

## THE DIFFERENTIAL EFFECTS OF USING TRACING SHEETS TO IMPROVE DEVELOPMENTALLY DELAYED STUDENT'S HANDWRITING ABILITY

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**Abstract:** *The purpose of this study was to see the effects of using tracing sheets to improve developmentally delayed student's handwriting ability. The participants in this study were three developmentally delayed 4-year-old preschool students. The study was conducted in a special education preschool program. The student's in the classroom ranged from ages 3-5. The letters in the student's name were presented to the participants. During baseline, the performance was low. All three participants showed improvement during training. Reasons for mastery not being met by some of the participants were discussed.*

**Key Words:** *handwriting, name writing, preschool, developmental delay, tracing.*

### Introduction

Handwriting continues to be a skill deemed important to teach and learn (Graham, 2010). The characteristics for legible handwriting include spacing, slant, directionality, alignment, and where to begin a letter in respect to the page lines (Sims & Weisberg, 1984). Even in our technologically based society, legible handwriting is a great tool skill that has wide implications. The ability to write gives people the opportunity to express themselves through written language (Graham, 1999, 2010). In preschool, handwriting begins with scribbling, holding a writing utensil, and eventually forming letters. These letters eventually turn into something as simple as writing a name. The lack of adequate instruction in handwriting has also been discussed in the popular media (Leo, 2006). In addition, there are still some issues surrounding which form of handwriting one should learn, manuscript or cursive (Schwellnus, Cameron, & Carnahan, 2012).

The benefits of improving handwriting have been clearly documented (Graham, 1999, 2010; Graham, Harris, & Fink, 2000). Teachers have been shown the same papers twice; once written by average ninth graders, and the again written by handwriting experts, the handwriting experts have received higher scores every time (Sloan & McGinnis, 1978). Unfortunately, this is not enough to encourage early elementary teachers to teach more handwriting within their classes. The average teacher only teaches handwriting 70 minutes per week (Graham, Harris, Mason, Fink-Chorzempa, Moran & Saddler, 2008). This discrepancy shows the necessity of teaching handwriting skills to all students, beginning in preschool.

Handwriting has also shown to be a pre-cursor to literacy and writing skills (Ferreiro & Teberosky, 1982; Graham et al., 2000). The ability to write your name between the ages of 4-7 has shown to have a direct correlation with writing skills in the future (Dunsmuir & Blatchford, 2004). The familiarity with letters and writing at school age students has been shown to support subsequent development in writing.

Developmental preschools have given educators the opportunity to expose children to writing and literacy before they become school-aged. This type of exposure will help students to develop in the future.

A commercially available handwriting program, *Handwriting without Tears*® (HWT) developed for use in the classroom, has been widely advocated for use by occupational therapists (Olsen, 1998, 2002). Empirical evaluations of components or the entire program have begun to appear in the peer-reviewed literature. McBride, Pelto, McLaughlin, Barretto, Robison, and Mortenson (2009) employed HWT worksheets and procedures to teach two preschool students with severe developmental disabilities to successfully write their first names. These procedures were replicated for a preschooler with autism (Cosby, McLaughlin, Derby, & Huwe, 2009). We have also been able to implement HWT and teach students handwriting using both HWT and its MatMan materials to teach handwriting to typical and developmentally delayed preschoolers (Morris, McLaughlin, Derby, & McKenzie, 2012) and for an entire integrated preschool classroom with 31 students (LeBrun, McLaughlin, Derby, & McKenzie, 2012). Even with these positive outcomes, a major drawback of employing HWT has been the cost of the materials and issues of regarding the training of preschool teachers and staff.

Several low cost and easily implemented methods for teaching handwriting have been employed in the schools. Interventions to improve handwriting have employed the use of consequences (Hopkins, Schutte, & Garton, 1971; McLaughlin, 1981), skills based and explicit instruction (McLaughlin & Walsh, 1996), and additional practice on specific errors in handwriting (McLaughlin, Mabee, Reiter, & Byram, 1989). In addition, tracing and prompting strategies have also been employed with a wide range of students in special and remedial education (Batchelder, McLaughlin, Weber, Derby, & Gow, 2009; Caletti, McLaughlin, Derby, & Rinaldi, 2012).

