Relationship between Writing Self-Efficacy and Writing Fluency in a Performance Feedback Intervention

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Abstract

National assessments have shown that a significant number of students are writing at a level below proficiency (National Center for Education Statistics, 2012; Persky, Daane, & Jin, 2003). The primary purpose of this study was to increase our understanding of the role of writing self-efficacy in relation to elementary-aged students’ writing fluency outcomes when they are receiving a performance feedback intervention. The study used secondary data collected from two larger studies, resulting in a final sample of 138 third-grade students from two cohorts. A hierarchical multiple regression analysis was conducted to examine whether students’ writing self-efficacy would predict their writing fluency outcomes in response to a performance feedback intervention. Results indicated that students’ writing self-efficacy was not a statistically significant predictor of writing fluency when students’ pre-intervention spelling and compositional skills were controlled for.

*Keywords*: Writing self-efficacy, Performance feedback, Elementary students, Writing fluency
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Relationship between Writing Self-Efficacy and Writing Fluency in a Performance Feedback Intervention

Writing is an important skill that we use in our everyday lives. Writing can be used to help us communicate, persuade, and express ourselves to others. For example, students are often required to communicate and express their ideas through written assignments across almost all academic areas. In schools, written assignments are often used because they help students to learn by allowing them to formulate their knowledge, thoughts, and ideas on paper. Not only is writing useful to students, but employers expect potential employees to be able to write effectively. A major survey found that most companies would not hire someone without basic writing skills because writing skills were viewed as an integral part of most jobs (National Commission on Writing, 2004).

Because thoughts and knowledge can be developed through writing, there is an obvious educational power in writing. Therefore, it should not be surprising that students need to be competent writers in order to succeed in school. Writing helps students to develop their thought processes, analytical skills, and ability to make valid distinctions (National Commission on Writing, 2003). In addition, students need to become competent writers because it will improve their academic aptitude and knowledge, as well as help them to formulate ideas that they can subsequently express to others (Persky, Daane, & Jin, 2003). On the other end, students who do not have adequate writing skills are at increased risk for chronic school failure, school dropout, and behavioral problems (Berninger et al., 2006). Good writing skills are needed in the future as well, since many colleges and universities examine the writing skills of applicants in their application process (Graham & Perin, 2007). If students can acquire writing skills and develop them well, they will become assets when they enter higher education and eventually the
workforce. However, as it will be discussed, the current condition of writing is in a troubled state.

Current Condition of Writing

To say that the current condition of writing is less than ideal would be an understatement. Although proficient writing skills are necessary for students to obtain for future academic and work success, many students’ performance falls short of this expectation. This trend has been highlighted in standardized writing assessments. For example, the National Assessment of Educational Progress (NAEP) is a national assessment that is used to assess the academic skill level of fourth-, eighth-, and twelfth-grade students in a multitude of academic areas, including writing. There are three achievement levels in which students could be categorized: basic (i.e., partial mastery), proficient (i.e., exhibiting mastery expected at grade-level), and advanced (i.e., superior performance). The percentage of students performing below the proficient level is substantial. Results showed that 72% of fourth-graders, 69% of eighth-graders, and 78% of twelfth-graders were writing below the proficient level (Persky, Daane, & Jin, 2003). More recent results from NAEP showed that the trend has remained relatively stable over time. The National Center for Education Statistics (2012) found that the majority (i.e., 73%) of both eighth- and twelfth-grade students were below the proficient level in writing. Fourth-graders were not included in this most recent assessment; however, these findings (National Center for Educational Statistics, 2012; Persky et al., 2003) suggests that elementary students who are not proficient in their writing ability continue to demonstrate similar difficulties in middle and high school.

Unfortunately, the percentage of students below the proficient level becomes even greater when demographic factors such as ethnicity/race and socioeconomic status (SES) are taken into
account. Among fourth-grade students in the sample of 2002 NAEP results, it was found that the majority of students of ethnic minority status (86% Black, 83% Hispanic, and 85% American Indian/Alaska Native) were performing below the proficient level in writing (Persky et al., 2003). Another noteworthy demographic factor was socioeconomic status (SES); 85% of fourth-grade students from a low SES background (i.e., they were eligible for free/reduced lunch) were writing below a proficient level (Persky et al., 2003).

**Theoretical Conceptualizations of Writing**

One factor that may account for the high percentage of students who are not proficient in writing is the complexity involved in utilizing the skill. For example, the writing process activates a number of cognitive processes including memory, attention, graphomotor output, sequential processing, higher-order cognition, language, and visual-spatial functions (Hooper, Knuth, Yerby, & Anderson, 2009). Given that writing process involves many cognitive processes, learning how to write can be demanding. According to researchers, there are different sequential steps in the writing process that students must master in order to become effective writers. These steps have been conceptualized into writing models.

There are two prominent theoretical models of writing that have been used to explain the writing process. In 1980, Hayes and Flower developed one of the most influential writing models in the research literature. The Hayes and Flower model (see Figure 1) proposes three recursive components of the writing process: (a) planning, which includes idea generating, organizing, and goal setting; (b) translating, which involves converting language representations into orthographic text; and (c) reviewing, which includes proofreading and editing. Although the Hayes and Flower (1980) model is influential, a salient critique has been its lack of applicability to developing writers. The translation component of the Hayes and Flower (1980) model lacked
subcomponents (i.e., unlike planning and reviewing) and was not as fully developed as the planning and reviewing components. Berninger et al. (1997) argued that translation is an important component of the writing process for beginning writers and that the Hayes and Flower (1980) model seemed more suitable to describe the writing process for adults. In addition, the processes of planning and reviewing are not as salient for emerging writers (Abbott & Berninger, 1993), because emerging writers are just beginning to learn how to write. Therefore, the subcomponents in the planning and reviewing components of the writing process outlined by Hayes and Flower could be considered too advanced. Another writing model (i.e., The Simple View of Writing) was conceptualized in order to better understand the writing process for emerging writers by further developing the area of translation.

In an attempt to develop a theoretical conceptualization of writing that is sensitive to the needs of developing writers, Berninger and colleagues (1992) expanded upon Hayes and Flower’s (1980) conceptualization of writing by adding two subcomponents (i.e., text generation and transcription) under translation. In this Simple View of Writing (Berninger, 2002), text generation involves the transfer of ideas into linguistic representations in working memory, whereas transcription involves the transfer of linguistic representations into motor output. Specifically, this model (see Figure 2) has three components that support the writing process: (a) transcription, including handwriting and spelling, (b) executive functions, including planning, reviewing, and revising, and (c) text generation, which includes translating ideas into written language. Abbott and Berninger (1993) argue that transcription is of particular importance because of its relation to spelling, handwriting, and compositional fluency.
**Current Instructional Practices in Writing**

Although many elementary-aged students are below proficiency in writing (Persky, Daane, & Jin, 2003), a wide array of writing instructional practices were developed and are commonly used by teachers in elementary classrooms to improve writing skills, including: strategy instruction (i.e., teaching students to independently plan, revise, and edit text), peer assistance (i.e., students work together to plan, revise, and edit their texts), setting product goals (i.e., setting writing goals to complete), summarization (i.e., teaching students how to summarize texts), and feedback (i.e., input from others about their writing). In addition to these formal writing practices, teachers have also used informal techniques such as providing extra one-on-one assistance, providing praise to struggling writers contingent upon completing work, and modifying instruction to suit struggling writers’ needs (e.g., using drawings or pictures in their writing) (Graham, Harris, Fink-Chorzempa, & MacArthur, 2003).

Although many instructional practices have been developed, the most common practice used among teachers is the process approach. The process approach, which first emerged in the 1970s as an alternative to traditional writing approaches, can be categorized as a problem-solving approach to writing by which students move sequentially through writing components such as pre-planning activities (i.e., planning or brainstorming), creating a written draft, and engaging in revision (Pritchard & Honeycutt, 2006). The movement between the writing components is recursive and the goal of this approach is to teach students how to plan, write, and edit their written work. In the 1980s, the process approach became the “gold standard” in writing instruction for children in grades K-12 (Patthey-Chavez, Matsumara, & Valdes, 2004) and recent assessments of current instructional practices in writing suggest that it is still a dominant approach.
For example, Cutler and Graham (2008) conducted a national survey to assess the type of writing instruction used in primary grades. A total of 178 primary grade teachers (i.e., first through third grade) from public and private schools across the nation were randomly surveyed. Teachers were given a questionnaire to collect the following information: personal demographics (e.g., gender; education level), demographics of their students (e.g., writing abilities; socioeconomic status), teachers’ attitudes about writing and their ability to teach it, how much instructional time was allotted for writing instruction, description of their approach to writing (e.g., process approach, traditional skills instruction), and instructional procedures with frequency of implementation in the classroom. The results of their survey indicated that 72% of teachers reported using the process approach in combination with another method in their writing instruction, while 20% of the teachers reported solely using the process approach. These findings suggest that the process approach is a popular writing instructional practice among teachers.

In a synthesis of writing instructional practices, Graham and Perin (2007) conducted a meta-analysis of 123 experimental and quasi-experimental writing intervention studies to examine the effectiveness of current instructional writing practices among children and youth (i.e., students in grades 4-12). Results from the meta-analysis indicated that several writing techniques were effective in improving students’ writing. For example, large weighted effect sizes were observed for strategy instruction \((d = 0.82)\), summarization \((d = 0.82)\), self-regulated strategy development (SRSD; \(d = 1.14)\), peer assistance \((d = 0.75)\), setting product goals \((d = 0.70)\). Moderate weighed effect sizes were observed for sentencing combining \((d = 0.50)\), non-self-regulated strategy development or non-SRSD \((d = 0.62)\), and word processing \((d = 0.55)\). Small weighted effect sizes were found for the process approach \((d = 0.32)\), pre-writing \((d =
0.32), inquiry \((d = 0.32)\), and study of models \((d = 0.25)\). It should be noted that the effect size of feedback interventions could not be determined for several reasons (e.g., diversity in procedures, lack of consistency in control group, etc.) and therefore, researchers did not report a weighted effect size.

