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Investigating the Effects of Performance Feedback and Choice as a Writing Fluency

Intervention

By

Samantha J. Steinman, M.S.

A Dissertation Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Psychology

In

School Psychology

Minnesota State University, Mankato

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Investigating the Effects of Performance Feedback and Choice as a Writing Fluency Intervention

Samantha J. Steinman

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Dedication

This dissertation is dedicated to my family. Thank you for all the love and support you have always provided. Each one of you have played a key role throughout this journey and I appreciate all you have done.

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I would like to thank the members of my committee, Dr. Carlos Panahon, Dr. Kevin Filter, Dr. Shawna Petersen Brown, and Dr. Alexandra Hilt-Panahon, for their commitment to excellence. This project would not have been possible without their feedback and support.

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Abstract of the Dissertation

Investigating the Effects of Performance Feedback and Choice as a Writing Fluency

Intervention

By

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Doctor of Psychology in School Psychology
College of Graduate Studies and Research
Minnesota State University, Mankato, 2017

Despite a need for more support in the area of writing, few interventions currently exist to target elementary students' writing fluency skills. Performance feedback has been identified as an effective intervention used to increase students' writing productivity. Additionally, the use of choice as a writing fluency intervention has recently been identified as a viable option. Therefore, this study investigated the effects of combining performance feedback plus choice as a writing fluency intervention on the writing skills of eight third grade students. Using standard curriculum-based measure written expression procedures, students were provided performance feedback, choice, and the combination of the two strategies. Using a multiple baseline across subjects design, with withdrawal phases, baseline levels of total words written (TWW) on curriculum based measures were compared across each intervention phase for each student, in addition to one follow-up probe. Results demonstrated improvements in all eight students' TWW over the course of the study. Overall, this study provides strong evidence that the combination of performance feedback plus choice results in increases in students' writing productivity.

Table of Contents

Copyright.....	i
Dedication.....	ii
Acknowledgments.....	iii
Abstract of the Dissertation.....	iv
Chapter 1. Introduction.....	1
Writing Instruction Overview.....	2
Measuring Writing: Curriculum-Based Measurement.....	3
Writing Fluency Interventions.....	8
Performance Feedback Overview.....	9
Choice Overview.....	23
Current Study	32
Chapter 2. Methods	34
Participants and Setting.....	34
IRB Review and Permissions.....	35
Researchers	36
Materials	37
Experimental Design.....	38
Response Definition and Measurement.....	39
Procedures	40
Treatment Integrity	43
Reliability.....	44
Follow-up.....	44
Data Analysis.....	45
Chapter 3. Results	47
Chapter 4. Discussion	56
Practical Implications	60
Limitations and Suggestions for Future Research.....	63
References.....	67
Appendices.....	79

Chapter 1

Introduction

Over the past few decades, a theme has appeared related to student performance in writing. Specifically, a considerable portion of students have failed to demonstrate proficient skills (i.e., mastery of grade-level standards or expectations) in the area of writing in a large number of investigations (Hier & Eckert, 2014). For instance, in 2003, the National Assessment of Educational Progress (NAEP) indicated that 72% of 4th grade students, 69% of 8th grade students, and 77% of 12th grade students failed to perform proficiently in writing (Hooper et al., 2013). In more recent reports, the NAEP identified that only 33% of 8th grade and 24% of 12th grade students demonstrated proficient writing skills (Salahu-Din, Persky, & Miller, 2008). Unfortunately, 67% of 8th grade students and 76% of 12th grade students still failed to demonstrate grade-level mastery of writing skills (Salahu-Din et al., 2008). An even greater percentage of students of racial minority and low socioeconomic status are not attaining mastery of grade-level writing skills (Hier & Eckert, 2014). Additionally, differences in gender have also been identified when looking at poor writing skills, in which females consistently outperform males on various writing tasks (Hier & Eckert, 2014). The data regarding students' lack of writing proficiency are indicative of the need for improvements in writing instruction and intervention within and across the educational setting.

Students who fail to communicate or express their ideas and thoughts through the act of writing are at a greater risk in receiving lower grades in classes that require written responses to demonstrate their learning (Graham, Harris, & Mason, 2005). Poor writing

skills can also impact a student's success in other academic areas such as social studies, math, and science (Graham et al., 2005). Hier and Eckert (2014) noted that poor writing skills have the potential to put students at risk for behavioral concerns, school failure, or dropout. Unfortunately, students who fail to gain proficient writing skills by the end of high school are less likely to attend college or enter into the workforce as marketable employees (Graham et al., 2005). The impact of poor writing skills is extended into the work setting (Coker & Ritchley, 2014). Businesses have expressed concerns in their employees' writing skills, which can impact their overall competency and has been estimated to cost businesses approximately \$3.1 billion each year (Graham et al., 2005). This evidence when considered collectively is alarming for the future of current students. Although the writing deficits can be seen across multiple grade levels, an ideal time to begin remediating writing deficits and improving students' writing skills is during their elementary school years.

Writing Instruction Overview

Writing instruction is often regarded as being highly complex (Truckenmiller, Eckert, Coddling, & Petscher, 2014). There are several elements of writing that are essential for the development of students' basic writing skills. According to Howell and Nolet (2000), these writing elements include: syntax, writing fluency, content, vocabulary, and writing conventions including capitalization, spelling, and punctuation. Related writing skills of importance include: handwriting, fine motor skills, spelling, grammar, creativity, and expressiveness (Shapiro, 2011). Within the process of written

expression, cognitive skills are also needed. For instance, writers must engage themselves in thought about what they will write, generate text onto paper, and express the meaning of their thoughts through planning and organization, all while using writing skills such as writing conventions, grammar, punctuation, and spelling (Robinson & Howell, 2008).

During early elementary grades (1st-3rd), writing instruction involves the development of basic writing skills to produce letters and words, as well as punctuation use (McCurdy, Skinner, Watson, & Shriver, 2008). As mechanical aspects of writing are developed, advanced writing skills, such as the formation and production of complex sentences, paragraphs, and the use of planning, evaluation, and revision can be performed (McCurdy et al., 2008).

Measuring Writing: Curriculum-Based Measurement

Pertinent to writing assessment and research, the use of Curriculum-Based Measurement (CBM; Deno, 1985) is an efficient and effective approach in improving students' writing skills. CBM is best known as a set of standardized assessment measures that have been scientifically validated and designed as a way for educators to evaluate the basic skills of reading, math, spelling, and writing (Deno, 1985; Ferrington et al., 2014; Shinn, 2007). Additionally, CBM is considered to be an alternative to mastery-based measurements of student performance in core areas (Fuchs, 2004), as CBM allows for a more frequent assessment of student growth and informs instruction (Shinn & Shinn, 2004). Ferrington et al. (2014) explained that performance scores obtained from CBM assessments are sensitive to minor changes, which allow them to be administered repeatedly (Ferrington et al., 2014). Ferrington et al. (2014) described that an increased

number of educational settings are choosing to implement CBMs to assess students' performances and to make data-based instructional decisions. Given that CBMs are tied to a school's curriculum, CBM results are directly associated to students' classroom performances (Farrington et al., 2014). According to Espin, Scierka, Skare, and Halverson (1999), within the implementation of CBM, frequent assessments of various indicators of student performance specific to the target academic skill area are necessary. Improved performance on the target indicator signifies a general improvement in the corresponding academic area (Espin et al., 1999). For instance, according to Deno, Mirkin, and Marston (1980), in a 3-minute writing sample, the total number of words written is an indication of an elementary aged student's general writing proficiency.

Use of CBM procedures allow educators to detect patterns in students' writing performances that are unlikely identified using more comprehensive assessments that can be too expensive (Farrington et al., 2014). Student data can ultimately be evaluated to determine the effectiveness of instruction by analyzing students' rates of growth across the data collected (Farrington et al., 2014).

Written expression CBM. CBM use has increased dramatically, particularly in its' use to assess students' progress in the area of writing (McMaster & Espin, 2007). This increased focus is not unwarranted given the amount of students who fail to write proficiently (McMaster & Espin, 2007). Written expression curriculum-based measurement (WE-CBM) can be described as a brief fluency measure, where students produce a writing sample, which allows for an assessment of various writing skills (Cusumano, 2007). WE-CBM assessment probes are becoming more common, as they

can be utilized for universal screening and progress monitoring purposes to assess all students' writing skills (Farrington et al., 2014). WE-CBM has been used across multiple grade levels from elementary to secondary grade levels (Farrington et al., 2014). Within WE-CBM standardized procedures, educators generally present students with a short writing prompt or story starter that provides an idea to students engaging in a narrative writing task (e.g., "The best trick I ever played on Halloween was..." (Shapiro, 2011, p. 160). It is important that the writing prompts chosen for the target student population are age-appropriate and can be used with a diverse population to ensure valid results (Truckenmiller et al., 2014). Additionally, Shapiro (2011) mentioned that writing prompts should contain words that a majority of students would find interesting. Once provided with the story starter, students are given one minute to think about the story they will write, then three minutes to write their story based on the short writing prompt provided (Hosp, Hosp, & Howell, 2007; Shapiro, 2011).

Following the procedural three-minute time allocation to generate a narrative story, students' writing responses are then scored and assessed based on the writing skills being examined and the determined writing measure(s) (Powell-Smith & Shinn, 2004; Shapiro, 2011). Six effective, feasible, and sustainable measures of written expression have been developed for use with elementary aged student populations (Espin et al., 1999; Farrington et al., 2014; Hosp et al., 2007). Keller-Margulis, Mercer, Payan, and McGee (2014) noted various measures that can be characterized as production-dependent or fluency-based measures that rely on length of writing sample such as: Total Words Written (TWW), Correct Writing Sequences (CWS), and Words Spelled Correctly

(WSC). TWW is the total number of words generated by the student during the allotted writing time (Hosp et al., 2007). A word is described as any letter/group of letters that is divided by a space, which include words that are incorrectly spelled (Farrington et al., 2014). TWW is considered to be a reliable measure of fluency when used with elementary student populations (Truckenmiller et al., 2014). WSC is the total number of words a student spells correctly, with consideration given to context (Hosp et al., 2007).

The CWS measure includes correct punctuation, capitalization, spelling, and syntax, where the number of correct adjacent word sequences are analyzed and scored based on those factors (Hosp et al., 2007). CWS can be calculated by circling all of the words in the writing sample that are incorrectly spelled, placing a caret (^) between each unit pair that are semantically, mechanically, and syntactically correct, then totaling the number of carets in the writing sample (Hosp et al., 2007, p. 91). CWS is considered to be a more precise measure of writing fluency, as well as writing quality (Espin et al., 1999). Additionally, Gansle et al. (2004) noted that the CWS metric has been identified as a global indicator of a student's writing performance. Currently, TWW, WSC, and CWS are the most common writing measures used when assessing the writing fluency skills of elementary students (Espin et al., 2000; Hosp et al., 2007). Other scoring measures are more commonly used with students who have developed more advanced writing skills (Hosp et al., 2007). Support for production-dependent writing measures can be seen in previous research that has demonstrated the reliability and validity of each measure (Jewell & Malecki, 2005).

In addition, there are also production-independent writing measures that rely on accuracy of writing sample such as: %Correct Word Sequences (%CWS), and %Words Spelled Correctly (%WSC; Keller-Margulis et al., 2014). The %CWS metric is determined by taking a student's CWS score, dividing that value by the total word sequences in the writing sample and multiplying the value by 100 (Keller-Margulis et al., 2014). The %WSC measure is determined by dividing the WSC by the TWW and multiplying that value by 100 (Keller-Margulis et al., 2014). Keller-Margulis et al. (2014) indicated that production-independent measures of writing are more commonly associated with students' performances on statewide assessment outcomes for middle and high school student populations compared production-dependent measures.

Finally, there are accurate production indices such as Correct Minus Incorrect Writing Sequences (CIWS) (Keller-Margulis et al., 2014). According to Keller-Margulis et al. (2014), CIWS value is established by subtracting the number of incorrect word sequences from the CWS, which may result in a negative value. It is important to note that a combination of writing measures as opposed to focusing on one measure is the greatest predictor of a students' overall writing performance (Keller-Margulis et al., 2014). However, a drawback of collecting more than one measure is the increased time needed for collecting and scoring students' responses.

There are many advantages of using WE-CBM. One of the greatest advantages is its efficiency, requiring only one to three minutes (Fewster & MacMillan, 2002). This short administration time allows educators time to obtain multiple samples of students' performances and evaluate those performances without interfering significantly with

instructional time. A second advantage is the minimal training needed to accurately implement CBM procedures and obtain reliable results (Hosp et al., 2007). As mentioned previously, training is often a concern for educators when implementing new interventions. A third advantage is that implementing CBM procedures is similar to typical academic tasks that occur on a regular basis throughout a school day (Hosp et al., 2007). A fourth advantage is the ease of administration, as obtaining CBM data requires little effort and is efficient whether data is being collected on an individual student or in a large group setting. CBM data for writing can be collected fairly effortlessly and efficiently on an individual student or in a whole group setting (e.g., entire classroom; Hosp et al., 2007).

Writing Fluency Interventions

Based on the evidence suggesting that many students continually fail to develop proficient writing skills, efficient and evidence-based writing interventions must be identified to address the needs of students as well as the needs of educators who are responsible for implementing and sustaining those interventions. Currently, a number of writing interventions exist to improve students' writings skills, however, a majority of these interventions focus on only a limited number of writing skills and processes which specifically include handwriting, spelling, self-regulated strategy skill instruction, planning and revising aspects of the writing process (Graham et al., 2005; Hooper et al., 2013). A target skill in the area of writing that is foundational to the development of elementary students' writing skills is writing fluency. Writing fluency can be defined as "the ability to write with speed and accuracy" (Hier & Eckert, 2014, p. 488-489). Some

researchers argue that writing fluency is a key writing skill that is in need of further attention for various reasons. For instance, a lack of writing fluency skills can result in poorer quality of writing performances and negatively impact an individual's overall writing achievement (McMaster & Espin, 2007). Even more discouraging evidence comes from other researchers who note of the relationship between the lack of writing fluency skills and its impact on an individual's postsecondary educational success (Calfee & Miller, 2007). Increased focus on improving students' writing fluency is evident. However, despite the importance of this particular skill, a concern within the current writing literature is the lack of writing fluency interventions available for students who are struggling with writing at the elementary level. Therefore, the following attempts to provide an overview of two promising interventions that have the potential to improve students' writing fluency skills.

Performance Feedback Overview

Performance feedback (PF) has been widely researched and has been identified as an effective intervention used to improve individuals' behavior and academics skills. Performance feedback can be described as "information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding" (Hattie & Timperley, 2007, p. 102). Performance feedback can serve as a motivator for students who are learning a new skill, in which feedback can be provided to correct inaccurate responses and assist in the development of various skills (McCurdy et al., 2008). The following provides a brief description of some of the theoretical underpinnings of feedback, followed by a brief review of literature surrounding

performance feedback and its' use in improving students' behavior and academic skills, as well as a detailed synthesis of the effects of performance feedback as it pertains to writing fluency.

Performance feedback theoretical foundation. Theories foundational to performance feedback are wide ranging (e.g., Thorndike's Law of Effect (Thorndike, 1931, 1933); Social Cognitive Theory (Bandura, 1991)). While theorists may conceptualize the effects of performance feedback differently, one commonality surrounding performance feedback is the positive effect this process can have on an individual's performance, which is arguably crucial to the overall learning process. Eckert et al. (2006b) suggested that the provision of feedback is "a long-standing method of instruction based on E. L. Thorndike's law of effect" (p. 169). More specifically, within Thorndike's Law of Effect, Thorndike (1931) suggested that the learning process is positively influenced when an individual is provided with feedback that incorporates the correct or appropriate response following their initial behavior. This process is believed to influence future responding. Essentially, the provision of feedback reinforces the stimulus response association (Eckert et al., 2006b). In addition to the behavioral perspective, a cognitive component is also relevant to the concept of performance feedback (Eckert et al., 2006). For instance, when provided feedback, it is believed that an individual thinks about the feedback they were provided and then applies the feedback during the learning process (Eckert et al., 2006b).

