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Cover, Copy, Compare and Performance Feedback: An Integrative Writing Intervention

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Abstract

A large proportion of students in the United States are performing below the proficient level in writing (National Center for Education Statistics, 2012) and a key component in enhancing writing quality is proficient spelling skills (Berninger, 1999). Unfortunately, explicit and developmentally-appropriate spelling instruction is neglected in elementary school classrooms. The goal of the present study was to evaluate the combination of two empirically-based interventions on third-grade students' spelling and writing performance. A total of 54 third-grade students were randomly assigned to either (a) Cover, Copy, Compare + performance feedback condition, or (b) performance feedback only condition. Results of the study indicated that students in both conditions demonstrated similar improvements in their spelling and writing performance on the post-intervention writing probe after controlling for their pre-intervention performance. However, there were no statistically significant differences in students' performance between the two conditions. In the context of a spelling test, statistically significant differences were observed between conditions, with students assigned to the Cover, Copy, Compare + performance feedback condition demonstrating greater spelling accuracy; however, this effect was moderated by students' pre-intervention performance. Implications for developing integrative writing interventions that target writing and spelling are discussed

Keywords: spelling, written expression, Cover, Copy, Compare, performance feedback

COVER, COPY, COMPARE AND PERFORMANCE FEEDBACK: AN INTEGRATIVE WRITING INTERVENTION

by

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Cover, Copy, Compare and Performance Feedback: An Integrative Writing Intervention

Writing and spelling are two important academic skills that are closely related. In order for a writing composition to be considered exceptional, the document must be free of spelling errors. Frequent misspelled words interrupt the flow of the document, and creates confusion and frustration in the reader. Due to the importance of strong writing skills in higher education settings and the workplace, it is important that lower-level skills (e.g., spelling) are explicitly taught to early elementary school students. Unfortunately, spelling instruction is limited in classrooms across the country, and a call for an efficient and effective spelling intervention is warranted (Fresch, 2003). Because spelling is considered a key lower-level skill in the area of writing (Berninger, 1999), an integrated writing and spelling intervention for elementary school students would be the most advantageous. The current study aims to explore the combination of these two academic areas, and the effectiveness of an integrative writing and spelling intervention on student writing quality and spelling accuracy.

The Importance of Writing

Strong writing skills are an important foundation for academic success as well as overall functioning in society. The seemingly basic skill of writing is necessary for communication, learning, and self-expression. Writing utilizes a number of complex strategies, such as planning, evaluating, and revising, all of which are key components in advanced coursework, including post-secondary education. However, college instructors estimate that half of high school graduates are not adequately prepared for college-level writing expectations (Achieve Inc., 2005). In addition, ACT (2005) reported that one-third of high school graduates are not prepared for college-level English courses. Similarly, strong writing skills are also essential in the work

place. The strong presence of technology in the workforce requires employees to communicate in a quick and concise manner, through email or text messaging. In the Silicon Valley region, employers were surveyed about the quality of written language of recent hires. The employers noted lack of attention to detail, typographical errors, presence of slang, and lack of structure of most concern, with several reporting termination of an employee due to poor writing ability (Stevens, 2005). In 2011, a survey conducted by the Graduate Management Admission Council indicated that 86% of employers in the business profession indicated communication as the most important skill of new applicants (Edgington, 2011).

The groundwork for strong writing skills begins in early elementary education. Unfortunately, the current condition of writing is less than ideal. In 2002, 72% of fourth- grade students did not demonstrate proficiency in their writing abilities (Persky, Daane, & Jin, 2003). Further, as recently as 2011, 73% of eighth- and twelfth-grade students did not demonstrate proficiency in their writing skills (National Center for Education Statistics [NCES], 2012). These findings are consistent with longitudinal educational trends, in which writing has become less of a focus in education. Often referred to as the "neglected R", enrollments in English composition courses have decreased, as high school enrollments in mathematics and science courses have steadily increased (National Commission on Writing, 2003).

Theoretical Conceptualization of Writing

Writing requires students to formulate their own thoughts, organize these thoughts, and create a written work using components of spelling and grammar (Graham & Perin, 2007). Flowers and Hayes (1981) created a theoretical model of the writing process, that identified three major processes: (a) planning (i.e., generation and organization of ideas, and setting goals for the written work), (b) translating (i.e., creating the written work), and (c) reviewing (i.e., evaluating and revising the written work). Recently this model was updated to include working memory,

motivation, and transcription components (Hayes, 2012). However, this model was primarily developed for adult writers.

Abbott and Berninger (1993) addressed the concern of the limited applicability of the Flowers and Hayes model for developing writers. Rather than viewing emerging writers' skills as a "watered-down" version of the Flowers and Hayes model, Abbott and Berninger suggested that developmental considerations, in addition to aspects associated with the translation of writing, to be important considerations. Berninger's Simple View of Writing (2002) conceptualized key lower-level processes for the development of writing in children, including two subcomponents of translation: transcription and text generation. Berninger's Simple View of Writing (2002) includes three components: (a) transcription (i.e., spelling, handwriting), (b) executive functioning (i.e., planning, reviewing, revising), and (c) text generation (i.e., translating ideas into written words). In this theoretical model, lower level processes (i.e., production of letters, rapid coding of orthographic information, fine motor skills), are vital before higher level processes exhibited in the Flowers and Hayes model can be developed (Berninger, Yates, et al., 1992).

Writing Instruction

Due to concerns surrounding students' academic difficulties in the area of writing, a wide variety of instructional practices were developed for teachers. Some of these instructional practices include: (a) teaching basic writing skills (i.e., handwriting, spelling, grammar), (b) teaching writing processes (i.e., planning, revising, and text generation strategies), (c) working with peers (i.e., students share their writing products with classmates), and (d) independent writing activities (i.e., students are given allotted time to practice writing skills) (Graham, Harris, Fink-Chorzempa, & MacArthur, 2003). In addition, one-on-one assistance, performance-

contingent praise, and adaptations for students struggling in the area of writing have also been utilized within the classroom (Graham et al., 2003). Although many of these practices are routinely used by teachers, only three instructional approaches to writing are empirically-based and considered developmentally appropriate for elementary-aged students.

The first instructional approach, strategy instruction, focuses on the key components of writing such as planning, text generation, revising, and editing. Each component is broken down into strategies that students utilize as they are writing. The primary goal of strategy instruction is to transition students from more explicit forms of instruction to independent writing. As a result, strategy instruction involves intensive, one-on-one instruction from the teacher. In a synthesis of writing instructional practices, Graham, McKeown, Kuihara and Harris (2012) reported that strategy instruction resulted in the largest effect (d =1.02) on student writing performance. However, this approach has been mainly implemented with students receiving special education services. Further, this approach requires intensive teacher time and effort and therefore would be difficult to implement in a general classroom setting. Finally, this approach focuses solely on key steps in the writing process, and does not address lower-level processes involved in writing (i.e., spelling). These lower level process skills are more relevant to early elementary students' writing instruction.

Another instructional approach, the process approach to writing, involves students engaging in planning activities, translating, and revising their written work. Additional emphasis is placed on students' ownership of their written work, as well as peer-to-peer collaboration. Although the process approach emphasizes collaboration and creating a positive, supportive learning environment (Graham & Perin, 2007), intensive instructional supports in the classroom (i.e., one-on-one instruction) are required. Unlike strategy instruction, this approach has been

associated with small effects (*d* =.40; Graham, McKeown, Kuihara, & Harris, 2012) in students' writing performance. In addition, this approach requires additional classroom time and resources that may not be feasible in general education classroom settings (i.e., peer-to-peer collaboration, one-on-one instruction). Further, the process approach focuses on the overall written product, rather than lower level skills necessary to create a high-quality writing product, such as spelling.

A third approach, performance feedback, provides students with information regarding their written performance. Specifically, students receive individualized feedback regarding their written composition (i.e., quantitative and graphic indictors; Eckert et al., 2006; Hier & Eckert, 2014). A meta-analysis of more than 196 studies that evaluated the use of performance feedback in the classroom compared to other classroom practices indicated a large effect (average *ES* =.79) on student performance (Hattie & Timperley, 2007).

Performance feedback interventions have been extensively researched in the area of writing, specifically in early elementary education. In one of the first studies, Eckert and colleagues (2006) examined the effectiveness of performance feedback on third grade students' writing fluency. Students were randomly assigned to two groups (i.e., performance feedback or control condition). Each week, both groups were given a story-stem (i.e., "I found a note under my pillow that said…") and had 3 minutes to compose their story. Before writing their story, students in the performance feedback group received individualized feedback on the number of words that they wrote in the previous session. This feedback consisted of the number of words the student wrote the session before, and a graphic indicator (i.e., upward or downward facing arrows) depicting if this number was greater or less than the number of words that the student wrote prior to that. The control group received the same story-stems, but did not receive any performance feedback. Students in both groups participated in eight sessions over the span of

eight weeks. To assess writing quality, students' stories were evaluated by trained researchers for the number of words written, the number of letters written, and the number of words spelled correctly. Results from a one-way analysis of variance (ANOVA) showed that the students in the performance feedback group showed significantly more growth in all three dependent variables compared to the control group.

In another study, Truckenmiller, Eckert, Codding, and Petscher (2014) evaluated the effects of a performance feedback intervention on the writing fluency growth of general education students compared to a practice-only condition and an instructional control condition. This study expanded on previous studies as students' correct writing sequences were also measured in addition to total words written. Correct writing sequences is a metric that is more sensitive to students' writing performance, as it evaluates spelling, grammar, punctuation, and syntax. A total of 133 third-grade students were randomly assigned to one of three conditions (i.e., performance feedback, practice-only, instructional control). The performance feedback and practice-only conditions were given a story-stem and three minutes to compose a story. Students in the performance feedback condition received individualized feedback identical to the procedures described in study by Eckert and colleagues (2006). The students in the practice-only condition did not receive any feedback. Students in the instructional control condition received a similar instructional experience as the performance feedback condition; however, the area in which students received feedback was in another academic skill, mathematics. During the intervention, students in this condition were given computational mathematics problems that spanned two minutes each. Individualized performance feedback on number of digits correct was provided to each student.

The results of a multilevel modeling analysis revealed that the students in the three conditions wrote a similar number of words at baseline. As predicted, the students assigned to the performance feedback condition gained the most words per week (1.25 words). However, the practice-only condition lost an average of 0.40 total words per week, and the instructional control condition gained an average of 0.35 words per week. In regards to correct writing sequences, results showed that the students assigned to the performance feedback condition gained more correct writing sequences per week compared to the instructional control condition (t (591) = 4.22, $p < .001$). However, contrary to one of the main study hypotheses, the practice-only condition did not gain more correct writing sequences than the instructional control condition (t (591) = -1.99, $p = .05$).

Although this type of approach can be implemented class-wide and requires less classroom resources, it has not yet been explored in conjunction with an intervention that targets lower level processes in writing, such as spelling. Previous research has suggested that performance feedback is an effective intervention with typically developing students in the general education classroom in the area of writing (i.e., Eckert et al., 2006; Truckenmiller et al., 2014). It would be advantageous to examine performance feedback in the context of an integrative writing intervention that simultaneously focused on essential lower level writing processes, specifically, spelling.

In conclusion, although three instructional approaches were demonstrated to be effective in improving students' writing performance, none of these approaches explicitly address students' spelling performance. Although Berninger (1999) argues the necessity of spelling skills and the automaticity of those skills in order to devote space in working memory for other complex writing processes, this academic area has been neglected in the classroom. Spelling is a

necessary skill in order to express one's ideas within the context of a writing composition. Without proficient spelling skills, the quality of writing is negatively impacted. As a result, it is also important to consider the theoretical conceptualization of spelling, if effective interventions are developed to improve students' performance in these areas.

Theoretical Conceptualization of Spelling

Until the 1960s, spelling was conceptualized as a skill of rote memorization due the complexities of the English language. However, this conceptualization changes as language researchers began to identify common letter patterns and relationships associated with children's spelling development. In 1971, Read and Henderson created a stage model to explain children's spelling development beginning with the precommunicative stage (i.e., the child uses letters from the alphabet when attempting to spell, but lacks letter-sound knowledge) and ending with the correct stage (i.e., the speller understands basic spelling rules). As the speller proceeds through each stage of the model, an increase in phonological and orthographical awareness occurs.

Building on the idea of spelling as a developmental process that proceeds through stages, Frith (1980) identified three phases of spelling development: the logographic phase (i.e., visual cues), alphabetic phase (i.e., phonological awareness), and the orthographic phase (i.e., integration of phonological and orthographic skills). However, unlike the work by Read and Henderson (1971), Frith (1985) highlighted the interdependence between three processes. That is, alphabetic and phonological skills are acquired in spelling and transfer to reading, through the understanding of letter-sound relationships. As children learn how to read, orthographic rules are recognized through text and used when spelling more complex words (Frith, 1985). Overall, these theoretical conceptualizations view spelling as a developmental process that incorporates alphabetical, phonological, and orthographic skills and strategies.

Henderson and Templeton (1986) proposed one conceptual model that encompasses the common elements of the previous conceptualizations in addition to emphasizing the developmental nature of spelling acquisition. This model expands on Frith's (1985) model by breaking down stages into specific steps that follow a developmental sequence. In this model, three key principles are associated with developing spelling competence: (a) the alphabetic principle (i.e., letters match sounds, left to right orientation to form words) (b) the within-word pattern (i.e., the sound a letter makes depends on its position) and (c) the meaning principle (i.e., words or parts of words that have similar meaning tend to be spelled the same). The development of these three key principles occurs over the span of five stages. The first stage is the emerging understanding of the form and function of print, as evidenced through free scribbling. The second stage emerges the alphabetic principle, in which emerging spellers become phonetically aware and match sounds to words (e.g., "ladr" for "ladder"). In the third stage, the within-word pattern principle becomes evident, as students transition from spelling letter by letter to sequenced units (e.g., "heik" for "hike", "leter" for "letter"). In the fourth stage, spelling conventions, such as consonant doubling (e.g., "robbin" for "robin"), stress on certain letters, vowel patterns, and prefix assimilation (e.g., "inmobile" versus "immobile") are understood and applied to spelling. Finally, in the fifth stage, refinements of spelling conventions as well as the meaning principle are recognized (e.g., "min" as in minimum, minimal).