In addition, Graham and Perin (2007) further examined the effectiveness of the process approach in relation to the amount of professional development teachers received. It was found that the effectiveness of process approach slightly increased \((d = 0.46)\) when teachers received prior proper training. However, when teachers were not trained in the process approach, only a small effect \((d = 0.27)\) for select grades (i.e., grades 4-6) was observed. These findings suggest that the most commonly-used instructional approach, the process approach to writing, may not be effective in improving students’ writing performance unless teachers receive adequate training. In addition, the process approach utilizes components that may be too advanced for third grade students (e.g., reviewing). Therefore, more developmentally-appropriate writing practices for emerging writers should be examined.

**Developmentally-Appropriate Writing Practices for Elementary-Aged Students**

In order for students to learn effectively, instruction needs to be provided that is appropriate based on their developmental level (Graham, McKeown, Kiuaha, & Harris, 2012). In one of the first studies to examine the developmental skills of emerging writers, Abbott and Berninger (1993) argued that instructional practices should primarily involve the subcomponents of translation (i.e., transcription and text generation). They argued that text generation (i.e., turning ideas into words or linguistic symbols in working memory) and transcription (i.e., converting those words or linguistic symbols from working memory into written words on the page) are the skills most frequently used by emerging writers.
To test this hypothesis, the researchers examined the structural relationships between latent factors underlying the developmental and component skills related to writing in a sample of 600 students from Grades 1-6 using multiple-group structural equation modeling. It was found that orthographic coding, which they defined as the ability to automatically, rapidly, and accurately encode visual information into printed words, was significantly correlated with handwriting in grades 1-6 and spelling in grades 1-3. Also, in the primary grades, there was evidence that oral language and reading contributed to students’ compositional fluency; however, the path was unclear in the intermediate grades (Grades 4-6) because of high covariance between those factors (i.e., reading and oral language). One of the salient implications of this study is that elementary-aged children can benefit from direct instruction in handwriting to order to help better automatize the process of retrieving and generating alphabetic letters, which should help to improve their writing fluency.

In fact, Berninger and colleagues (1997) argued that if children’s handwriting skills were improved and became more automatized, then their compositional fluency (i.e., words written within a time constraint) and compositional quality would improve. In addition, they theorized that the process of learning to write involves multiple components including low-level components (e.g., handwriting, memorizing letters) and high-level components (e.g., text generation, reviewing texts). Automatizing low-level components could free up working memory processes to be used for high-level components. If emerging writers’ handwriting became more automatic, then it would help to improve their fluency. In turn, improving their writing fluency would improve their writing quality, because they would be putting less effort into generating written text and more effort into what they write (e.g., plans and ideas).
In a related study, Graham and colleagues (1997) examined the relationship between the mechanical components of writing (i.e., spelling and handwriting fluency) and the outcomes of writing (i.e., compositional fluency and compositional quality) among 600 students enrolled in Grades 1 through 6. The primary grade sample (i.e., students in grades 1-3) and the intermediate grade sample (i.e., grades 4-6) were given measures of handwriting, spelling, and composition. For the primary grades, a statistically significant pathway was observed between compositional fluency and compositional quality. The path from spelling to compositional fluency was also statistically significant; however, spelling contributed to compositional quality only indirectly through its correlation with handwriting. For the intermediate grades, the path from handwriting fluency was statistically significant to compositional fluency and compositional quality. However, spelling seemed to be less of a factor with the older children, which was possibly due to this skill being automatized in older students. The path between spelling and compositional fluency was not significant and similar to students in the primary grades, spelling only contributed indirectly to compositional quality through its correlation with handwriting.

These results suggest that the only major difference between students in the primary grades and students in the intermediate grades was the relationship between compositional fluency and spelling, which was only significant among students in the primary grades. Graham and colleagues suggested that older children (i.e., intermediate grades) are more likely to have learned to use words that they know how to spell. These findings suggest that instruction in spelling and handwriting is more likely to result in improvements in primary students’ compositional skills, whereas instruction in handwriting is more likely to result in improvements in intermediate students’ compositional skills.
Writing Fluency

Writing fluency is the ability to automatically transcribe text with ease. Being able to transcribe easily is an important skill for children to acquire, given that indicators of written quantity (i.e., total words written) were found to highly correlate ($r = .920$) with indicators of writing quality (i.e., correct writing sequences) in a study where the reliability and validity of these indicators were compared (Videen, Deno, & Marston, 1982). In addition, the development of writing fluency is important for other writing-related skills such as planning and generating writing content, because writing fluency frees up cognitive resources for these higher order skills (Graham et al., 1997).

Writing fluency is typically developed during elementary school, which is why it has been recommended that translation be specifically targeted (Abbott & Berninger, 1993). Translation is targeted for two reasons: 1) elementary students are still trying to master the subcomponents of translation (i.e., text generation and transcription) and 2) acquiring proficiency in translation improves students’ writing fluency, because text generation (i.e., turning ideas into words in working memory) and transcription (i.e., turning words from working memory into written words on page) are more automatized. Therefore, it is critical that developmentally-appropriate instruction (i.e., focusing on skills associated with translation) be utilized among elementary-aged students in order to improve their written expression skills. One intervention that has been found to increase elementary-aged students’ writing fluency is performance feedback (Van Houten et al., 1974; Van Houten et al., 1975).

Performance Feedback Interventions

Feedback is any information given to an individual by some entity (e.g., teacher, parent, self) in regard to their performance on a task (Hattie & Timperley, 2007). Given adequate
instruction, feedback can be an effective means of enhancing students’ learning and achievement, because feedback provides information on what they should focus their effort and attention. In their meta-analysis of more than 190 studies, Hattie and Timperley examined the influence of feedback in the context of the classroom and found that the average effect size was large \((es = 0.79)\). Feedback was one of the strongest influences on student achievement along with other influences such as direct instruction \((es = 0.93)\) and students’ prior cognitive ability \((d = 0.71)\). However, researchers noted that there was some variability among the effects of different types of feedback. Hattie and Timperley reported that when studies included components of feedback that provided information about the task and how to perform the task more effectively, some of the largest effect sizes were obtained \((range, es = 0.95 to 1.10)\). Studies with some of lowest effect sizes gave feedback in the form of rewards \((es =0.31)\), praise \((es= 0.14)\), and punishment \((es = 0.20)\). While results of the meta-analysis showed that feedback can be helpful, Hattie and Timperley (2007) also noted that feedback tends to be less effective when there are high-levels of threat to the student’s self-esteem and feedback is more impactful if task complexity is low.

There have been several single-case design studies conducted on the effects of performance feedback on students’ writing fluency. Van Houten, Morrison, Jarvis, and McDonald (1974) examined whether the components of an intervention package (i.e., feedback, explicit timing, and public posting of each student’s highest score) could together increase the compositional rates (i.e., writing fluency) of second-grade and fifth-grade students. After baseline (i.e., writing as many as words as they could in a composition within a period of 10 minutes), students were exposed to the timing and feedback phase, during which their maximum total words written was posted on a board. In addition, after spending 10 minutes writing their
compositions, they were told to immediately count the total number of words that they had just written, as a form of immediate feedback. Using a reversal design, the results showed steady increases in the number of words written over the course of the experiment, ending with students writing three times as many words per minute than at baseline. In addition, it was found that students’ writing quality increased as well, based on scoring by an independent rater. Although there were substantial results, one of the limitations of this study was that the effects of performance feedback could not differentiated from the effects of the other components of the intervention package (e.g., motivation from public posting of scores) due to combined nature of the intervention package.

In order to address the aforementioned limitation in the Van Houten et al. (1974) study, Van Houten, Hill, and Parsons (1975) examined the contribution of each component (e.g., feedback and timing) to the overall effectiveness of the intervention package in one of two studies. The participants (i.e., fourth grade students in two classrooms) were exposed to different experimental phases via a reversal design: (a) baseline, (b) timing and feedback, (c) timing, feedback, and public posting, (b) timing and feedback, (c) timing, feedback, and public posting, (d) timing, feedback, public posting, and praise, and (c) timing, feedback, and public posting. For baseline (i.e., students wrote compositions with no feedback and no explanation of 10 min time limit) and subsequent experimental phases (see above), there were different timing restrictions for the classes (i.e., Class A had 20 min and Class B had 10 min). The results showed that each component contributed to the overall effectiveness of the package. For example, when feedback was provided in both classes, students’ writing rates almost doubled. In addition, the rate increased in both classes when public posting was added. When public posting was stopped, the rate decreased back to nearly previous levels caused by feedback, showing the
effects of feedback on its own. The results of study were able to demonstrate that performance feedback can be an effective intervention on its own.

Although these previous studies examined the effects of performance feedback on students’ writing skills, the majority included performance feedback as a component of a larger intervention (e.g., timing, feedback, and public posting). More contemporary studies have examined the effects of performance feedback on students’ writing fluency in isolation. Harris, Graham, Reid, McElroy, and Hamby (1994) examined the effects of performance feedback (i.e., through two self-monitoring procedures) on the written performance and on-task behavior of four students with learning disabilities in fourth- and fifth-grades. Results of the study found that students’ on-task behavior increased when they monitored their attention (i.e., through self-monitoring of attention procedure) and the quantity and quality of their writing increased when they monitored their academic performance (i.e., by counting their total words written and then graphing it after each session). Although results were promising, they are limited in terms of external validity. More specifically, the sample size was too small to generalize (i.e., only four students) and the only population assessed were students with learning disabilities, which does not generalize to more typically developing populations.

