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It is entitled:
Effects of Self-Monitoring on the Writing Performance of Elementary Students

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Effects of Self-Monitoring on the Writing Performance of Elementary Students

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by

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Abstract

Self-monitoring has been shown to improve academic performance across a variety of subjects. This study investigated the effectiveness of a self-monitoring checklist on the writing skills of five students in an urban Midwestern elementary school. At the end of 10 min in-class writing assignments, participants counted the total number of words written and answered five questions related to writing mechanics. Using a multiple baseline across subjects design, baseline levels of total words written (TWW), words spelled correctly (WSC), and correct minus incorrect writing sequences (CIWS) on weekly curriculum based measures were compared to intervention levels for each student, in addition to follow-up maintenance assessments. Results showed moderately positive effects on CIWS for Student 1 and mildly positive effects for Students 2 and 3. No effects were seen for Students 4 and 5, however, there were only two intervention points for Student 5, making it difficult to draw strong conclusions. Maintenance data demonstrated continued positive effects for Students 1 and 4. Acceptability of the self-monitoring procedures was demonstrated through positive results on student questionnaires and informal verbal report from the teacher.
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Introduction

Proficient writers express ideas clearly and effectively and are generally viewed as substantive thinkers (Kellogg, 2008). According to the National Commission on Writing in America’s Schools and Colleges [NCWASC, 2003], being able to write well is a vital skill for many American jobs; companies often consider writing skills not only during the hiring process but also when making decisions to promote employees (National Commission on Writing, 2004). Writing is also a good indicator of success in college, as Geiser and Studley (2001) found that the ability to compose extended text is the single best predictor of success in first year college coursework.

Learning to write is a process akin to mastering other complex cognitive domains and requires a number of years dedicated to maturation, instruction, and training (Kellogg, 2008). Schools therefore have a responsibility to shape and prepare children for increasingly demanding expectations. Results from the National Assessment of Educational Progress, a congressionally authorized project of the National Center for Education Statistics (NCES, 2012) showed that 24% of students at both Grades 8 and 12 performed at the Proficient level in writing in 2011. Fifty-four percent of eighth-graders and 52% of twelfth-graders performed at the Basic level. Only 3% of eighth- and twelfth-graders performed at the Advanced level. Children from low socioeconomic families tend to have even lower achievement in both writing and reading (Chall & Jacobs, 1983). These statistics highlight the need to strengthen writing instruction within our schools and to identify effective interventions to support struggling writers.

Explicit writing instruction appears to be dwindling at the secondary level, with a trend toward more high school students enrolling in advanced science and mathematics classes and enrollment declining in language arts courses such as composition (NCWASC, 2003). The
impact of this can be seen at colleges and universities where first-year students are unable to 
adequately organize information and construct critical analyses (NCWASC, 2003). The 
Commission recommends that “the amount of time students spend writing…be at least doubled” 
(2003, p. 4). However, more writing time within the school day needs to begin as early as 
possible in the elementary years, rather than waiting until the secondary grades.

In addition to decreased writing instruction, another barrier to improving writing may be 
lack of pre-requisite skills. Engaging in the writing process may be particularly difficult and un-
motivating for students who are already low achieving, considering the number of skills 
involved. For example, spelling assumes a command of phonological awareness and the 
alphabetic principle; therefore, those with reading difficulties will likely struggle to write 
fluently and accurately (Blachman, Tangel, Ball, Black, & McGraw, 1999; Gillon, 2004; 
NICHD, 2000). When spelling is not automatic, a good deal of cognitive processes is used, 
which in turn leaves little for forming ideas and producing text (Berninger, 1999). One 
intervention strategy that could help to rectify this would be self-monitoring spelling errors, 
which would allow the student to check for errors after writing their compositions rather than 
focusing their energies during the writing process.

**Writing Mechanics**

Writing proficiency is a broad term that typically is used to describe a mastery of several 
other smaller sub-skills involved in the writing process (Espin et al., 2000). As part of Tier 1 or 
class-wide instruction, teaching of these skills is generally combined into the larger context of 
the overall writing, or language arts, curriculum. However, these skills can also be taught in 
 isolation, such as in those cases where students have been identified as having skill deficits. 
Organization, management, and planning strategies are essential skills for beginning writers (De
La Paz, 1999) and continue to develop over time as students become more fluent with regulating the writing process (Goddard & Sendi, 2008). Another skill area is related to the actual content of the writing, which should demonstrate clearly the writer’s purpose and intended message (Robinson & Howell, 2008). Legibility is also important and will continue to be as long as longhand writing tasks continue to be used in the classroom (Robinson & Howell, 2008).