Spelling Instruction

Spelling instruction has followed the same traditional sequence for decades. The typical spelling instruction sequence is as follows: (a) introduction to new words, (b) administer pretest, (c) put words into a sentence, (d) address words identified as difficult by the pretest, and (e)

administer final spelling test (Rowell, 1972). Although the developmental approach to spelling has been found to be most effective (e.g. Henderson & Templeton, 1986), teachers predominately utilize the traditional spelling instruction procedures in the classroom. As a result, classroom spelling instruction has been criticized for its inability to account for the wide range of students' spelling abilities (Graham, 1983). In an article addressing effective instructional spelling practices for teachers, Graham (1983) described three principles that should be considered when planning spelling instruction: (a) the program should offer an individualized component, (b) instruction should be planned, monitored, and modified through systematic formative evaluation and (c) student attitudes need to be positive toward spelling instruction.

Despite recommendations for best practices in spelling instruction, studies examining classroom practices suggest that teachers recognize the importance of the developmental approach to spelling, but are not appropriately incorporating key developmental tenants to instruction (i.e., individualized word lists, immediate corrective feedback). In a study that assessed 42 teachers' beliefs and practices regarding spelling instruction, Johnston (2001) reported that elementary school teachers often utilized activities that required students to write words multiple times, alphabetize words, and look up words in the dictionary. A total of 93% of teachers reported using traditional spelling instructional methods in their classroom, and often provided struggling spellers with shorter words. Interestingly, 75% of the teacher respondents reported dissatisfaction with student spelling performance. Fresch (2003) found similar results when surveying 355 teachers in grades 1 to 5 on their beliefs and practices in spelling instruction. Although 55% of respondents did not agree that assigning a common word list was effective, 72% of the teacher respondents adopted this practice in the classroom. The misalignment between beliefs and practices suggest that teachers experience difficulty

incorporating instructional techniques that are consistent with best practices or a developmental approach. Limited research has identified effective interventions for struggling spellers in the general education classroom.

Spelling Interventions

Although a number of spelling instructional strategies were investigated, limited empirical attention has focused on spelling interventions among struggling spellers in general education classrooms. Wansek et al. (2006) conducted a meta-analysis of studies evaluating spelling interventions among children with learning disabilities in grades K to 12. A total of 19 studies were included in the research synthesis, including explicit spelling instructional interventions (n = 9), multiple modality and/or assistive technology approaches (n = 7), and explicit reading intervention (n = 3). Although all interventions were found to have a positive effect on students' spelling performance, explicit spelling instruction was found to be the most beneficial, specifically when students were provided with spelling strategies (ES = 1.76) or word practice coupled with immediate feedback (ES = 1.25). Interventions that utilized multiple modalities and assistive technology were found to have very small effects (ES = .11 to .16), whereas reading interventions were found to have moderate effects (ES = .46 to .59). The results of this meta-analysis demonstrate that spelling interventions utilizing explicit instruction and multiple practice opportunities were effective. However, this meta-analysis only focused on children classified as having a learning disability, and the effects cannot be assumed to generalize to struggling spellers in the general education setting.

Empirical support for explicit spelling interventions for students at-risk for spelling difficulties is limited. Most of the research focuses on implementing reading interventions that contain a spelling component to students in early elementary grades (e.g., Morris, Shaw, &

Perney, 1990; Santa & Hoien, 1999). This is unfortunate, given that research syntheses demonstrate that explicit spelling instruction is more beneficial than explicit reading interventions in improving students' spelling performance (Wansek et al., 2006). To date, a few studies have examined the effectiveness of explicit spelling interventions with students at-risk for spelling difficulties. Explicit spelling interventions that were used with young, at-risk spellers include word boxes and Cover, Copy, Compare.

Word Box Strategy

Word boxes are an instructional strategy used in the area of phonological awareness and spelling. In a word box activity, students are presented with connecting boxes that are created by dividing a rectangle into sections that correspond to the number of sounds in a word. Then, students are to write the letters of the word in the connected boxes as they slowly say each sound. As students progress, the sections of the rectangle turn into dotted lines, and then the lines are faded altogether (Joseph, 1999). Recently, Alber-Morgan et al. (2016) used a multiple baseline design across participants to evaluate the effect of adding word boxes as a supplemental instructional component in improving spelling acquisition, maintenance, and generalization with three African-American first-grade students identified as at-risk for spelling and reading difficulties. The intervention was broken down into five phases, each focusing on a different vowel (i.e., *a, e, i, o, u*). First, the intervention specialist modeled the word box procedure for the student, focusing on sounding out each letter of the word. Then, the student completed the procedure independently with performance feedback provided by the intervention specialist. Next, the teacher modeled how to spell the target word by writing each letter in the correct section of the word box, and prompted the student simultaneously. Finally, the student wrote the letters independently. However, one student had difficulty reaching criterion to move to the next

word set; therefore, he was unable to move to the next phase of the intervention. Maintenance was assessed one week after each assessment phase, and at the end of the study. The two students that were assessed both spelled 77% of words correctly on the last maintenance session at the conclusion of the study.

Although positive effects were observed after the intervention, a few limitations should be noted when interpreting the results. Without further replication, the results of this study can only be generalized to first-grade students at-risk for spelling and reading difficulties. Furthermore, the small sample size allowed for the intervention to be individually administered, with an intervention specialist instructing each student. As a result, the intervention was highly resource intensive and unfeasible to administer in a classroom without additional instructional support. In addition, the criterion for acquisition was predetermined, and it may have been set too high given that one student was unable to reach mastery to continue with the intervention.

In another study evaluating the effects of a word box intervention on spelling performance and phonemic awareness, Joseph (1999) compared the effectiveness of word box instruction to another instructional component, word sort, and a traditional spelling approach with 42 first- grade students. Unlike the study by Alber-Morgan et al. (2016), Joseph examined the effectiveness of a word box intervention within the context of a randomized control trial. Students were randomly assigned to one of the three instructional conditions, and were provided with 20 minutes of spelling instruction each day. In the word box condition, the instructor demonstrated all three stages associated with the procedure (i.e., placing chips below letters, articulating sounds, writing letters). In the word sort condition, the instructor taught students to place words into categories based on phonological similarities, and the traditional approach contained no explicit spelling instruction; however, students completed workbook exercises

related to specific phonograms. After 12 weeks, students' spelling performance was measured by a spelling test containing 20 words that were randomly selected from the intervention.

Results of a MANOVA analysis indicated that students assigned to the word sorting condition demonstrated significantly higher performance in the area of spelling compared to the control condition ($p < .01$); however, students assigned to the word box condition did not differ in their spelling performance when compared to the students assigned to the word sort condition. Interestingly, students assigned to the word box condition also did not differ from students assigned to the control condition in the area of spelling performance. However, students assigned to the word box condition were found to demonstrate higher accuracy rates in phonemic blending ($p < .01$), phonemic segmentation ($p < .001$), pseudo-word naming ($p < .05$) and word identification ($p < .05$) compared to students assigned to the control condition. Although spelling performance did not significantly differ between the instructional conditions, only students assigned to the word sort condition was found to have significant spelling improvement compared to students assigned to the control condition.

In summary, the empirical support for the word box intervention for spelling improvement is unclear. Alber-Morgan and colleagues (2016) demonstrated spelling improvements for two of the three participants, and Joseph (1999) demonstrated that the word box intervention was more effective in improving students' phonemic skills, rather than spelling skills. In addition, Joseph (1999) did not observe differences in students' spelling performance when compared to students who received a word sort intervention. Further, given the small number the studies focusing on the word box intervention and the exclusive use of students in first-grade, there is no evidence to suggest the intervention would be effective students in higher grades. In the early elementary grades, students are typically in the alphabetic stage of spelling

development, where appropriate instruction focuses on phonemic awareness. However, as students enter third grade, they are typically moving on to within word patterns and spelling conventions, where emphasizing phonemic awareness instruction may not be as appropriate (Henderson & Templeton, 1996). Although the word box intervention is an explicit spelling intervention that provides multiple practice opportunities, it is still missing two key instructional components identified by Wansek and colleagues (2006): immediate feedback and self-correction.

Cover, Copy, Compare

An intervention that is able to address each developmental stage in Henderson and Templeton's model of spelling development is important to explore, as it has the potential to be a versatile tool in a classroom of students at different ability levels. Cover, Copy, Compare is a self-managed intervention for improving accuracy, fluency, and maintenance across student ability levels and academic areas (Skinner et al., 1997). The general steps are as follows: (a) view and study the correct response, (b) cover the correct response, (c) write the correct response from memory, (d) uncover the correct response and (e) check to see if the written response matches the correct model of the response. If the response is correct, the student moves on to the next item. If the response is incorrect, the student repeats the procedure (Konrad & Joseph, 2013). Self-monitoring and self-evaluation are key characteristics in Cover, Copy, Compare through the features of immediate feedback and error correction. Immediate error correction (i.e., positive practice overcorrection and repetition) ensures lower probability of practicing incorrect responses (Skinner et al., 1997). Cover, Copy, Compare has been applied to a number of academic subjects, including spelling, math, geography, foreign language, and reading (Joseph et al., 2012; Skinner, McLaughlin, & Logan, 1997).

Joseph et al. (2012) conducted a meta-analysis of the effectiveness of Cover, Copy, Compare by examining 31 studies that used this intervention with elementary and secondary school students with and without disabilities. The meta-analysis focused on the academic areas of math and spelling, and measured outcomes by evaluating the percentage of overlapping data (PND) reported in each study. A total of 17 studies (55%) explicitly focused on improving students' spelling performance, and of those studies, 80% of the students were classified as having a disability.

Results showed that overall, Cover, Copy, Compare had limited effectiveness on students' spelling performance (PND = 67.3%). The strongest effects (PND = 92.3%) were obtained when the intervention was modified to include an additional instructional component (i.e., token economy, goal setting, additional opportunities to respond). However, it is important to note that a majority of studies (79%) included in the meta-analysis were conducted with students with disabilities. As a result, the results of this meta-analysis have limited generalizability to students without disabilities. Limited empirical attention has been allocated to evaluating Cover, Copy, Compare in the general education setting, and no prior studies have been conducted with a modified version of the intervention with students who were not eligible for special education services.

The effectiveness of Cover, Copy, Compare has been explored with general education students who are struggling with spelling. In an alternating treatments design with four second- and third- grade students identified as low achieving in spelling, Erion et al. (2009) compared a baseline spelling condition with two versions of Cover, Copy, Compare. In the first Cover, Copy, Compare version the students were instructed to correct their errors a single time, whereas the second version required students to correct their errors three times. In addition to the two

intervention conditions, a control condition, which mimicked traditional spelling instruction, was also included. During this condition, students were only assessed on target words. Each of the three conditions was presented to the students six times in a counterbalanced order. Intervention spelling words were identified from grade-level spelling tests and were mutually exclusive across conditions. At the conclusion of each condition, students' spelling performance was assessed by measuring the percentage of correct letter sequences on the targeted spelling words, which served as the primary outcome measure.

Visual inspection of the data indicated that both Cover, Copy, Compare conditions resulted in a majority of the students' demonstrating greater percentages of correct letter sequences than the baseline condition. However, there was not a discernible difference observed between the participants' spelling outcomes for either version of the Cover, Copy, Compare intervention. These results suggest that increased copy trials may not be necessary to result in improvements in students' spelling performance.

There are a few limitations associated with the study design. First, although different spelling words were utilized in each condition, it is impossible to rule out carryover effects given the nature of the design. Second, although three of the participants demonstrated spelling gains, one student did not evidence improvement. This suggests that Cover, Copy, Compare was not effective for all students. Therefore, it is important to consider individual differences that may play a role in students' response to the intervention. Additionally, treatment fidelity was only measured prior to implementation of the intervention. As a result, it is impossible to determine if the intervention was carried out with integrity during data collection.

It is important to note that the intervention was implemented individually by research assistants outside of the classroom using an outcome measure (i.e., correct letter sequences) that

is not often used by classroom teachers. As a result, it is impossible to generalize the findings to a general education classroom setting, with the teacher implementing the intervention independently. It would be advantageous to evaluate Cover, Copy, Compare in the general education classroom with outcomes that are more consistent with typical classroom practices (i.e., whole-word spelling accuracy). Finally, improvements in students' spelling performance were not examined within the context of other classroom outcomes, such as expository writing. The authors posit that future research should examine students' writing performance after exposure to Cover, Copy, Compare to assess the generalizability of students' spelling skills (Erion, 2009). Despite these limitations and further considerations, this study offered some support for the use of Cover, Copy, Compare with students identified as at-risk for spelling difficulties.

In another study, Jaspers et al. (2012) compared Cover, Copy, Compare with an intervention that utilized Cover, Copy, Compare with additional cues (i.e., a sentence and definition that accompanied a dictated word) as well as a control condition with students identified as struggling in the area of spelling. It was hypothesized that the additional cues would improve students' spelling performance, in addition to improvements in students' word definition and word reading performance. An alternating treatments design was used to compare the effectiveness of the three conditions among three first- grade students enrolled in an after-school program. In addition, students' spelling, word definition, and word reading performance were examined within the context of a pre- and post- analysis. Words were selected from experimental spelling materials developed in previous research (Graham, Harris, & Loynachan, 1993) which reflect grade-level words commonly found in reading, writing, and spelling curricula. Students were pre-assessed on grade-level words, and unknown words were randomly

assigned to the three conditions. During each session, the students were assessed on the number of words mastered from the previous session as well as the untargeted words assigned to the control condition. After the assessment, students received both interventions. When a word was mastered (i.e., word spelled correctly over two consecutive sessions), it was replaced with the next unknown word associated with the respective condition. The number of cumulative words mastered served as the primary outcome measure. Additionally, post-assessment data were collected at the conclusion of the intervention. The post-assessment data included measuring students' spelling performance, the number of words defined correctly, and the number of words read correctly on all of the words in the conditions (i.e., control and intervention).

Visual inspection of the data revealed that both interventions resulted in steady improvement in the students' cumulative target words mastered relative to the baseline condition. Minimal differences were found between the two interventions on cumulative words mastered. Analysis of the pre- and post- testing for spelling performance, word reading, and word definition was conducted descriptively. Results of this analysis suggested that students displayed higher spelling accuracy in both conditions relative to the baseline condition. A difference in spelling performance between the interventions was only observed for one student, but the difference was minimal (i.e., four additional words). Providing additional cues only resulted in one of the three students demonstrating increased word definition accuracy relative to the other two conditions. Finally, all three students demonstrated improvement in word reading across all conditions, although lower rates were observed on the control words. These results suggest that Cover, Copy, Compare is an intervention that is effective when used alone, and it be combined with another intervention without compromising its effectiveness. These results also

suggest that Cover, Copy, Compare has the potential to generalize to other areas (i.e., word reading, word definition) without necessitating the addition of a supplemental intervention.