More recent studies have examined performance feedback interventions with typically-developing students. Eckert, Lovett, Rosenthal, Jiao, Ricci, and Truckenmiller (2006) examined the effects of performance feedback on typically developing third-grade students, who were randomly assigned to either an instructional feedback (i.e., received feedback about their writing weekly) or control group (i.e., received no feedback about their writing). Instructional feedback was their total words written from the week prior accompanied by a symbol that indicated whether their progress had improved (i.e., upward error) or weakened (i.e., downward arrow).
Results showed that the gains in students’ writing fluency and spelling were greater in the feedback group than the control group.

Similarly, Eckert et al. (2006) also examined the effects of various amounts of feedback through different conditions (i.e., none, once per week, or three times per week) in their second study. Results showed a statistically significant difference in total words written between the two feedback and control conditions. However, there was no significant difference in their number of correctly spelled words. As the previous studies suggest, performance feedback can be an effective intervention to increase student’s writing fluency. Although performance feedback is an effective intervention, additional variables that could potentially affect students’ writing fluency in the intervention should be examined. One potential variable that could possibly affect students’ written performance is their writing self-efficacy (i.e., confidence in their ability to write).

**Self-Efficacy**

The amount of effort and persistence that an individual will invest in any given task often relates to their level of self-efficacy. Self-efficacy is defined as an individual’s confidence in his or her ability to perform certain actions (Bandura, 1997). People who have high levels of self-efficacy are more likely to persist and put forth more effort when they encounter difficulties than those with lower levels of self-efficacy (Schunk, 1991). In addition, self-efficacy is a domain-specific construct, which means that it can only be examined in relation to one task. Given that self-efficacy is not a global construct, an individual’s self-efficacy level can vary across domains. For example, a third-grade student may perceive herself as capable of solving a math equation (i.e., math self-efficacy), but less capable to effectively write an essay (i.e., writing self-efficacy).
Self-efficacy is often mistaken with other related concepts such as self-esteem (i.e., an appraisal of self-worth), self-concept (i.e., composite view of oneself), and locus of control (i.e., the belief as to whether their actions will affect outcomes). It is important to note the difference, given that self-esteem and self-concept are both global constructs and self-efficacy is a domain-specific construct (i.e., self-efficacy can only be studied in relation to one area). In addition, self-efficacy is related solely to confidence in ability, while locus of control focuses on perceived control over outcomes.

Self-efficacy beliefs are formulated primarily from four sources. According to Bandura (1997), self-efficacy beliefs are created by interpreting information from: (1) mastery experiences (i.e., experiences that an individual has completing the task), (2) vicarious experience (i.e., observational learning), (3) verbal messages and social persuasion (i.e., others’ verbal thoughts on your ability), and (4) physiological states (e.g., how you feel when asked to perform a task). Although all four sources can influence one’s self-efficacy beliefs, mastery experiences tend to be the most powerful because individuals to get firsthand experiences with the task and their performance tends to provide more reliable information about their competency than other sources (e.g., verbal persuasion).

Self-efficacy is an important concept within Bandura’s (1986) social-cognitive theory (see Figure 3). In this theory, it is hypothesized that human functioning is the by-product of the interplay between human behavior, personal factors (e.g., cognition, emotions), and environmental factors. In this theory, self-efficacy is often considered a mediating mechanism in human functioning. In fact, self-efficacy beliefs can often better predict performance than actual capabilities, because those self-perceptions will determine whether individuals use the skills and
knowledge that they possess (Pajares, 2003). Given self-efficacy’s importance to behavior, many researchers have examined it in the context of academic performance.

**Self-Efficacy and Writing Performance among Typically-Developing Elementary-Aged Students**

To date, only seven studies (Limpo & Alves, 2013; Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999; Pajares, 2001; Pajares, 2007; Schunk & Swartz, 1993; and Shell, Colvin, & Bruning, 1995) have examined the role of self-efficacy in typically-developing elementary-aged students’ writing performance. In the first study, Pajares and Valiante (1997) sought to examine the influence of various factors, such as self-efficacy, writing apprehension, perceived usefulness of writing, and writing aptitude on the written performance of fifth-grade students. A total of 218 students were asked to complete an essay as well as measures of self-efficacy, writing apprehension, perceived usefulness of writing, and writing aptitude. The measure for self-efficacy was the Writing Skills Self-Efficacy Scale (Shell et al., 1989), which consisted of eight items that asked students to rate confidence in performing various writing skills (e.g., “correctly punctuate a one-page passage”). The results of the study found that self-efficacy was predictive of students’ written performance ($B = .356$) in spite of writing aptitude’s strong effect ($B = .601$). It was found that writing apprehension and perceived usefulness of writing had no direct effects. However, there were effects of writing self-efficacy on perceived usefulness of writing ($B = .230$) and writing apprehension ($B = -.452$), which suggests these components may actually be a by-product of self-efficacy, which has been suggested in the literature (Bandura, 1997). In addition, there were no sex differences in written performance, but girls reported higher writing self-efficacy.
In a second study, Pajares, Miller, and Johnson (1999) sought to investigate the sex differences in writing self-efficacy among elementary-aged students in grades 3 through 5. All students were asked to write an essay and to complete measures of writing self-efficacy, writing self-concept, perceived usefulness of writing, writing aptitude, and self-efficacy for self-regulated learning. The measure for writing self-efficacy was the Writing Skills Self-Efficacy Scale, which was also used in Pajares and Valiante (1997). The measure for self-efficacy for self-regulated learning was the Self-Efficacy for Self-Regulated Learning Scale, which was adapted from Bandura’s Children Multidimensional Self-Efficacy Scale. It had seven items that were designed to assess students’ judgments of their capability to use various self-regulated strategies. In addition to the writing self-efficacy measure and the self-efficacy for self-regulated learning measure, students were asked six questions to determine how they compared their writing to that of other girls and boys in their class and school. Results of a multiple regression analysis indicated that when all other variables were taken into account, writing self-efficacy (B= .397) and writing aptitude (B= .387) were predictive of writing outcomes and self-efficacy was found to contribute to writing outcomes independently. Self-efficacy for self-regulation, writing apprehension, perceived usefulness, and sex did not significantly contribute to the model. In addition, it was found that girls were generally judged as superior writers, although there was no general difference in their writing self-efficacy beliefs from boys. This study adds to an inconsistent line of research of sex differences in writing self-efficacy in elementary-aged students. Pajares and Valiante (1997) found girls have higher writing self-efficacy, although other studies (Pajares & Valiante, 1999; Shell et al., 1995) have found no differences. Future research should examine sex differences in writing self-efficacy to help clear these inconsistencies.
In another study, Limpo and Alves (2013) sought to examine the contribution of planning, revision, transcription (i.e., handwriting and spelling), and self-efficacy to writing quality by using multiple-group structural equation modeling in two multi-grade groups. Measures of handwriting fluency (i.e., alphabet task and copy task), spelling, planning, revision, text generation, and self-efficacy (i.e., Writing Skills Self-Efficacy scale) were administered to 171 students in grades 4-6 and 205 students in grades 7-9. For the older students, it was found that transcription contributed to text generation indirectly through self-efficacy and planning. In addition, for this group, the model accounted for 82% of the variance in writing quality. For the younger students, 76% of the variance in writing quality was accounted for by the model and transcription contributed directly to text generation. The researchers also found that for younger children, text generation was constrained by transcription (i.e., handwriting, spelling, and writing fluency), which alludes to the importance of ensuring that students develop writing fluency in the primary grades. In addition, self-efficacy was influenced by transcription in all grades. The authors suggested that transcription skills (e.g., spelling) help students to gauge their own confidence. This point is especially important for younger students given that they are still learning those skills as emerging writers. Younger writers’ transcription skills seem to help inform their writing self-efficacy.

**Writing Self-Efficacy and Performance Feedback Interventions**

There have been very few studies that have examined the relationship between writing self-efficacy in relation to performance feedback interventions. This is unfortunate given the relatively higher amount of research examining the role of self-efficacy in relation to other academic areas. For example, in math, Schunk (1982) examined the effects of training and feedback on students’ math performance and self-efficacy. Results showed that students who
received training and feedback had greater skill development, higher perceptions of self-efficacy, and quicker progress in mastering subtraction skills than students who only received training. In reading, Schunk and Rice (1991) placed remedial reading students in one of three groups: (1) product goal, (2) process goal, or (3) process goal plus feedback. Results showed that students in the process goal plus feedback condition exhibited better reading comprehension and higher perceptions of self-efficacy. Although these studies were conducted outside the content area of writing, they do provide support indicating a relationship between feedback and self-efficacy that should be more extensively researched in writing given writing’s critical role in all levels of academic curriculum (Pajares, 2003).

To date, only one study (Schunk & Swartz, 1993) has examined the effects of a performance feedback and goal setting intervention on the writing achievement and self-efficacy and it was conducted in a group of 60 fifth-grade students (i.e., 27 males and 33 females). The goal of the study was to assess self-efficacy, generalization and maintenance of strategy use, and skill level (i.e., across time and different writing tasks). Students were randomly assigned to one of four groups: (1) process goal (i.e., they were instructed to use the strategy), (2) process goal plus progress feedback (i.e., they were instructed to use the strategy and given feedback), (3) product goal (i.e., they were instructed to write a paragraph), or (4) instructional control (i.e., they were instructed to try their best while working). The feedback given to the process goal plus progress feedback group was always during their independent practice period and was related to their use of the strategy.