Within the literature, feedback has been described through various models that have been proposed to help further conceptualize the understanding of feedback. For

example, one model proposed by Kluger and DeNisi (1996) is helpful in our understanding of the effectiveness of feedback as a component within various interventions. Results from a large meta-analysis specific to feedback as it pertains to a wide variety of skills, such as educational performance, indicates an average effect size of 0.38 (Kluger & DeNisi, 1996). Additionally, Kluger and DeNisi (1996) further described the effects of different forms of feedback, with the provision of feedback that indicates a change in performance over time (also referred to as velocity feedback) was identified as having a large effect size of 0.55. Additionally, feedback that provides an individual with knowledge of the correct answer was identified as having a medium to large effect size of 0.43, and feedback provided on a frequent basis had a medium effect size of 0.32 (Kluger & DeNisi, 1996). Taken collectively, feedback delivered in these various forms has the potential to change an individual's responses and lead to improved outcomes. Other influential concepts related to feedback proposed by Kluger and DeNisi (1996) have also indicated that interventions that incorporate feedback have a positive impact specifically when used within a task-motivation process. Specifically, feedback is found to be effective when it is directly related to the task itself. For example, if individuals are provided performance feedback, they have the capabilities of comparing their behavior to what is more desirable or expected. Further support for this notion comes from Hattie and Timperley (2007), who also emphasized that feedback is most effective when it relates to the specific task of interest. In an in depth analysis on feedback, Hattie and Timperley (2007) suggested that feedback can be used within the

classroom setting and can effectively enhance the learning process when combined with effective instruction.

Within the literature, performance feedback has been effectively implemented with a wide range of students across multiple academic domains such as reading (Ardoin, Morena, Binder, & Foster, 2013; Conte & Hintz, 2000; Eckert, Dunn, & Ardoin, 2006a; Van Houten & Van Houten, 1977; Willis, 1974), mathematics (Fink & Carnine, 1975; Schunk & Lilly, 1984; Strang, Lawrence, & Fowler, 1978; Van Houten, Morrison, Barrow, & Wenaus, 1974), handwriting (Salzburg, Wheeler, Devar, & Hopkins, 1971), written language (review of studies provided in the next section), and behavior (Drabman & Lahey, 1974; Maggs & Morgan, 1986; Onoder & Noro, 2007). The following provides a brief description of the effects of performance feedback that have been identified in the core academic areas of reading, mathematics, and behaviors. A detailed review of writing fluency studies is provided following this discussion.

Performance feedback and behaviors. Within the school setting, studies have demonstrated the effectiveness of performance feedback as a way to address student behavior. For instance, Drabman and Lahey (1974) utilized an ABAB design in which a performance feedback intervention was used to decrease the frequency of disruptive behaviors exhibited by a ten-year-old student. In this particular study, a teacher provided the student with a point rating scale (0-10) during ten-minute intervals. At the end of each interval, the teacher would inform the student of the number of points he had earned during that time period. Results of the study indicated when provided feedback the student's disruptive behavior decreased compared to when feedback was not provided.

In another study, Maggs and Morgan (1986) examined the effects of a combination of three forms of performance feedback (e.g., right–wrong, wrong–blank, and right–blank), and the effects on students’ on-task and task completion behaviors. Participants in this study included two students ages six and eight with behavior disorders. Effectiveness of feedback was demonstrated. When a student was engaging in off-task behaviors, the provision of performance feedback resulted in an increase in on-task behavior as well as an increase in task completion behaviors.

More recently, Onodera and Noro (2007) examined the effects of performance feedback in the form of line-graph feedback as well as oral feedback on reducing the classroom noise level. Participants in this study included 23 fourth grade students. Researchers implemented an ABC design in which students were first provided no intervention. The class was then exposed to an oral feedback condition, followed by the line-graph feedback condition. Within the oral feedback condition, a teacher provided students with immediate feedback orally regarding the amount of time it took for the class to reach a quiet noise level. In the graph feedback condition, the teacher graphed the average time it took for the class to reach the quiet level each day and publicly displayed the results to the class at the end of each school day. Results of this study demonstrated the powerful effects of performance feedback on student behavior. Providing students with feedback in the form of graphing was found to be most successful at reducing the amount of time between the command to be quiet and the class complying with that command. A follow-up session was conducted that demonstrated that class’ behavior had been maintained.

Performance feedback and academics. In the area of reading, multiple studies have demonstrated the positive effects of performance feedback in improving students' reading performance. In one of the earliest studies, Willis (1974) investigated the effects of feedback on three elementary students' oral reading fluency performance. The use of performance feedback in this study was demonstrated by the provision of colored plastic chips for the correction of read sentences. Red chips indicated errors and green chips indicated correct sentences. Students' chips were then totaled, graphed, and publicly displayed. Results indicated an increase in the rate of correct sentences read and a decrease in the amount reading errors committed by two of the three students (Willis, 1974). Van Houten and Van Houten (1977) provided individualized feedback in a similar manner as Willis (1974) to students receiving special education regarding the number of reading lessons completed each day. Positive outcomes were identified in which individualized feedback provided resulted in an increased rate of lessons completed.

In a study conducted by Conte and Hintze (2000), researchers examined the effects of feedback on students' oral reading fluency. Students were randomly assigned to a no feedback condition, a static goal line condition, or a dynamic goal line condition. The static goal line condition and dynamic goal line condition served as the performance feedback interventions, in which students were provided a graph that tracked their performance. The provision of performance feedback resulted in an increase in oral reading fluency rate for students receiving either the static goal line or dynamic goal line graphing feedback compared to students in the no feedback condition.

In a more recent study, Eckert, Dunn, and Ardoin (2006a) examined the effects of two different forms of performance feedback and their effects on improving students' reading performances. Specifically, performance feedback on students' words read correctly and performance feedback on words read incorrectly were provided to six elementary students. Outcomes of this study demonstrate the effects of performance feedback on words read correctly which resulted in a decrease in the number of oral reading fluency errors compared to performance feedback provided on students words read incorrectly.

As in the area of reading, performance feedback has been utilized in the area of mathematics in which positive outcomes can be observed in students' math performances. For instance, in Van Houten, Morrison, Barrow, and Wenaus (1974), researchers investigated the effects of a multi-component performance feedback intervention on elementary students' math fluency skills. Within this intervention, students were provided feedback (number of correctly solved problems/minute), public posting of performance, and praise for improved performance. Students who received the performance feedback intervention demonstrated greater progress in math fluency rates than students in the control condition when compared to grade-level norms (Van Houten et al., 1974).

In a study conducted by Fink and Carnine (1975), positive effects of performance feedback on students' math performance was demonstrated. Participants in this study included ten first grade students who were exposed to an information feedback condition (number of errors made on their math worksheet) and then a feedback plus graphing

condition. When provided with feedback plus graphing, the number of mathematical errors committed decreased.

This overview of the effects of performance feedback utilized to address behaviors, reading and math skills is not an exhaustive literature review of each domain. However, this evidence describes the powerful effects of performance feedback across a wide range of domains within the school setting. Ultimately, these studies support the use of performance feedback as a crucial component within interventions that seek to improve the learning process. The effects of performance feedback in the areas of behavior and academics described previously indicate that feedback is an effective intervention that can be used in various ways to improve various skills.

Performance feedback and writing. The effects of performance feedback as an intervention to improve students' behavior and a variety of academic skills are evident. As an extension of its' use within the area of academics, performance feedback has been identified as an effective intervention that can be used to specifically improve students' writing fluency skills. According to Graham, Harris, and Herbert (2011), "a long-term staple of writing instruction is for teachers to provide students with feedback about one or more aspects of their writing" (p. 17). According to Baker, Gersten, and Graham (2003) when providing individualized feedback in the area of writing, it is recommended that feedback is elaborate, specific, and explicit. Experts encourage the use of feedback as it is believed that improvements in students' writing skills can occur when students are provided with feedback regarding the effectiveness of their writing (Graham et al., 2011).

According to Truckenmiller et al. (2014), performance feedback is considered a versatile evidence-based instructional intervention. Multiple research studies have demonstrated the effectiveness of performance feedback in improving elementary students' writing fluency skills either as a standalone intervention or in combination with other strategies. The following is a review of past literature that has incorporated various methods of performance feedback to improve students' writing fluency skills.

Within one of the original studies that utilized performance feedback to improve students' writing skills, Van Houten, Morrison, Jarvis, and McDonald (1974) examined the effects of a combined intervention of self-score performance feedback on students' writing fluency. A single-subject withdrawal design was utilized with second and fifth grade students. Performance feedback involved students counting their total words written following the completion of a writing task. Goal setting and public posting were also part of the intervention package used within this study. Results indicated that the combination of performance feedback, goal setting, as well as the public posting of students' writing performances led to an increase in improvement of students' writing fluency scores compared to their baseline performance.

Then in 1975, Van Houten, Hill, and Parsons examined a packaged intervention that incorporated performance feedback along with other strategies (public posting of performance, explicit timing, and contingent teacher praise) within two fourth grade classrooms. The performance feedback component in this particular study involved the statement "beat your highest score". Van Houten and colleagues identified that all components of the intervention package improved students' writing fluency skills except

for teacher praise. The intervention components were then implemented jointly in a fifth grade classroom, where similar results were found, in which students' rate of assignment completion increased significantly (Van Houten et al., 1975). Van Houten (1979) analyzed the generalization of the performance feedback intervention package within the same two fourth grade classrooms as Van Houten et al. (1975). Within the generalization task, students completed a writing task without receiving the intervention package. Results suggested that the intervention package increased students' writing fluency skills and students' writing skills were successfully transferred to alternative academic tasks (Van Houten, 1979).

Another study that examined the effects of performance feedback on students' writing skills was conducted by Harris, Graham, Reid, McElroy, and Stern Hamby (1994). Researchers utilized a multiple baseline design across participants. During this study, four students with learning disabilities in grades fifth and sixth engaged in a 15-minute writing session. Students were presented a picture prompt and were to respond by writing a story. Students were then expected to score their writing response by counting the total words written. In this study, the self-counting of the total words written served as performance feedback and was found to improve students' writing fluency by an average of 59.25 words over the span of 60 sessions. Results from this study indicate that performance feedback in the form of self-counting was effective in improving students' writing fluency.

Although these studies demonstrated the positive effects of performance feedback in improving students' writing fluency skills, further research was needed to examine the

effects of performance feedback in isolation and use with students in the general education setting.

Therefore, in 2006, Eckert and colleagues attempted to further investigate performance feedback. Unlike the studies previously described, Eckert and colleagues utilized a different method of performance feedback. In this study performance feedback involved first providing students with an individualized writing packet that included performance feedback in the form of a number that represented the student's writing productivity from the previous writing session. Additionally, students were also provided with feedback in the form of an arrow pointing up or down indicating an increase or decrease in the student's performance based on the previous session. This type of performance feedback has been referred to as velocity feedback (Kluger & DeNisi, 1996). Once students were presented with the performance feedback, they completed the writing session in which they were presented with a story starter and were provided one minute to think about what they would write and then three minutes to write (Hosp et al., 2007).

In one study, Eckert and colleagues (2006b) examined the effects of performance feedback condition compared to a control condition. Using a group design, 50 third grade students were randomly assigned to one of the two conditions. Results indicated students who received performance feedback in this form described above, demonstrated significantly greater increases in their writing fluency as measured by TWW and CSW, compared to students who did not receive feedback. Then in a second study, Eckert and colleagues further examined the effects of performance feedback and its effects in

improving third grade students' writing fluency performances. This study differed from the previous study as it examined the frequency of performance feedback provided to students. In this study, 42 students were randomly assigned to three conditions: (a) practice-only control; (b) performance feedback once per week; and (c) performance feedback three times per week. As seen in the previous study, results of this study indicated that students who were provided performance feedback either one or three times per week significantly improved their writing fluency as measured by total words written compared to students who received no feedback. Additionally, the amount of performance feedback that was provided (once per week vs. three times per week) did not appear to result in significant differences in students' fluency growth.

Taken together, results from these two studies provide evidence that a standardized performance feedback method can lead to greater improvements in students writing fluency skills when implemented with elementary students. Although the performance feedback methods utilized by Eckert et al. (2006b) and those utilized by Van Houten and colleagues (1974, 1975) and Harris and colleagues (1994) differed, performance feedback was found to lead to improved outcomes in students' writing skills in each of these studies.

In a more recent study, conducted by Hier and Eckert (2014), a goal was to examine the effects of a performance feedback intervention on elementary students' writing skills compared to a practice-only condition. Outcomes of this study indicated that students who received the performance feedback intervention exhibited significantly greater initial and generalized writing fluency improvements compared to students who

did not receive performance feedback. Additionally, evidence of generalization of skills were also identified within this study, in which students provided with performance feedback were greater able to successfully utilize their writing skills during the generalization task compared to those who did not received performance feedback. Overall, performance feedback significantly improved students' writing fluency growth, in which these skills were generalized to writing tasks that differed from the writing task used initially in the study. Recent findings such as these, add to the literature base supporting the effectiveness of this intervention in improving students' writing fluency performances and the extension of the skills to other tasks.

Truckenmiller and colleagues (2014) attempted to examine the effectiveness of performance feedback and a fluency-based intervention in a randomized control trial. This study was the first of its kind to compare rates of writing fluency change between students receiving performance feedback and a control group. In this study, the writing fluency of 133 third grade students across three schools were assessed. Outcomes of this study indicated that students who received performance feedback significantly improved their writing fluency to a greater degree compared to students who did not receive performance feedback. More specifically, at the end of the seven week study, students receiving performance feedback demonstrated an average of 41.6 TWW. As a comparison, 37 TWW is the standard for three minutes of writing at this grade level for CBM-WE tasks (Mirkin et al., 1981).

Results from both Hier and Eckert (2014) and Truckenmiller and colleagues (2014) provide additional support for the use of performance feedback as an intervention to improve students' writing fluency performances.

Strengths of performance feedback. Within the framework of using performance feedback as an intervention to improve students' writing fluency skills, there are several strengths that should be noted. For instance, a strength of performance feedback is that it can be implemented with individual students, as a large-group writing intervention, or a combination of the two. For instance, when using performance feedback with a large group, educators can provide students with feedback regarding the class average writing performance following each writing session (McCurdy et al., 2008). Individualized performance feedback can be reserved for students who are learning new writing skills and in the acquisition stage of learning (McCurdy et al., 2008).

A second strength of the performance feedback intervention is that it is not curriculum-dependent and it can easily be implemented into general instructional practices within a classroom (Truckenmiller et al., 2014). Compared to other writing interventions and strategies, Truckenmiller et al. (2014) stated that performance feedback should be considered a "go to" writing intervention prior to implementing more intense individualized interventions, given that many other writing interventions may require more resources and are more time-consuming (Truckenmiller et al., 2014).

A third strength is that performance feedback can be used alone or in combination with other evidence-based writing interventions and strategies (Graham, McKeown, Kiuahara, & Harris, 2012). As an example, Berninger et al. (2006) noted that performance

feedback in combination with the self-regulated strategy instruction may lead to higher outcomes in students' overall writing skills, particularly more fluent writing skills, if they are to receive instruction in planning and revision in addition to targeted writing fluency support. Overall, Eckert et al. (2006b) explained that performance feedback interventions have the potential to produce positive student outcomes in a short amount of time. Additionally, educators implementing performance feedback interventions do not need to obtain extensive training in order to obtain encouraging results from their students (Eckert et al., 2006b).