The Jaspers et al. (2012) study has some methodological limitations. First, the design was an alternating treatments design; therefore, carryover effects cannot be eliminated. No information related to the diversity of word patterns across condition lists was provided. As a result, it is unknown if the increase in accuracy on the untargeted words was due to similar word patterns learned in the interventions. Additionally, spelling word accuracy was measured based on whole words. Although whole-word accuracy is consistent with typical classroom practices for assessing student performance, the addition of a more fine-grained analysis of students' spelling performance (i.e., correct letter sequences) might have allowed a more detailed analysis of change over time and between conditions.

Second, it is important to note this study utilized a pre- and post-test analysis and reported descriptive results. Additionally, it is difficult to make any claims regarding the interventions' effectiveness on any of the dependent variables given the data were analyzed descriptively. Although the data provided some evidence for the effectiveness of Cover, Copy, Compare on the dependent variables, no statistical analyses were conducted to examine the significance of the differences in between conditions. Due to these limitations, it is difficult to conclude that Cover, Copy, Compare interventions were more effective in word definition or word reading performance relative to the control condition.

It is also important to note that the intervention was administered individually by a single research assistant with only three participants, making it difficult to determine the feasibility of administering the procedures in a general education setting. Although the addition of sentence definition into Cover, Copy, Compare did not necessarily impede its effectiveness in terms of

spelling, word definition, or word reading performance, it did not significantly increase students' performance. This suggests that sentence definition might not be a suitable intervention to couple with Cover, Copy, Compare when attempting to address other spelling and reading skills. This study was the first to examine Cover, Copy, Compare in combination with another intervention to measure additional outcomes besides spelling, but failed to report a significant change in these other areas (i.e., word reading and definition) as a result of the combined intervention. Additional studies should examine compatible interventions to Cover, Copy, Compare to improve students' reading and writing skills.

In a study by Schermerhorn and McLaughlin (1997), 16 fifth- and sixth- grade students were exposed to a traditional basal spelling instruction and the Cover, Copy, Compare intervention. For the purposes of this study, an additional component (i.e., Add-a-Word) was added to the Cover, Copy, Compare intervention in order to systematically replace mastered words with unknown words once a criterion was established (e.g., spelled correctly on three consecutive days). All students participating in the study were enrolled in a general education classroom and were not receiving special education services. The primary dependent variable was the percentage of words spelled correctly on a weekly posttest. In addition, the quarterly spelling grade and the number of words spelled correctly on a 50-word spelling test at the end of the grading period were used as secondary outcome measures. Spelling words were selected by spelling materials provided from the school.

For the purposes of evaluating the effectiveness of the intervention, students were divided into two conditions. In condition 1, students initially participated in the traditional basal spelling instruction. In condition 2, students were initially taught using the Add-a-Word/Cover, Copy, Compare intervention. Although the authors indicated that a single case replication design was

used, the design features and analytical approaches that were implemented were not consistent with single case design methodology (i.e., collapsing students into groups, analyzing outcomes using parametric statistics). Although the trends indicated that student spelling performance in the Add-a-Word/Cover, Copy, Compare group was greater than the spelling performance of students in the traditional basal spelling group, the study design and analytical approaches were not sufficient for drawing firm conclusions. Specifically, there were increasing trends in students' spelling performance across both conditions. In addition, limited information was provided regarding treatment integrity, as the teachers implemented the intervention presumably without training. Additionally, no support, either psychometric or instructionally, was provided for the word list utilized and no additional outcome measure was used. Despite these limitations, the results provide some tentative support for the Add-a-Word/Cover, Copy, Compare intervention on improving general education students' spelling performance.

To date, only one study examined Cover, Copy, Compare and its ability to impact students' writing performance. Pratt-Struthers, Struthers, and Williams (1983) evaluated the effects of Add-a-Word/ Cover, Copy, Compare on 9 fifth- and sixth- grade students' spelling accuracy in creative writing samples. The students in this study were enrolled in special education classrooms. A multiple baseline design across target spelling words was used to assess the effectiveness of the Add-a-Word/Cover, Copy, Compare intervention in improving students' correct spelling within the context of students' creative writing. Target spelling words were chosen by evaluating student writing samples and selecting the words that were most commonly used and misspelled. In the baseline condition, the Add-a-Word/Cover, Copy Compare intervention was implemented with each student using a list of 10 spelling words from the students' spelling series. Directly following the Add-a-Word/Cover, Copy, Compare

intervention, students were instructed to complete a creative writing assignment. During the treatment condition, the spelling words used in the Add-a-Word/Cover, Copy, Compare intervention were obtained from frequently misspelled words that appeared in the students' creative writing assignment. The mean percent of correctly spelled target words contained in the creative writing sample was used as the outcome measure in this study.

After exposure to the Add-a-Word/Cover, Copy, Compare intervention, immediate and discernable increases in student responding were observed. All students improved their spelling accuracy relative to the baseline performance (i.e., greater than 80%). This finding suggests that Cover, Copy, Compare/Add-a-Word produced consistent effects across words used in the intervention. Although this study found promising evidence, some methodological limitations should be noted. No information regarding implementation of the Cover, Copy, Compare intervention was provided. It was unclear if research assistants or teachers were in charge of implementing the intervention. Further, no treatment integrity information was provided, so it is impossible to know if Cover, Copy, Compare was administered with integrity across all treatment sessions. The sample consisted of students enrolled in special education classrooms; therefore, it is impossible to generalize these findings to students in the general education classroom. Finally, although the students demonstrated that they were able to accurately use the targeted spelling words in their creative writing samples, no information regarding overall writing quality was provided. Further research would benefit from examining whether concurrent improvements in spelling and writing are evidenced following the implementation of Cover, Copy, Compare.

Previous studies have supported the effectiveness of Cover, Copy, Compare as well as variations of the intervention (e.g., Schermerhorn & McLaughlin, 1997; Pratt-Struthers,

Struthers, & Williams, 1983; McCallum et al., 2014). Participants included students with disabilities and/or classified as struggling in the area of spelling and were implemented in a single-case or small group design. Most of the studies reviewed measured effectiveness by evaluating direct spelling outcomes after the intervention, except for one study that evaluated creative writing samples of fifth and sixth grade students (Pratt-Struthers, Struthers, & Williams, 1983). Cover, Copy, Compare is an explicit intervention that encompasses all the key instructional components in spelling: immediate feedback, self-correction, and multiple practice opportunities. Further, given the intervention features of Cover, Copy, Compare, (e.g., simple, individualized intervention), it could be easily incorporated into existing interventions to improve students' writing performance, such as performance feedback, to concurrently target students' spelling and writing outcomes. The present study is expanding on previous literature by implementing the Cover, Copy, Compare intervention in a large group setting (i.e., the general education classroom), with students who are struggling in the area of writing, but not receiving additional classroom resources.

Purpose of the Present Study

High quality writing is an essential skill that will benefit students not only in their academic career, but also in the workplace. In order to produce high quality writing products, students must possess adequate spelling skills. Spelling is a lower-level skill that must be mastered before moving on to higher level processes in writing, such as planning and reviewing (Berninger, 1999). By third grade, students are moving past the alphabetic principle of spelling, and learning to use higher level skills, such as within-word patterns (Henderson & Templeton, 1986). Previous intervention research has targeted writing and spelling skills in isolation; however, the conceptualization of writing set forth by Berninger posits that without the lower

level skill of spelling, students will not reach a proficient level of writing. To address the appropriate skills, a developmentally-appropriate spelling intervention is warranted. However, previous studies have suggested that spelling instruction is neglected in the classroom (i.e., Fresch, 2003). Therefore, a spelling intervention that can be easily combined with an effective writing intervention would be most practical and feasible for teachers to implement in the general education classroom. No previous studies have examined the effectiveness of an integrative writing and spelling intervention to target student writing performance. The present study aims to close this gap in the literature by investigating one potential approach: the combination of two evidence-based interventions, Cover, Copy, Compare and performance feedback.

The main aim of this study was to examine the effectiveness of Cover, Copy, Compare in conjunction with a performance feedback intervention to improve students' spelling and writing performance in the general education classroom. To address this purpose, the following primary research questions were posed:

(1) In comparison to students who are only receiving a performance feedback intervention, is the addition of Cover, Copy, Compare able to significantly increase students' correct spelling responses when implemented in the general education classroom after controlling for baseline performance? It was hypothesized that the implementation of the Cover, Copy, Compare + performance feedback intervention would improve students' spelling outcomes (e.g., McCallum et al., 2014; Schermerhorn & McLaughlin, 1997).

(2) In comparison to students who are only receiving a performance feedback intervention, is the addition of Cover, Copy, Compare able to significantly increase students' writing fluency when implemented in the general education classroom after controlling for

baseline performance? It was hypothesized that the students in the Cover, Copy, Compare + performance feedback condition will perform significantly higher on measures of writing performance (i.e., correct writing sequences, words spelled correctly, correct letter sequences, and incorrect letter sequences) compared to the students in the performance feedback only condition. (e.g., Eckert et al., 2006; Pratt-Struthers, Struthers, & Williams, 1983)

In addition to the major purposes of the study, the present study also conducted an exploratory analyses to examine the impact of feedback type (i.e., positive, negative, mixed) on students' writing performance (i.e., correct writing sequences). Given that a prior meta-analysis (Kluger & DeNisi, 1996) demonstrated that discouraging feedback negatively impacted performance (d = -.14), it was hypothesized that positive feedback will result in greater writing performance than negative feedback.

Method

Participants and Setting

The data used in the present study were collected in a prior study that examined the effect of a performance feedback intervention on third grade students' writing outcomes. Approval was obtained from the Institutional Review Board for the university and the participating school district. Prior to participation, parent consent and child assent were obtained, along with eligibility screenings. A total of 80 third-grade students were screened for eligibility. Of these students, four students moved to another school and four students' parents declined to give consent for participation. Eighteen students were excluded because they did not meet the minimum writing proficiency requirement of 10 words when asked to compose a story (see Eligibility Assessment).

A total of 54 students were determined to be eligible and participated in the study (see Figure 1). About half of the sample were male (51.85%), and their race was mostly identified as White (50%) or Black or African American (27.78%). A smaller proportion of the students identified their race as constituting two or more races (11.11%), Asian (7.41%) or American Indian or Alaskan Native (3.70%). In addition, most of the students indicated their ethnicity as Not Hispanic or Latino (92.59%). The students' average age was 8 years, 5 months (range, 8.03 to 10.06). A small percentage of students met the eligibility requirements but received special education services due to a speech and language impairment (3.70%), a specific learning disability (1.85%) or an emotional disturbance (1.85%). Table 1 illustrates the demographic data for the sample.

The third-grade students that participated in the study were enrolled in an urban elementary school located in a moderately sized city in the northeast. Free lunch is provided to all students due to the schools district's overall free lunch enrollment exceeding 95%. With the exception of poverty level, the participants in the study were similar to the school demographics based on the New York State Department of Education report card data. The school was selected due to its proximity to the university.

Experimenters

Doctoral-level school psychology graduate students served as the primary experimenters with the assistance of psychology undergraduate research assistants. All research assistants were required to complete formal training in research ethics. The training consisted of completing the Social and Behavioral Focus and Responsible Conduct of Research courses through the Collaborative Institute Training Initiative (CITI) designed to ensure the protection of human research subjects. Research assistants received training in the administration and scoring of the

dependent measures in addition to data entry and procedural integrity assessments (i.e., interscorer agreement). All research assistants were required to demonstrate 100% proficiency in scoring as well as conducting procedural checks prior to assisting with data collection.

Materials

Narrative Curriculum-Based Measurement in Written Expression. Narrative Curriculum-Based Measurement in Written Expression (WE-CBM) probes were used in eligibility determination as well as in the intervention. The students were provided with a two-page packet. On top of the first page, there was a self-referenced story stem (i.e., "One night I had a strange dream…") followed by horizontal lines where the student wrote their story. No additional instructional materials were provided to the students. McMaster and colleagues (2010) have examined the technical adequacy of these probes for grades 2 to 3. Based on their findings, the alternate-form reliability was moderately high (r =.73 to .90) and the criterion-related validity was moderate (r =.63).

Intervention spelling words. Based on students' spelling performance on the eligibility WE-CBM probes, the 10 most commonly misspelled words of the group were selected as the intervention spelling words. In addition, five words with common letter combinations were also selected as intervention spelling words in order to familiarize the students with the correct spelling of the commonly misspelled word (i.e., "heir" and "their"). A total of 15 intervention spelling words were assessed at pre- and post- intervention to evaluate the students' spelling performance (see Table 2).

Cover, Copy, Compare worksheet. A Cover, Copy, Compare modified worksheet was created based on previous work by Manfred and colleagues (2015). The worksheet (see Appendix A) contained three rows and three columns, presented in a landscape orientation. In

the first column, the intervention spelling words were listed. Next to each intervention word, there were three blank spaces with the corresponding labels to provide the students with directions. Each intervention word had a corresponding color slip of paper to act as the "cover". This step was included in order to remind the students to work on one word at a time, as well as prevent the students from looking at the correct model of the word when spelling from memory.

Kids Intervention Profile. The Kids Intervention Profile (KIP; Eckert, Hier, Hamsho, & Malandrino, 2017) was administered at the conclusion of intervention. The KIP is an 8-item measure that assesses students' perceptions of intervention acceptability. Boxes of increasing sizes are used in conjunction with a 5-point Likert-type scale that ranges from *'Not at All'* to *'Very, Very Much.'* The internal consistency (Cronbach's alpha = .79) and test-retest reliability (r = .70) across a 3-week interval was determined to be adequate (Eckert, Hier, Hamsho, & Malandrino, 2017). Results of a principal components factor analysis indicated that the scale consists of two factors, labeled "Overall Intervention Acceptability" and "Skill Improvement." Based on criteria established by the scale's authors, a total score greater than 24 represents an acceptable rating.