All students were given the following: (1) pretests assessing self-reported strategy use, self-efficacy, and achievement, and (2) instructional programming dedicated to teaching the strategy for each paragraph type (e.g., descriptive). Before the first session for each paragraph
type, students were given a self-efficacy measure, which did not have a former name, examining their ability to improve their skills in relation to that paragraph type. All students were also given a posttest, which included measures of self-efficacy, writing achievement, perceived progress in strategy learning, strategy value, and self-reported strategy use. Lastly, students were also given a maintenance test six weeks later, which included writing a descriptive paragraph and completing measures of self-efficacy, strategy use, and achievement. The study found that the process goal plus progress feedback group outperformed the instructional control and product goal groups on writing skill and number of words written. For self-efficacy, the process goal plus progress feedback group performed better than the instructional control group on posttest measures of self-efficacy and skill, and self-efficacy for improvement. Also, the process goal plus progress feedback scored higher on the self-efficacy measure than product goal group and the instructional control group on certain paragraph types (i.e., narrative descriptive paragraph). In addition, there was a positive correlation between self-efficacy and both strategy use and skill on posttest and maintenance measures. Lastly, posttest measures of self-efficacy, but not pretest self-efficacy measures, predicted written performance. However, the researchers noted that sample was too small to draw much of a conclusion about predictive value.

From the perspective of social-cognitive theory, the results may suggest that students in the feedback group had better written performance than other groups because they were given repeated opportunities to use the writing strategy (i.e., they were getting mastery experiences) along with feedback, which was information they could use to subsequently increase their performance in their subsequent attempts at writing (i.e., improving their competence). In addition, while students were increasing their competence through mastery experiences and feedback, they were also improving their confidence in their writing ability.
There were a number of limitations associated with this study. First, the researchers did not explain how they developed the writing self-efficacy measure and it was not stated whether the measure was based on a theoretical model of writing, which has been done in a later study (i.e., Bruning et al., 2013). Future research should examine writing-efficacy using a theoretically-based, age-appropriate measure for writing self-efficacy in elementary aged students, especially within the context of performance feedback research. In addition, the study’s sample was too small to draw conclusions on self-efficacy’s predictive value. Future research should examine the predictive value of writing self-efficacy in a larger sample. Also, the study focused on how to write better paragraphs and did not address writing fluency. Currently, no study has examined whether writing self-efficacy actually predicts writing fluency gains in an academic intervention, which future research should examine.

**Self-Efficacy: Assessment Measures in Writing**

When self-efficacy is being assessed, the assessment must be domain-specific. It has to be assessed this way, because self-efficacy beliefs vary according to the task and cannot be generalized to all areas (i.e., a student’s math self-efficacy may differ from their writing self-efficacy). Therefore, when self-efficacy is assessed in relation to writing, it is called writing self-efficacy. The majority of previous research in writing self-efficacy measures have been conducted in the college student population (e.g., McCarthy et al., 1985, Shell et al., 1989). Shell et al. (1989) examined the relationship between outcome expectancy beliefs, writing self-efficacy, and writing achievement in college students. The scale they created to measure writing self-efficacy contained two subscales: (a) a writing component skills subscale (i.e., confidence in completing a component of writing, such as recognizing letters); and (b) a writing task subscale (i.e., confidence to complete a writing objective, like writing a letter to a friend). The writing
component skills subscale \( (r = 0.95) \) and the writing task subscale \( (r = 0.92) \) were both found to be reliable. In addition, the correlations between the subscale scores and items were all positive and exceeded .40. It was found that the writing component skills self-efficacy predicted written performance. However, writing task self-efficacy did not predict written performance.

In a later study by Shell, Colvin and Bruning (1995), the writing self-efficacy measure was modified in an attempt to examine the role of self-efficacy, causal attributions, and outcome expectancy among fourth-, seventh, and tenth-grade students’ writing achievement. The items in the subscales were changed to better reflect the types of writing completed by students in those grades (e.g., “correctly punctuate a one-page passage” became “correctly punctuate a sentence”). In addition, the number of items in the subscales was modified. The items in the writing component skills subscale decreased from eight items to four items. The writing task skills subscale was decreased from sixteen items to five items. It should be noted that reliability decreased somewhat on both subscales: writing component skills subscale \( (r = .760) \) and the writing task subscale \( (r = .690) \). The results of this study replicated the previous findings by demonstrating that students’ writing self-efficacy could be measured with this scale and that writing components skills self-efficacy predicted students’ writing performance across grade levels. In addition, the scale demonstrated its ability to generalize across multiple populations (i.e., elementary-school, middle-school, high-school, and college) through the two studies (Shell et al. 1989; Shell et al. 1995). There are some limitations associated with these studies. First, the measure was not used in all grades; therefore, it is only applicable to the grades accessed (i.e., Grade 4 and above). Further, the factor structure of the scale was not assessed; therefore, it is unsure whether it is psychometrically sound.
Because only the writing components skills self-efficacy subscale predicted written performance, it was used on its own as a scale in future research (Pajares & Valiante, 1997; Pajares, 2001; Pajares, 2007) and called the Writing Self-Efficacy Scale. However, although the scale was subsequently used in various studies, its factor structure was never examined. Pajares (2007) aimed to examine the psychometric properties of the Writing Self-Efficacy Scale by using exploratory factor analysis. A sample of 1,258 students in fourth through eleventh grade completed the measure. The results of an exploratory factor analysis indicated that two factors emerged: (a) basic writing skills (e.g., grammar) and (b) advanced composition skills. The factor loadings of the items on Factor 1 (basic writing skills) had coefficients that ranged from .64 to .78 and the factor loadings of the items on Factor 2 (advanced compositional skills) had coefficients that ranged from .47 to .86. The internal consistency reliability estimates for basic writing skills ($r = .880$), advanced composition skills ($r = .860$), and the overall scale ($r = .910$) were high. In addition, the advanced composition skills items accounted for 88% of the variance in middle school students and 85% of the variance for high school students, whereas the basic writing skills items accounted for 88% of the variance in elementary students. These results make sense, given that younger students are still working on their basic writing skills and older students have automatized basic writing skills. The researchers concluded that the measure was psychometrically sound and could be used from grades 4 through high school. Given that the results show self-efficacy for basic writing skills was more salient for younger students, it necessitates the importance of using developmentally-appropriate writing self-efficacy measures. However, there were a number of limitations associated with the study. First, it did not examine students in Grades 3 and below, which is a younger population that future research can explore. Another limitation of the scale was that a theoretical model of writing was not used to guide its
development. In fact, none of the previously mentioned writing self-efficacy measures were guided by a theoretical model of writing.

Bruning, Dempsey, Kauffman, McKim, and Zumbrunn (2013) created a writing self-efficacy measure that included the planning (i.e., ideation generation) and translation components of the Hayes and Flower’s (1980) model of writing. Specifically, Bruning and colleagues posited that there were three possible dimensions of students’ writing self-efficacy: (1) writing ideation (i.e., idea generation), (2) writing conventions (i.e., translating ideas into written forms), and (3) writing self-regulation (i.e., monitoring, management, and evaluation of one’s writing). In the first of two experiments, the scale was given to middle school students (N=697) in order to test the adequacy of their model. Students completed the Self-Efficacy for Writing Scale (SEWS), which consisted of 16 items that corresponded to one of the three aforementioned dimensions of writing. After conducting a confirmatory factor analysis, the factor loadings for each factor were as follows: five items for writing ideation (range, 0.92 to 1.01), five items for writing conventions (range, 0.840 to 1.38), and six items for writing self-regulation (range, 0.800 to 1.00). In the second experiment, the scale was given to students in two high schools (N=563). For this study, there were two goals: (1) to examine the generalizability of the three-factor model; and (2) to examine SEWS’s relationship with other variables, such as students’ writing preferences and writing performance. Results of the second experiment replicated and confirmed the three factor-model in high school students. The results of the second study demonstrated that the three factor-model was able to generalize to another population. In addition, there were several relationships found among the writing variables assessed in relation to the SEWS. Self-efficacy for writing ideation (r = 0.487) and self-efficacy for writing self-regulation (r = 0.497) were more strongly correlated with liking writing than the
writing conventions dimension \((r = .225)\). However, self-efficacy for writing conventions \((r = .378)\) was more related to students’ performance on statewide writing assessments than writing self-regulation \((r = .206)\) or writing ideation \((r = .203)\). In addition, each of the three factors correlated positively with self-reported writing performance \((range, r = .357 \text{ to } .404)\).

Bruning et al. (2013) made significant contributions to the writing self-efficacy research. First, the researchers used a theoretical model of writing to inform scale development and created a developmentally-appropriate writing self-efficacy scale. In addition, the psychometric evidence provided in the study validated the scale and the scale was able to truly assess the three factors that were based from a theoretical model \((i.e.,\ Hayes \text{ and } Flower, 1980)\). However, there were some limitations to the study. First, elementary students were not examined and future research should examine this group. However, in future research, the measure should be altered because it would not sufficiently measure elementary-aged students’ writing self-efficacy, given that the Hayes and Flower \((1980)\) model is more suitable for adults. In addition, younger children’s writing self-efficacy is more closely related to transcription skills \((\text{Limpo} \text{ and } \text{Alves, 2013})\), which is more thoroughly conceptualized in the Simple View of Writing \((\text{Berninger et al., 1992})\). Therefore, future research should work toward creating a more developmentally-appropriate writing self-efficacy measure that is based on a theoretical framework of writing \((i.e.,\ Simple View of Writing)\) for developing writers. In addition, given that writing self-efficacy has been found to predict written performance \((\text{Pajares} \text{ and } \text{Valiante, 1997})\), a developmentally-appropriate writing self-efficacy measure could potentially provide us with preliminary information in relation to students’ written performance. It should be noted that although previous research \((\text{Pajares, 2007})\) has examined the writing self-efficacy of elementary aged children with a measure \((i.e.,\ Writing Self-Efficacy Scale)\), their scale was not based on a
theoretical model of writing, which conceptualizes the writing process.