Fluency, or the amount of writing produced, is also a desirable skill as it has been associated with the overall quality of compositions (Moxley & Lutz, 1995). Finally, students should demonstrate a command of mechanics, or conventions, which are the established conventions for words used in written language. Common examples include spelling, capitalization, contractions, and punctuation among others.

Mechanics appear to play a large role in the way teachers score student compositions, regardless of other factors such as the ability to manipulate sentence structure. For example, when using holistic rating scales for students in Grades 5, 8, and 11, raters tended to give higher scores to compositions that were longer and free from mechanical errors, especially spelling (Grobe, 1981; Stewart & Grobe, 1979). This also appears to hold true at the college level. Another study altered college-level expository essays by decreasing the quality of both content and mechanics (Rafoth & Rubin, 1984). The original and altered versions were rated analytically and holistically according to instructions directing raters to attend to one aspect of writing more than to another. Results showed that mechanics had a greater influence on raters' judgments than either content or rating instructions.

Despite findings for the apparent value of mechanics, it is perhaps possible that an overemphasis on accurate mechanics may take the writer’s focus away from other aspects of writing that are equally important, which can have the unintended effect of producing writing
that lacks depth or coherence. This was demonstrated in a study by Glynn, Britton, Muth, & Dogan (1982) in which college students were told not to pay attention to mechanics when writing preliminary drafts of a persuasive document. As a result, first drafts contained more arguments than those written by students who were asked to write mechanically accurate drafts (Glynn et al., 1982). However, the findings from this study may not generalize to younger students. In another study using structural equation modeling with students in Grades 1-6, writing mechanics accounted for a significant proportion of the variance in composition fluency and quality on one narrative and one expository essay (Graham, Berninger, Abbott, Abbott, & Whitaker, 1997). Fluency was scored in terms of number of words written and quality was scored through the average of two experienced teachers’ ratings on a scale of 1 to 5; ratings were based on the content and organization of information (Graham et al., 1997). These results suggest that requiring elementary students to attend to mechanics does not detract from the overall quality of compositions but rather may add to it. One way to help students narrow in on specific aspects of mechanics is through the use of self-management strategies.

**Self-Management**

Self-management is defined as “the personal application of behavior change tactics that produces a desired change in behavior” (Cooper, Heron, & Heward, 2007, p.578). This may include one or all of the following procedures presented in Table 1.
Table 1

Definitions of Major Components of Self-Management

<table>
<thead>
<tr>
<th>Component</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-monitoring</td>
<td>A person responds to and records some aspect of his behavior (Cooper et al., 2007).</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>A person compares his performance to a standard (Cooper et al., 2007).</td>
</tr>
<tr>
<td>Self-graphing</td>
<td>A person graphs his performance data (Cooper et al., 2007).</td>
</tr>
<tr>
<td>Self-reinforcement</td>
<td>A person delivers to himself a consequence, contingent on his behavior (Cooper et al., 2007).</td>
</tr>
<tr>
<td>Strategy instruction</td>
<td>A process wherein a student is taught a series of steps to independently follow in solving a problem or achieving an outcome (Coyne, Kame’enui, &amp; Simmons, 2001).</td>
</tr>
</tbody>
</table>

One of the many benefits of self-management is that students, once trained, can use the procedures independently with relative ease. Self-management consequently involves minimal teacher effort relative to other teacher-led interventions. For example, feedback and error correction are typically delivered by the teacher or interventionist but can be delegated to the student with self-monitoring.