Choice Overview

The use of choice as an intervention within the educational setting has been identified as an effective practice. Providing choice making opportunities to students has been defined in a variety of ways. For example, in the educational setting, choice has been defined as a verbal statement that provides a student with two or more response options (Guess, Bensen, & Siefel-Causey, 1985; Jolivette, Wehby, Canale, & Massey, 2001). A similar definition of choice making is provided by Lancioni, O'Reilly, and Emerson (1996) who defined choice making as the allowance of an individual to select an activity from a presented set. Some experts in the field have referred to choice as an antecedent strategy that has been found to be effective when intervening and preventing problem behaviors and increasing academic engagement (Kern & Clemens, 2007).

Multiple researchers have described various examples of how to incorporate choice opportunities within the school setting. Some choice making opportunities can include but are not limited to the following: (a) the option to choose between academic or

behavioral tasks, (b) order of completion of the task, (c) choice of materials to use during the task, (d) choice of who to interact with during work activities, (e) choice of where to complete tasks, and (f) time of day in which to complete a task (Jolivette et al., 2001; Kern & State, 2009). Research supporting the effectiveness of choice extends into multiple domains including behavioral, academic tasks, as well as recent support specifically in the area of writing. The following provides a brief description of some of the theoretical underpinnings of choice, followed by a brief overview of the literature surrounding choice and its' use in improving students' behavior and academic skills in multiple areas, as well as a description of the prospective use of choice to improve students' writing fluency skills.

Choice theoretical foundation. Within the research regarding choice, some researchers have presented theories surrounding the effectiveness of providing choice. For example, Kern and State (2009) suggested that choice is effective because as humans, having the ability to choose between different options is necessary for survival. Another possible theory surrounding the effectiveness of choice is the consideration of an individual's preference (Houghton, Bronicki, & Guess, 1987; Jolivette et al., 2001). Often times, our preferences for various options have the potential to change and the provision of choice allows one to choose the option that is most preferred at a given moment (Jolivette et al., 2001). In addition to the consideration of one's preference, engaging in a more preferred activity may in turn motivate a student to engage in the activity more often (Jolivette et al., 2001).

Choice and behavior. The use of choice as an intervention to address student behaviors in the school setting has been demonstrated in various studies. Three key literature reviews (Kern, Vorndran, Hilt, Ringdahl, Adelman, & Dunlap, 1998; Morgan, 2006; Romaniuk & Miltenberger, 2001) have described the effects of choice making on student behavior and provide evidence on the use of choice as an effective intervention to address both problem behaviors as well as increase academic engagement. For example, within Morgan's (2006) review of choice as an intervention, 13 articles were examined to assess the effectiveness of choice across elementary and secondary students' behavior and academic performance. In general, Morgan (2006) reported that choice can be successfully implemented as an intervention to increase students' task engagement and completion as well as accuracy. Although the following is not an exhaustive review of choice, the studies described below demonstrate support for the use of choice to improve students' behavior, specifically, decreasing problem behaviors and increasing task completion.

In an early study conducted by Dyer, Dunlap, and Winterling, (1990), researchers examined the effects of choice on decreasing problem behavior. During the choice intervention, students had the option to choose from a sampling of reinforcers and educational tasks. During the no-choice conditions, students were not provided with the option of choosing their reinforcement or task. Results of this study demonstrated the effects of choice, which led to a decrease in problematic behavior exhibited by the students.

In 1997, a study conducted by Powell and Nelson examined the effectiveness of providing choice of academic task on reducing problematic behaviors displayed by a student with attention deficit hyperactivity disorder. Comparable results to Dyer et al. (1990) were identified in which students' problematic behaviors decreased when they were provided with a choice of academic tasks.).

Research in this area was then extended by Kern, Mantegna, Vorndran, Bailin, and Hilt (2001) who studied three individuals who exhibited problem behaviors during task situations. When participants were offered a choice in the order in which they were to complete expected tasks, all three participants' problematic behaviors decreased and student engagement increased. In a similar study examining the effects of choice of task sequence, positive effects were identified in the increased number of correct responses, as well as a decrease in problem behavior (Jolivette et al., 2001).

Romaniuk et al. (2002) also demonstrated the effects of choice on decreasing problem behaviors. In their study, seven students participated in a functional analysis. Students whose behaviors were identified as being maintained by escape only or both escape and attention were provided choice as an intervention. For these students, choice was found to be effective in reducing the problematic behaviors.

Effects of choice on improving student behavior has also been identified to be particularly beneficial for students with disabilities. In a review of the effects of choice used with individuals with disabilities, Shogren, Faggella-Luby, Bae, and Wehmeyer (2004) analyzed 13 studies in their meta-analysis of the effects of choice. In their study, Shogren et al. (2004) identified that provision of choice as an intervention has a moderate

effect size. Additionally, researchers suggest that providing choice can result in dramatic differences in student behaviors. Implications of this study suggested the use of choice as an appropriate aspect of behavioral interventions.

Choice and academics. In addition to utilizing choice as an intervention to improve student behaviors and engagement, research on choice has also identified positive outcomes in accuracy and productivity in various academic areas such as mathematics, social studies, reading, and science (State & Kern, 2009). Within these academic domains, effects of choice have been examined for use regarding different academic assignments such as worksheets, math word problems, and writing exercises (State & Kern, 2009). Additionally, research mentioned previously indicating the effects of choice on students' behavior also provided support for choice and improving students' academic performance (see Dyer et al., 1990, Cosden, Gannon, & Haring, 1995; Jolivette et al., 2001). For instance, the study conducted by Jolivette et al. (2001) also identified improvements in students' task completion. For example, when provided choice of task, students attempted and completed more math problems. However, other studies that support the use of choice in the area of academics have been conducted. For example, in 1989, McNeir and Schuldt examined the effects of choice in achievement standards in mathematics. In this study, students in elementary and secondary levels were either presented with a choice in math performance standards, provided a math standard determined by the experimenter, or were not provided any specific standard. Outcomes of this study resulted in an increased number of multiplication problems for high school students who were provided with a choice in standards compared to the other two

conditions. A positive impact of choice particularly for male students was identified in this study.

More recently, a study conducted by Daly, Garbacz, Olson, Persampieri, and Ni (2006) examined the effects of choice on students' academic performance specifically improving students' oral reading fluency. In this study, two students' oral reading fluency skills were assessed. Each student was able to earn a reward for reaching the determined reading criterion. Choice in this study was provided in which students were allowed to choose whether or not they received instruction in a similar reading passage. Results indicated that students' oral reading fluency increased when students chose to receive instruction.

The effects of providing choice in academic assignments and task completion were investigated recently by Stenhoff, Davey and Lignugaris/Kraft (2008). In this study, an ABAB design was utilized to examine the effects of providing a choice between two different science assignments on the percent of assignments completed as well as the percent of items students correctly identified on the science assignment. Results suggest that the provision of choice in academic assignment resulted in improved student outcomes on both measures. Specifically, when provided a choice the participant's productivity and performance were dramatically higher compared to when no choice was provided to the student (Stenhoff et al., 2008).

The studies previously described provide only a snapshot of the effects of choice on improving students' behavior and academic performance in various domains.

Implications of these studies demonstrate the powerful effects of an approach that simply involves presenting students with a choice of more than one option.

Choice and writing. Compared to behavior and other academic areas, the use of choice in the area of writing is limited. Providing choice as a writing intervention simply involves providing students with the opportunity to choose between two writing prompts to utilize as a basis for their writing responses during CBM writing sessions (Panahon, Hilt-Panahon, & Arbolino, 2012). Providing choice is efficient and although research is limited, its effects in improving students writing fluency have been identified.

One study examined the effects of a multicomponent writing intervention referred to as the Comprehensive Writing Program (CWP; McCurdy et al., 2008). The CWP was comprised of direct instruction, increased opportunities to respond, and choice between two story starters, interdependent group-oriented reinforcement, and individual feedback on the writing performance. The choice component allowed students the option to choose between two story starters. The 17 participants included in this study were students in ninth grade who were identified with disabilities. In this study, student choice was not examined in isolation but as part of the CWP. Writing skills of focus in this study included: percent of sentences completed, contained adjectives, and compound sentences. Results of this study were positive in that the CWP was found to be effective in improving students' writing skills. Although this study incorporated students' choice as a component of the CWP, the effects of choice were not examined in isolation. The inability to separate the use of choice from the other intervention components does not

allow for an understanding of the effects of offering a choice can have on improving students' writing skills.

Evidence examining the effects of choice in isolation on students' writing performance has also been identified. Recently, Panahon et al. (2012) found that independently providing students a choice of story starters produced positive effects. Results of this study identified that when provided a choice in story starter, students wrote more words when presented with a choice of writing prompts as opposed to being provided with only one writing prompt. A replication study conducted by Steinman, Panahon, Hilt-Panahon, and Shea (2014) reexamined the effects of providing choice on middle school students receiving extended school year services. Similar results were found in which students' TWW increased when provided choice compared to students receiving no intervention (no choice).

In a more recent study conducted by Steinman, Schreiber, Panahon, and Hilt-Panahon, (2015), the effects of choice were examined on students from five second grade classrooms and two sixth grade classrooms within two public school districts. Preliminary results indicated a similar trend found in Panahon et al. (2012) and Steinman et al. (2014). In this study, both males and females demonstrated improvements in the length of their writing responses as measured by TWW. The quality of students' writing is also currently being examined as measured by correct writing sequences. While Steinman et al. (2014; 2015) are not currently published studies; evidence of the positive effects of providing choice on improving students' writing fluency is evident and promising. However, a further investigation of these effects is warranted. Within Panahon

et al. (2012) and Steinman et al. (2014; 2015) improved writing fluency rates were identified for both male and female students. Implications of these studies lead some researchers to believe that choice may be a promising option for educators when seeking to remediate students' writing fluency skills. In addition, other studies examining the use of choice suggest that this may be an effective and efficient intervention that is easily incorporated into the classroom setting. The following describes three beneficial aspects of providing choice as an intervention based on evidence from previously mentioned studies.

Strengths of choice. One strength in providing students with a choice in writing prompt is the ease of implementation within the classroom setting (Kern & State, 2009) and in conjunction with standard CBM procedures. With limited time available to meet the needs of students struggling in the area of writing throughout the school day, an appealing aspect is the simplicity of providing choice in combination of CBM procedures.

A second strength is choice requires little changes to daily instructional time (Powell & Nelson, 1997), and minimal staff training for educators. For instance, within the Jolivet et al. (2001) study, educators who implemented the intervention rated the choice intervention as effective and feasible. Identifying interventions that are feasible for educators should be a priority of researchers. Feasible interventions may lead to a greater commitment to treatment integrity, which can lead to more effective outcomes for students.

A third strength is that choice can be successfully implemented at both the individual student level and at the class-wide level (Kern, Bambara, & Vogt, 2002). An additional strength of this intervention can be seen in two recent studies in which elementary-aged male students particularly benefited from this intervention as their writing performances improved (see Steinman, Panahon, Hilt-Panahon, & Arbolino, 2015).

While research within the past two decades has demonstrated choice as an intervention is indeed effective in improving the academic performance and behaviors of students. A limitation of utilizing choice specifically as a writing intervention is that research is currently mixed on its effects. For instance, Gabrielson, Gordon, and Engelhard (1995), examined the effects of providing a choice of writing tasks on the quality of students' writing, but found no clear intervention effect. In order for educators to be confident and invest in implementing choice as a writing intervention, additional research is necessary to fully examine the effects of choice on improving students' writing performances.

Current Study

The primary goal of the study was to extend the empirical literature regarding the effects of performance feedback and its' use as a writing fluency intervention, as well as the use of choice as a writing intervention. Results from this study may address the lack of literature regarding writing interventions that specifically seek to improve the writing fluency skills as measured by the total words written (TWW) by elementary students. In order to address the goal of this study, the following research question and corresponding

hypotheses were posed: Is the combination of performance feedback plus choice more effective in improving students' TWW compared to performance feedback and choice individually? To investigate the effectiveness of this intervention, researchers examined students' writing performances following the implementation of a CBM writing fluency task. Specifically, students' writing fluency were examined by measuring a common written expression metric, TWW. Due to previous research indicating that performance feedback has been identified as an effective intervention in improving students' writing fluency (Eckert et al., 2006b; Harris et al., 1994) and recent research has uncovered the potential positive effects of choice on improving students writing fluency (Panahon et al., 2012; Steinman et al., 2014), it was hypothesized that both the choice and performance feedback administered individually would lead to an increase in students' TWW. It was also hypothesized that the combination of choice with performance feedback would lead to a greater improvement in students TWW, as the addition of choice would maximize the effectiveness of the performance feedback intervention and would lead to greater improvements in students' writing performances as measured by TWW when compared to performance feedback and choice delivered individually.

Chapter 2

Methods

Participants and Setting

Participants included eight third grade students, (three males; five females) within a public school district in the Midwest region of the United States. Students in third grade were recruited due to the fact that composition of connected text is generally an expected skill beginning in third and fourth grade (Berninger et al., 2006). Additionally, it is believed that students in these grade levels are most likely to benefit from additional writing fluency support through targeted interventions.

Third grade teachers were contacted and provided an overview of the study in one elementary school located in the Midwest part of the United States. Once a third grade teacher was identified to assist with the search for students in need of writing support, students were recruited to participate in this study based on teacher nominations. The teacher was asked to identify students in her classroom who may benefit from additional support in writing. The nominated students were then screened to ensure they had met the eligibility criteria. The eligibility criteria included: (a) student does not receive special education services, (b) student's first language is English, (c) student does not receive instructional modifications in the classroom, and (d) student does not have a specific learning disability in reading or written expression.

Following the teacher nomination and eligibility screening, eight students were identified. Six students were randomly assigned to one of two groups. More specifically, three students received the performance feedback intervention following initial baseline,

while the other group began with the choice intervention following initial baseline. The two students not assigned to either of the two groups mentioned, served as a control group for the study. The study was designed to account for potential attrition; therefore, these two students could have replaced a participant if one had withdrawn from the study. These students were not provided choice or performance feedback individually, but were provided with the performance feedback plus choice intervention following an extended baseline.

The study took place in an elementary school with approximately 400 students enrolled during the 2016-2017 school year. Individualized writing sessions were conducted in a small office located within the building.

IRB Review and Permissions

Prior to participant recruiting, the study was reviewed by the Minnesota State University, Mankato Institutional Review Board for approval. Institutional Review Board approval from Minnesota State University, Mankato was obtained (IRB# 948551) as well as approval from the participating school district's research office (dated 2/21/2017). Permission was then obtained from the director of teaching and learning and the building principal. Written parent permission was obtained from the eligible participants' parents or legal guardians using a consent form (Appendix A). Two copies of the consent form were sent home to parents with their student(s) so that parents could keep one copy for their records. Signature of the form indicated that parents agreed to have their child participate in the study. Additionally, student assent was obtained prior to the start of the study. Students were asked to participate using the script listed on the child assent form

(Appendix B). The principal investigator verbally read the assent form to the students prior to getting the student's response.

Parental consent was obtained for all eight students invited to participate in the study. Of the students whose parents consented, 100% provided child assent to participate in the study. No students nominated were excluded from the study and all students nominated met the eligibility criteria.

Researchers

Two doctoral students in school psychology, including the principal investigator, and one licensed special education teacher administered the sessions. Research assistants received training on all of the responsibilities. As part of their training, research assistants were provided with an overview of the study, procedural scripts for conducting procedural integrity observations and received training on scoring the dependent measures and received materials (from AIMSweb, Hosp et al., 2007; & Shapiro, 2011). Following initial training, research assistants were provided with opportunities to practice and receive feedback on scoring the probes. All research assistants were required to demonstrate proficiency by observing and scoring the steps of two mock writing sessions. A standard of 95% accuracy was required for both sessions. An assessment of the research assistants' scoring skills was conducted and each were required to score three third grade level writing responses and obtain 95% proficiency in scoring prior to the start of the study.