Procedures

The study was divided into four phases which included eligibility determination, pre-assessment, intervention, and post- assessment. Sessions were conducted weekly, and lasted approximately 30 minutes. Students were randomly assigned to one of two conditions: (a) performance feedback only; or (b) Cover, Copy, Compare + performance feedback.

Eligibility assessment. Potential participants completed one WE-CBM that was administered following standardized administration procedures. The research assistant stated to the students, "I am going to read you a sentence, and then I want you to write a story about what

happens next. You will have some time to think about the story you will write and then you will have some time to write it. Please turn to the next page of your packet. For the next minute, think about writing a story that begins with this sentence "One night I had a strange dream about…" Remember, take time to plan your story. A well-written story usually has a beginning, a middle, and end. It also has characters that have names and perform certain actions. Use paragraphs to help organize your story. Correct punctuation and capitalization will make your story easier to read. Please do not write the story yet. Just think of a story that begins with this sentence "One night I had a strange dream about…" Ready? Start thinking". Students were given 1 minute to think about what they are going to write. After 1 minute, the research assistant stated, "When I tell you to start, please begin writing your story. Remember, if you don't know how to spell a word, you should try your best and sound it out. It is important that you do your best work. If you fill up the first page, please turn to the next page and keep writing. Do not stop writing until I tell you to. Do your best work. Okay, you can start writing". Students were given 3 minutes to write their story, after 90 seconds the research assistant stated, "You should be writing about "One night I had a strange dream about…".

Pre-assessment. During the pre-assessment phase of the study, students that were eligible to participate were administered the intervention word spelling list. The research assistant provided numbered, lined paper and stated to the students, "We are going to take a 2-minute spelling test. I am going to say some words that I want you to spell on the sheet of paper in front of you. Write the first word on the first line, the second word on the second line, and so on. I'll give you 7 seconds to spell each word. When I say the next word, write it down even if you haven't finished the last one. You will receive credit for each correct letter. Ready? Begin".

The research assistant started the stopwatch, said each word twice, and then dictated the next word after 7 seconds. If the word was a homonym, a sentence was provided.

Performance feedback only condition. Participants assigned to this condition were provided with a writing packet each session that contained the following contents: (a) identifying cover page, (b) individualized performance feedback, and (c) a self-referenced, narrative writing probe. The individualized performance feedback page includes a box in the center of the page with a number inside, that depicted the number of words the student wrote in the previous session (see Appendix C). Next to the box, there was an upward or downward facing arrow or an equal sign that denoted how their performance compared to the previous session. The experimenter followed a procedural script to explain the performance feedback sheet to the students in addition to administering the next WE-CBM probe. The experimenter stated, "The box in the middle of the page (The research assistant should point to the box) tells you how many words you wrote last week. Next to the box you will see an arrow. If the arrow is pointing up towards the sky, that means you wrote more words since the last time I worked with you. If the arrow is pointing down towards the floor, that means you wrote fewer words since the last time I worked with you. If there is an equal sign, that means you wrote the same number of words as you did the last time I worked with you". After explaining the performance feedback, the experimenter administered the next WE-CBM probe. The students had one minute to think about the story they will write and three minutes to write their story. In total, eight intervention sessions were administered.

Cover, Copy, Compare + performance feedback condition. Participants assigned to this condition received the performance feedback intervention and Cover, Copy, Compare intervention during a single session. At the beginning of each session, participants received a

writing packet that included: (a) an identifying cover sheet, (b) an individualized performance feedback sheet (i.e., performance feedback intervention), (c) a self-referenced, narrative WE-CBM probe, and (d) a Cover, Copy, Compare worksheet (i.e., Cover, Copy, Compare intervention). The students received performance feedback on their writing performance in addition to the spelling intervention.

Based on procedures developed Skinner, McLaughlin, and Logan (1997) and adapted for spelling by Manfred, McLaughlin, Derby, and Everson (2015), students were given a worksheet that listed three intervention words in the left column (see Appendix B). If the word was a homonym, an exemplar sentence was placed underneath the word in the first column. Three separate colored strips of paper covered the first two columns of each row (i.e., the "cover"). The steps to complete the worksheet included: (a) look at the modeled word, (b) write the word while looking at it, (c) cover the modeled word with the colored strip of paper, (d) write the word from memory, (e) uncover the modeled word, (f) compare the newly written word to the modeled word, (g) repeat for each of the words on the worksheet (see Appendix A). If students spelled a word incorrectly, they were told to put an "X" through the incorrectly spelled word and try again in the next blank space. If the word was spelled incorrectly a second time, the students were told to put an "X" through the second incorrectly spelled word and move on to the next word. The students were given 90 seconds to complete the worksheet. The 90-second time limit was chosen as previous research has found that students require less than 30 seconds per word when completing the intervention (Zannikos, 2012). All students were able to complete the Cover, Copy, Compare worksheet before the 90 seconds expired. In total, there were eight intervention sessions administered.

Words were deemed "mastered" when the condition reached 85% accuracy. This percentage was chosen due to its alignment with current standards (Shapiro, 2010) associated with general classroom guidelines (75-85%) associated with high quality classroom instruction. The following week, a new word replaced the mastered word on the worksheet. Words were chosen from the intervention spelling word list, and were identical to the words used in the pre- and post-assessments. No novel words were introduced in the Cover, Copy, Compare intervention.

Post-assessment. An intervention spelling word test and the WE-CBM probe, was administered at the conclusion of the study. Standard administration procedures were followed. The writing probes used in pre- and post- assessment differed based on the story stem. Specifically, for the pre-assessment writing probe, students were provided with the following story stem: "One night I had a strange dream about…", whereas for the post-assessment writing probe, students were provided with the following story stem: "One day when I got home from school…". The intervention spelling word test was identical to the test used in pre-assessment and reflected the words that were used in the Cover, Copy, Compare intervention. Following the administration of the writing probes and the spelling intervention word list, the Kids Intervention Profile (KIP) was administered to all the students to assess their perceptions of the interventions received. Students in the performance feedback only condition were administered an 8-item version of the KIP that assessed their perceptions of the performance feedback intervention. Students in the Cover, Copy, Compare + performance feedback condition were administered a 16-item version of the KIP that assessed their perceptions of both interventions (i.e., first 8 items assessed perceptions of the performance feedback intervention, followed by 8 items that assessed the perceptions of the Cover, Copy, Compare intervention).

Dependent Measures

Spelling performance. To measure students' spelling performance, correct letter sequences were computed for the pre- and post- intervention spelling word list probes using scoring procedures developed by Shinn and Shinn (2002; see Appendix D). A correct letter sequence was defined as a pair of letters correctly sequenced within a word. For example, the word *CAT* contains four possible correct letter sequences (i.e., ^*C*^*A*^*T*^). In contrast, an incorrect letter sequence is defined when two letters are incorrectly sequenced within a word. For example, if a student spelled *CAT* as *CATE,* two incorrect letter sequences would be recorded (i.e., ^*C*^*A*^*T*^{x}*E*^{x}). Test-retest reliability coefficients for correct letter sequences are moderately high (*r* =.73 to .92; Marston, 1982). Criterion validity for correct letter sequences is moderately high (*r* =.80 to .86) when compared to the Stanford Achievement Spelling subtest (Deno et al., 1980). In addition to correct and incorrect letter sequences, words spelled correctly were also scored to capture a more global representation of student spelling performance.

Writing performance. To measure the fluency and quality of students' writing performance, correct writing sequences were computed on the pre- and post-intervention WE-CBM probe. Procedures developed by Shapiro (2004) were for scoring correct and incorrect writing sequences (See Appendix E). Specifically, each adjacent word in the students' writing was scored for accuracy based on spelling, capitalization, punctuation, and syntax. In a meta-analysis by McMaster and Espin (2007), single-score alternate-form reliability was moderately high (*r* =.73 to .90) for correct writing sequences among second- and third- grade students. Criterion validity for correct writing sequences was also found to be moderate to high (*r* =.29 to .66) when compared to the Test of Written Language- Third Edition (TOWL-3; Hammill &

Larsen, 1996). Due to the importance of spelling in writing skills, the spelling metrics listed in the previous section were also examined in the students' post-intervention WE-CBM probe.

Intervention acceptability. Two versions of The Kids Intervention Profile (KIP; Eckert, Hier, Malandrino, & Hamsho, 2017) were administered to examine intervention acceptability. Students in the performance feedback only condition were administered an 8-item version of the KIP that assessed their perception of the performance feedback intervention. Students in the Cover, Copy, Compare + performance feedback condition were administered a 16-item version of the KIP that assessed their perception of the performance feedback intervention as well as the Cover, Copy, Compare intervention. The internal consistency for the eight items on the KIP that addressed the performance feedback intervention was poor ($\alpha = .47$). For the eight items that addressed only the Cover, Copy, Compare intervention, internal consistency was acceptable ($\alpha = .77$). The internal consistency for the 16-item KIP that addressed the performance feedback intervention and the Cover, Copy, Compare intervention was good ($\alpha = .83$).

Exploration of feedback type. To examine the impact of feedback type (i.e., positive, negative, mixed) on students' writing fluency, students were divided into one of three groups based on the proportion of positive and negative feedback they received over the course of the intervention: (a) students that received positive feedback for 50% of the sessions or greater, (b) students that received negative feedback for 50% of the sessions or greater, and (c) students that received a relatively equal combination of positive and negative feedback.

Experimental Design

An a priori power analysis was conducted using GPower (Erdfelder, Faul, & Buchner, 1996). Sample size was calculated by setting α to equal .05 and power equal to .80. The sample size was calculated to detect an effect size of .60. Results from this analysis indicated that 52

participants in total were required, which is consistent with the obtained sample size of 54 third-grade students. A covariate adaptive randomization method was used to assign eligible students within their respective classroom to conditions based on their average performance on the four pre-assessment measures using a random number generator. That is, students in each classroom were ranked in terms of their average pre-assessment performance (i.e., number of correct writing sequences), which is an important baseline characteristic to equate across conditions. Within each classroom, students were randomly assigned in sequential order to one of two conditions: (a) performance feedback only (n = 27), or (b) Cover, Copy, Compare + performance feedback (n = 27). This method of randomization controls for the possible influence of students' initial writing performance while retaining equal sample sizes across conditions.

There were no statistically significant differences between the two conditions with regard to gender, $\chi 2$ (1, N = 54) = .297, p = .494, ethnicity, $\chi 2$ (1, N = 54) = 1.08, p = .299, special education status, $\chi 2$ (3, N = 54) = 2.00, p = .572, English Language Learner status, $\chi 2$ (1, N = 54) =.164, p = .685, or age, F (1, 52) = 0.179, p = .670. However, there was a statistically significant difference between the conditions with regards to race, specifically, there were more White students in the performance feedback only condition (66.67%) compared to the Cover, Copy, Compare + performance feedback condition (33.33%), $\chi 2$ (1, N = 54) = 6.00, p = .014 (see Table 1).

Procedural Integrity

To assess procedural integrity, the primary experimenter followed a procedural script and checked off every individual step completed. A secondary experimenter followed along on the procedural script and checked off all the observed steps the primary experimenter completed. Agreements between the primary and secondary experimenter were summed to calculate

procedural integrity. The lower total count was divided by the higher total count of agreements and multiplied by 100. The mean procedural integrity was 100%, with no reported deviations.

Interscorer Agreement

At the conclusion of data collection, 40% of the pre- and post- intervention spelling word lists were randomly selected and scored for correct letter sequences, incorrect letter sequences, and words spelled correctly. The mean percentage of interscorer agreement for correct letter sequences on the intervention spelling word list was 99.9% (range, 97% to 100%) and the mean Kappa coefficient was 0.92 (range, 0.58 to 1.0). The mean percentage of interscorer agreement for incorrect letter sequences on the intervention spelling word list was 99.9% (range, 97% to 100%) and the mean Kappa coefficient was 0.92 (range, 0.58 to 1.0). The mean percentage of interscorer agreement for words spelled correctly was 99.9% (range, 93% to 100%) and the mean Kappa coefficient was 0.99 (range, 0.86 to 1.0). In addition, 40% of pre- and post-intervention WE-CBM writing probes were also randomly selected and rescored for correct writing sequences, words spelled correctly, correct letter sequences, and incorrect letter sequences. Interscorer agreement was calculated by dividing the number of agreements by the sum of agreements and disagreements. Kappa coefficients were also computed. For the WE-CBM probes, the mean percentage of interscorer agreement for correct writing sequences was 98% (range, 87% to 100%) and the mean Kappa coefficient was 0.94 (range, 0.53 to 1.0). The mean percentage of interscorer agreement for words spelled correctly was 97% (range, 82% to 100%) and the mean Kappa coefficient was 0.93 (range, 0.45 to 1.0). The mean percentage of interscorer agreement for correct letter sequences for the writing probe was 98% (range, 77% to 100%) and the mean Kappa coefficient was 0.87 (range, 0.39 to 1.0). The mean percentage of

interscorer agreement for incorrect letter sequences for the writing probe was 98% (range, 77% to 100%) and the mean Kappa coefficient was 0.87 (range, 0.39 to 1.0).

Results

Data Preparation

Data input and consistency checks. The primary researcher, along with trained research assistants were responsible for entering data into a Microsoft Excel file. Another researcher double-checked all imputed data to ensure accuracy. Data were transferred from Microsoft Excel to SPSS 21.0 (SPSS Inc., 2012). SPSS was used to perform descriptive statistics in addition to statistical analyses.

Descriptive Analyses

Descriptive statistics for pre-intervention measures were computed and analyzed using t-tests to determine whether differences existed between conditions (see Table 3). On the spelling intervention word list, no statistically significant differences were found for the number of correct letter sequences, incorrect letter sequences, or words spelled correctly that students produced between the two conditions. These findings suggest that students in each condition were performing similarly on the assessed spelling words.

On the WE-CBM writing probe, no statistically significant differences were observed for the number of correct writing sequences or correct letter sequences that students produced between conditions. However, students in the performance feedback only condition demonstrated higher mean scores on words spelled correctly (M = 24.11, SD = 12.37) in comparison to the students in the Cover, Copy, Compare + performance feedback condition (M = 17.81, SD = 9.43); t (52) = 2.12, p = .039). Additionally, students in the performance feedback

only condition displayed greater mean incorrect letter sequences (M = 9.19, SD = 6.50) than the students in the Cover, Copy, Compare + performance feedback condition (M = 4.37, SD = 4.22, p = .002). These results suggest that students in the performance feedback only condition and the Cover, Copy, Compare + performance feedback condition were not homogenous with respect to their spelling performance within the context of their writing samples at pre-intervention.