Research has been clear that prompt feedback and error correction, when paired with explicit instruction, have positive impacts on learning new skills, including writing (Alber-Morgan, Ramp, Anderson, & Martin, 2007; Heubusch & Lloyd, 1998; Shapiro, 2004; Siewert, 2011). Providing individualized, timely feedback is problematic with writing tasks, however, as feedback is almost never immediate and only comes after a great amount of energy has been spent (Zimmerman & Risemberg, 1997). Days and weeks pass by before many students receive anything back (Kellogg, 2008). Significant effort on the part of the teacher is also involved, even when using holistic ratings scales without lengthy commentary and corrections. Therefore, having at-risk students monitor and record their own progress during or immediately following a writing activity, without eliminating teacher feedback, could provide the additional benefit of students providing their own feedback.
Numerous studies have shown that self-management interventions with elementary and middle school students can have positive effects on academic behaviors in the absence of other intervention components (Ballard & Glynn, 1975; Goddard & Sendi, 2008; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Harris, Graham, Reid, McElroy, & Hamby, 1994; McLaughlin & Skinner, 1996; Moxley & Lutz, 1995; Shimabukuro, Prater, Jenkins, & Edelen-Smith, 1999; Wolfe, Heron, & Goddard, 2000). While some of the academic self-management interventions described in the literature targeted only one area, such as productivity, or the amount of work completed, (Ballard & Glynn, 1975; Fish & Mendola, 1986; Levendoski & Cartledge, 2000; Moxley & Lutz, 1995), many researchers have addressed a combination of productivity, accuracy, on-task behaviors, and quality constructs (Carr & Punzo, 1993; Goddard & Sendi, 2008; Harris et al., 1994; Shimabukuro et al., 1999; Wolfe et al., 2000).

In studies examining the effects of self-management strategies on writing, students were typically given a specific length of time to write their stories and were sometimes provided with a story starter to guide their writing (Goddard & Sendi, 2008; Harris et al., 1994). At the end of the writing sessions, students independently assessed whether or not they had performed a specified behavior. As a measure of productivity, the number of words produced was used most frequently (Goddard & Sendi, 2008; Harris et al., 1994; Moxley & Lutz, 1995; Wolfe et al., 2000). Other measures of writing productivity used by researchers included the number of completed items (Shimabukuro et al., 1999) and the number of different action verbs, describing words, and number of sentences (Ballard & Glynn, 1975). In addition to writing productivity measures, researchers have used student checklists of quality constructs to measure writing quality (Goddard & Sendi, 2008). Writing accuracy measures required students to count and record the number of items correctly answered (Shimabukuro et al., 1999). For on-task
behavior, students assessed and recorded whether or not they were on-task in response to a stimulus such as a timer or tone (Harris et al., 1994; Wolfe et al., 2000). Self-graphing writing behaviors was used in all but one of the self-monitoring studies for writing (Ballard & Glynn, 1975).

When considering the effectiveness of self-monitoring on writing performance, many studies fail to clarify whether self-monitoring alone is sufficient without the addition of some other component such as goal setting, self-graphing, or self-reinforcement (Goddard & Sendi, 2008; Harris et al., 1994; Moxley & Lutz, 1995; Shimabukuro et al., 1999). In the following example, however, it was apparent that self-monitoring words written did not increase total words until a goal setting phase was added. Wolfe and colleagues (2000) used a reversal design to examine the effectiveness of self-monitoring on both on-task behaviors and total number of words written. Participants were between the ages of 10 and 12 years who were diagnosed with learning disabilities. During 10 min story writing sessions, a taped tone went off on an average of 60 s intervals. At the sound of each tone, students recorded whether or not they were on-task. At the end of each session, students counted the total number of times they were on-task along with the total number of words written and graphed those numbers. Students were reinforced for their accuracy in their recordings. Results showed that, although self-monitoring significantly increased on-task behaviors, writing production did not see significant gains until the last phase of the study, in which a changing criterion with public posting was introduced. This study suggests that self-monitoring word counts may increase total words written, however, the results were very modest. The research recommended exploring generalizability of behavior change as well as the effects of self-monitoring apart from self-graphing. Additional research identified by
Wolfe and colleagues (2000) as needed examined whether total words written would increase if students also self-monitor some type of quality construct such as mechanics usage.