Materials

Curriculum-based measure probes in written expression were administered individually to each student by the researcher. Materials provided to each student during all writing sessions include two sharpened pencils with eraser and a writing packet. A stopwatch was utilized by the researcher to provide the allotted time to the student during each writing session. Within the standard writing packet utilized during baseline, the first page of the packet contained the student's identifying information as well as a grade appropriate writing prompt with a stop sign displayed below. On the second page of the packet, the writing prompt was displayed again along with lines for the student to write (see Appendix C). In the choice only conditions, materials included two separate standard writing packets that contained two different story starters. For the performance feedback only conditions, writing packets included an individualized performance feedback sheet on the first page (see procedures), followed by the standard writing packet pages as described above (i.e., page one: identifying information, writing prompt, and stop sign; page two: writing prompt and lined paper; see Appendix C). In the performance feedback plus choice conditions, materials included a separate one-page document that contains the individualized performance feedback, followed by two separate standard writing packets that contained two different story starters. Again, each of these two packets appeared identical to the standard writing packet format (i.e., page one: identifying information, writing prompt, and stop sign; page two: writing prompt and lined paper; see Appendix C). Additionally, for each writing session, a standardized procedural script (i.e., intervention protocol) was created for the researcher to follow for the four conditions.

Specifically, the baseline procedural script contained nine steps, performance feedback procedural script contained 11 steps, choice procedural script contained 12 steps, and performance feedback plus choice procedural script contained 14 steps (see Appendix C).

Experimental Design

A multiple baseline design across participants with withdrawal probes ($A_1BA_2CA_3D$) was utilized to compare the effectiveness of the performance feedback plus choice intervention to the performance feedback alone and choice alone conditions. This design allowed the researcher to evaluate and compare the effectiveness of the three conditions. During each session, students' writing fluency performance was assessed. During baseline sessions, students were provided a writing prompt with no feedback or opportunity for choice in writing prompt. All students began with the initial baseline phase and until a stable or decreasing rate of performance had been established. Following the baseline phase, the individualized conditions (performance feedback and choice) were presented in a counterbalanced manner to control for an order effect. That is, three students were randomized to receive the performance feedback only condition following the first baseline phase, while three other participants received the choice only condition following the first baseline phase. Therefore, Students 1, 2, and 3 received performance feedback only following the initial baseline condition, while Students 4, 5, and 6 received choice only following the initial baseline condition. More specifically, within the multiple baseline design, when Student 1 was introduced to the performance feedback, Students 2 and 3 remained in the baseline condition to further examine the influence of the intervention on students' writing performance. The same process was

utilized with Students 4-6, where Student 4 was introduced to the choice condition, Students 5 and 6 remained in the baseline condition. Students who first received performance feedback only were then administered the choice only intervention, while students who received choice were then administered performance feedback only. Throughout the study, a brief withdrawal probe was implemented between each condition. The purpose of the withdrawal phases was to allow for a distinct change between each intervention and to eliminate any potential carryover effects of the previous intervention on the student's writing performance. During the withdrawal phases, if a student's writing performance decreased to similar levels as the initial baseline phase or performance was observed to be stable, students were then provided with the next intervention. In the final intervention phase, all participants received the performance feedback plus choice combined intervention. A follow-up phase that included one writing session was implemented during the last week of school with each of the eight participants.

Two additional students (Students 7 and 8) served as a control for this study. Both students remained within the baseline phase for 15-16 writing sessions. The purpose of this extended baseline phase was to address any potential attrition that may have occurred with Students 1-6. Following this extended baseline, both students received the performance feedback plus choice condition.

Response Definition and Measurement

The independent variables for this study included choice, performance feedback, and the combined performance feedback plus choice writing interventions. The primary

dependent variable was each student's writing fluency per session. Writing fluency was measured by counting the total words writing (TWW) for each story starter. TWW was chosen based on the appropriateness with elementary students and the reliability of the measure as a common measure of writing fluency skills. TWW is considered to be a reliable measure of fluency when used with elementary student populations (Truckenmiller et al., 2014). TWW is the total number of words generated by the student during the allotted writing time (Hosp et al., 2007). A word was counted as any letter or group of letters with an identifiable space that divides the next letter or group of letters. Words that were spelled incorrectly or nonsense words were counted within the total (Hosp et al., 2007). In addition, words within titles, abbreviations, and dates were also included in the total words written. However, numbers that were not written in word form were not included.

Procedures

The study was conducted across nine weeks. Writing sessions were scheduled three times per week during the students' classroom writing period. Across all phases of the study, sessions were conducted in an individualized format within a quiet office located in the center of the school building. Each individual session lasted for approximately five minutes and were conducted by research assistants (one or two assistants per session) who were responsible for conducting the sessions.

Baseline condition. During baseline, students were provided with the standard CBM writing packet and the researcher provided instructions following a procedural script. As part of the baseline procedure, a story starter was read aloud to the students.

Students were then instructed to write a short story about what happens in which they had one minute to think about the story they would write then were provided three minutes to write the story. At the end of the three minutes, students were instructed to stop writing. Writing packets were then collected and the researchers calculated the total number of words written by each student. Results from the baseline sessions were used to provide feedback to students who received the performance feedback intervention during the second phase of the study.

Performance feedback condition. In this condition, students were provided with the performance feedback CBM writing packet and the researcher provided instructions following a procedural script created for this condition. As part of the performance feedback procedure, students were provided with individualized performance feedback from the previous writing session on a single page. Performance feedback was provided by displaying a box indicating the number of words the student wrote during the previous writing session as well as an arrow pointing up or down indicating an increase or decrease, respectively in the number of words the student wrote when compared to the session before the last one. Additionally, an equal sign was an option for students who wrote the same number of words. It should be noted that both a visual and verbal description on the performance feedback was provided during these sessions. Once the student had reviewed the individualized performance feedback, he or she would be asked to turn to the second page of the packet, which comprised of a story starter. A story starter was read aloud to the students. Students were then instructed to write a story about what happens in which they had one minute to think about the story they would write

then were provided three minutes to write the story. At the end of the three minutes, students were instructed to stop writing. Writing packets were then collected and the researchers calculated the total number of words written by each student.

Choice intervention condition. In this condition, students were provided two writing packets. Each writing packet contained a different age-appropriate story starter. The only visual difference between each writing packet for students was the different writing prompt. That is, the writing packets were presented on the same color of paper and in the same displayed format. All other features of the writing packets remained the same. The researcher then provided instructions following a procedural script created for this condition. Within the choice condition, two story starters were read aloud to the students. Students were then instructed to choose between the two options. Once a choice was made, students then had one minute to think about the story they would write and then were provided three minutes to write a story. At the end of the three minutes, students were instructed to stop writing. Writing packets were then collected and the researchers calculated the total number of words written by each student.

Performance feedback plus choice combined condition. In this condition, students were first provided performance feedback as well as a choice between two story starters. The researcher then provided instructions following a procedural script unique to this condition. In this condition, students were first provided with individualized performance feedback from the previous writing session on a single page. Performance feedback was provided by displaying a box indicating the number of words the student wrote during the previous writing session as well as an arrow pointing up or down

indicating an increase or decrease, respectively in the number of words the student wrote. Additionally, an equal sign was an option for students who wrote the same number of words from the previous session. As in the performance feedback alone condition, both a visual and verbal description of the student's previous performance was provided. Once the student had reviewed the individualized performance feedback, students were provided two writing packets. Two story starters were read aloud to the students. Students were then instructed to choose between the two options. Once a choice was made, students then had one minute to think about the story they would write and then were provided three minutes to write a story. At the end of the three minutes, students were instructed to stop writing. Writing packets were then collected and the researchers calculated the total number of words written by each student.

Following the completion of the study, a debriefing session was held with the classroom teacher to provide an overview of each student's writing progress. The researcher provided the teacher with the script for each writing intervention utilized in this study, CBM-WE materials, and a data collection template for future use.

Treatment Integrity

Treatment integrity was collected and analyzed on 37% of sessions. Treatment integrity measures the degree in which a treatment is implemented as intended (Noell, Gresham, & Gansle, 2002). In order to measure treatment integrity within this study, a direct observation method was used in which a secondary research assistant accompanied the primary investigator and directly observed and recorded the occurrence/nonoccurrence of the components within each intervention across 37% of all

writing sessions (10 sessions/27 sessions). During the observations, the secondary researcher collected treatment integrity data on each intervention step by documenting whether the step was implemented as written within the procedural script or whether a step did not occur during the session. Treatment integrity was then calculated by dividing the number of steps completed for each intervention by the total number of steps required and multiplying that value by 100. The mean treatment integrity for writing prompts was 100% across sessions.

Reliability

Interscorer agreement. Interscorer agreement for TWW was calculated across 37% of sessions to examine the reliability of scoring across the researchers. For these selected sessions, two researchers independently recorded the TWW for each individual student and the total score was compared. The percent of interscorer agreements for TWW were calculated using the following formula: $\text{Agreements} / (\text{Agreements} + \text{Disagreements}) \times 100$. The mean interscorer agreement for TWW was 100%.

Follow-up

In this study, maintenance of the intervention effect was assessed using one follow-up session during the final week of the study after all participants had successfully completed all intervention and withdrawal phases. The maintenance of an intervention effect target behavior after an intervention has been withdrawn allows researchers to examine the long-term effectiveness of a treatment(s) without compromising the experimental control (Byiers, Reichle & Symons, 2012).

Data Analysis

Visual analysis was utilized as the primary method of analysis within this study. Line graphs were analyzed for change in level of performance between conditions, trends of performance across conditions, overlap, and variability. These characteristics are often viewed collectively to make decisions about the degree of experimental control. Visual analysis was also used to further examine the effectiveness of the writing interventions on increasing students' TWW. Percentage of nonoverlapping data points (PND) was used to supplement visual analysis in order to better determine the effects of the intervention as well as any effects across time. As a method of visual inspection commonly used within single subject research, PND is used to calculate the nonoverlap of data points between baseline and intervention phases (Parker & Vannest, 2009; Scruggs, Mastropieri, & Castro, 1987). Since the desired effect of the intervention was an increase in performance in TWW, PND was calculated by identifying the range of data point values in baseline. Next, the number of data points in the second condition were counted. This step was followed by counting the number of data points in the second condition that do not fall within the range of the first condition. The number of nonoverlapping data points are the ones that fall outside of the value range in the intended direction of change. For example, if the range of values in the first condition is 5-10, then only data points in the second condition higher than 10 would be considered non-overlapping. Finally the number of nonoverlapping data points was divided by the total number of data points in the second condition and multiplied by 100. PND scores range from 0% to 100% with higher scores indicating a more effective intervention. Scruggs, Mastropieri, Cook, and Escobar (1986)

described specific criteria for interpreting PND that includes the following: PND > 90% indicates highly effective intervention, 70-90% fairly effective, 50-70% questionable effectiveness, and <50% indicates unreliable treatment.

Chapter 3

Results

The mean number of TWW across sessions for each participant and condition are summarized in Tables 1 and 2 (see Appendices D and E). PND for each participant are summarized in Tables 3 and 4 (see Appendices F and G). Results demonstrated positive effects regarding participants' writing performances following the implementation of each intervention. Specifically, both performance feedback and choice administered separately led to an increase in writing performance ($M = 36.35$ and $M = 34.48$, respectively) compared to baseline ($M = 20.08$) for all six participants. In addition, the combination of performance feedback plus choice led to improved performance in writing ($M = 42.42$) for all participants.

Figure 1 shows the results for Students 1, 2, and 3 (see Appendix H). During baseline, Student 1's performance was low and stable. Due to this low level of performance compared to Student 2 and 3's initial baseline performance, the performance feedback intervention was first introduced to Student 1. The student averaged 11.00 TWW with a range of 8 to 14 TWW per session. Upon implementation of the performance feedback intervention, level of performance immediately jumped and continued with an increasing trend throughout the condition. Data ranged from 24-44 TWW with an average of 34.25 TWW. While Student 1's performance increased once performance feedback was provided, the performance of Student's 2 and 3 remained stable while they stayed in baseline. Results from these four sessions of performance feedback showed no overlap (PND = 100%) with baseline performance. During the first

withdrawal phase, Student 1's TWW dropped immediately from 44 to 23. When the choice intervention was implemented, Student 1's performance again jumped immediately and continued with an increasing trend. Student 1's level of performance remained high as he averaged 38.33 TWW. Results from these sessions of choice showed no overlap (PND = 100%) with baseline performance. For the second withdrawal phase, Student 1's performance again dropped immediately once intervention was removed. During the first combination of performance feedback plus choice session, Student 1's performance increased immediately to 45 TWW and remained above baseline performance ($M = 43.50$), displaying no overlap (PND = 100%) with baseline performance. An immediate decrease in performance occurred during the third withdrawal probe once the intervention was removed. The combined intervention was implemented a second time, as it was determined to be the most effective of the three interventions at increasing Student 1's writing performance. During the second combination of performance feedback plus choice session, a similar response pattern was observed in which Student 1's performance increased immediately to 44 TWW and remained above baseline performance with little variability ($M = 43.75$), displaying no overlap (PND = 100%) with baseline performance. When the follow-up probe was introduced four weeks later, performance remained at intervention levels. Overall, Student 1 benefited from the writing interventions. By the end of the study, he was writing three times as much as he had at the beginning of the study as his average TWW increased from 11.00 during baseline to 43.75 during the last condition. Student 1's rate of improvement across the duration of the study was 3.38 words/week.

Student 2's performance during baseline ($M = 19.00$) started low and then became stable as he produced between 20 and 22 TWW for 5 of the last 6 sessions. Upon implementation of the performance feedback intervention, performance jumped immediately to 36 TWW and remained stable as he averaged 31.00 TWW. There were zero overlapping data points between baseline and intervention conditions (PND = 100%). While Student 2's performance increased once performance feedback was provided, the performance of Student 3 remained stable while she stayed in baseline. During the first withdrawal probe academic performance dropped back to baseline levels. When the choice intervention was implemented, Student 2's performance immediately increased ($M = 32.33$), and remained above baseline levels displaying no overlap (PND = 100%) with baseline performance. A similar pattern of performance was observed when the second withdrawal probe was introduced. During the first combination of performance feedback plus choice session, Student 2's performance increased immediately to 33 TWW and remained above baseline performance with little variability ($M = 35.75$) displaying no overlap (PND = 100%) with baseline performance. An immediate decrease in performance occurred during the third withdrawal probe once intervention was removed. The combined intervention was implemented a second time as it was determined to be effective of the three interventions at increasing Student 2's writing performance. During the second combination of performance feedback plus choice session, a similar response pattern was observed in which Student 2's performance increased immediately to 39 TWW and remained above baseline performance ($M = 36.00$) displaying no overlap (PND = 100%) with baseline performance. When the

follow-up probe was implemented three weeks later, performance remained above baseline levels and slightly below intervention levels. Overall, Student 2's academic productivity increased as a result of the writing interventions. By the end of the study, this student more than doubled the amount of words he had written at the beginning of the study with a rate of improvement of 2.33 words/week.

For Student 3, baseline data were variable, ranging from 18 to 36 TWW with an average of 29.60 TWW. This student remained in the baseline phase for a longer time compared to Student's 2 and 3 in an attempt to demonstrate the functional relationship between the interventions and the student's writing performance. This allowed the researchers to examine whether this student's writing performance increased when and only when the writing intervention was implemented. During the performance feedback condition, TWW increased to an average of 50.67 and a PND value of 100% with baseline. During the first withdrawal phase, a slight decrease in TWW occurred initially followed by stable responding with an average of 49.67 TWW. All three data points overlapped with performance during the initial intervention condition (PND = 0%). This student was provided three withdrawal probes in an attempt to reduce potential carry over effects between the intervention phases. When the choice intervention was implemented, writing performance increased to an average of 56.67 TWW with a PND value of 67% when compared to the preceding withdrawal phase. Within the next withdrawal phase, a slight decrease in TWW occurred initially followed by a second withdrawal probe demonstrating an even greater decrease and an average of 52 TWW. During the performance feedback plus choice combined condition, an immediate increase was seen

with a continued increasing trend and an average of 64.25 TWW and a PND value of 100% with baseline. When the follow-up probe was introduced three weeks later, Student 3's performance remained at intervention levels. This student produced 68 TWW, more than two times the mean performance during baseline. Overall, Student 3 benefited from the writing interventions. By the end of the study, this student more than doubled the amount of words she had written at the beginning of the study with a rate of improvement of 4.33 words/week.