**Purpose of the Study**

Although writing skills are important, a disheartening number of students are below a level of proficiency in writing (Persky et al., 2003). Effective writing interventions have been created to help improve the writing skills of typically-developing children. Performance feedback is one such effective writing intervention (Van Houten et al., 1974; Eckert et al., 2006). Previous studies in math and reading (Schunk, 1982; Schunk & Rice, 1991) have shown the positive effects that feedback can have on academic performance and self-efficacy beliefs. However, very few studies (Schunk & Swartz, 1993) have examined the relationship between feedback and writing self-efficacy beliefs. This is unfortunate given the benefits of feedback and writing self-efficacy (i.e., good predictor of written performance). In addition, no study has ever examined whether writing self-efficacy is a predictor of writing fluency gains in a performance feedback intervention.

There have been some measures created to assess writing self-efficacy (Shell et al. 1995; Pajares, 2007). However, no measure based on a theoretical framework of writing had been created to assess elementary students’ writing. This is a deficit in the literature given that a previous study (Bruning et al., 2013) has used such a measure to assess writing self-efficacy in older students (i.e., middle-school students and high-school students). However, the model used for older children (i.e., the Hayes and Flower model) would not be relevant to emerging writers. A more developmentally-appropriate measure of writing self-efficacy based on a theoretical framework of writing (i.e., the Simple View of Writing) was used in this study.

The aim of this study was to increase our understanding of the role of writing self-efficacy in relation to elementary-aged students’ writing fluency outcomes when they are
receiving a performance feedback intervention. To address this aim, the following research question was proposed: Will students’ writing self-efficacy predict their writing fluency outcomes in response to a performance feedback intervention? Based on previous studies that examined the predictive nature of writing self-efficacy (Pajares & Valiante, 1997), it was hypothesized that students’ writing self-efficacy would predict their writing fluency outcomes in response to a performance feedback intervention.

**Method**

**Participants and Setting**

The participant data was collected during two previously conducted studies that used performance feedback interventions with third-grade students from general education classrooms. For both studies, approval was obtained from the Institutional Review Board of Syracuse University and the participating school district. The participants were invited to participate in the study and only participated after both parental consent and student assent were obtained. After attaining consent, students were screened for participation and the exclusionary criteria were based on the information gained from teacher interviews, student records, and baseline data. The exclusionary criteria were as follows: (a) no serious motor deficits that could interfere with the ability to write stories; (b) not eligible for special education services; (c) primary spoken language is English; (d) not eligible for receiving a 504 plan (i.e., required modification in instruction) or an instructional aide; (e) did not having a learning disability in writing; (f) no hearing or vision impairments; (g) able to demonstrate minimal proficiency by writing at least seven words on a baseline assessment; and (h) able to write a subset of alphabet letters legibly.
After combining the data from both studies, there were 138 participants in this study (see Table 1) and the average age was 8 years and 4 months. The majority of the sample was male (51.4%) and most students self-identified their race as Black (50.7%) or White (38.4%). In addition, most students identified their ethnicity as Not Hispanic or Latino (50%). Additional participant ethnic identities included Somali (3.6%), Arab (7%), Hutu (7%), Krygryz (7%), and Maithili (7%). It should be noted that there were statistically significant demographic differences between the two cohorts in terms of race and ethnicity. There were more students that self-identified as Black or African-American (68.6%) in cohort 1; whereas most students in cohort 2 identified as White (69.8%) or Asian (100%), $\chi^2(4, n = 138) = 29.45, p < .001$. In addition, there were more students who self-identified as Hispanic or Latino (91.7%) in cohort 1; whereas most students in cohort 2 self-identified as Not Hispanic or Latino (98.6%) in cohort 2, $\chi^2(6, n = 138) = 115.65, p < .001$. There were no statistically significant differences in sex between the two cohorts, $\chi^2(1, n = 138) = .694, p = .405$.

The recruited participants attended two public elementary schools located in a moderately-sized city in the northeastern section of the country. These schools were located close to the university; therefore, it was a convenience sample. All sessions during the study took place in classrooms within the school.

**Experimenters**

The experimenters were doctoral-level students in school psychology program as well as advanced undergraduate research assistants. Prior to the start of the study, research assistants were trained to do the following: administer and score dependent measures, conduct procedural integrity observations, and input data. In addition, all research assistants received formal training (i.e., Collaborative Institute Training Initiative) in research ethics, as required by Syracuse
University, prior to conducting the study. Before data were collected, all research assistants demonstrated 100% proficiency on conducting procedural integrity observations and scoring dependent measures.

**Materials**

**Writing packet.** During the intervention sessions for the performance feedback condition, students received a packet containing the following information: (1) participant’s identifying information on the first page, (2) stop sign on the second page, (3) individualized performance feedback from previous week on the third page, and (4) a curriculum-based measurement in written expression (CBM-WE) probe on the remaining pages.

**Writing self-efficacy measure.** A self-efficacy measure was administered to measure students’ level of self-efficacy in the area of writing. The writing self-efficacy measure (see Appendix 1) contained 10 questions that asked students to rate their confidence level in different areas such as spelling, handwriting, and writing stories. Students were also asked how much they liked spelling, handwriting, and writing stories. In addition, students were asked if they received any help at home with their work. The boxes ranged in size (i.e., the smallest box was for “not at all” and the largest was for “very, very much”). It should be noted that items 2 and 7 were worded the same for the purposes of a consistency check. As a result, the students’ writing self-efficacy score was calculated based on their responses to nine of the ten questions (Items 1, 2, 3, 4, 5, 6, 8, 9, 10).

Items on the measure were loosely based on Bruning et al.’s (2013) self-efficacy scale. However, aspects of the scale were modified to fit the population (i.e., elementary-aged children) and developmental level based on theoretical models of writing (i.e., Simple View of Writing; Berninger, 2002). Therefore, there are questions about handwriting (e.g., how good do you
think you are at handwriting?), spelling (e.g., how much do you like spelling?), and writing fluency (e.g., how good do you think you are at writing stories?) because these are the skills that fall under transcription in the Simple View of Writing and in theory, these are the skills that students are still trying to master. The measure had a Cronbach’s alpha of .854, which demonstrates adequate internal consistency.

**Wechsler Individual Achievement Test (WIAT) Spelling Standard Score.** The WIAT Spelling subtest was administered to all participants and is a measure of a student’s spelling ability. In order to complete the WIAT Spelling subtest, students are required to try their best at correctly spelling words read to them aloud by the experimenter. Students’ standard scores on the WIAT Spelling subtest were used as a control variable in this study in order to examine the effects of writing self-efficacy on writing fluency. The grade-based test-retest reliability coefficient for the Spelling subtest was .95.

**Wechsler Individual Achievement Test (WIAT) Essay Composition Standard Score.** The WIAT Essay Composition Standard Score is a measure of student’s writing quality. In order to complete the WIAT Essay Composition subtest, students are required to an essay for 10 minutes in response to a story starter. The WIAT Essay Composition Standard Score is then derived from the following components: 1) Word Count, 2) Theme Development and Text Organization, and 3) Grammar and Mechanics. Word count is a measure of productivity, or number of words written. Theme Development and Text Organization measures idea clarification and elaboration as well as organization of ideas (WIAT Manual, 2009). Grammar and Mechanics measures students’ grammar and mechanics by subtracting their number of correct word sequences from their number of incorrect word sequences. The WIAT Essay Composition Standard Score was controlled for in this study in order to examine the effects of
writing self-efficacy on writing fluency. The grade-based test-retest reliability coefficient for the Essay Composition subtest was .86.

**Procedures**

Both studies consisted of three phases including a screening assessment phase, baseline assessment phase, and intervention phase. The screening and baseline assessments took place during the first three weeks of the study. After these two initial assessments, students were randomly assigned to one of three conditions: (a) practice only condition, (b) performance feedback condition, and (c) performance feedback plus generalization condition. The sessions were bi-weekly, lasted approximately 30 minutes, and were conducted by trained research assistants in the classrooms. For the purposes of this study, only the data associated with the students assigned to the performance feedback condition were examined.

**Screening and baseline assessments.** For the screening assessment phase, participants were screened for eligibility before the intervention sessions began. They were given an informal measure of handwriting first. For the informal handwriting measure, participants were instructed to print each letter, in lower-case, on the response sheets as the experimenter read the 10 letters aloud. If less than 80% of the letters were legible, the participant became ineligible to participate in the study. Second, a CBM-WE probe was administered. For the CBM-WE probe, students were given approximately three minutes to write a composition in response to the writing prompt (i.e., story starter). If the participant met the eligibility criteria, then their results from the CBM-WE probe were used to provide performance feedback if they were randomly assigned to that condition. If participants wrote less than seven words on the CBM-WE probe, then they were considered ineligible to participate in the study. Ineligible participants were given alternative work to complete by their teacher during baseline and intervention phases.
Administration of the writing self-efficacy measure. The self-efficacy measure was given during the first intervention session in the study conducted in 2014 and it was administered during the third baseline session of the study conducted in 2016. For each cohort, the writing self-efficacy measure was given prior to the start of the intervention (i.e., nine weeks before the last intervention session). The research assistant read the procedural script, which instructed the experimenter to read items on the scale (e.g., How much do you like to write stories?) aloud to the participants. The participants responded to the items by checking one option (e.g., very, very much) for each.