Moxley and Lutz (1995) studied the effects of self-monitoring words written, however, goal setting and reinforcement were used throughout the length of the study and results were more positive. Interestingly, higher word counts were associated with increases in measures of expression but not mechanical accuracy. The researchers observed different results with four class-wide interventions with regular education students in Grades 1-3 and of gifted students in Grade 4. In these interventions, the students counted and recorded only the number of words they had written at the end of each writing session. By the end of the case studies, writing production increased along with gains in the use of concrete details, such as dialogue, and sentence complexity, which was measured by word length and syntax. The fourth grade study took place in a classroom for 15 students identified as gifted. The students engaged in freewriting for 3 min and kept individual colored bar graphs of the number of words written. A whole class bar graph displayed cumulative progress for words written. Positive individual and group consequences were administered based on reaching standard goals for total words written. Increases in writing speed were accompanied by increases in expression and negligible decreases in mechanical accuracy. It remains unknown if self-monitoring alone would have similar effects without self-graphing or goal making. Also, because mechanics decreased slightly, Moxley and Lutz (1995) identified research was needed to determine if self-monitoring mechanics would have improved performance in this area. Finally, because the students in the fourth grade study were identified as gifted, it is possible this was not an area of great need; future studies should therefore make appropriate selections based on initial writing assessments.
Graphing was added to a self-monitoring procedure with positive results in a study by Harris and associates (1994). The effects of self-monitoring attention and self-monitoring academic performance were compared based on on-task behavior, writing performance, and writing quality of students with learning disabilities. During self-monitoring sessions, students marked on a sheet whether or not they were on-task at the sound of a tone. At the end of the session, they counted and graphed the total number of times they were on-task along with the total number of words written. Performance was measured by the number of words written, while quality was measured using a holistic 8-point rating scale. Students were taught and encouraged to use a writing strategy when writing stories. These strategies were written on a chart and posted in the classroom for students to reference when writing. Results showed that both monitoring attention and monitoring performance had a positive effect on engagement and performance; neither was shown to be consistently superior to the other. Other researchers obtained similar results for a self-monitoring intervention targeting on-task and spelling behaviors for students with ADHD (Harris et al., 2005). This seems to indicate that it may not make a difference whether students self-monitor on-task behavior or academics and therefore it may be more convenient for students to monitor only one behavior. If students are not assessed to have initial low engagement, however, it would seem more effective to self-monitor academics alone. It remains unknown if similar outcomes could be seen with students without disabilities on generalized measures of writing and whether similar results would have been obtained had self-graphing not been used.

Previously described research shows that self-monitoring word counts may have positive effects under limited circumstances, yet it is important to explore how self-monitoring other writing variables may contribute to improved outcomes. In one study, students with learning
disabilities self-monitored the number of quality indicators met in addition to the number of words written during 10 min writing sessions (Goddard & Sendi, 2008). The participants included four fourth grade students. The intervention was conducted in a special education resource room. Each writing session began with a story starter and 5 min brainstorming activity. At the end of the session, students counted and graphed the total number of words written and completed a checklist containing seven writing quality constructs: neatness, indenting at the beginnings of paragraphs, capitalization at the beginning of sentences, correct punctuation at the end of sentences, use of a topic sentence, use of four to five detail sentences, and a closing sentence (Goddard & Sendi, 2008). These constructs were taken from a writing rubric that was used throughout the school district. Results indicated that self-monitoring produced a significant increase in the number of words written across all participants and an increase in the number of quality constructs for three of the four participants. Although the research suggests that the intervention has a positive effect on in-class writing assignments that were being self-monitored, more studies should be conducted examining the generalization of writing improvements to other assessments, such as curriculum based measures. Again, future studies should also examine the efficacy of self-monitoring apart from self-graphing.

Though the use of a checklist is one way students can self-monitor writing quality, Ballard and Glynn (1975) also demonstrated positive results with a slightly different strategy. In their study, students counted and recorded the number of sentences written, the number of different action words, and the number of describing words. Moreover, a chart was posted in the classroom to remind students of specific criteria before they begin writing, which may be a simple addition for practitioners to implement in the classroom. The study was conducted in a general education classroom with randomly selected participants. A multiple baseline across
behaviors design was used to demonstrate the effects of self-assessment and self-recording on the number of sentences written, number of different actions words, and number of different describing words. Self-determined and self-administered reinforcement was added to the self-assessment and self-recording procedures contingent on each of the writing responses in turn. A chart was located in the front of the room to remind students to write in sentences, use describing words, and use action words. At the end of each writing session, students performed the self-monitoring procedures. Results revealed that self-management increased writing responses only when it was paired with self-reinforcement. In this study, participants were selected randomly not based on skill level. As such, the participants may not have had needs in writing, which could have led to ceiling effects. It remains unknown whether the intervention would have had more positive effects for lower performing students versus higher performing students.