Although the main focus of this study was to examine between-group differences, a series of paired t-tests were conducted to examine the within-group differences in the students' writing performance over the course of the study. On the post-intervention writing probes, large effect sizes were observed for students assigned to the Cover, Copy, Compare + performance feedback condition on the following metrics: (a) correct writing sequences (d = 1.10), (b) words spelled correctly (d = 1.37), and (c) correct letter sequences (d = 1.34). Similarly, large effect sizes were observed for students in the performance feedback only condition also displayed a large effect size on the following metrics within the post-intervention writing probes: (a) correct writing sequences (d = 0.99), (b) words spelled correctly (d = 1.11), and (c) correct letter sequences (d = 1.29).

Major Analysis

To examine whether the addition of Cover, Copy, Compare to a performance feedback intervention improved students' spelling and writing performance in comparison to students that received only a performance feedback intervention, one-way analyses of covariances (ANCOVA) were proposed. Pre-intervention scores were used as a covariate to control for individual differences in performance. Prior to conducting the ANCOVAs, the underlying assumptions were tested. The homogeneity of regression slopes assumption was violated for two of the seven analyses, wherein the regression lines were not parallel for correct letter sequences

and words spelled correctly on the intervention spelling word list. As a result, multiple regression analyses, which included the Johnson-Neyman technique (Johnson & Neyman, 1936) were conducted. This analytical approach is advised when there is a violation in the heterogeneity of regression slopes (D'Alonzo, 2004; Ji, 2016) because it allows an analysis of the moderation effects of students' pre-intervention performance on correct letter sequences and words spelled correctly, using the approach outlined by Hayes (2013). Significant interactions were further probed using the Johnson-Neyman technique (Johnson-Neyman, 1936). Prior to conducting the multiple regression analyses, the underlying statistical assumptions were tested, including, linearity, normality, multicollinearity, and homoscedasticity. All underlying assumptions were met.

Spelling performance. In order to examine if the Cover, Copy, Compare + performance feedback condition improved student spelling performance in comparison to the performance feedback only condition, a regression analysis for each related metric (i.e., correct letter sequences, incorrect letter sequences, and words spelled correctly) was conducted. Due to the violation of the homogeneity of regression slopes assumption, the proposed ANCOVA analyses were not conducted for correct letter sequences or words spelled correctly. As a result, a multiple regression analysis that included the Johnson-Neyman technique was conducted.

For correct letter sequences, an interaction between pre-intervention performance and condition approached statistical significance, t (44) = -1.80, p = .078. As a result, the interaction was further probed by testing the conditional effects at three levels of pre-intervention correct letter sequences, one standard deviation below the mean, at the mean, and one standard deviation above the mean. Condition was significantly related to post-intervention correct letter sequences when pre-intervention correct letter sequences was one standard deviation below the mean (M =

53.11, p = .01) and when correct letter sequences was at the mean (M = 62.50, p =.003), but not when pre-intervention correct letter sequences was one standard deviation above the mean (M = 71.89, p =.78; see Figure 3). The Johnson-Neyman analysis further indicated that when students wrote fewer than 67 correct letter sequences on the pre-intervention spelling word list, students assigned to the Cover, Copy, Compare + performance feedback condition wrote significantly more correct letter sequences on the post-intervention spelling word list.

For words spelled correctly, an interaction between pre-intervention performance and condition approached statistical significance, t (44) = -1.88, p = .067. As a result, the interaction was probed by testing the conditional effects at three levels of pre-intervention words spelled correctly, one standard deviation below the mean, at the mean, and one standard deviation above the mean. Condition was significantly related to post-intervention words spelled correctly when pre-intervention words spelled correctly was one standard deviation below the mean (M = 7.93, p < .01) and when at the mean (M = 10.83, p < .01), but not when pre-intervention correct letter sequences was one standard deviation above the mean (M = 13.73, p = .24; see Figure 3). The Johnson-Neyman analysis further indicated that when students wrote fewer than 13 words correctly on the pre-intervention spelling word list, students in the Cover, Copy, Compare + performance feedback condition spelled significantly more words correctly on the post-intervention spelling word list.

For the remaining spelling outcome, the results of an ANCOVA examining students' incorrect letter sequences during the post-intervention spelling word list was statistically significant, F (1 ,46) = 12.98, p = .001, with students in the Cover, Copy, Compare + performance feedback demonstrating lower adjusted mean scores of incorrect letter sequences

(adjusted $M = 5.08$, $SD = 4.05$) on the post-intervention spelling word list than students in the performance feedback only condition (adjusted $M = 9.63$, $SD = 6.23$; see Figure 4).

Students' writing performance. In order to examine if the Cover, Copy, Compare + performance feedback intervention improved students' writing performance in comparison to the performance feedback only condition, four analyses of covariance (ANCOVAs) were conducted. To control for family-wise error, a Bonferroni adjustment was made and an adjusted alpha of .01 was applied. Evaluation of the assumptions was satisfactory and there were no outliers. No statistically significant differences were found for any of the writing outcomes, including correct writing sequences, $F(1, 49) = 3.05$, $p = .09$, words spelled correctly, $F(1, 48) = 1.97$, $p = .18$, correct letter sequences, $F(1, 48) = 1.98$, $p = .166$, or incorrect letter sequences, $F(1, 48) = 0.64$, $p = .43$. These results indicate that students' in each condition did not significantly differ in their spelling and writing performance in the context of a writing sample (see Figure 5).

In addition to the ANCOVA analyses, descriptive analyses of AIMSweb percentile norms and Rate of Improvement (ROI) data were calculated for both groups for correct writing sequences and words spelled correctly. ROI was calculated by subtracting the score (i.e., correct writing sequences or words spelled correctly) of the first probe from the score of the second probe and dividing that value by the total number of weeks between the administration of the probes. For correct writing sequences, students in the performance feedback only condition were at the 37th percentile at pre-intervention and at the 46th percentile at post-intervention, resulting in a ROI of 0.60 correct writing sequences per week. Students in the Cover, Copy, Compare + performance feedback condition were at the 26th percentile at pre-intervention, and increased to the 54th percentile at post-intervention, resulting in a ROI of 1.07 correct writing sequences per week. For words spelled correctly, students in the performance feedback only condition were at

the 39th percentile at pre-intervention, and reached the 61st percentile at post-intervention, resulting in a ROI of 0.87 words spelled correctly per week. Students in the Cover, Copy, Compare + performance feedback condition were at the 24th percentile at pre-intervention and increased to the 61st percentile at post-intervention, resulting in a ROI of 1.33 words spelled correctly per week (see Table 4).

Intervention Acceptability Outcomes

Cover, Copy, Compare + performance feedback condition. To examine the relationship between students' perceptions of the interventions and post-intervention spelling performance, correlation coefficients were calculated. Students' intervention acceptability ratings and their post-intervention correct letter sequences were positively correlated, r (24) = .46, $p < .05$. In addition to examining the association between intervention acceptability ratings and post-intervention performance, the overall levels of intervention acceptability as well as individual factor scores were examined. For the overall levels of intervention acceptability, a total score greater than 24 denotes an acceptable rating (Eckert et al., 2017). Results from the KIP revealed that students rated the Cover, Copy, Compare intervention as acceptable (M = 26.27, SD = 7.18). On the two factor scores, students rated their skill improvement (M = 2.92, SD = 1.81) and overall intervention acceptability (M = 3.50, SD = 1.53) (see Table 5).

To examine the effect of intervention acceptability of the performance feedback intervention on students' post-intervention writing performance, correlation coefficients were calculated. Students' intervention acceptability ratings and their post-intervention correct writing sequences were not significantly correlated, r (24) = .06, p = .76. In addition, the results of the KIP revealed that students in this condition rated the performance feedback intervention as acceptable (M = 27.38, SD = 5.48). On the two factor scores, students rated their skill

improvement (*M* = 2.92, *SD* = 1.75) and overall intervention acceptability (*M* = 3.61, *SD* = 1.58) (see Table 6).

Performance feedback only condition. To examine the intervention acceptability of performance feedback on students' post-intervention writing performance in the performance feedback only condition, a correlation coefficient was calculated. For students assigned to the performance feedback only condition, intervention acceptability ratings and post-intervention correct writing sequences were not significantly correlated, r (24) = .24, p = .26. The results of the KIP revealed that students in this condition rated the performance feedback intervention as acceptable (*M* = 27.43, *SD* = 4.66). In regards to the two factor scores, students rated skill improvement (*M* = 2.93, *SD* = 1.74) and overall intervention acceptability (*M* = 3.59, *SD* = 1.63) (see Table 6).

The performance feedback only condition and the Cover, Copy, Compare + performance feedback condition both completed the same 8-items on the KIP that assessed perceptions of the performance feedback intervention. The KIP results on the eight items that addressed the performance feedback intervention were not significantly correlated between the two groups, r (23) = .24, p = .26.

Exploratory Analysis

Four one-way-between subjects ANCOVAs was conducted to examine the effect of feedback type (i.e., positive, negative, mixed) on each post-intervention writing outcome (i.e., correct letter sequences, incorrect letter sequences, words spelled correctly, and correct writing sequences). To account for pre-intervention performance, baseline scores on each metric were used as the covariate in each analysis. Prior to conducting the ANCOVAs, the underlying statistical assumptions were tested. All assumptions were met. The results of the ANCOVAs

indicated that there were statistically significant differences for feedback type on post-intervention words spelled correctly, F (2, 40) = 4.73, p = .015. There were no statistically significant differences for feedback type on any of the other post-intervention writing outcomes (i.e., correct writing sequences, correct letter sequences, incorrect letter sequences; see Table 7). Taken together, these results suggest that students' words spelled correctly was the only metric that was influenced by the type of feedback received.

Discussion

Spelling skills are a key component of writing proficiency; however, explicit and developmentally-appropriate spelling programming is currently neglected in elementary school classrooms (Berninger, 1999; Fresch, 2003). The purpose of the present study was to evaluate the combination of a performance feedback and Cover, Copy, Compare intervention on students' spelling and writing outcomes in comparison to an intervention that only consisted of performance feedback. Given the existing literature supporting the use of performance feedback in improving students' writing performance (Eckert et al., 2006; Hier & Eckert, 2014), as well as the empirical evidence of Cover, Copy, Compare in improving students' spelling performance (Schermerhorn & McLaughlin, 1997; Jaspers et al., 2014), the present study aimed to examine whether combining the interventions would result in improvement in both academic domains. Results of the study's main aims indicated that the addition of Cover, Copy, Compare significantly increased students' spelling performance on explicit targeted words, which is consistent with prior research studies (McCallum et al., 2014, Schermerhorn & McLaughlin, 1997), but did not result in any statistically significant increases in writing outcomes. However, an interesting finding emerged whereas students that performed below average or average on the pre-intervention spelling word list benefited more from the Cover, Copy, Compare +

performance feedback intervention in terms of their performance on the post-intervention spelling word list than students that performed above average on the pre-intervention spelling word list.

Cover, Copy, Compare and Performance Feedback as an Integrative Writing Intervention

Overall, the results of this study provide support for the hypothesis that the implementation of a Cover, Copy, Compare and performance feedback intervention would improve students' spelling outcomes. Students in the Cover, Copy, Compare + performance feedback condition wrote significantly fewer incorrect letter sequences than students in the performance feedback only condition on the post-intervention spelling word list. For correct letter sequences and words spelled correctly, students in the Cover, Copy, Compare + performance feedback condition scored higher than students in the performance feedback only condition; however, this trend was moderated by students' baseline performance on the spelling intervention word list. Specifically, students that performed in the average or below average range prior to the intervention benefitted most from the addition of Cover, Copy, Compare to the performance feedback intervention. The moderating effect of pre-intervention performance for correct letter sequences and words spelled correctly is noteworthy and is consistent with emerging recommendations for alternative analytical approaches to analyzing individual differences in students' responding to academic interventions (Petscher & Logan, 2014; Reeves & Lowe, 2009). As observed in this study, there was a different pattern of responding for students at varying levels of pre-intervention performance. Traditional statistical models based on means-based analysis (e.g., ANCOVA) produce an average effect that may mask other associations in the data that cannot be understood by a mean-based analysis (Petscher & Logan, 2014). By using alternative statistical approaches, researchers can test for whom a relation is

stronger or weaker. In the context of academic intervention research, this is extremely useful because it permits an analysis of how students perform across a distribution of possible scores. Although the analytic technique commonly recommended for examining score distributions (i.e., quantile regression; Petscher & Logan, 2014) was not used in this study, the moderation analysis permitted me to examine whether students' post-intervention performance on two of the spelling outcomes was influenced by their initial performance. The observed results for students performing above the mean further suggest that potential ceiling effects may have been present, which is common when examining mastery skills such as spelling. Thus, by examining the moderation of baseline performance on post-intervention correct letter sequences and words spelled correctly, I was able to pinpoint to which groups of students were impacted by the intervention.

Despite the confirming spelling outcomes, the writing outcomes did not provide support for the hypothesis that students in the Cover, Copy, Compare + performance feedback condition would perform significantly higher on measures of writing performance in comparison to students in the performance feedback only condition. Although students in both intervention conditions demonstrated significant improvements in their writing and spelling performance within the context of the writing probe, the students' performance between the two groups on the post-intervention writing probe was relatively similar. One explanation for the null findings is that the Cover, Copy, Compare intervention specifically targeted the within-word pattern stage of spelling development (Henderson & Templeton, 1986). Although this may be an effective strategy for learning to spell words, it may not be sufficient to generalize the target words to students' writing samples. In order for the target words to generalize, the student must understand the meanings and be able to incorporate the target words into their vocabulary

(Henderson & Templeton, 1986). Therefore, it seems plausible that both aspects of spelling development (i.e., within-word pattern and meaning principle) should be targeted within the context of the Cover, Copy, Compare intervention in order to observe improved spelling and writing performance in the context of a writing sample. The findings from this study do not support the combination of Cover, Copy, Compare and performance feedback as an integrative writing intervention, as the addition of the Cover, Copy, Compare intervention did not improve students' spelling and writing performance in the context of a writing probe. In contrast to the hypothesis, the interventions appeared to have worked independently, wherein the Cover, Copy, Compare intervention increased performance on target spelling words and the performance feedback intervention increased students' writing fluency.