Individualized performance feedback condition. During the individualized performance feedback condition, participants received a writing packet and the research assistants read a procedural script that provided instructions to the participants. When the participants reviewed the individualized performance feedback sheet, they saw a box that contained their total words written from their previous writing sample with an up, down, or equal sign next to it. Research assistants explained the meaning of an up sign (i.e., participant wrote more words than last time), a down sign (i.e., participant wrote less words than last time), and an equal sign (i.e., participant wrote the same amount of words as last time). The participants’ first individualized performance feedback came from their total words written (TWW) measured during the baseline CBM-WE probe.

Administration of the Curriculum Based Measurement in Written Expression (CBM-WE). The participants received different CBM-WE probes over the course of eight intervention sessions. For the CBM-WE, the participants were asked to write a response to a story starter prompt (e.g., “One day, I heard a knock on the door and...”) which was read aloud by the experimenter. Students were told to spend one minute planning their response, before
they were given three minutes to write a narrative response. Students were prompted to continue writing if they stopped before the three minutes was over.

**Dependent Measures**

**Curriculum-Based Measurement in Written Expression (CBM-WE) Probes.** Participants’ writing fluency was measured by using Curriculum-Based Measurement in Written Expression (CBM-WE) probes, which is a measure that requires students to generate a written response to a writing prompt. Typically, children are given three minutes to write a response to a story-started prompt (e.g., “One day I heard a loud noise at the door and...”). This measure was used because it can be administered frequently in order to obtain a dynamic assessment of students’ writing fluency growth over time. Nine CBM-WE probes were administered in this study. The probes used in this study were found to have strong alternate-form reliability (range, \( r = .730 \) to \( .950 \)). In addition, the probes were found to have low to moderate validity (range, \( r = .290 \) to \( .630 \)) for correct writing sequences (McMaster, Wayman, Deno, Espin, & Yeo, 2010).

The probes were scored for the total words written and correct writing sequences. Total words written (TWW) allowed for a quantitative measure of students’ writing and it was used to provide students with performance feedback. TWW is computed by counting every word that the child writes in their written response. Correct writing sequences was the primary outcome measure of this study, and provides a measure of students’ writing fluency (i.e., speed/rate and accuracy). The method for scoring correct writing sequences followed the model outlined by Shapiro (2011), which evaluates the accuracy of writing components including spelling, syntax, capitalization, and punctuation of the adjacent words. For this study, the correct writing sequences was used as the dependent measure. In order to examine writing fluency, students’
correct writing sequences from their last intervention session were used. These scores were used in a hierarchical regression analysis as the dependent variable.

**Design and Analysis**

A hierarchical multiple regression was conducted in order to examine whether writing self-efficacy had an effect on writing fluency in a performance feedback intervention. In the analyses, students’ WIAT Essay composition standard score and WIAT spelling standard score were controlled for in order to focus on writing self-efficacy’s impact on writing fluency.

**Procedural Integrity**

For the performance feedback intervention, procedural integrity was assessed in two ways. First, the primary experimenter was given a procedural script to follow during each intervention session, which was intended to help maintain procedural integrity. In addition, there was a secondary experimenter present during at least 33% of the sessions to evaluate procedural integrity. The secondary experimenter also had a procedural script and checked off every step that the primary experimenter completed correctly. For this study, the procedural integrity for intervention was 100%, because all of the steps were followed during the last intervention session for both years.

Procedural integrity was also assessed for administration of the self-efficacy measure. The primary experimenter followed the session of the procedural script for the self-efficacy measure and a secondary experimenter evaluated procedural integrity. The procedural integrity for the self-efficacy measure was 100%, because all of the steps were followed during the administration of the measure for both years.
Interscorer Agreement

Following the completion of data collection, a total of 33% of the probes were scored and re-scored to check for interscorer agreement. Interscorer agreement was calculated by dividing the total number of agreements by the total number of agreements and disagreements. Then the number was multiplied by 100%. The interscorer agreement for both cohorts was averaged. The mean percentage of interscorer agreement was 96.9% (range of all scores: 82% – 100%). Additionally, kappa coefficients were calculated in order to account for chance agreements and both kappa coefficients from the two cohorts were averaged together. The mean kappa coefficient was .88 (range .28 to 1.0).

Results

Data Preparation

Data input and consistency checks. The researcher combined the raw data from both data collection years into Microsoft Excel. After the data were inputted into Microsoft Excel, the data were transferred into SPSS version 23 (SPSS, 2015) in order to conduct the descriptive and hierarchical multiple regression analyses.

Data inspection. Data were analyzed in order to test for the assumptions of linearity, outliers, normality, multicollinearity, autocorrelation, and homoscedasticity. With the exception of normality, all of the assumptions were met. Because the relationship between the writing self-efficacy data and correct writing sequence data did not have any visible relationship after examining a scatterplot (see Figure 4), it was decided that transformation of the data would not help the relationship between these variables. Therefore, the data were not transformed.
Descriptive Analyses

The descriptive summaries of the measures are presented in Table 3. For the writing self-efficacy measure, students rated their self-efficacy in the Average range ($Mdn = 37.00, SD=9.33$). However, it should be noted, the distribution of scores was positively skewed, which means that the measures of central tendency were higher than what would be seen in a normal distribution. As a result, students reporting lower writing self-efficacy in the context of this study, would be considered falling in the Average range if a normal distribution of scores were obtained. The consistency check between items 2 and 7 yielded a strong correlation, $r (138) = .713, p < .01$.

Students’ performance on the standardized measures of writing and spelling were in the Average range. On the WIAT Spelling subtest, the median standard score was 95.00, and the median standard score on the WIAT Essay Composition subtest was 98.00. However, on the CBM-WE measure, students’ performance fell in the below Average range ($Mdn = 23.5, SD = 15.31$), which corresponds to be between the $25^{th} – 50^{th}$ percentile for their grade level based on national normative data. In addition, it should be noted that there were no statistically significant differences between the cohorts’ performance on these measures. Given that a prior study noted gender differences in student performance on measures of written expression (Pajares & Valiante, 1997) this was analyzed with the combined cohort sample. The results of these analyses indicated that there were no statistically significant gender differences in the writing self-efficacy scores, $t (136) = -0.035, p = .972$; correct writing sequences, $t (136) = -.060, p = .953$; WIAT essay composition standard scores, $t (136) = -1.125, p = .263$; or WIAT spelling standard scores, $t (136) = .269, p = .788$. Therefore, these results suggest that there was no
difference between how male and female students performed on the measures examined in this study.

There were no statistically significant correlations between writing self-efficacy and the other measures. However, for correct writing sequences, there was a statistically significant correlation with the WIAT essay compositions standard scores ($r = .394, p \leq .01$) and the WIAT spelling standard scores ($r = .421, p \leq .01$). In addition, there was a statistically significant correlation with the WIAT essay composition standard scores and the WIAT spelling standard scores ($r = .356, p \leq .01$). The correlations between measures are presented in Table 3.

**Major Analyses**

**Relationship between self-efficacy and correct writing sequences.** A hierarchical multiple regression was conducted to assess the ability of students’ writing self-efficacy to predict their writing fluency outcomes (i.e., correct writing sequences) in a performance feedback intervention. The WIAT essay composition score and the WIAT spelling composition score were controlled for by entering both variables in Step 1 of the regression analysis. These variables explained 23.4% of the variance in writing fluency. Writing self-efficacy was entered at Step 2, so its sole contribution as a predictor to writing fluency could be examined (see Table 2). It should be noted that item 7 (i.e., the consistency check item) of the writing self-efficacy data was removed from the analyses. When writing self-efficacy was added, 23.1% of the variance in writing fluency was accounted for. The best model for predicting students’ writing fluency contained the WIAT essay standard composition score and the WIAT spelling standard score, $R = .496$, $R^2 = .234$, $F (2,135) = 21.97, p < .001$. The addition of writing self-efficacy to the regression analysis did not significantly improve the model’s predictive value, $R = .499$, $R^2 = .249$, $F (1,134) = .621, p = .432$. In addition, when a second multiple regression was conducted,
in which the CBM-WE baseline probe was used as a control variable instead of the WIAT variables, the model did not have a significantly predictive value, \( R = .504, R^2 = .254, F (1,135) = 2.57, p = .111 \). While this model was not significantly predictive, it was an improvement (i.e., the \( p \) value was closer to significance) over the model that contained WIAT data as the control variable. This may suggest that the model improved due to consistency in measures, since CBM data was used as a control variable and dependent variable.

Correlations were conducted to assess the relationship between individual self-efficacy scale items to correct writing sequences (see Table 4). The correlation between correct writing sequences and the scale items were as follows: “How much do you like to write stories?” \( (r = - .035, p = .684) \); “How good do you think you are at writing stories?” \( (r = -.077, p = .368) \); “How much do you like handwriting?” \( (r = .086, p = .318) \); “How good do you think you are at handwriting?” \( (r = .096, p = .263) \); “How much do you like spelling?” \( (r = -.007; p = .935) \); “How good do you think you are at spelling?” \( (r = .084, p = .328) \); “How good do you think you are at writing stories?” \( (r = -.076, p = .377) \); “How much extra writing do you do at school?” \( (r = -.048, p = .574) \); “How much writing do you do at home?” \( (r = .037, p = .664) \); “How much do adults at home help you with your writing?” \( (r = -.064, p = .456) \).