Self-monitoring has also been shown to improve the writing performance of older students (Shimabukuro et al., 1999). In contrast to the Ballard and Glynn (1975) study, Shimabukuro et al. (1999) found that self-monitoring improved writing performance without the addition of self-reinforcement. However, the effects on writing accuracy were shown to be more modest when compared to writing production and self-graphing was used in combination with self-monitoring. The researchers investigated effects of self-monitoring of academic productivity and accuracy on the academic performance and on-task behavior of three male students with LD and ADHD. A multiple baseline across three academic conditions (reading, math, and written expression) was used. Subjects included 17 students in a private school for disabilities. The study was conducted in a self-contained classroom with mixed grade levels (Grades 6-8). Following instruction, students were given 10 to 15 min to complete their independent practice assignments. Student participants recorded their completion and accuracy
percentages on their progress graphs at the end of the period. Reading and math instruction occurred in small groups while written expression instruction involved the entire class. Only those involved in the study engaged in self-monitoring. Student participants self-monitored for academic accuracy and productivity and on-task behavior was observed and recorded by the teacher. During intervention, the teacher circulated among the small groups to oversee accuracy in scoring, recording, and graphing. Academic productivity and on-task behavior improved for all students in the three subject areas. Gains in productivity were greater than gains in accuracy, and productivity gains were greater for both reading comprehension and math than for written expression. It is not known which form of self-management, self-monitoring or self-graphing, had the biggest impact on performance and future studies should clarify this. Again, similar to previous studies, it remains unknown whether there would be similar results for students without disabilities in a general education setting.

Explicit and systematic instruction in the areas of planning, revising, and editing text has also shown to be an effective method of teaching students to improve their writing on their own (Graham & Perin 2007). Strategy instruction, which is considered to be a self-management technique, involves direct and explicit teaching of strategies for planning, revising, or editing text (Graham, 2006; Mooney, Ryan, Uhing, Reid, & Epstein, 2005). Through a meta-analysis, Graham (2006) demonstrated an immediate and lasting effect on writing performance as measured by writing quality, elements, length, and revisions. Little impact, however, was made on mechanics.

A specific type of strategy instruction, Self-Regulated Strategy Development (SRSD), uses self-monitoring as part of a larger package that also includes goal setting, self-instruction, and self-reinforcement. Research evidence suggests that SRSD is effective in improving writing
performance with students with disabilities in Grades 2-7, specifically with regard to persuasive writing elements such as planning, organization, clarity, topic sentences and supporting details, and summarizing (Lane et al., 2008; Mason, Kubina, & Taft, 2009; Mason & Shriner, 2008; Saddler, 2006; Wong, Hoskyn, Jai, Ellis, & Watson, 2008). None of the studies examined the effects of SRSD on writing mechanics in isolation but word counts were assessed by all, with the exception of Wong et al. (2008). In most instances, students who increased their number of essay elements also improved the number of words written, which supports the connection between writing quality and quantity.

To summarize, evidence in support of using self-monitoring procedures specifically for improvements in written expression is inconsistent at best. Although some studies provided evidence of improvements in particular variables monitored by the students, there is not enough evidence to assume that self-monitoring on its own, without added components such as self-graphing or self-reinforcement, can improve either writing productivity or overall quality. More research is needed to support the use of these strategies with confidence in the classroom. Due to the fact that self-monitoring is a less intensive intervention option for students who may be at risk, it would be worth investigating further with what populations and in what conditions self-monitoring may improve writing performance.