Although no statistically significant findings were observed, ROI data indicated that there was a difference in terms of average growth in correct writing sequences and words spelled correctly between the two conditions over the course of the intervention. Students in the Cover, Copy, Compare + performance feedback condition had a larger ROI value than the students in the performance feedback only condition for both metrics. This is important to note, as this provides preliminary evidence of the effectiveness of combining Cover, Copy, Compare and performance feedback on student writing outcomes in the context of a curriculum-based measurement writing probe.

The Relationship between Intervention Acceptability and Spelling Outcomes

The results of the correlational analysis indicated a significant, positive correlation between students' intervention acceptability ratings and post-intervention correct letter sequences, suggesting that students who rated the intervention as "acceptable" demonstrated greater spelling performance on the post-intervention word list. Overall, students rated the

Cover, Copy, Compare intervention as "acceptable" in both skill acquisition and overall acceptability. In addition, students in both conditions rated the performance feedback condition as "acceptable" in both domains. These results suggest that students generally found the Cover, Copy, Compare and the performance feedback interventions to be enjoyable and helpful. Reporting standards in psychology (APA Presidential Task Force on Evidence-Based Practice, 2006), school psychology (Kratochwill & Shernoff, 2004), and special education (Losinkski et al., 2014) highlight the importance of considering students' perceptions of academic interventions. Although school personnel often provide feedback regarding academic interventions, intervention acceptability ratings from students allow researchers to gain an understanding of the intervention directly from the consumer's perspective (Shaprio & Goldberg, 1993). Additionally, the likelihood of enhancing students' academic performance increases if students view interventions as acceptable (Mautone et al., 2009).

The Effect of Feedback Type on Students' Writing Performance

The results of an exploratory analysis examining the effect of feedback type (i.e., positive, negative, mixed) on students' writing performance provided an initial examination of the impact of formative feedback on students' writing performance. Although results of prior meta-analysis (Kluger & DeNisi, 1996) indicated that providing single instances of discouraging feedback negatively impacted performance, the results of this study only demonstrated statistically significant differences on words spelled correctly based on feedback type that was delivered on multiple occasions. No statistically significant differences were observed in students' performance on correct writing sequences, correct letter sequences, and incorrect letter sequences. Although the exploratory results of this study did not reveal statistically significant differences between feedback type and on all metrics of students' writing performance, it is

important to note that trends observed in the descriptive data appeared to substantiate the findings reported by Kluger and DeNisi. That is, students who received mostly positive feedback throughout the intervention wrote a higher number of correct writing sequences, words spelled correctly, correct letter sequences, and incorrect letter sequences, followed by students that received relatively equal proportion of positive and negative feedback. Students who received mostly negative feedback wrote the lowest number of correct writing sequences, words spelled correctly, correct letter sequences, and incorrect letter sequences on the post-intervention writing probe.

One descriptive trend emerged; however, which was contradictory to my hypothesis and the results of Kluger and DeNisi (1996). Specifically, students that received mostly positive feedback wrote more incorrect letter sequences than students receiving mostly negative or neutral feedback. A plausible explanation for this finding is that the performance feedback that the students received referred to the total number of words written in the writing probe, regardless of spelling. Total words written was selected because it is easily understood by elementary-aged students (Truckenmiller et al., 2014). However, it is possible that some students, when working to increase the number of words written, sacrificed their spelling accuracy, which explains the increase in incorrect letter sequences.

Limitations

Several limitations should be considered when interpreting the results from this study. First, it is important to note there were several threats to internal validity. Although significant efforts were taken to randomly assign students to conditions, true randomization did not occur. That is, the two conditions did not display similar pre-intervention spelling performance in the context of the writing probe. Specifically, the students assigned to the performance feedback

condition wrote significantly more words spelled correctly and incorrect letter sequences on the pre-intervention writing probe compared to students assigned to the Cover, Copy, Compare + performance feedback condition. In addition, the two conditions were not homogenous with respect to race. Specifically, there was significantly more White students in the performance feedback only condition than in the Cover, Copy, Compare + performance feedback condition. Because pre-intervention performance was used as a covariate in the analyses, selection bias was controlled for on pre-intervention spelling performance on the writing probe. However, demographic factors, such as race, were not controlled for in analyses. Another threat to internal validity in this study was instrumentation, as there were only 15 target words contained on the intervention spelling word list. Due to this upper limit, there is the possibility of ceiling effects for some of the students. An additional instrumentation issue was the lack of measurement of common spelling word patterns within grade-level words.

There were two threats to external validity in this study. First, there was a possibility of interaction effects. The results observed in the Cover, Copy, Compare condition could potentially be due, in part, to selection biases that were not addressed by randomization (i.e., racial differences). Second, there was the issue of sample bias. The study population was limited to third-grade students in an urban elementary school, most of which received a free or reduced priced lunch. Therefore, the generalizability of these results is limited to samples of similar demographics.

Directions for Future Research

There are a number of directions for future research. First, this study was implemented in a group context, therefore it could not be tailored to fit students' individual instructional needs. The target words that were chosen for the Cover, Copy, Compare intervention were identified by

surveying the students' pre-intervention writing probes to extract the most commonly misspelled words. Although the target words were presumably relevant to the majority of the students, the difficulty of the words is unclear. It is possible that the words may have been too difficult or too easy for some students. Further, the Add-a-Word component of the Cover, Copy, Compare intervention was not sensitive to differentiated instruction. Target words were removed when 85% of the students reached mastery level. By utilizing this criterion, 15% of students could potentially be falling behind, as they did not receive sufficient practice to build proficiency on target words. As Graham (1983) highlighted, spelling instruction has been thoroughly criticized for its inability to account for a wide range of students' spelling abilities. Therefore, future research should manipulate features of the intervention in order to be sensitive to varying levels of student abilities.

Within the context of a writing probe, the results of this study did not demonstrate that the addition of the Cover, Copy, Compare intervention to performance feedback improved students' spelling and writing performance. As noted by Henderson and Templeton (1986), in order for target spelling words to generalize, students must understand the word meanings and be able to incorporate the target spelling words into their vocabulary. Therefore, an intervention that incorporates targeting both the within-word spelling patterns and meaning principles would be more appropriate for examining spelling and writing performance within the context of a writing probe. Future research should consider adapting the Cover, Copy, Compare intervention to incorporate this component that has been identified to result in generalized spelling performance. In addition, future studies should examine the degree to which students generalize the target words from the Cover, Copy, Compare intervention into their writing samples.

An additional consideration pertaining to future research directions relates to emerging recommendations that encourage the analysis of individual differences in response to academic interventions (Petscher & Logan, 2014; Reeves & Lowe, 2009). An interesting finding observed in this study was the differentiated pattern of responding for students at varying levels of pre-intervention performance on the intervention spelling word list. Not only do these findings have implications for future research but they also provide initial practice recommendations. That is, by examining pre-intervention performance, decisions can be made regarding the students who would benefit from the intervention.

Finally, in order to fully examine the generalizability of the findings, this study should be replicated with a different population of third-grade students (i.e., students of different socioeconomic status in different geographical locations). It is also recommended to examine the effects of the intervention with older elementary students with the inclusion of more complex spelling skills (i.e., the addition of the meaning principle). In addition, due to issues of statistical power in the exploratory analysis, it is recommended that the study be replicated with a larger sample size in order to examine if the trends observed in this study reach statistical significance with a sufficiently powered sample.

Conclusions

A large percentage of the nation's students are struggling in the area of writing (National Center for Education Statistics, 2012). An important component of writing is the ability to spell proficiently (Berninger et al., 1999). Unfortunately, spelling instruction is less than ideal in elementary school classrooms (Fresch, 2003). Despite recommendations to implement a developmental approach to spelling instruction, these recommendations are not followed, resulting in school-based instructional practices with limited evidence of effectiveness

(Henderson & Templeton, 1986; Johnston, 2001). Furthermore, empirical support for explicit interventions for students at-risk for spelling difficulties is limited. This study aimed to incorporate empirically- based strategies of effective spelling instruction (i.e., explicit instruction, multiple practice opportunities, immediate feedback; Wansek et al., 2006) in the form of a Cover, Copy, Compare intervention and a performance feedback writing intervention in order to increase students' writing and spelling performance. Results of the current study indicated that although all the students that received performance feedback demonstrated improvements in writing and spelling, the addition of the Cover, Copy, Compare spelling intervention did not significantly increase spelling and writing performance in the context of a writing probe. These results suggest that the combination of the Cover, Copy, Compare intervention and the performance feedback intervention did not result in an integrative writing intervention. Rather, the interventions improved performance on their targeted outcomes (i.e., spelling and writing). Future studies should continue to explore manipulations to the proposed integrative writing intervention in order to generalize students' spelling improvement to their writing products.

Appendix A

Cover, Copy, Compare (CCC) Condition Intervention Script

Directions:

1. Participants should be seated with their desks cleared
2. Pass out all necessary materials (e.g., worksheet, pencils)
3. Introduce intervention to participants: “Today we are going to use this worksheet to work on spelling words”
4. Narrate the five steps (a) lift slip of paper and read word silently, (b) Copy the word in the first blank, (c) Use strip of paper to cover printed and written word, (d) Write the word from memory in the third blank space (emphasize no peeking), (e) Lift slip of paper and compare answer to correct model
5. Explain to participants steps for correct (move to the next problem) and incorrect (repeat CCC steps) responses
6. Start the timer and give participants 90 seconds to complete the worksheet
7. Monitor participants and provide assistance when needed
8. When timer goes off, instruct participants to, “Stop, put pencils down”
9. Collect CCC worksheets when completed

Appendix B
Cover, Copy, Compare Student Worksheet

Name: _____

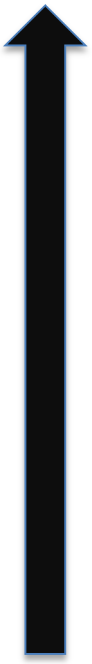
WORD	COPY	COVER 1	COVER 2
Be			
Was			
Cause			

Appendix C

Individualized Performance Feedback

Last week, you wrote this many words:

44



Appendix D

Correct Letter Scoring (CLS) Rules (Shinn & Shinn, 2002)

Omissions. When required letters are not written.

goat

written as

goat	^g^o^a^t^	CLS=5, ILS=0
got	^g^o^{x}t^	CLS=3, ILS=1
gt	^g^{x}t^	CLS=2, ILS=1

Double Letters. When one letter in a double letter combinations (tt, ll, oo) is omitted, is usually works best to count the first letter as the first of the two letters.

cool

written as

cool	^c^o^o^l^	CLS=5, ILS=0
col	^c^o^{X}l^	CLS=3, ILS=1

Insertions. When extra letters are written.

top

written as

top	^t^o^p^	CLS=4, ILS=0
tope	^t^o^p^{x}e^{x}	CLS=3, ILS=2
toap	^t^o^{x}a^{x}p^	CLS=3, ILS=1

Capitalized Words. Proper nouns must be capitalized.

July

written as

July	^J^u^l^y^	CLS=5, ILS=0
july	^{x}j^{x}u^l^y^	CLS=3, ILS=2

Hyphentated Words. The hyphen is counted as a letter.

re-aim

written as

re-aim	^r^e^-^a^i^m^	CLS=7
re aim	^r^e$_{x}$a^i^m^	CLS=5, ILS=1

Abbreviations. A period(s) contained within the word is counted as a letter.

Mrs.

written as

Mrs.	^M^r^s^.^	CLS=5, ILS=0
Mrs	^M^r^s^{x}	CLS=3, ILS=1

Apostrophes. Counted as letters.

Won't

written as

won't	^w^o^n^'^t^	CLS=6, ILS=0
wont	^w^o^n^{x}t^	CLS=4, ILS=1

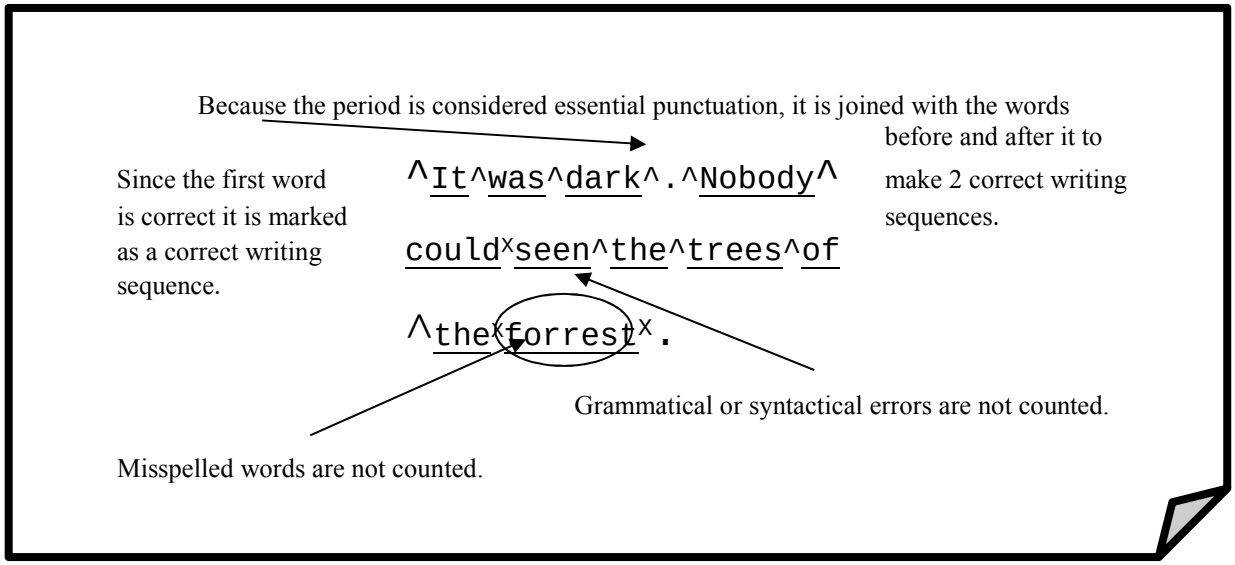
Appendix E

Correct Writing Sequences (CWS) and Incorrect Writing Sequences (IWS) Scoring Rules

When scoring correct writing sequences, the examiner goes beyond the confines of the isolated word to consider units of writing and their relation to one another. Using this approach, the examiner starts at the beginning of the writing sample and looks at each successive pair of writing units (writing sequence). Words are considered separate writing units, as are essential marks of punctuation.