The purpose of the present research was to employ modeling, prompting and tracing as a method to teach preschool students with developmental delays handwriting. These two procedures have been employed with various handwriting curricula from HWT (Thompson, McLaughlin, Derby, & Conley, 2012) to D'Nealian (Maricich, McLaughlin, Derby, & Conley, 2012). An additional purpose was to extend and replicate our previous research with a different commercially available handwriting program (Zaner-Bloser).

## Methodology

### Participants and Setting

Three preschool students served as the participants in this study. Participant 1 was a 4-year-old male with developmental delays. He was chosen for the study because of his interest in learning to write his name, and his ability level was the highest of the preschoolers. Participant 1 may be referred to as Leo. Participant 2 is a 5-year-old male with Autism Spectrum Disorder. Participant 2 may be referred to as Carter. Participant 3 is a 4-year-old female with developmental delays. Participant 3 may be referred to as Lillian. All participants were chosen because of their need. All three participants were going to enter an Integrated kindergarten program or to general education kindergarten the following year.

The preschool class enrolled eight students in the fall of 2012. There were several adults present in the classroom (a lead teacher, a student teacher, and two instructional aids). At other times, there is a speech pathologist, an occupational therapist, and a physical therapist providing services to students. The classroom has a book corner, a quiet corner, a front circle area, and four small desks for centers. There is a bathroom available to the students at all times. Throughout the classroom, there were toys and manipulative on bookshelves. These bookshelves were hidden from student glance with curtains. The intervention took place either during the time designated for centers, or during one-on-one instruction. The students and researcher were seated at a desk with 4 chairs.

### Materials

The materials used were worksheets with the student's name given to them at the top of the page. The first author created the worksheets from various Internet websites to assist the students. The participants used Crayola markers or thick pencils to write.

### Dependent Variables and Measurement

Data were gathered by scoring the students performance for size and formation. They earned a point for each. Size was defined as: no more than one-inch tall and one inch thick. Formation was defined with a master letter. If the letter was legible when isolated it was rewarded a point for formation. After the points were awarded, the researcher inputted this information into a data collection sheet (See Figure 1). The data collection system employed was permanent product. The researcher looked at the last line of the worksheet where the student was asked to write their full name. The student was awarded up to two points per letter. A point was given for size and another point for formation. Therefore, each participant was able to earn up to two points per letter. If a student earned two points for 3 consecutive sessions, they progressed to the next letter in their name.

### Experimental Design and Conditions

An ABC single case design (Kazdin, 2011) was employed to evaluate the effectiveness of our procedures. A description of each condition follows.

**Baseline.** Baseline was taken for each participant. Each participant was given a sheet of lined paper that had his or her name on the top. The researcher said to the participants, "Write your name." and pointed to the appropriate starting point. The participant was expected to write their name on the given paper. The samples were then scored, each letter able to earn 2 points, and recorded on the data collection sheet. No feedback was given during baseline other than, "Thank you for working hard." For all three participants, baseline was taken for two sessions. The same baseline was used for each letter implemented.

**Zaner-Bloser worksheet.** Each participant was given a worksheet with the first letter of his or her name on it in a repeated manner. Each page had four lines for practice. Each of the four lines was broken in half with a space. The left side of the top line had the letter written with a solid line, and the right side of the top line had the letter written with a dotted line. The next line had the letter written with dotted lines on both sides. The next line had dotted lined letters on the left side, and a blank space on the right side. The last line was the same as the previous line. The blank lines were used to write their full first name or practice their letter. The students continued to work on the first letter of his or her name until it was mastered. They then moved onto the next letter in the sequence. At the end of each session, the student was asked to write his/her name. Data was taken on this occurrence.

The participants were given an edible rewards for working hard. This was usually mini M&M's. Each student was also rewarded from the researcher starring the letters they did well on as they went. All students were given great amounts of verbal praise and recognition.

**Zaner-Bloser worksheet and tracing first name.** During the next condition, the students continued to use the same worksheets. The instructor made one small change to the routine. On the last two blank lines, where students previously practiced their letters or wrote their full first name, the instructor required

the students to trace their full name and then write their full name independently. Data was still taken on the last occurrence of independent name writing.