Current Study

With current pressures in education to improve student performance using scientifically-based interventions, researchers need to continue to add to the pool of resources available to educators and to fill in the gaps that may hinder bringing research to practice. This study will build upon existing knowledge of the use of self-monitoring techniques to improve writing skills (e.g., Ballard & Glynn, 1975; Goddard & Sendi, 2008; Harris et al., 1994; Moxley & Lutz, 1995;
Wolfe et al., 2000). Although self-monitoring is a well-researched intervention, its utility with writing skills has not been explored as in-depth as other academic behaviors such as mathematics (Brown & Frank, 1990), reading (McLaughlin & Truhlicka, 1983), and spelling (Harris et. al., 1994). The current study will address some gaps in the research literature on self-monitoring with writing skills. First, the few studies that have been completed have largely been conducted with students who have specific learning disabilities. This study will extend the generalization to the general education classroom for those students who may be at-risk for academic failure but do not necessarily have intensive needs. Second, sufficient data do not exist on using self-monitoring alone without the addition of self-graphing. Finally, this study will examine generalization effects through weekly curriculum-based measurements with students using total words written, words spelled correctly, and correct minus incorrect writing sequences. This study proposes to address two research questions:

1) To what degree is self-monitoring classroom writing assignments effective in increasing scores on weekly curriculum-based measures?

2) To what degree will increases resulting from the intervention generalize across time, verified through maintenance assessments?

**Method**

**Participants**

The school principal nominated a fourth grade language arts teacher who might be interested in a writing intervention for students. Initially, a third grade teacher was suggested, however, upon speaking with the teacher it was evident that the students would not yet have the ability to apply all the skills listed on the self-monitoring checklist because they had either not yet been taught or would not be taught until later in the school year. The researcher then met
with the fourth grade teacher to explain the purpose and procedures of the study and answered any questions the teacher had prior to agreeing to participate in the research.

Student participants were selected for the study based on written expression curriculum based measurement data collected by the teacher prior to the start of the study. The students were assessed in the whole class setting and were presented orally with a pre-selected story starter according to standardized administration directions developed by Powell-Smith and Shinn (2004). The students were told that they would be given 1 min to think about their essay and 3 min to write the essay. Afterward, scores were calculated for total words written (TWW) and correct minus incorrect writing sequences (CIWS). Students were selected if they performed at or above the 20th percentile on the TWW measure and between the 25th and 75th percentiles on CIWS measures as compared to their classroom peers on writing assessments. Using a selection criteria for CIWS between the 25th and 50th percentiles yielded a very limited pool of participants, which would not leave room for attrition. With the revised criteria, it was thought that students would still have room for improvement. This selection criteria was chosen in order to target those students who had mild to moderate difficulties with the use of writing mechanics but were not significantly below average with total words written. Oral reading fluency data taken from class-wide DIBELS assessments were the final criteria. Participants needed to perform at or above the 25th percentile in order to rule out reading deficits as a contributing factor to low writing performance.

The participants included 5 fourth-grade students, three boys and two girls. None of the participants received special education services as guided by an Individualized Education Plan. Two of the students participated in GATE, the district’s gifted program, in the area of creative thinking ability. Two of the students were 9 years old and three were 10 years old. The five
students were all in the same homeroom, where they spent the morning in math and science instruction. After lunch, they switched classes for language arts and social studies instruction.

**IRB Review and Permissions**

Prior to participant recruiting, the study was reviewed by the University of Cincinnati Institutional Review Board for approval. Permission was obtained from the building principal. Written parent permission was obtained from the eligible participants’ parents or legal guardians using a permission form (Appendix A). Two copies of the form were sent home to parents with their student(s) so that parents could keep one copy for their records. By signing the permission form, parents agreed to have their child participate in the study’s research activities. Due to their age, students were asked to provide assent with the use of a recruitment script and assent form (Appendix B). The principal investigator verbally read the assent form to the students prior to getting assent.

**Setting**

The study took place in an elementary classroom in an urban school located in the Midwestern United States. The school included students in kindergarten through fifth grade, with approximately three to five classroom teachers per grade level. Average daily enrollment for the school was 569 for the 2012-2013 school year. Of the students enrolled in the school, 59% were reported as Caucasian, 30%, Hispanic, 8% Multiracial, and 4% Black, Non-Hispanic. Over half of the student population (72.6%) was considered economically disadvantaged and 12.7% of the population was identified as students with disabilities.

**Materials**

Materials for the assessment procedures included a list of story starters, a copy of administration directions (Appendix D), and lined paper for students to write their essays. For
the self-monitoring procedures, each student participant was given their own binder in which to store in-class writing samples, Writing Quality Checklists (Appendix E), and point tally sheets (Appendix F). An examiner’s copy of the Writing Quality Checklist (Appendix G) was used to check for student accuracy. A Good Writing Chart (Appendix H) was also posted on the wall in the classroom.