To receive credit, writing sequences must be correctly spelled, and be grammatically correct. Each sequence should be examined in isolation and credit should be given when the sequence is correct (e.g., "seen^the") or marked incorrect when the sequence is not correct (e.g., "could^{x} seen"). In effect, the student's writing is judged according to the standards of informal standard American English. A caret (^) is used to mark the presence of a correct writing sequence and an X (^{X}) is used to mark the presence of an incorrect writing sequence.

An illustration of selected scoring rules for correct writing sequences is provided below:



Correct Writing Sequences (CWS) - Continued:

Rules:

☑ Correctly spelled words make up a correct writing sequence (reversed letters are acceptable, so long as they do not lead to misspellings):

Example: ^I^like^the^reb^car^.

☑ Necessary end marks of punctuation (periods, question marks, and exclamation points are included in correct writing sequences:

Example: ^Is^that^a^red^car^?

All other punctuation, except apostrophes, that is used correctly is counted as well (quotation marks, colons, semicolons, parentheses).

Example: ^Sally^said^,^"^Is^that^a^red^car^?^"

If commas or other punctuation besides the end punctuation is missing, students are **not** penalized for this.

☑ Syntactically correct words (i.e., correct word order or structure in sentence) make up a correct writing sequence:

☑ Example: ^Is^that^a^red^car^?

^Is^a^that^car^red^? [note: 'a car' is not syntactically correct]

☑ Semantically correct words (i.e., grammatically correct) make up a correct writing sequence:

Example: ^Is^that^a^red^car^?

^Is^that^a^rip^car^? [note: 'rip car' is not semantically correct]

Correct Writing Sequences (CWS) – Continued:

☑ If correct and capitalized, the initial word of a writing sample is counted as a correct writing sequence:

Example: ^Is^that^a^red^car^?

Capitalization Rule: The only words that are expected to be capitalized are (a) those words that begin a sentence, (b) the word "I", and (c) proper nouns. Do not penalize other capitalization mistakes.

Example: ^Is^that^a^Redˣfordˣcarˣ?

☑ If the student re-writes the story starter, then each word pair is counted as a correct writing sequence. However, the student does not get a correct writing sequence for the first word written because the student did not connect their text to the story starter:

Example: ^I^never^dreamed^the^basement^door^would^open^.

☑ Titles are included in the correct writing sequence count, but not the words "The End":

Example: ^The^Terrible^Rotten^Day

☑ For this measure, numerals **are counted**.

Example: ^The^14^soldiers^waited^in^the^cold^.

^The^crash^occurred^in^1976^.

☑ ***Like*** in the middle of a sentence is incorrect.

Example: ^ He ^ wore ˣ like ˣ a ^ t-shirt ^ .

Correct Writing Sequences (CWS) - Continued:

Not surprisingly, evaluating a writing probe according to correct writing sequences is the most time-consuming of the scoring methods presented here. It is also the metric; however, that yields the most comprehensive information about a student's writing competencies. A WE-CBM sample scored for correct writing sequences is provided below:

	TWW	WSC	CWS
^I^xwoud^xdrink^water^from^the^ocean	07	05	05
^and^I^xwoud^xeat^the^fruit^off^of	08	07	06
^the^trees^. ^Then^I^xwoud^xbilit^xa	07	05	05
^house^out^of^trees^,^and^I^xwoud	07	06	07
^xgather^firewood^to^stay^warm^.^I	06	06	06
^xwoud^xtry^and^fix^my^boat^in^my	08	07	06
^spare^time^.	02	02	03

This sample is found to contain:

37 correct writing sequences

Incorrect Writing Sequences (IWS):

This metric further distinguishes writing quality from correct writing sequences. A potential disadvantage of this metric; however, is that it not as sensitive to growth in fluency. Counting these sequences can be done simultaneously with correct writing sequences. Any sequence that is not marked by a caret (^) can be marked with an X to designate an incorrect writing sequence. The number of X's can then be tallied.

A WE-CBM sample scored for incorrect writing sequences is provided below:

	TWW	CSW	CWS	IWS
^I^Xwoud^Xdrink^water^from^the^ocean . . .	07	05	05	02
^and^I^Xwoud^Xeat^the^fruit^off^of	08	07	06	02
^the^trees^. ^Then^I^Xwoud^Xbilit^Xa . . .	07	05	05	03
^house^out^of^trees^,^and^I^Xwoud . . .	07	06	07	01
^Xgather^firewood^to^stay^warm^.^I . .	06	06	06	01
^Xwoud^Xtry^and^fix^my^boat^in^my	08	07	06	02
^spare^time^.	02	02	03	00

This sample is found to contain:

11 incorrect writing sequences

37 correct writing sequences

Table 1

Student Demographic Information (N=54)

			Condition					
	Total Sample		Performance Feedback Only Condition		Cover, Copy, Compare + Performance Feedback Condition			
Characteristics	%	(*n*)	%	(*n*)	%	(*n*)	X^2	*p*
Sex							.297	.586
Female	48.15	(26)	51.85	(14)	55.56	(15)		
Male	51.85	(28)	48.15	(13)	44.44	(12)		
Race								
American Indian or Alaska Native	3.70	(2)	3.70	(1)	3.70	(1)	0.00	.755
Asian	7.41	(4)	3.70	(1)	11.11	(3)	1.08	.305
Black or African American	27.78	(15)	18.52	(5)	37.04	(10)	2.31	.112
White	50.00	(27)	66.67	(18)	33.33	(9)	6.00	.014*
Two or more races	11.11	(6)	7.41	(2)	14.82	(4)	0.75	.334
Ethnicity							1.08	.299
Hispanic or Latino	7.41	(4)	11.11	(3)	3.70	(1)		
Not Hispanic or Latino	92.59	(50)	88.89	(24)	96.30	(26)		
Special Education Eligibility							2.00	.572
Emotional Disturbance	1.85	(1)	0.00	(0)	3.70	(1)		
Learning Disability	1.85	(1)	3.70	(1)	0.00	(0)		
Speech or Language Impairment	3.70	(2)	3.70	(1)	3.70	(1)		
Limited English Proficiency/English Language Learners								
Eligible	12.96	(7)	11.11	(3)	14.81	(4)	0.67	.413
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	F	*p*
Age	8.05	(0.52)	8.05	(0.49)	8.06	(0.56)	1.79	.673

*$p < .05$

Table 2

Intervention Spelling Words

Word	Session Introduced	Session Removed	Correct Letter Sequences
1. Be	1	2	3
2. Was	1	2	4
3. Cause	1	6	6
4. Bend	2	2	5
5. Because	2	5	8
6. Pause	3	3	6
7. Friend	3	5	7
8. They	4	4	5
9. When	6	6	5
10. What	6	6	5
11. He	6	2	3
12. The	7	6	4
13. Heir	7	7	5
14. Their	7	8	6
15. Hey	8	--	4

Note. The listed words denote the target words used in the Cover, Copy, Compare intervention. These words were also assessed during pre- and post- assessment to measure student spelling accuracy.

Table 3

Students' Average Scores on Pre-Intervention and Post-Intervention Measures of Spelling and Writing

	Pre-Intervention						Post-Intervention					
	Performance Feedback Only Condition			Cover, Copy, Compare + Performance Feedback Condition			Performance Feedback Only Condition			Cover, Copy, Compare + Performance Feedback Condition		
	M	*(SD)*	%	M	*(SD)*	%	M	(*SD)*	%	M	*(SD)*	%
Intervention Spelling Word List												
Correct Letter Sequences	60.83	(10.09)	81.1%	64.04	(8.23)	85.4%	62.42	(10.09)	83.2%	69.62	(5.44)	92.8%
Incorrect Letter Sequences	11.04	(7.11)	14.7%	9.30	(6.80)	12.4%	9.83	(6.78)	13.1%	4.77	(4.05)	6.4%
Words Spelled Correctly	10.38	(3.10)	69.2%	11.30	(2.54)	75.3%	10.54	(3.28)	70.3%	13.08	(1.83)	87.2%
WE-CBM Probe												
Correct Writing Sequences	20.11	(12.16)	69.6%	16.26	(9.23)	76.2%	29.16	(14.78)	66.4%	32.04	(18.27)	77.1%
Words Spelled Correctly	24.11	(12.37)	89.3%	17.81	(9.25)	66.0%	37.16	(14.86)	89.2%	37.96	(17.05)	96.8%
Correct Letter Sequences	112.89	(53.75)	91.1%	87.56	(45.28)	93.7%	170.04	(63.26)	91.0%	169.92	(77.54)	94.4%
Incorrect Letter Sequences	9.19	(6.50)	8.9%	4.37	(4.22)	6.3%	15.88	(13.08)	9.0%	8.72	(8.24)	5.6%

Table 4

AIMSweb Normative and Rate of Improvement Data for Pre-Intervention and Post-Intervention Measures of Writing

	Pre-Intervention		Post-Intervention		ROI	
	M	Percentile	*M*	Percentile	Targeted	Attained
Performance Feedback Only Condition						
Correct Writing Sequences	20.11	37th	29.16	46th	0.67	0.60
Words Spelled Correctly	24.11	39th	37.16	61st	0.60	0.87

Cover, Copy, Compare + Performance Feedback Condition						
Correct Writing Sequences	16.26	26th	32.04	54th	0.93	1.07
Words Spelled Correctly	17.81	24th	37.96	61st	1.00	1.33

Note. ROI = Rate of Improvement

Table 5

Descriptive Results of the Kids Intervention Profile for Students' Perceptions of the Cover, Copy, Compare Intervention

	Cover, Copy, Compare + Performance Feedback Condition	
	M	*(SD)*
Factor 1: Overall Intervention Acceptability	3.43	(1.62)
Factor 2: Skill Improvement	2.92	(1.81)
How much do you like working on spelling with us each week?	3.85	(1.49)
How much do you like keep being told what words to spell?	3.15	(1.52)
Were there times when you didn't want to work on spelling with us?	2.00	(1.30)
Were there times when you wished you could work more on spelling with us?	3.44	(1.71)
How much do you like using the colored worksheets to work on spelling?	4.19	(1.23)
How much do you think it helped you to cover the words and try to write them from memory?	3.92	(1.55)
Do you think your spelling has improved?	4.27	(1.25)
Do you think your spelling has gotten worse?	1.58	(1.17)

Table 6

Descriptive Results of the Kids Intervention Profile for Students' Perceptions of the Performance Feedback Intervention

	Performance Feedback Only Condition		Cover, Copy, Compare + Performance Feedback Condition	
	M	*(SD)*	*M*	*(SD)*
Factor 1: Overall Intervention Acceptability	3.59	(1.63)	3.61	(1.58)
Factor 2: Skill Improvement	2.93	(1.74)	2.92	(1.75)
How much do you like writing stories with us each week?	4.43	(0.95)	4.24	(1.27)
How much do you like being told what to write about?	2.83	(1.53)	3.23	(1.39)
Were there times when you didn't want to write with us?	2.04	(1.55)	1.96	(1.48)
Were there times when you wished you could work more on writing stories with us?	3.83	(1.59)	3.62	(1.60)
How much do you like being told how many words you wrote?	4.48	(1.28)	4.35	(1.06)
How much do you think it helps you when you were told how many words you wrote?	3.96	(1.40)	4.31	(1.26)
Do you think your writing has improved?	4.22	(1.24)	4.04	(1.37)
Do you think your writing has gotten worse?	1.65	(1.11)	1.81	(1.33)

Table 7

Average Scores on Measures of Writing and Spelling Performance Based on Types of Feedback Received

	Positive (n = 17)		Negative (n = 15)		Mixed (n = 9)			
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*F*	*p*
Correct Writing Sequences	36.12	(20.73)	27.07	(15.09)	32.67	(14.35)	3.07	.06
Words Spelled Correctly	45.50	(17.56)	32.60	(14.95)	38.22	(14.33)	4.73	.02
Correct Letter Sequences	198.06	(83.00)	147.20	(65.59)	181.78	(62.49)	0.54	.56
Incorrect Letter Sequences	14.94	(15.64)	9.73	(10.93)	12.22	(8.63)	0.22	.81

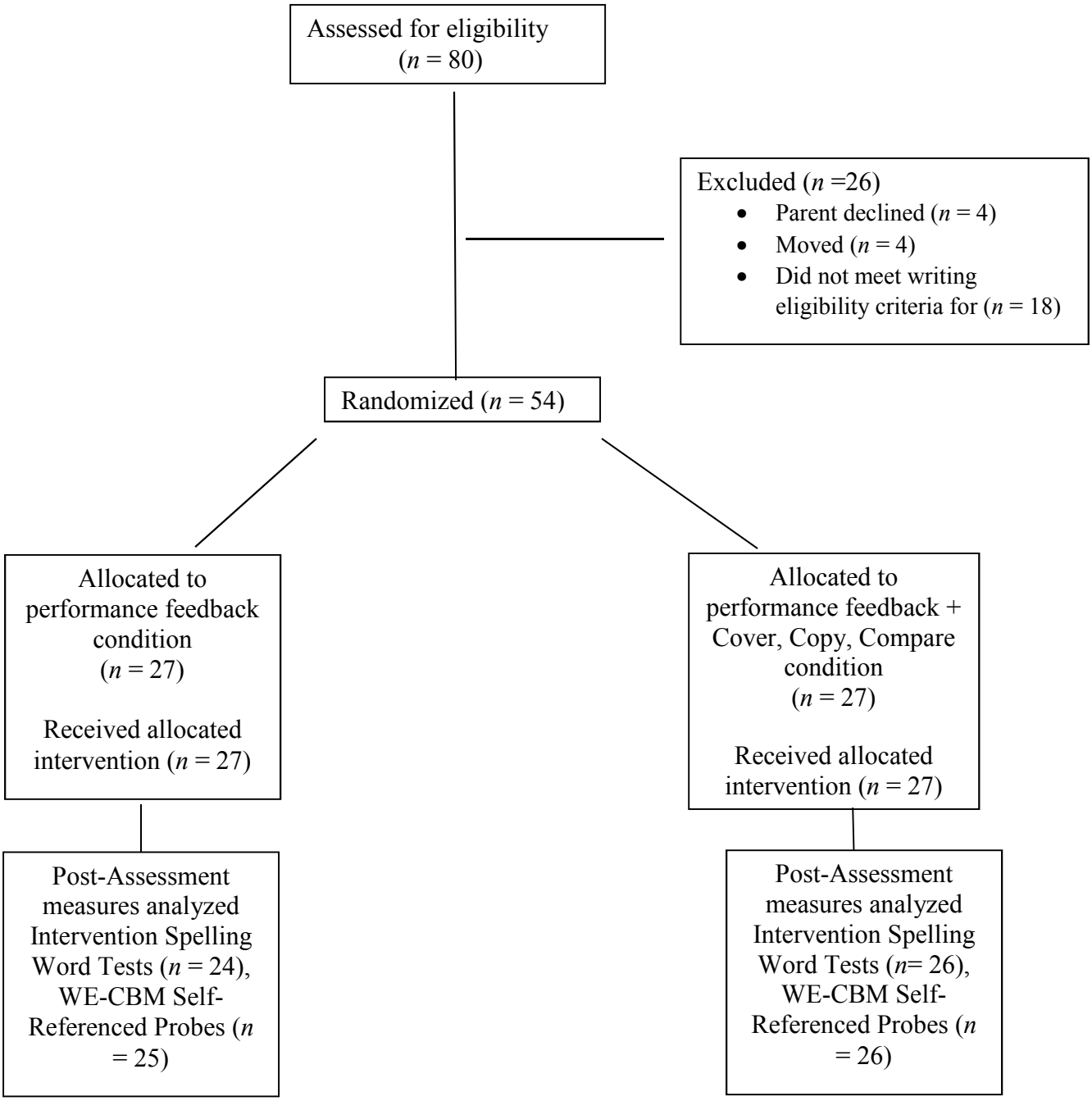


Figure 1. Participant flow chart following consolidated standards of reporting trial guidelines.