### **Reliability**

Interobserver agreement was taken 100% of the time for all three participants. An observer recorded each participant's scores independently using the permanent product of the worksheets. The observer had their own data collection sheet that they used to record their data after the participants had completed the worksheets. Dividing the number of agreements by the sum of the agreements and disagreements and dividing by 100 calculated interobserver agreement. Overall agreement by the researcher and observer was 98%. For participant 1, the agreement was 95%, participant 2 had 100% agreement, and participant 3 had 100% agreement.

### **Findings**

The results of each participant are presented in Figures 1-3.

#### **Participant 1**

Participant 1 earned a score of 0 points for the first session of baseline, and a score of 1 for the second session of baseline. Because of the low scores, the instructor decided to intervene after two sessions of baseline.

Intervention began on the letter L. The participant began tracing exercises. After beginning tracing, the participant's scores went up and down from 1 to 2. The scores never went back to 0. The participant mastered the first letter by session 13.

The next letter began after the first letter had been mastered. The student received 0 points for this letter during both baseline sessions. The student began to get scores for size, but not for formation. On the last session, the student received 2 points on this letter.

#### **Participant 2**

Participant 2 began in baseline with 0 points for both sessions. Because of his low scores, the researcher decided to implement the intervention after two sessions of baseline.

The first letter intervened on was the letter 'C'. On the first session of intervention, the participant still scored a 0. After that, the student began getting 1 point or 2 points. The student mastered the letter 'C' by Session 12.

The intervention for letter 'A' began after the student mastered the first letter. The student worked on the letter for 4 sessions, and no gains were made.

#### **Participant 3**

Participant 3 began with 0 points for all letters during baseline. Because of her low scores during baseline, the researcher began intervention after only two sessions of baseline.

The participant began intervention with the letter 'L'. During session 3 she scored a score of 2 points. The participant's scores varied until sessions 9-12. She mastered at session 12 she has proved mastery of the letter 'L' and the researcher moved to intervention on the next letter.

The next letter that was intervened on was 'I'. The participant received 2 points for two sessions in a row, but because of the student's unpredictability, the researcher continued with intervention on this letter. The participant then began scoring 1 point for three sessions in a row. The letter 'I' was not mastered.

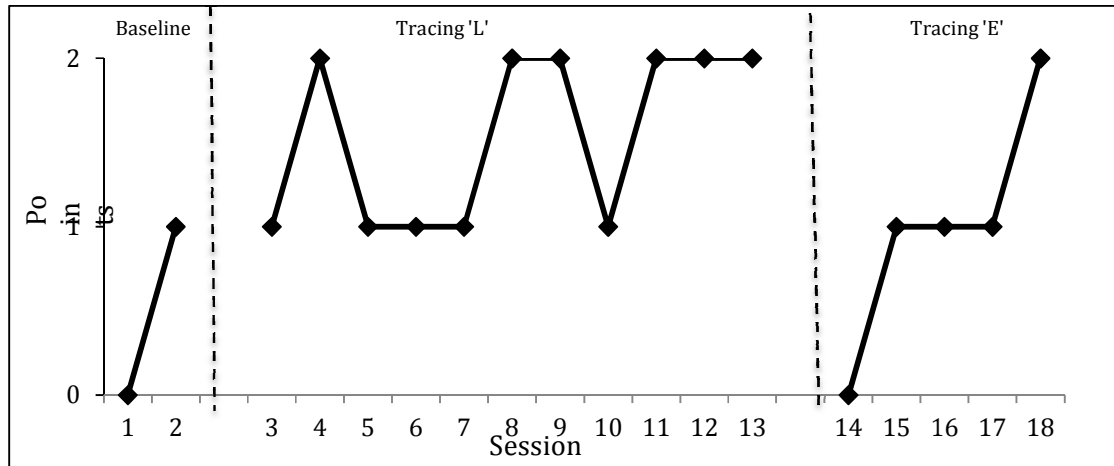
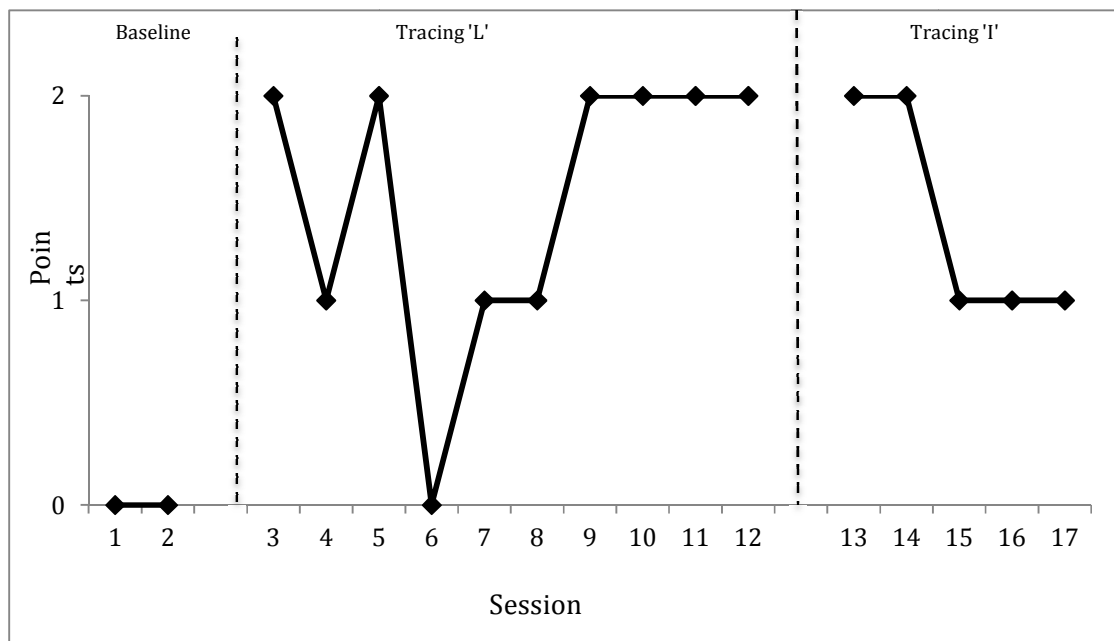