Discussion

According to national assessments on children’s academic skills, the majority of children in the United States are underperforming in the area of writing (National Center for Education Statistics, 2012; Persky et. al., 2003). Given that this is an area of such need, it is important that studies identify factors that are predictive of writing aptitude. One such factor that has received attention in the literature is writing self-efficacy. Writing self-efficacy, which reflects individuals’ confidence in their ability to write, has been found to be a good predictor of writing
in several studies (Pajares & Valiante, 1997; Pajares et al. 1999; Schunk & Swartz, 1993). However, no studies have examined writing self-efficacy as a predictor of writing fluency gains in the context of a performance feedback intervention. Additionally, no previous studies have used a measure based off theoretical model that is developmentally appropriate for elementary-age students. This study is important, because it addressed those deficits in the literature.

The primary aim of this study was to examine whether writing self-efficacy would predict the writing fluency gains of elementary-aged students, who received a performance feedback intervention after controlling for their pre-intervention writing and spelling ability. Results showed that writing self-efficacy was not a significant predictor of students’ writing fluency gains. The discussion will explore potential explanations for these findings.

**The Relationship between Writing Self-Efficacy and Writing Fluency**

Few studies have examined the predictive validity of writing self-efficacy in connection to students’ writing fluency, which is unfortunate, given that self-efficacy beliefs have been found to be predictive of behavior across different areas (Bandura, 1986). To date, only seven studies (Limpo & Alves, 2013; Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999; Pajares, 2001; Pajares, 2007; Schunk & Swartz, 1993; Shell, Colvin, & Bruning, 1995) have examined the role of writing self-efficacy in typically-developing elementary-aged students’ writing performance. In addition, only two of these studies (Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999) had a primary aim of examining whether writing self-efficacy was a predictor of written performance. These studies found writing self-efficacy to be a statistically significant predictor of writing achievement. These results were not replicated in the current study.
A potential reason for these different outcomes in the current study is an age difference in participants. In the other two studies that examined the predictive value of writing self-efficacy in elementary-aged students (Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999), most of the participants were older than the participants in this current study. Students in the current study were in third grade, among the youngest participants relative to the other studies. Pajares & Valiante (1997) only examined students in the fifth grade. Pajares et al. (1999) study examined students in third-grade, fourth-grade, and fifth-grade. Given that these other studies used mostly older elementary students and found writing-self efficacy to be a significant predictor, it could be argued that students in third-grade may be too young to be able to discern their self-efficacy beliefs. Individuals discern their self-efficacy beliefs from previous experiences with a task and/or others’ opinions about their ability (Bandura, 1997). Therefore, older elementary-aged children may have had more opportunities to explore their writing ability, which in turn, better informed their self-efficacy beliefs. Despite this possibility, third-grade students cannot be disregarded as a potential research group completely. Pajares et al. (1999) used third-grade students as a part of their sample and found that writing self-efficacy was predictive of written performance. In addition, they examined the interactive effects of grade level and writing-efficacy and it was found to be non-significant, which means the relationship between writing self-efficacy and written performance was not affected by grade level. Their findings showed that younger elementary-aged students, such as third-grade students, are a viable group for assessing self-efficacy beliefs.

A second potential reason for these outcomes may be differences in study populations. More specifically, students in the current study were from a low socioeconomic background, while students in other studies (Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999) were
described as middle-class. It should be noted that the only reference to socioeconomic status in
the other studies was the use of the term “middle-class” and it was not indicated whether students
were eligible for free or reduced lunch, which is the current study’s marker for SES (socio-
-economic status). Given that many of the students in the current sample were from a low
socioeconomic background, the current sample represented a more disadvantaged population
relative to that of other samples.

Validity of the Current Study’s Self-Efficacy Measure

A third potential reason for these outcomes could be related to the writing self-efficacy
measure that was used. Although the writing self-efficacy measure used in this study
demonstrated adequate internal consistency, the measure was not validated. Therefore, the
measure may not have been a representative measure of writing self-efficacy. Alternatively, the
measure may not be sensitive to aspects of self-efficacy that students experience during a writing
intervention. For example, questions used on the measure were related to writing competence
and whether students liked to write. More appropriate questions could have possibly been about
the students’ ability to improve in their writing or about their ability to persist if writing becomes
more difficult. In addition, previous studies (Shell et al. 1995) found that asking about students’
self-efficacy related to their writing skills (e.g., ability to correctly punctuate a sentence) was
found to be predictive of written performance. Therefore, it could be that asking questions about
behaviors more specific to a performance feedback intervention (e.g., the ability to write more
words each week) may be more appropriate.

In addition, studies that found a predictive relationship between writing self-efficacy
written performance (Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999) used an
alternative measure of writing self-efficacy. Two studies (Pajares et al. 1999; Pajares &
Valiante, 1997) used the Writing Skills Self-Efficacy measure which was based on a measure used in a previous study (Shell et al. 1989). This measure asked questions about self-efficacy for writing skills, such as composition and grammar. The writing self-efficacy measure used in this study differed from the Writing Skills Self-Efficacy measure, because the former focuses more on whether students like writing stories, or whether think that they are good at writing stories, spelling, and handwriting. Also, the present measure includes more task-oriented questions (e.g., How good do you think you are at writing stories?), while the Writing Skills Self-Efficacy measure is more skills-oriented (e.g., whether they could correctly punctuate a sentence). Shell et al. (1989) found that writing task self-efficacy, like writing stories, did not predict written performance, while writing skills self-efficacy did predict written performance in college students. Although more research would need to be done with elementary-aged students to draw more definitive conclusions, the results of that study could help to explain why the current study’s measure wasn’t predictive. It could be possible that the measure used in the current study may have had too much of an emphasis on writing tasks, which Shell et al. (1989) found did not have additional predictive value. The Writing Skills Self-Efficacy measure, which was based on a measure used in Shell et al. (1989) most likely inquired about more relevant aspects of self-efficacy then the measure used in this study.

Additionally, there was a theoretical difference between the two measures. The measure used in this study was based off the Simple View of Writing, while the Writing Skills Self-Efficacy measure was based on previous measures that had been based on work by Bandura (1986). The measure used in the current study may have benefited from asking questions more closely related to transcription, since it is a salient component of the Simple View of Writing model. Limpo and Alves (2013) found that transcription skills influenced students’ self-efficacy
believes; therefore, it could be possible that an inverse relationship exists, such as that self-efficacy beliefs about transcription related skills (e.g., correctly spelling words; punctuating a sentence) could predict transcription skills.

**Academic Characteristics of the Sample**

A fourth potential reason for the outcomes of the current study is the academic characteristics of the sample. It is possible that students in the sample were not able to accurately estimate their writing ability, which lead to higher writing self-efficacy ratings. Individuals’ sense of self-efficacy is highly influenced by their past success and failure (Broderick & Blewitt, 2015) and according to normative data based on the students’ writing fluency on the CBM-WE probes, students are in the current sample were performing below the Average range as a whole. If students are performing below the Average range as a group, then individual students may view their personal writing ability as average relative to their peers. If students were put in an environment where there was a greater variation in performance, maybe their self-efficacy beliefs would have been less skewed.

One study (Graham et al., 2005) found that students who were identified as struggling writers self-reported writing self-efficacy scores that were slightly above average. In this study, Graham et al. (2005) examined third-grade students from a low SES background, who were struggling writers. The main aim of the study was to teach students an instructional technique (i.e., self-regulated strategy development) in order to improve their writing ability. However, they did assess students’ writing self-efficacy at pretest and posttest. Results of their study indicated that the students’ self-efficacy pretest scores were slightly above average and remained unchanged at posttest. The self-efficacy measure used in Graham et al. (2005) was based on the measure used in Graham et al. (1993). The measure, which included only five items, focused on
aspects related to planning and writing a story (e.g., When I plan a paper, my plan is one of the best in the class). Their findings show that the writing self-efficacy scores of struggling writers were elevated even when it may not have been warranted, which was also the case with this current study. Therefore, it is possible that self-efficacy scores in the current study could be due to inaccurate perceptions of writing ability. Although more research needs to be done, it is possible that struggling writers may not have accurate perceptions of their writing ability when in a group or classroom of other struggling writers.

Although there were several potential reasons mentioned as to why writing self-efficacy was not predictive in the current study, it should be noted that writing self-efficacy is still an important factor to examine in the context of academic interventions. The current study found pre-intervention skills (i.e., writing and spelling) to be more predictive of students’ responsiveness to intervention than writing self-efficacy; however, previous research has found writing self-efficacy to be predictive independently of writing aptitude (Pajares et al. 1999). Pajares and Valiante (1997) found writing self-efficacy to be predictive in spite of the strong impact of writing aptitude. If modifications were made to the measure (e.g., changing the questions asked) in the current study, writing self-efficacy could be found to be a predictor of students’ responsiveness to intervention in future research.

**Limitations**

There were a few limitations associated with this study. The first limitation is the use of secondary data. Since the study used secondary data, the experimental design could not be manipulated or retroactively changed. Second, another limitation could be that the sample was too young to be able to discern their writing self-efficacy beliefs. Only one study (Pajares et al., 1999) has found third-grade students to be a viable group for study and more research needs to
be done with third-grade students to examine whether this group can accurately assess their writing self-efficacy beliefs. The third limitation with this study is that the results from this sample of students may not generalize to the larger population. Students in this sample were third-grade students from a lower SES background in a moderately-sized urban city in the northwest section of the United States. It is unclear if the results of the study can generalize to students from other socioeconomic backgrounds. The fourth limitation is that there are no psychometric properties of the scale with the exception of internal consistency. In order to better understand the properties of the scale, it could be helpful to do an exploratory factor analysis. Finally, a limitation of the study is that follow-up sessions were not conducted. If students’ writing fluency was examined at a follow-up session, it could have been assessed whether their writing fluency gains were maintained.

