improve the legibility with a single preschool student with autism. Two recent studies found that *Handwriting without Tears* procedures could be implemented in an integrated ECAP preschool setting. Morris, McLaughlin, Derby & McKenzie found that employing the mat man component of HWT could improve the pre-handwriting skills of a large group of preschool students. In addition, employing HWT with a large group of students in a single classroom was viewed by the classroom staff as effective and something the class looked forward to each day. LeBrun, McLaughlin, Derby, and McKenzie (in press) employed *Handwriting without Tears* to teach 31 preschool students with and without disabilities to be more legible when they wrote their names.

The purpose of this study was to evaluate the effects of the *Handwriting without Tears*® program on the letter writing legibility of two preschool children with developmental delays. The children could write some letters independently, but would be attending kindergarten next

year where they would be expected to know and write all 26 alphabet letters. An additional purpose was to replicate our prior work employing Handwriting without Tears in the same classroom, but with different students.

Methodology

Participants

Our participants were two preschool-age students with special needs. Participant 1 was a 4-year-old male with developmental delays, and participant 2 was a 5-year-old boy diagnosed with developmental delays. Both participants were chosen because they were unable to independently write the letters in their first names. This participant had an annual goal on his Individualized Education Plan (IEP) to write his name legibly and independently. Participant 1 was enrolling in a general education kindergarten the following year while participant 2 was targeted for enrollment in an integrated kindergarten. Both participants were expected to learn and write all 26 alphabet letters in their next settings.

The study took place in a self-contained special education preschool classroom. The classroom was located in an elementary school in Washington State. Both participants attended the afternoon program and had attended preschool for about one school year. Nine additional students attended the afternoon session. There was a range of four to six adults in the classroom while the investigation took place including a certified teacher, a student teacher (first author), and two instructional assistants.

Setting

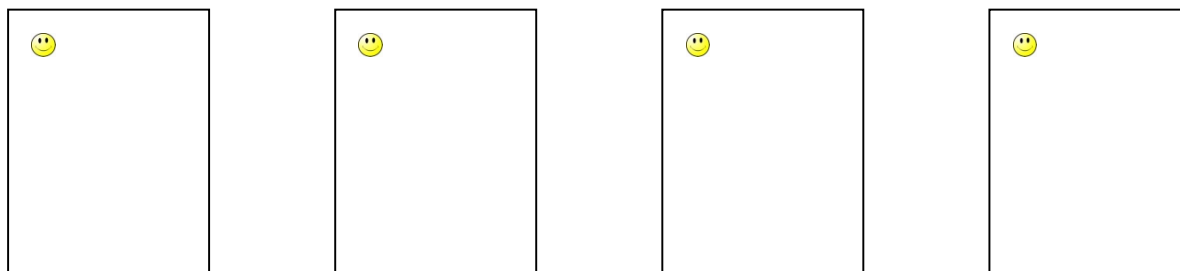
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Curriculum Materials

The *Handwriting without Tears*® curriculum was the primary independent variable (Olsen, 1998). A 3x5" *Handwriting without Tears*® chalkboard, designed with a smiley face in the upper left hand corner (See Figure 1), was used with a wet sponge, dry paper towel, and chalk. Wooden letter pieces created by the *Handwriting without Tears*® program were used to

Student's Name: _____ Date: _____

Baseline: _____ Intervention: _____



give the students a kinesthetic approach to building letters. Worksheets were taken from the “Get Set for School” *Handwriting without Tears*® workbook to correspond with each of the letters that participants were working on. In addition, the students used crayons to complete the letter worksheets and specifically designed *Handwriting without Tears*® pencils to write their letters for baseline and intervention.

Dependent Variables and Measurement Procedures

This study consisted of three dependent variables: size, legibility and following the *Handwriting without Tears*® model of the letters. We developed a point system to evaluate their performance. A specific letter was given one point if it covered at least 80% of the box. If it covered less than 80% of the box, or if more than 10% of the letter was outside of the box, then no point was given. Furthermore, one point was given if the letter was legible. Legibility was measured by whether or not the letter could be identified as the appropriate capital letter. If the letter was not legible, no point was given. The participants were prompted and modeled to write letters according to the *Handwriting without Tears*® program. If the letter followed the *Handwriting without Tears*® model within 80% it received one point. Letters that did not follow the letter, such as letters with extra slant or curve, received no points. Thus, a maximum of three points could be obtained per letter.

Experimental Design

This study employed a multiple baseline design (Barlow, Nock, & Hersen, 2008; Kazdin, 2010) across letters.