Figure 2 displays the results for Students 4, 5, and 6 (Appendix I). Student 4's performance throughout baseline was stable and low with an average of 7.00 TWW. Due to this low level of performance and compared to Student 5 and 6's initial baseline performance, the choice intervention was first introduced to Student 4. Upon implementation of the choice intervention, TWW increased immediately and remained high throughout the condition ($M = 16.75$ TWW). Student 4's performance during the choice condition exceeded his performance during baseline (PND = 100%). This increase in performance occurred while responding remained stable for Students 5 and 6. Once the choice intervention was withdrawn, performance dropped below intervention levels but remained above initial baseline performance. When the performance feedback intervention was implemented, performance immediately increased and remained stable throughout this phase ($M = 20.67$ TWW) and a PND value of 100% with baseline. Once performance feedback was withdrawn, writing performance decreased below intervention levels but remained above initial baseline performance. During the first combination of performance feedback plus choice session, Student 4's performance increased

immediately from 12 TWW to 24 TWW and remained above baseline performance with little variability ($M = 23.75$) and a PND value of 100% with baseline. A decrease in performance was again observed during the third withdrawal probe. The combined intervention was implemented a second time as it was determined to be the most effective of the three interventions at increasing Student 4's writing performance. During the second combination of performance feedback plus choice session, a similar response pattern was observed in which Student 4's performance increased immediately to 20 TWW and remained above baseline performance with an increasing trend ($M = 24.00$) and a PND value of 100% with baseline. When the follow-up phase was introduced four weeks later, a slight decrease in performance occurred, however, writing performance remained at intervention levels. Overall, Student 4's academic productivity improved as he was writing more than three times more than he was at the beginning of the study. Student 4's rate of improvement across the duration of the study was 2.50 words/week.

For Student 5, baseline data ranged from 12 to 27 TWW with an average of 21.86 TWW. Upon implementation of the choice intervention, TWW increased immediately for the first session but dropped back to baseline levels during the second session. Student 5 averaged 28.40 TWW for the choice condition with only two of the five data points exceeding performance during baseline (PND = 40%). While Student 5's performance increased once choice was provided, the performance of Student 6 remained stable while she remained in baseline. During the first withdrawal probe, a large decrease in TWW was observed when the intervention was removed. When performance feedback was implemented, Student 5's performance immediately increased ($M = 30.00$), and three of

four data points remained above baseline levels and a PND value of 75% with baseline. A similar pattern of performance was observed when the second withdrawal probe was introduced in which performance immediately decreased to 16 TWW. During the first combination of performance feedback plus choice session, Student 5's performance increased immediately to 24 TWW and three of four data points remained above baseline levels with some variability ($M = 30.25$). When a third withdrawal probe was introduced, performance immediately decreased to 21 TWW. The combined intervention was implemented a second time as it was determined to be the most effective of the three interventions at increasing Student 5's writing performance. During the second combination of performance feedback plus choice session, a similar response pattern was observed in which Student 5's performance increased immediately to 30 TWW and remained above baseline performance with little variability ($M = 34.67$). When the follow-up probe was implemented three weeks later, performance fell back to baseline levels. Overall, Student 5's academic productivity improved after being exposed to all three interventions. Student 5's rate of improvement across the duration of the study was 1.56 words/week.

For Student 6, baseline data ranged from 25 to 37 TWW with an average of 32.00 TWW. This student remained in the baseline phase for a longer time compared to Student's 4 and 5 in an attempt to demonstrate the functional relationship between the interventions and the students' writing performance. This allowed the researchers to examine whether students' writing performance increased when and only when the writing intervention was implemented. During the choice condition, TWW increased to

an average of 42.50 and PND value of 75% with baseline. During the first withdrawal phase, a decrease in TWW occurred with a change from 47 to 37 TWW. When the performance feedback intervention was implemented, writing performance increased to an average of 51.50 TWW and a PND value of 100% with baseline. Within the next withdrawal phase, a slight decrease in TWW occurred with a change from 48 to 46 TWW. During the performance feedback plus choice combined condition, an immediate increase was seen with an increasing trend and an average of 54.75 TWW and a PND value of 100% with baseline. When the follow-up probe was introduced three weeks later, Student 6's performance remained at intervention levels. Overall, Student 6's writing performance improved after being exposed to all three interventions. Student 6's rate of improvement across the duration of the study was 2.89 words/week.

Figure 3 displays the results for Student 7 (Appendix J). Baseline data were somewhat stable with slight variability towards the end of the baseline phase with an overall range of 34 to 55 TWW and an average of 46.07 TWW. Upon implementation of the performance feedback plus choice combined condition, level of performance increased immediately with an increasing trend. During the combination of performance feedback plus choice session, Student 7's performance increased immediately from 41 to 63 TWW and remained above baseline performance with little variability ($M = 64.17$). Results from these six sessions of performance feedback plus choice showed no overlap (PND = 100%) with baseline performance. When the follow-up probe was implemented three weeks later, performance remained above baseline levels and similar to intervention levels. Overall, Student 7 benefited from the performance feedback plus choice combined

intervention. Although Student 7's initial baseline performance was relatively higher than the other participants within the study, this student's writing skills continued to develop as an increase in writing performance was evident following the implementation of the combined intervention. Student 7's rate of improvement across the duration of the study was 2.89 words/week.

Figure 4 displays the results for Student 8 (Appendix K). Baseline data were stable with slight variability towards the end of the baseline phase. Student 8 averaged 42.06 TWW with an overall range of 24 to 51 TWW. During the combination of performance feedback plus choice session, Student 8's performance increased immediately from 51 to 58 TWW and remained above baseline performance with little variability ($M = 62.17$). Results from these six sessions of performance feedback plus choice showed no overlap (PND = 100%) with baseline performance. When the follow-up probe was implemented three weeks later, performance remained above baseline levels and slightly below intervention levels. Overall, Student 8 benefited from the performance feedback plus choice combined intervention. Student 8's initial baseline performance was comparable to Student 7's as a similar increase in TWW immediately following the implementation of the combined intervention occurred. Student 8's rate of improvement across the duration of the study was 2.00 words/week.

Chapter 4

Discussion

The current study extends previous research of both performance feedback and choice utilized as writing fluency interventions. It also represents the first study investigating the combination of the two interventions. This study examined the effects of performance feedback, choice, and the combination of the two interventions on students' writing fluency performance as measured by TWW. Using a multiple baseline with withdrawal probes design across participants, this study sought to investigate if choice and performance were effective in improving students' TWW when delivered individually. Additionally, this study investigated whether the combination of performance feedback plus choice was more effective in improving students' TWW compared to performance feedback and choice individually.

It was hypothesized that all students would benefit from both choice and performance feedback delivered individually and an increase in students' TWW would be evident when compared to baseline performances. This hypothesis was supported as all six participants exposed to the performance feedback intervention in isolation led to improvements in writing performance. When this intervention was implemented in isolation, the range of performances across students was 20.67 to 51.50 ($M = 36.35$ TWW), while the range of performances across students during baseline was 7.00 to 32.00 ($M = 20.08$). During performance feedback, Student 1 displayed the greatest improvement with an increase in his average TWW by 23 from baseline, followed by Student 3 who increased her average by 21 TWW. Students 6, 4, 2, and 5 increased their

average TWW by 19, 13, 12, and 9, respectively. This increase in performance indicates that the performance feedback was effective in increasing students' writing performance when compared to no writing intervention. Additionally, Jewell and Malecki (2005) provided norms in which the expected writing fluency performance is 36 TWW during the spring of a standard academic school year for third grade students. Based on this information, two of the six students exceeded the expected grade-level norm, while the four other students narrowed the gap between their baseline performance and the expected performance following this intervention.

Ultimately, for all six students exposed to performance feedback in isolation, the average rate of writing performance increased. Potential reasons surrounding the increase in writing performance seen within this study may relate to the benefits of performance feedback as a form of instruction. More specifically, the format in which performance feedback was provided to students during this study was one that was individualized and directly related to the writing task allowing students the option to make adjustments to their writing behavior and move towards a more expected behavior. Past research supports this notion and promotes the use of specific task related feedback (Hattie & Timperley, 2007) as well as feedback that individualized for students learning new writing skills (McCurdy et al., 2008).

Additionally, a similar pattern of responding can be seen for students provided choice in isolation. All six participants exposed to the choice intervention led to improvements in writing performance. When this intervention was implemented in isolation, the range of performances across students was 16.75 to 56.67 ($M = 34.48$

TWW), while the range of performances across students during baseline was 7.00 to 32.00 ($M = 19.65$). During choice, Students 1 and 3 displayed the greatest improvement with an increase in their average by 27 TWW from baseline, followed by Student 6 who increased her average by 10 TWW. Students 2, 4, and 5 increased their average TWW by 13, 9, and 7, respectively. This increase in performance indicates that choice was effective in increasing students' writing performance compared to no writing intervention. When comparing students' performances to Jewell and Malecki (2005) expected spring writing norm, three students exceeded the standard of 36 TWW, while three students narrowed the gap between their baseline performance and the expected performance.

The average rate of writing performance increased for all six students exposed to choice in isolation. It is possible that students whose performance increased benefited from this intervention due to having the option to choose their most preferred story starter at that moment, which potentially led to an increase in motivation to engage in the writing activity. This concept is similar to viewpoints held by Jolivette and colleagues (2001) who suggested engaging in a more preferred activity may lead to increased motivation to engage in the activity more often.

The hypothesis that the combination of performance feedback plus choice would lead to a greater improvement in students' TWW when compared to performance feedback and choice delivered individually was inconclusive. When comparing students' performances to Jewell and Malecki (2005) expected spring writing norm, six of eight students met or exceeded the standard of 36 TWW, while the other two students

narrowed the gap between their baseline performance and the expected performance. During the combined intervention phase, Students 3 and 1 displayed the greatest improvement with an increase in their average by 35 and 32 TWW respectively, from baseline, followed by Students 6 and 8 who increased their average by 22 and 20 TWW respectively, from baseline. Students 2, 7, 4, and 5 increased their average TWW by 19, 18, 16, and 11, respectively. This increase in performance indicates the combination of performance feedback plus choice was effective in increasing students' writing performance compared to no writing intervention. However, the results are inconclusive when determining which of the three interventions were most effective as all three were found to increase student performance.

When follow-up data were collected after the writing interventions were withdrawn, seven of the eight students' writing performances remained above baseline levels. For all but one student (Student 5), the effect of the combined intervention not only led to an immediate increase in writing performance when implemented, but when removed writing performance was sustained supporting the potential long-term effectiveness of the interventions. As a result, this study provides strong evidence that the performance feedback, choice, and performance feedback plus choice combined intervention result in increases in students' writing productivity. Potential reasons surrounding the increase in writing performance seen within this study may relate to the combined benefits of performance feedback and choice. Students receiving individualized and explicit instruction associated with the performance feedback intervention as well as the option of choosing their story starter may have led to the

increase in writing performance seen within this study. As students' understanding of the writing task increased, it is possible their level of engagement when provided a choice also increased resulting in an improvement in writing performance overall.

Additionally, due to the process of teacher nomination used within this study, students who participated in the study displayed varying degrees of skills. Specifically, Students 3, 6, 7, and 8 began the study demonstrating writing skills near grade level or above, while Students 1, 2, 4, and 5 began the study with skills well below grade level expectations. With initial writing skills ranging from below grade level to above grade level following the initial baseline, comparing the maintenance of the effects of the interventions was a challenge. Follow-up results indicated that for Students 3, 6, 7, and 8 the effects of the interventions were maintained where students were performing at similar levels when compared to the ending intervention phase. However, for Students 1, 2, 4, and 5, follow-up results demonstrated that their performance decreased when intervention was no longer being implemented. This indicates that students with higher levels of writing skills are able to benefit from the interventions and maintain this performance, while students beginning with lower levels of writing skills may need continued exposure to the interventions to reach a level of where the effects of the interventions are maintained when that support is no longer present.

Practical Implications

Results from this study have several implications. A key implication of this study is simple interventions; such as providing performance feedback and choice have the potential to increase writing productivity for students who struggle in the area of writing.

According to Tadatada (2011), the expected weekly growth rate for third grade students is 0.35 words. The weekly growth rate in the number of words students wrote across the duration of this study provides strong evidence in support of the effects of performance feedback and choice. The average rate of improvement across all eight students was 2.74 words written each week, with a range of 1.56 to 4.33 words/week. Therefore, educators utilizing performance feedback and choice can expect to see students' writing increase over time. Given the research available that depicts the importance of writing as a key skill required throughout one's life, it is imperative effective writing interventions are implemented at an early point in a student's educational career. This study demonstrates that students who were identified as struggling in the area of writing greatly benefited from the provision of performance feedback and choice. Without additional writing supports, students at the elementary level may lose opportunities to build these early skills, which have the potential to negatively impact them across multiple academic domains and throughout their educational career.

A second implication of this study includes the purpose or intent of the interventions used within the study. The nature of the interventions examined throughout this study is not instructional in that it does not directly teach writing skills. Rather, they are designed to provide opportunities for the development of writing performance. Specifically, for students who struggle engaging in writing tasks or are unmotivated, performance feedback and choice administered individually or in a combined intervention format offer opportunities to help increase their motivation and ultimately increase their writing performance.

A third implication as a result of this study includes the training required for staff in order to successfully implement this study within an educational setting. Training for researchers conducting this study involved an overview of writing fluency, review of procedural scripts that incorporate standardized CBM-WE processes (from AIMSweb, Hosp et al., 2007; & Shapiro, 2011) that were developed for each intervention phase as well as baseline phases, and training on how to accurately score and interpret the writing measure utilized (total words written in this study). While initial training may require some additional time, implementation of the intervention does not require extensive training. Therefore, elementary teachers may find the training and implementation process similar to other academic content areas that are newly incorporated within their classroom.

As an extension of the minimal training required to implement the performance feedback plus choice intervention, a third implication is the feasibility or ease of implementation. It is important with the amount of content required for student learning, that interventions designed to supplement general education curriculum are feasible for educators to implement. Limited time and resources can become barriers to providing additional supports to students struggling in the area of writing. In this study, trained researchers prepared and implemented the writing materials throughout all sessions. However, the ease of implementation allows for a general classroom teacher to use the pre-developed writing packets along with additional materials to implement brief writing sessions (5 and 10 minutes in duration) in a one-to-one or group format and produce positive student outcomes in a short amount of time. More specifically, when

implementing performance feedback, effort required on the part of an educator during each session would include identifying one story starter and updating the individualized feedback form with the student's TWW score and whether that performance increased, decreased, or remained the same when compared to the previous session. When implementing the choice intervention, educators would only be required to identify two story starters during each session. Finally, the combined condition requires the most steps for educators to implement compared to performance feedback and choice alone. To implement the combined condition, educators would need to identify two story starters as well as update the feedback form as in the performance feedback intervention. However, while there is a level of effort required to implement each intervention, improvement in performance in a short amount of time is evident. For students who were once unmotivated to engage in writing tasks or lacked the confidence in their writing skills, now have the potential to make multiple word gains each week when one of the three interventions are implemented. The improved performance and the benefits of the interventions are evident within the results of this study. When students were provided with one of the three interventions, performance increased and when the interventions were withdrawn performance decreased. This pattern supports the impact of the interventions and encourages educators to consider each as a viable option when seeking to increase writing performances.

Limitations and Suggestions for Future Research

Although the performance feedback plus choice writing intervention had positive effects for a majority of the students, there are several limitations that need to be

addressed. First, a small group of students were utilized to examine the effectiveness of the intervention. In order to gain additional support in regards to the effectiveness of the combined intervention, it would be beneficial to conduct a study that further examines the effects of this intervention within a larger sample and across multiple grade levels within the elementary setting. Writing fluency interventions are still currently limited at the elementary level. There still remains a need for additional writing supports available to target students struggling with basic writing skills. In addition, while this study examines the effects of the combined intervention as well as both performance feedback and choice administered individually, in order to further examine the effects of the combined intervention, conducting a study utilizing the combined intervention alone may lead to a deeper understanding of the impact of this intervention.