Figure 1. Participant 1's outcomes employing tracing sheets for L and E.

Figure 2. Participant 2's outcomes during baseline and when using tracing sheets for letters C and A.



*Figure 3.* Participant 3's handwriting points for the letters L and I in baseline and during using tracing sheets.

## Conclusion

The purpose of this study was to teach the participants how to accurately write their name and expose them to writing using worksheets and practice. Improvements were made during intervention. Students began to get the hang of holding a pencil or marker, they improved with a lot of practice, and they continued to be interested in writing their names. There is a correlation between the worksheets and the increase in accuracy.

Overall, the results of this study indicated that tracing worksheets made by the researcher increased the student's ability to write his/her name. To truly assess the mastery of this skill, the research would have needed to be longer, with more instructional sessions.

## Suggestions and Recommendations

The students are only at school for 2.5 hours a day, for four days a week. Because of this lack of time, the students did not get the opportunity to work on their practice sheets everyday. There are many adults that are involved with the therapy of the students, and there were many days that the participants were too busy to work on name writing. Because of these time constraints, the participants were not able to complete the intervention of their full names.

Although the participants were not able to learn their full name, there was progress between baseline and intervention for each participant. In all three cases, the students were able to learn how to correctly write the first letter of their name, and began working on the second letter of their name. All participants were showing progress on the second letter of their name as well. Because of the progress shown on the first and second letter of the participant's names, the correlation of the worksheet practice and name writing is clear.

The present outcomes provide a partial replication of the research by Caletti et al., (2012) and Maricich et al. (2012) using D'Nealian worksheets and tracing. It also provides some additional evidence for employing tracing (McBride et al., 2009; Thompson et al., 2012). The differential effects of our procedures have been documented in our prior handwriting research (Carstons, McLaughlin, Derby, & Blecher, 2009; Coussens, McLaughlin, Derby, & McKenzie, 2012). It is the severity of the student's developmental delay, the type of delay or disability designation, or some other factor? The reasons for the differential outcomes merit further attention.

The weaknesses of this study are evident. The first weakness is the lack of time available for student practice. Another weakness is the amount of time it took for each student to learn the letters in their name. Although, considering the lack of time the students had had writing their name prior to this research, the results are good.

The strengths of the study began with the participant's motivation. All three participants were motivated each day to work hard and earn their edible reinforcement. They were also excited about learning to write their names. Another strength of this study was the resources available in the classroom. The master

teacher (fourth author) provided all of the materials needed for this study. This allowed for a low-cost study.

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