Baseline. Four letters were selected for intervention for each participant (i.e., # 1 worked on D, M, H, and P while #2 Practiced D, M, A, and P). For each baseline session, participants were given a piece of paper with four empty boxes on it and the verbal prompt, “Write the letter J (or the appropriate letter name).” Participants wrote one letter in each of the four boxes following the prompt. For letter one, two students participated in two baseline sessions. Subsequent baselines across the additional three letters were held in place contingent on student performance. Specifically, when performance gains were observed for letter one, treatment was put in place for letter 2 and so on.

After initial baseline data were stable, the *Handwriting without Tears*® chalkboard, wooden letters, and worksheet with highlighted letter and smiley face start was implemented. Each daily lesson began with participants completing the appropriate baseline sessions for that day. Following baseline sessions, the *Handwriting without Tears*® curriculum was instituted. Students were told which letter they were going to work on for that day and presented with the materials of the chalkboard, sponge, paper towel and chalk. The instructor modeled the letter by drawing it on the chalkboard and stating the *Handwriting without Tears*® formation instructions for that specific letter. The instructor wrote the letter “J,” for example, while verbally prompting, “Start at the middle, big line down, curve up, frog jump to the top, line across the top.” Each letter had different formation instructions created by the *Handwriting without Tears*® program. After the instructor modeled the letter for the student, they traced over the letter with a wet sponge while saying the formation instructions aloud. This same procedure was repeated by the participant with a dry paper towel and then a piece of chalk. Following the completion of the chalkboard procedure, the instructor modeled how to build the letter with the *Handwriting without Tears*® wooden letter pieces. *Handwriting without Tears*® makes wooden letter piece sets that have big lines, little lines, big curves, and little curves. Those pieces allow for the creation of any letter in the alphabet, and correspond with the letter formation instructions that *Handwriting without Tears*® provides. Specifically, the instructor lays a large piece of construction paper, stamped with a smiley face in the upper left hand corner, in front of the participant. While placing the wood pieces on the construction paper, the instructor would simultaneously state the letter formation instructions. For example the instructor would tell the student, “start in the middle, big line down (place big wooden piece on construction paper), curve up (place little curve on construction paper), frog jump to the top, line across the top (place big line across the top). We just built a ‘J!’” Students then built the letters themselves. Next, students were presented with the “Get Set for School,” *Handwriting without Tears*®, worksheet that corresponded to the current letter. The worksheet allowed students to practice tracing each letter, four times using the *Handwriting without Tears*® model. Finally, participants were given pieces of paper with four boxes on them similar to the paper presented at baseline. This time, however, the boxes had a smiley face in the upper left hand corner, to model a start point, and one box had a highlighted model for the students to trace. The students were given the instructions “Write the letter ‘J’ (or the appropriate letter for that day),” for all four boxes. Data

were taken individually for each letter and then averaged for one score per session. Once receiving two points for a letter on two consecutive sessions, the participant would move to the next intervention for that letter. Furthermore, upon reaching the two points for two sessions, the participants would begin intervention on another letter.

Handwriting without Tears® chalkboard, wooden letters, and worksheet with letter model and smiley face start (Intv 2). Intervention 2 required participants to complete the chalkboard, wooden letters, and worksheet procedures that were previously explained during intervention 1. After completing the procedures, the participants were given a paper with four boxes on it. Each box had a smiley face in the upper left hand corner. However, no highlighted model was presented. Conversely a model of the targeted letter was presented visually to participants, and they were given the verbal prompt, “Write the letter_____.”

Handwriting without Tears® chalkboard, wooden letters, and worksheet with smiley face start (Intv 3). The participants completed the chalkboard, wooden letters, and worksheet procedures. When given the piece of paper to write the targeted letter on, the participants were given the instructions “Write the letter_____.” Four boxes were present on the paper with smiley faces in the upper left hand corner. No highlighted model and no letter model were provided.

Independent writing (Intv 4). The participants were given a piece of paper with four boxes on it and the instructions “Write the letter_____.” No highlighted model, letter model, or smiley face were provided.

Interobserver Agreement and Treatment Fidelity

Inter-observer agreement was conducted by independent scorers on 100% of the sessions. Specifically, the first author scored each letter based on the criteria described within the dependent variables. The letters were then re-scored independently at a local private university by the second data collector. Interobserver agreement was calculated by dividing the agreement by the sum of the agreements and disagreements and multiplying by 100. Inter-rater agreement was 98.3% and 96% for participants 1 and 2 respectively. In order to ensure that correct usage of the *Handwriting without Tears®* program was being employed correctly, integrity data was taken by the regular preschool classroom teacher and the University supervisor. The correct application of the materials and prompts were monitored. Perfect agreement (100%) was recorded for the correct implementation of the *Handwriting without Tears®* procedures.