A second limitation includes time restraints. For example, time constraints limited the researchers' ability to gather more than one session of follow-up data limiting the ability to examine whether the performance feedback plus choice intervention resulted in sustained writing performance. The study was conducted at the beginning of March with data being collected three days each week for a total of 7-10 weeks for some students and ending during the last week of the school year in which the rigor of typical academic instruction decreases resulting in changes to student engagement and motivation.

A third limitation includes practice effects or learning that may have occurred throughout the duration of the study in the absence of an intervention. Withdrawal probes were utilized throughout the study in an attempt to reduce this potential limitation. Results of this study indicate that when the interventions were withdrawn, a decrease in

students' writing performance from the previous intervention can be seen and provides further support for the direct effects of the writing interventions on writing performance.

Another limitation included in this study was the use of PND as a method to determine the effectiveness of the interventions. In order to determine these effects, the students' writing performance during each of the three interventions was compared individually to the initial baseline phase and not across each consecutive condition. With each withdrawal phase only resulting in one data point (with the exception of Student 3), the limited number of data points did not allow for a direct comparison between each condition and the succeeding intervention condition. Therefore, PND values were calculated for the three separate interventions and compared only to the initial baseline phase.

A final limitation included in this study includes the generalization across other academic subject areas. Due to generalization not being addressed in this study, it is unclear if the writing skills students gained throughout this study were generalized to other academic tasks that require proficient writing skills. Additional research examining students' writing skills on other academic tasks following the implementation of the performance feedback plus choice intervention may be warranted to support the continued use and sustainability of this writing intervention.

Despite limitations of this study, the performance feedback plus choice intervention as well as choice and performance feedback administered individually are ideal in the elementary setting due to the effectiveness for students who struggle to make progress in the area of writing. In this case, all students benefited to a high degree within

several weeks of intensive writing interventions and supports. Replication of the combined intervention is necessary to fully investigate the various ways in which performance feedback and choice can be utilized as a dual component writing intervention that seeks to improve elementary students' writing fluency skills as measured by TWW.

References

- Ardoin, S. P., Morena, L. S., Binder, K. S., & Foster, T. E. (2013). Examining the impact of feedback and repeated readings on oral reading fluency: Let's not forget prosody. *School Psychology Quarterly*, 28(4), 391-404.
doi:<http://dx.doi.org/10.1037/spq0000027>
- Baker, S., Gersten, R., & Graham, S. (2003). Teaching expressive writing to students with learning disabilities: Research-based applications and examples. *Journal of Learning Disabilities*, 36, 109-123.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50, 248-187.
- Berninger, V. W., Rutberg, J. E., Abbott, R. D., Garcia, N., Anderson-Youngstrom, M., Brooks, A., & Fulton, C. (2006). Tier 1 and tier 2 early intervention for handwriting and composing. *Journal of School Psychology*, 22, 3-30.
- Byiers, B. J., Reichle, J., & Symons, F. J. (2012). Single-subject experimental design for evidence-based practice. *American Journal of Speech-Language Pathology / American Speech-Language-Hearing Association*, 21(4), 397-414.
[http://doi.org/10.1044/1058-0360\(2012/11-0036\)](http://doi.org/10.1044/1058-0360(2012/11-0036))
- Calfee, R. C., & Miller, R. G. (2007). *Best practices in writing assessment*. In S. Graham, C. A. MacArthur, & J. Fitzgerald (Eds.), *Best practices in writing instruction* (pp. 265-286). New York, NY: Guilford Press.
- Coker, D. L., Jr., & Ritchey, K. D. (2014). Universal screening for writing risk in

kindergarten. *Assessment for Effective Intervention*, 39(4), 245-256.

doi:<http://dx.doi.org/10.1177/1534508413502389>

Conte, K. L., and Hintze, J. M. (2000). The effects of performance feedback and goal setting on oral reading fluency within curriculum-based measurement.

Diagnostique, 25, 85-98.

Cosden, M., Gannon, C., & Haring, T. (1995). Teacher-control versus student-control over choice of task and reinforcement for students with severe behavior problems.

Journal of Behavioral Education, 5, 11-27.

Cusumano, D. (2007). Is it working?: An overview of curriculum-based measurement and its uses for assessing instructional, intervention, or program effectiveness.

Behavior Analyst Today, 8, 24-34.

Deno, S. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children*, 52, 219-232.

Deno, S. L., Mirkin, P. K., & Marston, D. (1980). *Relationships among simple measures of written expression and performance on standardized achievement tests* (Research Report No. 22). Minneapolis: University of Minnesota Institute for Research on Learning Disabilities.

Daly, E. J., Garbacz, S. A., Olson, S. C., Persampieri, M., & Ni, H. (2006). Improving oral reading fluency by influencing students' choice of instructional procedures: An experimental analysis with two students with behavioral disorders. *Behavioral Interventions*, 21, 13-30.

Dyer, K., Dunlap, G., & Winterling, V. (1990). Effects of choice making on the serious

problem behaviors of students with severe handicaps. *Journal of Applied Behavior Analysis*, 23, 515–524.

- Drabman, R. S., & Lahey, B. B. (1974). Feedback in classroom behavior modification: Effects on the target and her classmates. *Journal of Applied Behavior Analysis*, 7, 591- 598.
- Eckert, T. L., Dunn, E. K., & Ardoin, S. P. (2006a). The effects of alternate forms of performance feedback on elementary-aged students' oral reading fluency. *Journal of Behavioral Education*, 15(3), 149-162. doi:<http://dx.doi.org/10.1007/s10864-006-9018-6>
- Eckert, T. L., Lovett, B. J., Rosenthal, B. D., Jiao, J., Ricci, L. J., & Truckenmiller, A. J. (2006b). *Classwide instructional feedback: Improving children's academic skill development*. In S. Randall (Ed.), *Learning disabilities: New research* (pp. 271-285). Hauppauge, NY: Nova Science.
- Espin, C. A., Scierka, B. J., Skare, S., & Halverson, N. (1999). Criterion-related validity of curriculum-based measures in writing for secondary school students. *Reading & Writing Quarterly: Overcoming Learning Difficulties*, 15(1), 5-27.
- Espin, C. A., Skare, S., Shin, J., Deno, S. L., Robinson, S., & Benner, B. (2000). Identifying indicators of written expression proficiency for middle school students. *Journal of Special Education*, 34, 140-153.
- Fearrington, J. Y., Parker, P. D., Kidder-Ashley, P., Gagnon, S. G., McCane-Bowling, S.,

- & Sorrell, C. A. (2014). Gender differences in written expression curriculum-based measurement in third through eighth-grade students. *Psychology in the Schools*, *51*(1), 85-96. doi:<http://dx.doi.org/10.1002/pits.21733>
- Fewster, S., & MacMillan, P. D. (2002). School-based evidence for the validity of curriculum-based measurement of reading and writing. *Remedial and Special Education*, *23*(3), 149-156. doi:<http://dx.doi.org/10.1177/07419325020230030301>
- Fink, W. T., & Carnine, D. W. (1975). Control of arithmetic errors using informational feedback and graphing. *Journal of Applied Behavior Analysis*, *8*, 461.
- Fuchs, L. S. (2004). The past, present, and future of curriculum-based measurement research. *School Psychology Review*, *33*, 188–192.
- Gabrielson, S., Gordon, B., & Engelhard, G. J. (1995). The effects of task choice on the quality of writing obtained in a statewide assessment. *Applied Measurement In Education*, *8*(4), 273-290. Doi: 10.1207/s15324818ame0804_1.
- Gansle, K. A., Noell, G. H., VanDerHeyden, A. M., Slider, N. J., Hoffpauir, L. D., & Whitmarsh, E. L. (2004). An examination of the criterion validity and sensitivity to brief intervention of alternate curriculum-based measures of writing skill. *Psychology in the Schools*, *41*, 291-300.
- Graham, S., Harris, K. R., & Hebert, M. (2011). *Informing writing: The benefits of formative assessment*. A Carnegie Corporation Time to Act report. Washington, DC: Alliance for Excellent Education.
- Graham, S., McKeown, D., Kiuahara, S., & Harris, K. R. (2012). A meta-analysis of

writing instruction for students in the elementary grades. *Journal of Educational Psychology*, 104(4), 879.

- Graham, S., Harris, K. R., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology*, 30, 207–241.
- Guess, D., Benson, H. A., & Siegel-Causey, E. (1985). Concepts and issues related to choice-making and autonomy among persons with severe disabilities. *Journal of the Association for Persons with Severe Handicaps*.
- Harris, K. R., Graham, S., Reid, R., McElroy, K., & Stern Hamby, R. (1994). Self-monitoring of attention versus self-monitoring of performance: Replication and cross-task comparison studies. *Learning Disability Quarterly*, 17(2), 121-139.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81-112.
- Hier, B. O., & Eckert, T. L. (2014). Evaluating elementary-aged students' abilities to generalize and maintain fluency gains of a performance feedback writing intervention. *School Psychology Quarterly*, 29(4), 488-502.
doi:<http://dx.doi.org/10.1037/spq0000040>
- Hooper, S. R., Costa, L. C., McBee, M., Anderson, K. L., Yerby, D. C., Childress, A., & Knuth, S. B. (2013). A written language intervention for at-risk second grade students: A randomized controlled trial of the process assessment of the learner

- lesson plans in a tier 2 response-to-intervention (RtI) model. *Annals of Dyslexia*, 63(1), 44-64. doi:<http://dx.doi.org/10.1007/s11881-011-0056-y>
- Hosp, M. K., Hosp, J. L., & Howell, K. W. (2007). *The ABCs of CBM: A practical guide to curriculum-based measurement*. New York, NY: Guilford Press.
- Houghton, J., Bronicki, G. J., & Guess, D. (1987). Opportunities to express preferences and make choices among students with severe disabilities in classroom settings. *Journal of the Association of Persons with Severe Handicaps*, 12, 18-27.
- Howell, K. W., & Nolet, V. (2000). *Curriculum-based evaluation: Teaching and decision making*. Wadsworth Publishing.
- Jewell, J., & Malecki, C. K. (2005). The utility of CBM written language indices: An investigation of production-dependent, production-independent, and accurate production scores. *School Psychology Review*, 34, 27-44.
- Jolivet, K., Wehby, J. H., Canale, J., & Massey, N. G. (2001). Effects of choice-making 56 opportunities on the behavior of students with emotional and behavioral disorders. *Behavioral Disorders*, 26, 131-145.
- Keller-Margulis, M., Mercer, S. H., Payan, A., & McGee, W. (2014). Measuring annual growth using written expression curriculum-based measurement: An examination of seasonal and gender differences. *School Psychology Quarterly*, 30(2), 276. doi:<http://dx.doi.org/10.1037/spq0000086>
- Kern, L., Vorndran, C. M., Hilt, A., Ringdahl, J. E., Adelman, B. E., & Dunlap, G. (1998). Choice as an intervention to improve behavior: A review of the literature. *Journal of Behavioral Education*, 8, 151-170.

- Kern, L., Bambara, L., & Fogt, J. (2002). Class-wide curricular modification to improve the behavior of students with emotional or behavioral disorders. *Behavioral Disorders, 27*, 317-326.
- Kern, L., Mantegna, M. E., Vorndran, C. M., Bailin, D., & Hilt, A. (2001). Choice of task sequence to reduce problem behaviors. *Journal of Positive Behavior Interventions, 3*, 3- 10.
- Kern, L., & Clemens, N. H. (2007). Antecedent strategies to promote appropriate classroom behavior. *Psychology in the Schools, 44*(1), 65.
- Kern, L., & State, T. (2009). Incorporating choice and preferred activities into classwide instruction. *Beyond Behavior, 18*(2), 3-11.
- Kluger, A. N., & DeNisi, A (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin, 119*(2), 254-284.
- Lancioni, G., O'Reilly, M. F., & Emerson, E. (1996). A review of choice research with people with severe and profound developmental disabilities. *Research in Developmental Disabilities, 17*, 391-411.
- Maggs, A., & Morgan, G. (1986). Effects of feedback on the academic engaged time of behaviour disordered learners. *Educational Psychology, 6*(4), 335-351.
- McCurdy, M., Skinner, C., Watson, S., & Shriver, M. (2008). Examining the effects of a comprehensive writing program on the writing performance of middle school students with learning disabilities in written expression. *School Psychology Quarterly, 23*(4), 571-586. doi:<http://dx.doi.org/10.1037/1045-3830.23.4.571>

- McMaster, K. L., & Espin, C. A. (2007). Technical features of curriculum-based measurement in writing: A literature review. *The Journal of Special Education, 41*(2), 68-84.
- McNeir, L. M., & Schuldt, W. J. (1989). Effects of achievement standards, choice, sex, and educational level on mathematical performance. *Psychology in the Schools, 26*.
- Mirkin, P. K., Deno, S. L., Fuchs, S. L., Wesson, C., Tidal, G., Marston, D., et al. (1981). Procedures to develop and monitor progress on IEP goals. Minneapolis, University of Minnesota, Institute for Research on Learning Disabilities.
- Morgan, P. L. (2006). Increasing task engagement using preference or choice-making: Some behavioral and methodological factors affecting their efficacy as classroom interventions. *Remedial and Special Education, 27*(3), 176-187.
- National Center for Educational Statistics. (2007). *National Assessment of Educational Progress (NAEP), 2002 and 2006 Writing Assessments*. Washington: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Noell G. H, Duhon G. J, Gatti S. L, Connell J. E. (2002). Consultation, follow-up, and implementation of behavior management interventions in general education. *School Psychology Review, 31*, 217–234.
- Onodera, K., & Noro, F. (2007). Facilitation of fourth grade students' quiet behavior during greetings at the beginning and end of classes: Performance feedback by line graphs. *Japanese Journal of Behavior Analysis, 22*(1), 31-38.

- Panahon, C. J., Hilt-Panahon, A., & Arbolino, L. (2012, February). *Writing Interventions for students with EBD: Applications in the Classroom*. Poster presented at the meeting of the National Association of School Psychologists, Philadelphia, PA.
- Parker, R. I., & Vannest, K. J. (2009). An improved effect size for single case research: Nonoverlap of all pairs (NAP). *Behavior Therapy, 40*, 357–367.
- Powell, S., & Nelson, B. (1997). Effects of choosing academic assignments on a student with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis, 30*, 181- 183.
- Powell-Smith, K. A., & Shinn, M. R. (2004). *Administration and scoring of written expression curriculum-based measurement for use in general outcome measurement*. Eden Prairie, MN: Edformation.
- Robinson, L. K., & Howell, K. W. (2008). *Best practices in curriculum-based evaluation & written expression*. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology V* (pp. 439-452). Bethesda, MD: National Association of School Psychologists.
- Romaniuk, C., Miltenberger, R. G., Conyers, C., Jenner, N., Jurgens, M., & Ringenberg, C. (2002). The influence of activity choice on problem behaviors maintained by escape versus attention. *Journal of Applied Behavior Analysis, 35*, 349-362.
- Romaniuk, C., & Miltenberger, R. G. (2001). The influence of preference and choice of activity on problem behavior. *Journal of Behavior Intervention, 3*, 152-165.
- Salahu-Din, D., Persky, H., & Miller, J. (2008). *The nation's report card: Writing*

- 2007 (NCES 2008 – 468). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.
- Salzburg, B. H., Wheeler, A. J., Devar, L., & Hopkins, B. L. (1971). The effect of intermittent feedback and intermittent contingent access to play on printing of kindergarten children. *Journal of Applied Behavior Analysis, 4*, 163-171.
- Schunk, D. H., & Lilly, M. W. (1984). Sex differences in self-efficacy and attributions: Influence of performance feedback. *Journal of Early Adolescence, 4*(3), 203-213.
- Scruggs, T.E., Mastropieri, M.A., & Castro, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remediate and Special Education, 8* 24-33.
- Scruggs, T.E., Mastropieri, M.A., Cook, S.B., & Escobar C. (1986). Early intervention for children with conduct disorders: A quantitative synthesis of single-subject research. *Behavioral Disorders, 11*, 260-271.
- Shapiro, E. S. (2011). *Academic skill problems: Direct assessment and intervention*. New York: Guilford.
- Shinn, M. (2007). Identifying students at risk, monitoring performance, and determining eligibility within response to intervention: Research on educational need and benefit from academic intervention. *School Psychology Review, 36*(4), 601-617.
- Shinn, M. R., & Shinn, M. M. (2004). *Administering and scoring of reading curriculum-based measurement for use in general outcomes measurement*. Retrieved from <http://www.aimsweb.com>.
- Shogren, K. A., Faggella-Luby, M. N., Bae, S. J., & Wehmeyer, M. L. (2004). The effect

of choice-making as an intervention for problem behavior: A meta-analysis.