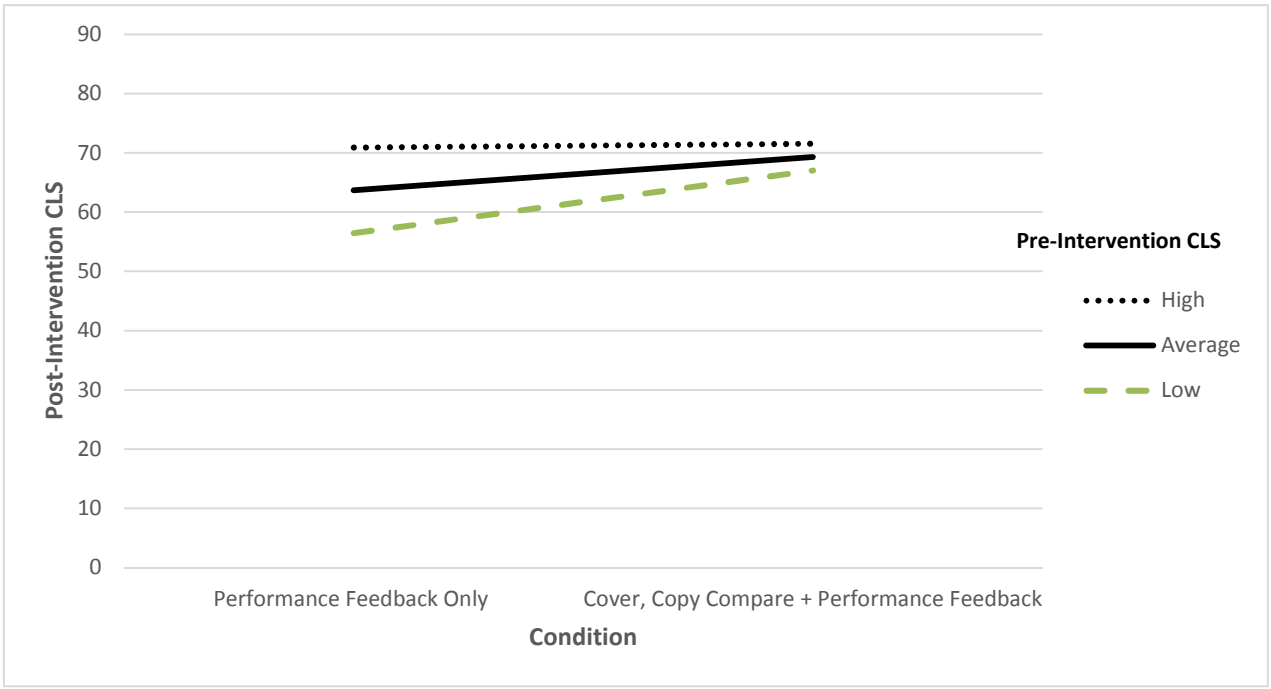


Figure 2. Simple slopes of condition predicting post-intervention Correct Letter Sequences (CLS) and Words Spelled Correctly (WSC) for 1 *SD* below the mean (Low), the mean (Average), and 1 *SD* above the mean (High) of pre-intervention CLS and WSC.

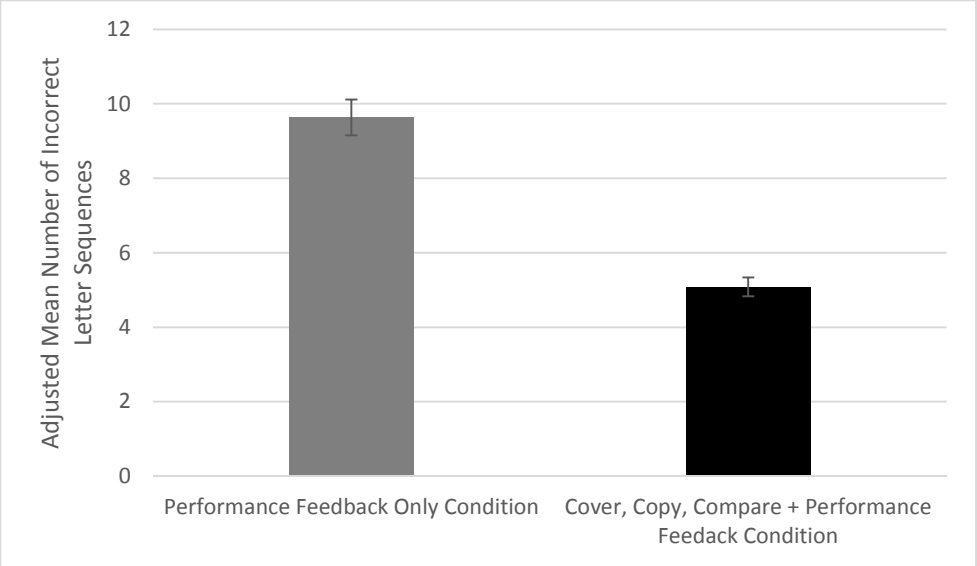
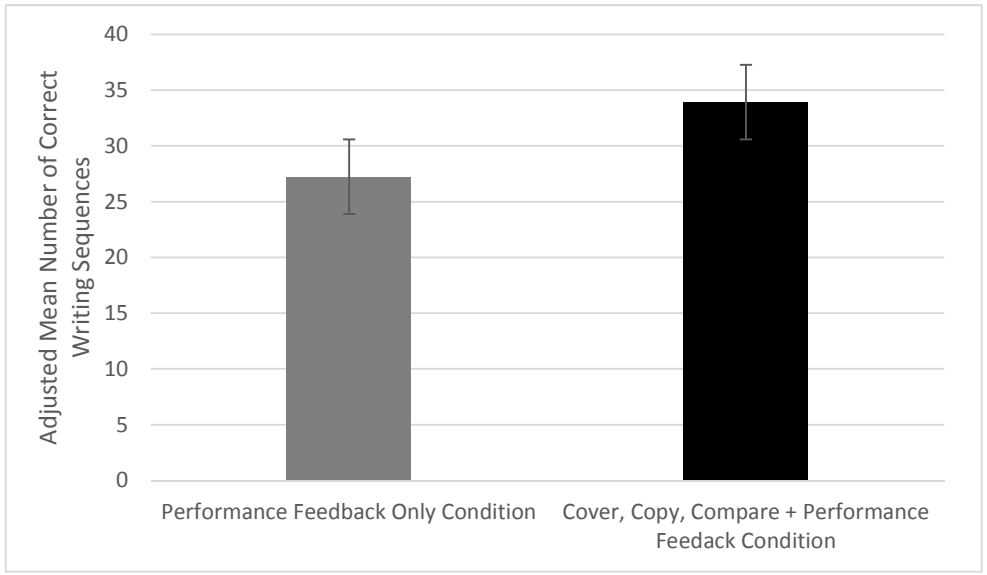
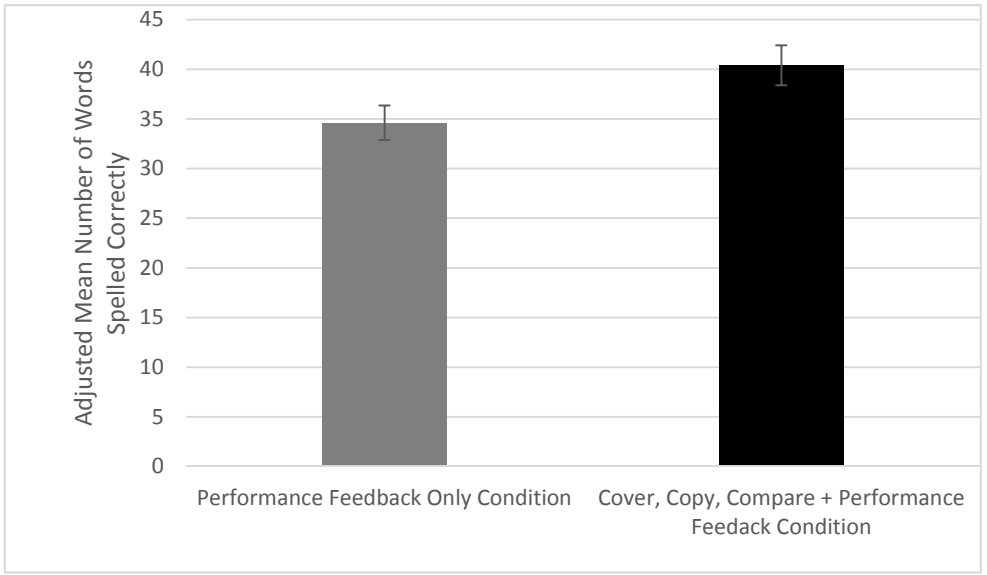
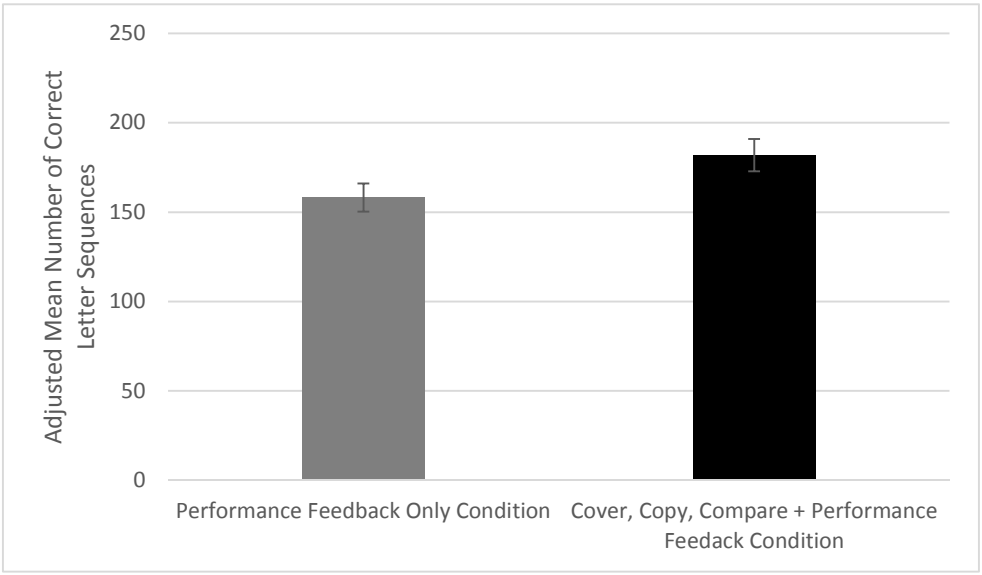


Figure 3. Adjusted mean number of incorrect letter sequences by condition on the post intervention spelling words spelled correctly.







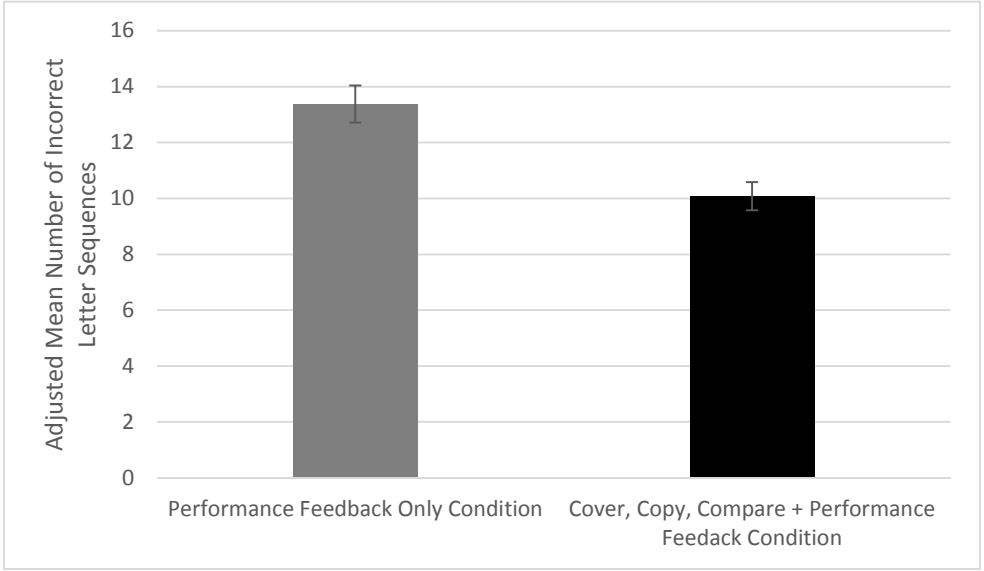


Figure 4. Adjusted mean scores by condition on the post WE-CBM probes.

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