Findings

The results indicate that the *Handwriting without Tears®* practices and procedures increased the quality of letters produced for each student. For participant 1, the letter D had a mean score of

2.0, the letter M had a mean score of 0.0, the letter H had a mean score of 2.2, and the letter P had a mean score of 0.77. During intervention 1, participant 1 maintained at 2.0 for the letter D, increased to a mean of 2.2 for intervention 2, to 2.4 for intervention 3, and 2.5 for intervention 4. For the letter M, participant 2 increased to a mean of 2.0 for intervention 1, 2.2 for intervention 2, 2.25 for intervention 3, and 2.8 for intervention 4. Although the baseline mean for the letter H was already above the target score of 2, participant 1 increased to a mean of 2.6 for intervention 1, 2.75 for intervention 2, 3.0 for intervention 3, and 3.0 for intervention 4. The letter P increased to a mean of 2.3 for intervention 1, 2.3 for intervention 2, 2.6 for intervention 3, and 3.0 for intervention 4.

In baseline, participant 2 had a mean score of 0.0 for the letter D, 0.0 for the letter M, 0.5 for the letter A, and 0.0 for the letter P. The letter D increased to an average of 1.7 for intervention 1, 2.1 for intervention 2, and 2.75 for intervention 3. The letter M increased to a mean of 2.4 for intervention 1 and 2.5 for intervention 2. The letter A increased to a mean of 2.75 for intervention 1. Data were no longer taken for this participant due to time constraints.

Conclusion

Overall, the *Handwriting without Tears*® (Olsen, 1998) practice and procedures used in this study increased the participants' ability to legibly write letters. However, the effects were uneven across participants and letters. The differential outcomes indicate that additional research needs to be carried out. For example, to further evaluate the effects of the *Handwriting without Tears*® program additional letters as well as participants will be needed. The present study replicates the differential outcomes of Case-Smith (2002) using a between groups design.

Suggestions and Recommendations

Strengths of this study include its time and cost effectiveness, the developmental appropriateness, the generalization that occurred, and the appeal of the procedures created by the *Handwriting without Tears*® program. Data collection sessions lasted only 15 minutes and appeared to keep participants eager and excited. Using a small chalkboard and writing with a wet sponge was novel and fun for those young students and added excitement to letter writing. The wood pieces to build letters also gave students a fresh look at letters and allowed them to manipulate their schoolwork. The worksheets were pleasing for the students because they were decorated with animals or cars and allow them to color while they did their work.

Although the *Handwriting without Tears*® materials cost a significant amount of money, a classroom would only need one set of materials for the entire class. Materials can be used multiple times and with an entire class of students. A huge strength to this study is that the participants showed generalization (Cooper et al., 2007; Stokes & Baer, 1977) to other letters

after completing the *Handwriting without Tears*® procedures. The participants began employing *Handwriting without Tears*® techniques to letters that were still in the baseline stage because of the intervening on other letters. The *Handwriting without Tears*® curriculum has been advocated for use by occupational therapists because of its appropriate developmental techniques (Case-Smith, 2000, 2002). For example, *Handwriting without Tears*® introduces letters in the order that would be easiest for a child to write based on the development of their fine motor skills. Letters with only straight lines, such as E and A, are what the program begins with. As performance increases, more difficult letters with curves, such as D, P, and C are introduced (Olsen, 1998).

Limitations of this study include short duration, the second participant did not finish the total program due to absences, and the existing letter scoring system. Scoring handwriting can be very subjective and in order to receive full credit for a letter, the participants had to meet the exact criteria mentioned above. The size and model of the letters was a difficult task for the participants to master because their fine motor skills are not fully developed and they often made their letters too small, too large, or just a little skewed from the *Handwriting without Tears*® model. The use of the time series single case design allowed us to continue to add components of *Handwriting without Tears*® curriculum. Unfortunately, none of these procedures were sequentially withdrawn (Kazdin, 2010). Carrying out such an analysis would have been able to demonstrate which component or components were responsible for the improvement for each participant's performance or was it simply time.

From these outcomes, *Handwriting without Tears*® (Olsen, 1998) was shown to be an effective program for two preschool two preschool students with developmental delays. For participant 1, increasing baselines with three of his letters make a such a statement tentative. The present research provides one of the few data-based studies with information regarding *Handwriting without Tears*®. The findings in this study somewhat replicates prior research regarding teaching handwriting to preschool children with disabilities (Park et al., 2007). The results of this study suggest that the participants should be successful with their handwriting in the kindergarten setting. Finally, the present outcomes add to the growing evidence (Carlson et al., 2009; Cosby et al., 2009; LeBrun et al., 2012; McBride et al., 2009; Morris et al., 2012) showing that *Handwriting without Tears*® can improve handwriting legibility.

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