Journal of Positive Behavior Interventions, 6, 228-237.

Stenhoff, D. M., Davey, B. J., & Lignugaris/Kraft, B. (2008). The effects of choice on assignment completion and percent correct by a high school student with a learning disability. *Education & Treatment of Children*, 31, 203-211.

Steinman, S. J., Panahon, C. J., Hilt-Panahon, A., & Shea, D. (2014). *Using choice to improve the writing of students receiving ESYS*. Poster presented at the meeting of the National Association of School Psychologist, Washington D.C.

Steinman, S. J., Panahon, C. J., Hilt-Panahon, A., & Arbolino, L. (2015).

Investigating gender differences in writing studies using choice. Poster presented at the meeting of the National Association of School Psychologist, Orlando, Florida.

Steinman, S. J., Schreiber, C., Panahon, C. J., & Hilt-Panahon, A. (2015-2016). *Using choice as a writing intervention to investigate gender differences*. (Preliminary presented at the National Association of School Psychologist, New Orleans, Louisiana).

Strang, H. R., Lawrence, E. C., & Fowler, P. C. (1978). Effects of assigned goal level and knowledge of results on arithmetic computation: A laboratory study. *Journal of Applied Psychology*, 63(4), 446.

Tadatada, A. (2011). Growth rates of curriculum-based measurement-written expression at the elementary school level. Unpublished master's thesis, Western Kentucky University, Bowling Green.

- Thorndike, E. L. (1931). *Human learning*. Cambridge: The M.I.T. Press.
- Thorndike, E. L. (1933). A proof of the law of effect. *Science*, *77*, 173-175.
- Truckenmiller, A. J., Eckert, T. L., Coddling, R. S., & Petscher, Y. (2014). Evaluating the impact of feedback on elementary aged students' fluency growth in written expression: A randomized controlled trial. *Journal of School Psychology*, *52*(6), 531-548. doi:<http://dx.doi.org/10.1016/j.jsp.2014.09.001>
- Van Houten, R., Hill, S., and Parsons, M. (1975). An analysis of a performance feedback system: The effects of timing and feedback, public posting, and praise upon academic performance and peer interaction. *Journal of Applied Behavior Analysis*, *8*, 449-457.
- Van Houten, R. (1979). The performance feedback system: Generalization of effects across time. *Child Behavior Therapy*, *1*(3), 219-236.
- Van Houten, R., Morrison, E., Jarvis, R., & McDonald, M. (1974). The effects of explicit timing and feedback on compositional response rate in elementary school children. *Journal of Applied Behavior Analysis*, *7*, 547-555.
- Van Houten, R., and Van Houten, J. (1977). The performance feedback system in the special education classroom: An analysis of public posting and peer comments. *Behavior Therapy*, *8*, 366-376.
- Willis, J. (1974). Effects of systematic feedback and self charting on a remedial tutorial program in reading. *Journal of Experimental Education*, *42*, 83-85.

Appendices

Appendix A: Parental Consent Form

Appendix B: Child Assent Form

Appendix C: Session Protocols and Materials

Appendix D: Table 1. Writing Performance: Means and Standard Deviations: Students 1-3 and 7 (Control).

Appendix E: Table 2. Writing Performance: Means and Standard Deviations: Students 4-6 and 8 (Control).

Appendix F: Table 3. Writing Performance: Percentage of Nonoverlapping Data (PND) for Students 1-3 and 7 (Control).

Appendix G: Table 4. Writing Performance: Percentage of Nonoverlapping Data (PND) for Students 4-6 and 8 (Control).

Appendix H: Figure 1. Writing Progress: TWW Multiple Baseline Design Graph (Students, 1, 2, and 3).

Appendix I: Figure 2. Writing Progress: TWW Multiple Baseline Design Graph (Students, 4, 5, and 6).

Appendix J: Figure 3. Performance Feedback Plus Choice and TWW for Student 7.

Appendix K: Figure 4. Performance Feedback Plus Choice and TWW for Student 8.

Appendix A

Parental Consent Form

February 2017

Dear Parent or Guardian:

My name is Samantha Steinman and I am currently an employee of Mankato Area Public Schools as well as a doctoral candidate in the School Psychology Program at Minnesota State University, Mankato. I am inviting your child to participate in a research project being conducted in your child's classroom. Your child has been chosen by school staff members because they believe the student may benefit from this project. Participation in this project is voluntary and you may choose to have your child participate or not. Below is a description of what the project is about.

I am interested in learning how providing a student with performance feedback and choice of topics to write about affects academic productivity in the area of writing. One of the research assistants or I will work with your child during their writing time for approximately 5-7 minutes three times per week for approximately 12 weeks. The work presented to your child will be appropriate for his or her skill level. Your child will be asked to write a story about a different topic each time. Each session, your child will be provided at least one topic to write about. For some sessions, your child may be able to choose between two topics to write about for that day and/or will receive feedback on their past performance. All information collected about your child will be kept confidential; this means that only the trained researchers conducting this study will have access to your name and your child's name.

Potential Risks to Your Child

The potential risks of participating in this project are minimal and may involve your child becoming frustrated when he/she does not want to write about the selected topic. In order to minimize this risk, the writing sessions have been designed to be brief and appropriate for his or her grade level.

Benefits to Your Child

Evaluating the effects of providing performance feedback and choices on students' writing skills can inform us of potential ways to improve performance on schoolwork, specifically in the area of writing. Participants may benefit by improving his or her writing skills through repeated practice. Additionally, by conducting this research we are taking steps to better understand the effects of writing fluency interventions that may lead to effective options that can improve students' overall academic productivity.

If at any time you or your child no longer wishes to participate, you have the right to withdraw from the project at any time without hurting your relationship with Minnesota

State University, Mankato. Thank you for considering my request, and best wishes to you and your child. If after reading the description you have any questions about this study or what is expected of your child, please feel free to contact me at 507.276.7277 or sstein1@isd77.k12.mn.us or Dr. Chip Panahon at 507.389.2815 or carlos.panahon@mnsu.edu. If at any time you have questions about your rights as a participant, please contact the Institutional Review Board Administrator, Dr. Barry Ries, at 507.389.1242

If you want your child to participate in our study, please complete the section below and return the signed copy in the addressed envelope provided. Enclosed is a copy of this letter for you to keep.

If you have any questions or would like anything clarified, please contact me before returning this letter. Your initials at the bottom of the previous page and signature on this page indicate that you have read and understand the information above, that you willingly agree to participate, that you may withdraw at any time and discontinue participation without penalty, that you will receive a copy of this form. Thank you very much for your consideration.

I have read and understand the above information. I hereby give permission for my child, _____ to participate in the research project evaluating effects of performance feedback and choice on academic productivity conducted by Samantha Steinman, M.S.

Name of Parent/Guardian

Signature of Parent/Guardian

Date

___ copy provided to parent/guardian

MSU IRBnet ID#: 948551

Date of MSU IRB approval: 9/21/16

Appendix B

Child Assent Form

In order for children to participate in this project, each student must provide oral assent to participate prior to the start of the first session. Therefore, each student must orally indicate that he/she is willing to participate in the project before you can begin working with the student. Please read the following script to the child and document whether the student assent has been obtained.

Directions:

1. Say the following to the child,

“I am interested in learning more about writing and would like you to help me. I would like you to write a story three times each week. Your parent(s) have said that it is okay that I work with you. I want to make sure that it is okay with you. It is totally up to you if you want to do this. Even if you want to do this, you could tell me to stop whenever you would like if you get upset.

If you would like to do this, then you will be helping me out with a research project I am conducting with other students. You and the rest of the students will be asked to spend 5 minutes writing a different story each time we work together. The decision you make will not affect your grades in any of your classes.

If you want to rest, or stop completely, you could just tell me or your teacher, you will not get into any trouble. In fact, if you don't want to work with me at all, you don't have to. Also, if you have any questions about what you'll be doing, or if you can't decide whether to do it or not, just ask me, your teacher, or your parents and we'll try to answer them.

If you would like to help me, please say yes. Your parents have already told me that it is ok with them if you would like to do this. Do you have any questions for me, your teacher, or parents? You may ask us at any time.

Would it be okay if we worked together in the area of writing?”

2. Please circle the child's response to the question:

Yes **No** **I don't know** **No response**

3. Please provide the following information:

Child's Name: _____

Date: _____

Appendix C

Session Protocols and Materials

Writing Packet Curriculum-Based Measurement in Written Expression Probe

Name:

The best thing that ever happened to me was ...



Procedural Script for Baseline Condition

Student: _____ Date: _____ Session #: _____

Experimenter 1: _____ Experimenter 2: _____

Integrity: Y N Reliability: Y N

Protocol for **BASELINE** Condition*(Please check [X] each box as you complete each step)*

- Researcher distributes the copy of the probe to the student.
- Say *“Please place your name on the sheet of paper in front of you (the unlined side).”*
- Say to the student, *“I want you to write a story. I am going to read a sentence to you first, and then I want you to write a short story about what happens. You will have 1 minute to think about the story you will write and then have 3 minutes to write it. Do your best work. If you don’t know how to spell a word, you should guess. Are there any questions?”*
- “For the next minute think about ... [The best thing that ever happened to me was...]*
- Start the stopwatch
- At the end of 1 minute, say: *“Okay, stop thinking, turn to the next page of your packet, and start writing”*.
- While the student is writing, the experimenter sits quietly across from student. If the student stops writing before the 3-minute timing period has ended, the researcher encourages them to continue writing.
- After 3 additional minutes have expired, say *“Stop writing, please put your pencil down.”* Do not provide any reinforcement or additional prompting.
- Collect writing probe from the student.

Completed ___ out of 9 steps

Writing Packet for Choice Condition

Option 1

Name:

The best thing that ever happened to me was ...



Writing Packet for Choice Condition

Option 2

Name:

I opened the front door very carefully and . . .



Procedural Script for Choice Condition

Student: _____ Date: _____ Session #: _____
 Experimenter 1: _____ Experimenter 2: _____
 Integrity: Y N Reliability: Y N

Protocol for **CHOICE** Condition


(Please check [X] each box as you complete each step)

- Researcher distributes copies of 2 writing probes face down to the student.
- Say *“I want you to write a story. Today you will have a choice of which story you want to write. I am going to read two sentences to you first, and then I want you to choose which story you want to write about.”*
- Turn one packet over and say, “Look at this paper (pointing to the corresponding copy). The sentence says [The best thing that ever happened to me was...]. Give student about 5 seconds to think about the story starter. Turn the other packet over, and say, “Now look at this paper (pointing to the other copy). The sentence says... [I opened the front door very carefully and ...]. Give students 5 seconds to think about the second story.*
- Say to student, “Please choose which story you would like to write today.”*
- After the student has chosen a story say “Please place your name on the sheet of paper in front of you (the unlined side).”*
- Now say, “It is time to write the story. I am going to read the choice again, and then I want you to write a short story about what happens in the story you chose. You will have 1 minute to think about the story you will write and then have 3 minutes to write it. Do your best work. If you don’t know how to spell a word, you should guess. Are there any questions?”*
- “For the next minute think about [The best thing that ever happened to me was...] or [I opened the front door very carefully and ...]*
- Start the stopwatch
- At the end of 1 minute, say: “Okay, stop thinking, turn to the next page of your packet, and start writing”.*



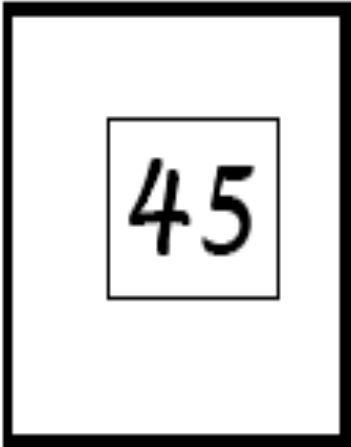
- ❑ While the student is writing, the experimenter sits quietly across from student. If the student stops writing before the 3-minute timing period has ended, the researcher encourages them to continue writing.
- ❑ After 3 additional minutes have expired, say, “*Stop writing, please put your pencil down.*” Do not provide any reinforcement or additional prompting.
- ❑ Collect writing probe from the student.

Completed ___ out of 12 steps

Writing Packet for Performance Feedback Condition



Here is how you are doing in your writing:



Name:


The best thing that ever happened to me was ...





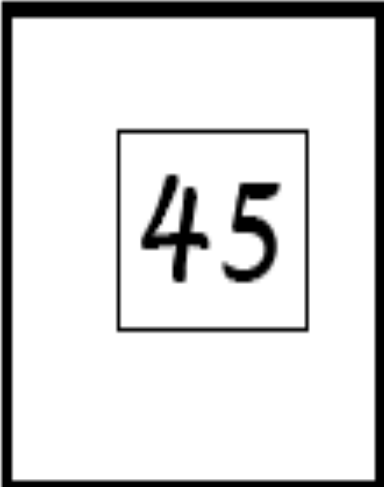
- After 3 additional minutes have expired, say, “*Stop writing, please put your pencil down.*” Do not provide any reinforcement or additional prompting.
- Collect writing probe from the student.

Completed ___ out of 11 steps

Writing Packet for Performance Feedback Plus Choice Condition



Here is how you are doing in your writing:



Option 1

Name:

The best thing that ever happened to me was ...



Option 2

Name:

I opened the front door very carefully and . . .



Procedural Script for Performance Feedback Plus Choice Condition

Student: _____ Date: _____ Session #: _____
 Experimenter 1: _____ Experimenter 2: _____
 Integrity: Y N Reliability: Y N

Protocol for **PERFORMANCE FEEDBACK PLUS CHOICE** Condition

(Please check [X] each box as you complete each step)

- Researcher distributes a one-page sheet to the student indicating their performance.
- Say *"In the box on the left you will see a number. The number tells you how many words you wrote in your story the last time. Next to the box you will see an arrow. If the arrow is pointing up that means you wrote more words in your story since the last time. If the arrow is pointing down that means you wrote fewer words in your story since the last time. If there is an equal sign that means that you wrote the same number of words in your story since the last time."*
- Then, the researcher distributes copies of 2 writing probes face down to the student.
- Say *"I want you to write a story. Today you will have a choice of which story you want to write. I am going to read two sentences to you first, and then I want you to choose which story you want to write about."*
- Turn one packet over and say, *"Look at this paper (pointing to the corresponding copy). The sentence says [The best thing that ever happened to me was...].* Give student about 5 seconds to think about the story starter. Turn the other packet over, and say, *"Now look at this paper (pointing to the other copy). The sentence says [I opened the front door very carefully and...].* Give students 5 seconds to think about the second story.
- Say to student, *"Please choose which story you would like to write today."*
- After the student has chosen a story say *"Please place your name on the sheet of paper in front of you (the unlined side)."*
- Now say, *"It is time to write the story. I am going to read the choice again, and then I want you to write a short story about what happens in the story you chose. You will have 1 minute to think about the story you will write and then have 3*

minutes to write it. Do your best work. If you don't know how to spell a word, you should guess. Are there any questions?"