**Directions for Future Research**

Previous research has found that writing self-efficacy beliefs are generally predictive of writing performance (Pajares & Valiante, 1997; Pajares, Miller & Johnson, 1999). Writing is an important skill that students need in order to be successful in school and eventually at their jobs (National Commission on Writing, 2004). More research needs to be conducted to examine the relationship between writing self-efficacy and writing fluency in elementary-aged children, especially since writing fluency typically develops during that time (Berninger et al., 2006). The aim of this study was to examine whether writing self-efficacy could predict writing fluency gains in a performance feedback intervention, which is an intervention that aims to increase writing fluency. Contrary to the initial hypothesis, the results of the study found that writing self-efficacy was not a statistically significant predictor of students’ writing fluency.
For this study, a writing self-efficacy measure based off a developmentally-appropriate theoretical model was used. However, it is possible that the measure used in this study may not have included questions related to the skills or characteristics needed during a performance feedback intervention. Future research could use a modified version of this measure to include questions related to the skills targeted by the intervention. Alternatively, it could be possible that the measure is not valid and an exploratory factor analysis should be done in the future. Also, even if the measure was valid, it may be possible that it is not appropriate to use with third grade students. In the studies that examined the predictive value of writing self-efficacy in relation to written performance, fifth-grade students were the more common participant group (Pajares & Valiante, 1997; Pajares et al. 1999). Future research could use the measure with older elementary students, such as fifth-grade students.

Conclusions

National assessments have shown that a significant number of students are writing at a level below proficiency (National Center for Education Statistics, 2012; Persky, Daane, & Jin, 2003). Since writing is important to student’s academic success, it is important to examine aspects of the writing process, such as student’s confidence. Performance feedback has been found to be an effective intervention for increasing writing fluency in elementary-aged students (Eckert et al., 2006) and writing self-efficacy has been found to predictive of writing performance in elementary-aged students (Pajares et al., 1999).

To date, only one study has examined writing self-efficacy and writing performance after an intervention. In addition, no study has examined whether writing self-efficacy can predict writing fluency gains in a performance feedback intervention and this current study sought to examine this relationship in order to add more information to the larger literature. The results of
the study found that writing self-efficacy was not a significant predictor of students’ writing fluency gains, after controlling for pre-intervention writing and spelling ability. The results contradict previously conducted studies that have found a relationship (Pajares & Valiante, 1997; Pajares et al., 1999). Given that previous research has found a relationship, future studies should examine the relationship between writing self-efficacy and writing fluency in a performance feedback intervention, perhaps with modifications to the writing self-efficacy measure.
Table 1

*Student Demographic Information (N=138)*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total Sample</th>
<th>13-14 Cohort</th>
<th>15-16 Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (N)</td>
<td>% (N)</td>
<td>% (N)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>51.4% (71)</td>
<td>47.7% (31)</td>
<td>54.8% (40)</td>
</tr>
<tr>
<td>Female</td>
<td>48.6% (67)</td>
<td>52.3% (34)</td>
<td>45.2% (33)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>2.2% (3)</td>
<td>1.5% (1)</td>
<td>2.7% (2)</td>
</tr>
<tr>
<td>Asian</td>
<td>3.6% (5)</td>
<td>--</td>
<td>6.8% (5)</td>
</tr>
<tr>
<td>Black or African-American</td>
<td>50.7% (70)</td>
<td>73.8% (48)</td>
<td>30.1% (22)</td>
</tr>
<tr>
<td>White</td>
<td>38.4% (53)</td>
<td>24.6% (16)</td>
<td>50.7% (37)</td>
</tr>
<tr>
<td>Other</td>
<td>5.1% (7)</td>
<td>--</td>
<td>9.6% (7)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>43.5% (60)</td>
<td>84.6% (55)</td>
<td>6.8% (5)</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>50% (69)</td>
<td>1.5% (1)</td>
<td>93.2% (68)</td>
</tr>
<tr>
<td>Somali</td>
<td>3.6% (5)</td>
<td>7.7% (5)</td>
<td>--</td>
</tr>
<tr>
<td>Arab</td>
<td>0.7% (1)</td>
<td>1.5% (1)</td>
<td>--</td>
</tr>
<tr>
<td>Hutu</td>
<td>0.7% (1)</td>
<td>1.5% (1)</td>
<td>--</td>
</tr>
<tr>
<td>Krgrgyz</td>
<td>0.7% (1)</td>
<td>1.5% (1)</td>
<td>--</td>
</tr>
<tr>
<td>Maithili</td>
<td>0.7% (1)</td>
<td>1.5% (1)</td>
<td>--</td>
</tr>
<tr>
<td><strong>M SD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>8.04 .50</td>
<td>8.04 .49</td>
<td>8.05 .5</td>
</tr>
</tbody>
</table>
Table 2

*Regression Analysis Results*

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>B</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-29.954</td>
<td>9.552</td>
<td>0.00</td>
<td>-3.13</td>
<td>.002</td>
</tr>
<tr>
<td>WIAT Standard Essay</td>
<td>.209</td>
<td>.059</td>
<td>.284</td>
<td>3.53</td>
<td>.001</td>
</tr>
<tr>
<td>WIAT Standard Spelling</td>
<td>.341</td>
<td>.085</td>
<td>.323</td>
<td>4.02</td>
<td>.001</td>
</tr>
<tr>
<td>Writing Self-Efficacy</td>
<td>.077</td>
<td>.124</td>
<td>.047</td>
<td>.623</td>
<td>.535</td>
</tr>
</tbody>
</table>

*Note: F (3, 134) = 14.7, p < .001, with an R^2 of .231*
Table 3

Descriptive Analyses by Variable and Cohort

<table>
<thead>
<tr>
<th></th>
<th>Total Sample</th>
<th>13-14 Cohort</th>
<th>15-16 Cohort</th>
<th>Correlation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Writing Self-Efficacy</td>
<td>36.06</td>
<td>9.33</td>
<td>37.74</td>
<td>9.03</td>
</tr>
<tr>
<td>WIAT Essay Standard</td>
<td>95.04</td>
<td>20.83</td>
<td>91.03</td>
<td>26.59</td>
</tr>
<tr>
<td>WIAT Spelling Standard</td>
<td>94.23</td>
<td>14.49</td>
<td>91.72</td>
<td>16.12</td>
</tr>
<tr>
<td>Correct Writing</td>
<td>24.7</td>
<td>15.31</td>
<td>19.2</td>
<td>10.85</td>
</tr>
</tbody>
</table>

*Note. **p<.001*
Table 4  
Correlations Between Correct Writing Sequences and Individual Self-Efficacy Items

<table>
<thead>
<tr>
<th></th>
<th>$r$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much do you like to write stories?</td>
<td>.035</td>
<td>.684</td>
</tr>
<tr>
<td>How good do you think you are at writing stories?</td>
<td>-.077</td>
<td>.368</td>
</tr>
<tr>
<td>How much do you like handwriting?</td>
<td>.086</td>
<td>.318</td>
</tr>
<tr>
<td>How good do you think you are at handwriting?</td>
<td>.096</td>
<td>.263</td>
</tr>
<tr>
<td>How much do you like spelling?</td>
<td>-.007</td>
<td>.935</td>
</tr>
<tr>
<td>How good do you think you are at spelling?</td>
<td>.084</td>
<td>.328</td>
</tr>
<tr>
<td>How good do you think you are at writing stories?</td>
<td>-.076</td>
<td>.377</td>
</tr>
<tr>
<td>How much extra writing do you do at school?</td>
<td>-.048</td>
<td>.574</td>
</tr>
<tr>
<td>How much writing do you do at home?</td>
<td>.037</td>
<td>.664</td>
</tr>
<tr>
<td>How much do adults at home help you with your writing?</td>
<td>-.064</td>
<td>.456</td>
</tr>
</tbody>
</table>
Figure 1. Hayes and Flower (1980) Model of Writing
Figure 2. Berninger et al. (1992) Component Processes of Writing
Figure 3. Social Cognitive Theory (Bandura, 1986)
Figure 4. Scatterplot of relationship between writing self-efficacy data and writing self-efficacy data.
## Appendix 1

### Writing Self-Efficacy Measure

1) How much do you like to write stories?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Some</th>
<th>A lot</th>
<th>Very, very much</th>
</tr>
</thead>
</table>

2) How good do you think you are at writing stories?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Some</th>
<th>A lot true</th>
<th>Very, very good</th>
</tr>
</thead>
</table>

3) How much do you like handwriting?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Some</th>
<th>A lot</th>
<th>Very, very much</th>
</tr>
</thead>
</table>

4) How good do you think you are at handwriting?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Some</th>
<th>A lot</th>
<th>Very, very good</th>
</tr>
</thead>
</table>

5) How much do you like spelling?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Some</th>
<th>A lot</th>
<th>Very, very much</th>
</tr>
</thead>
</table>
6) How good do you think you are at spelling?

☐ Not at all  ☐ A little bit  ☐ Some  ☐ A lot  ☐ Very, very good

7) How good do you think you are at writing stories?

☐ Not at all  ☐ A little bit  ☐ Some  ☐ A lot true  ☐ Very, very good

8) How much extra writing do you do at school?

☐ Not at all  ☐ A little bit  ☐ Some  ☐ A lot  ☐ Very, very much

9) How much writing do you do at home?

☐ Not at all  ☐ A little bit  ☐ Some  ☐ A lot  ☐ Very, very much

10) How much do adults at home help you with your writing?

☐ Not at all  ☐ A little bit  ☐ Some  ☐ A lot  ☐ Very, very much


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