- ❑ *"For the next minute think about [The best thing that ever happened to me was...] or [I opened the front door very carefully and...]."*
- ❑ Start the stopwatch
- ❑ At the end of 1 minute, say: *"Okay, stop thinking, turn to the next page of your packet, and start writing"*.
- ❑ While the student is writing, the experimenter sits quietly across from student. If the student stops writing before the 3-minute timing period has ended, the researcher encourages them to continue writing.
- ❑ After 3 additional minutes have expired, say, *"Stop writing, please put your pencil down."* Do not provide any reinforcement or additional prompting.
- ❑ Collect writing probe from the student.

Completed ___ out of 14 steps

Appendix D

Table 1

Writing Performance: Means and Standard Deviations: Students 1-3 and 7

	Student 1 <i>M (SD)</i>	Student 2 <i>M (SD)</i>	Student 3 <i>M (SD)</i>	Student 7 <i>M (SD)</i>
Baseline	11.00 (2.58)	19.00 (3.96)	29.60 (5.70)	46.07 (5.78)
Performance Feedback	34.25 (8.42)	31.00 (3.56)	50.67 (9.29)	N/A
Choice	38.33 (6.43)	32.33 (3.51)	56.67 (6.51)	N/A
Performance Feedback + Choice Phase 1	43.50 (3.87)	35.75 (2.63)	64.25 (5.25)	64.17 (3.25)
Performance Feedback + Choice Phase 2	43.75 (4.11)	36.00 (3.00)	N/A	N/A

Appendix E

Table 2

Writing Performance: Means and Standard Deviations: Students 4-6 and 8

	Student 4 <i>M (SD)</i>	Student 5 <i>M (SD)</i>	Student 6 <i>M (SD)</i>	Student 8 <i>M (SD)</i>
Baseline	7.00(0.82)	21.86 (4.91)	32.00 (3.89)	42.06 (6.18)
Performance Feedback	20.67 (0.58)	30.00 (5.29)	51.50 (3.87)	N/A
Choice	16.75 (2.36)	28.40 (6.84)	42.50 (6.61)	N/A
Performance Feedback + Choice Phase 1	23.75 (1.71)	30.25 (5.91)	54.75 (3.30)	62.17 (2.71)
Performance Feedback + Choice Phase 2	24.00 (2.94)	34.67 (4.51)	N/A	N/A

Appendix F

Table 3

Writing Performance: Percentage of Nonoverlapping Data (PND) for Students 1-3 and 7

	Student 1 <i>M (SD)</i>	Student 2 <i>M (SD)</i>	Student 3 <i>M (SD)</i>	Student 7 <i>M (SD)</i>
Baseline vs. Performance Feedback	100%	100%	100%	N/A
Baseline vs. Choice	100%	100%	67%	N/A
Baseline vs. Performance Feedback + Choice	100%	100%	100%	100%

Appendix G

Table 4

Writing Performance: Percentage of Nonoverlapping Data (PND) for Students 4-6 and 8

	Student 4 <i>M (SD)</i>	Student 5 <i>M (SD)</i>	Student 6 <i>M (SD)</i>	Student 8 <i>M (SD)</i>
Baseline vs. Performance Feedback	100%	75%	100%	N/A
Baseline vs. Choice	100%	40%	75%	N/A
Baseline vs. Performance Feedback + Choice	100%	86%	100%	100%

Appendix H

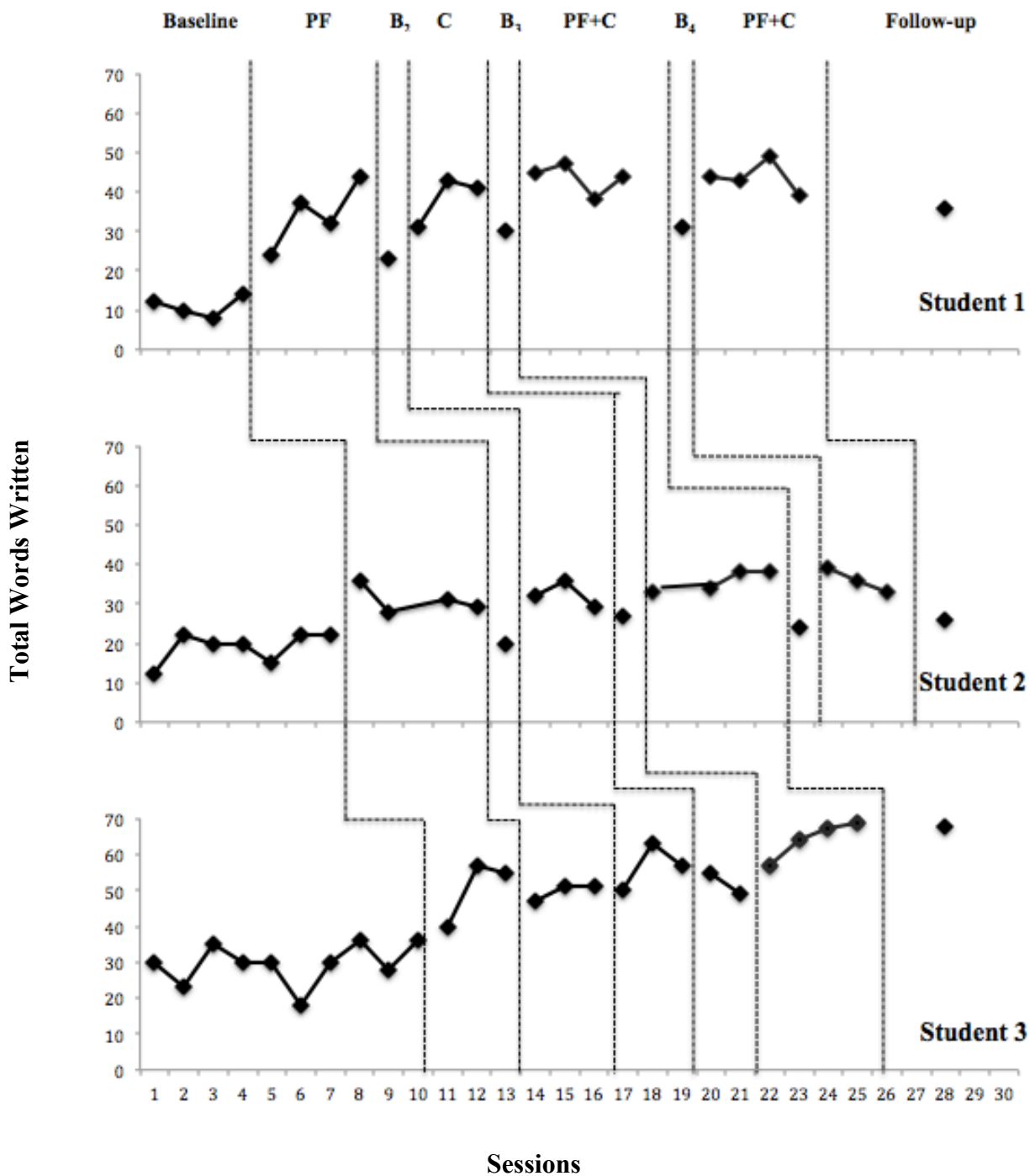


Figure 1. TWW Multiple Baseline Graph (Students 1, 2, and 3).

Note. B = Withdrawal Probe, PF = Performance Feedback, C = Choice, and PF+C = Combined Condition.

Appendix I

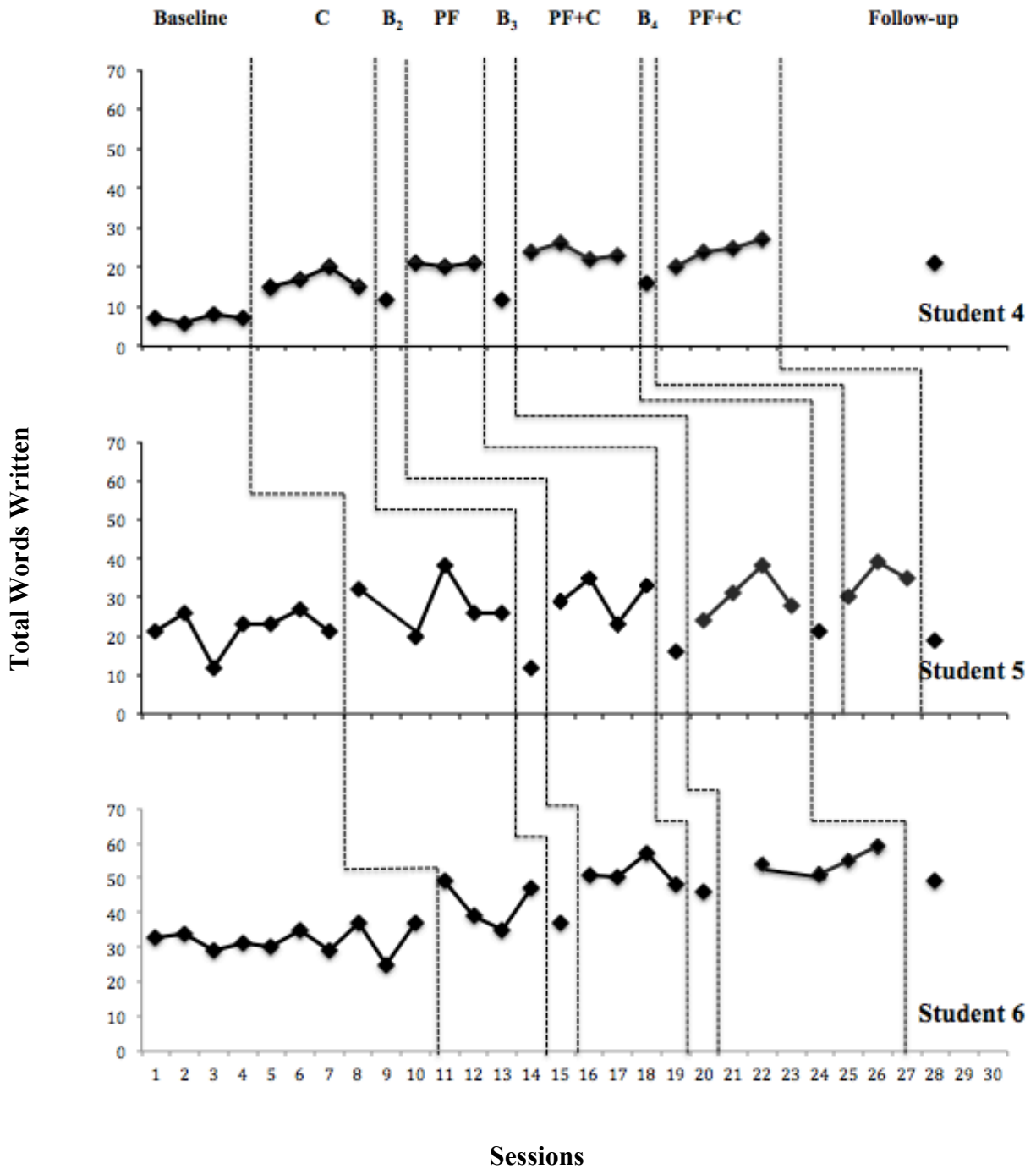


Figure 2. TWW Multiple Baseline Graph (Students 4, 5, and 6).
 Note. B = Withdrawal Probe, PF = Performance Feedback, C = Choice, and PF+C = Combined Condition.

Appendix J

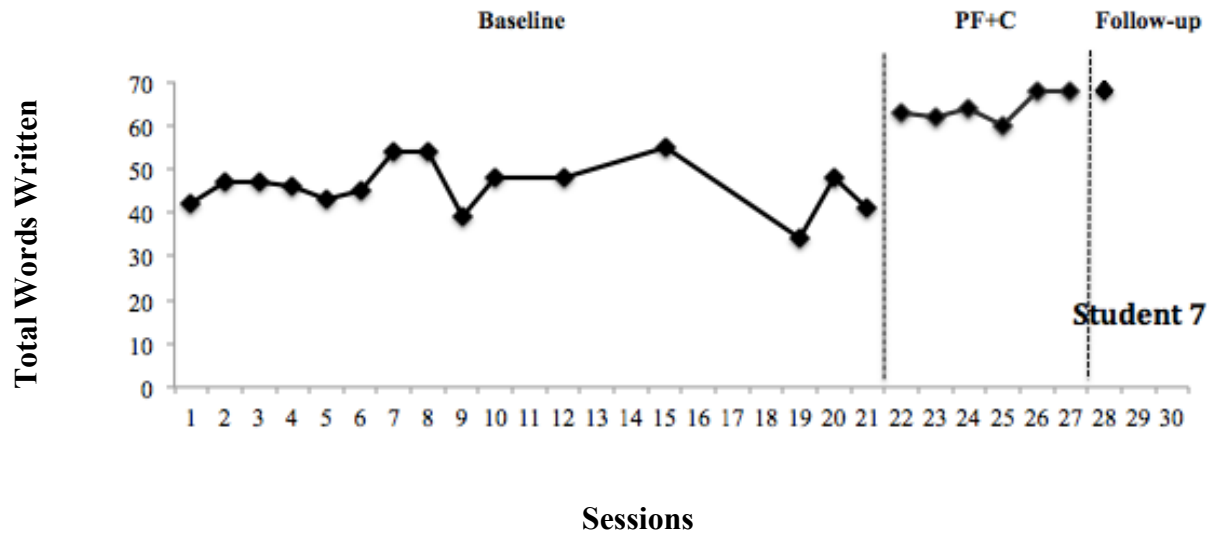


Figure 3. Performance Feedback Plus Choice and TWW for Student 7.
Note. PF+C = Combined Condition.

Appendix K

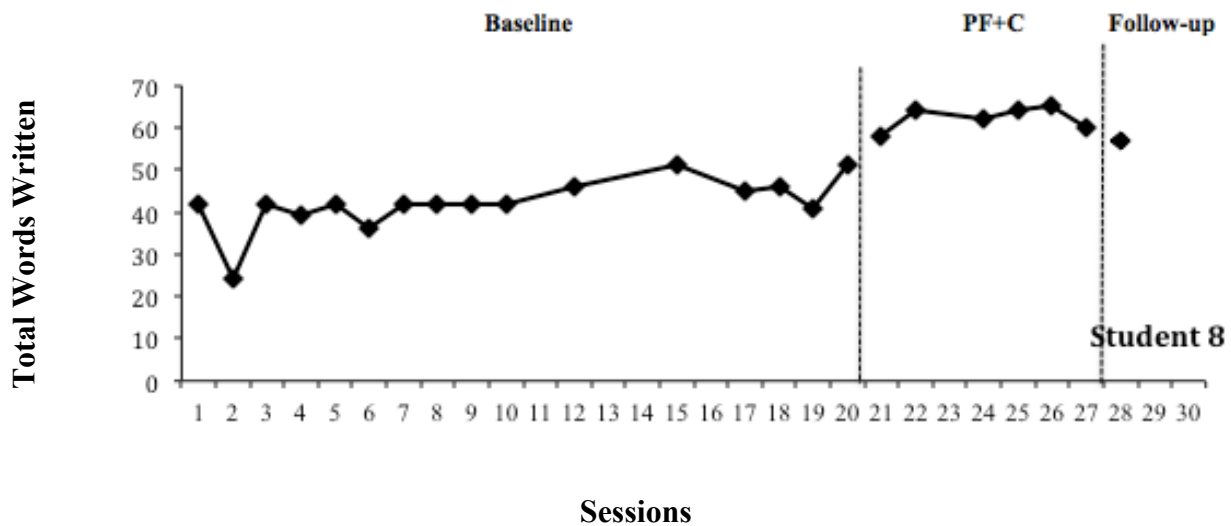


Figure 4. Performance Feedback Plus Choice and TWW for Student 8.
Note. PF+C = Combined Condition.