**Experimental Design**

The design of this study was a multiple baseline (MB) design, which is a type of single case design that does not require the withdrawal or reversal of treatment (Kennedy, 2005). Multiple baseline designs are useful in instances in which the independent variable is irreversible or a return to baseline is not desirable (Kennedy, 2005). A MB design may examine intervention effects across subjects, settings, or behaviors. This study used an MB across subjects design as the purpose of the study is to evaluate the effectiveness of self-monitoring, specifically on writing behavior in the classroom. A baseline condition was established simultaneously for each of the participants’ behavior and the intervention was introduced systematically one student at a time. Participants were selected to begin the intervention phase based on the stability of their baseline data.

**Dependent Variables**

Across both baseline and intervention conditions, participants were individually assessed once per week with an expository story starter, or writing prompt. Similar to recruitment procedures, students were presented orally with a story starter according to standardized administration directions developed by Powell-Smith and Shinn (2004). Story starters are designed to make writing easier for the student (Hudson, Lane, & Mercer, 2005), be free from cultural bias and relate to the student’s life, and encourage writing for an extended period of time.
(Robinson & Howell, 2008). Story starters were therefore selected carefully. The researcher informed the students that they would be be given 1 min to think about their essay and 3 min to write the essay. At the end of the 3 min writing session, the researcher calculated the scores for total words written (TWW), words spelled correctly (WSC), and correct minus incorrect writing sequences (CIWS) and recorded the results on an assessment form (Appendix C).

The primary dependent variable was correct minus incorrect writing sequences (CIWS), which is a measure that subtracts the number of incorrect writing sequences in the sample from the total number of correct writing sequences. The number of incorrect writing sequences is calculated by subtracting the number of correct writing sequences in the sample from the total number of possible writing sequences. Correct writing sequences are defined as two adjacent writing units that are acceptable within the context of what is written. Spelling, punctuation, capitalization, and grammar are considered when determining pairs of correct adjacent words. Correct minus incorrect writing sequences is a production-independent indice, with utility for use in the older grades and may be the more appropriate choice for a broad score that taps both fluency and accuracy. Research has also suggested that CIWS is more strongly related to other types of writing criteria than production-dependent indices (Jewell & Malecki, 2005; Tindal & Parker, 1989).

Secondary variables included TWW and WSC. TWW is calculated by counting the total number of words in the sample, which is defined by any letter or group of letters separated by a space. Misspellings and nonsense words are disregarded. WSC is calculated by counting the total number of words spelled correctly, which is based on a low-inference judgment regarding appropriateness of context within the English language.
Two studies of children with learning disabilities have found that TWW and WSC, were highly related with the Test of Written Language, the Developmental Sentence Scoring System, and the Language Subtest of the Stanford Achievement Test, with correlations ranging from .41 to .81 (Deno, Marston, & Mirkin, 1982; Deno, Mirkin, & Mareton, 1980). Furthermore, a single case study with first through fourth grade classes demonstrated an increase in concrete detail and sentence complexity as writing rates increased (Moxley & Lutz, 1995).

Procedures

Baseline. Before beginning the intervention, the writing teacher gave the class a 5 min lesson on important traits of good writing using the Good Writing Chart, which was posted in the classroom (Appendix H). At the beginning of the class writing period, three days per week, the teacher referred to the Good Writing Chart and briefly reviewed and gave examples for each point. After reviewing the Good Writing Chart with the class, the teacher wrote two expository writing cues and gave the students the opportunity to choose one to write about. The teacher then told the class, “You will have three minutes to pick a topic and brainstorm your ideas on a piece of scrap paper.” The teacher would then start the timer. After the timer went off, she told the class, “Now you have ten minutes to write an essay about the topic you have chosen. When I say stop, please stop writing and I will collect your papers.” The teacher then collected the writing samples.

Training. Before beginning the first intervention session, the researcher trained participants on the self-monitoring procedures. The first step involved an explanation of the procedures with an opportunity for students to ask questions. The researcher asked the students to provide examples for each of the items on the checklist to confirm familiarity with the concepts. The second step was a modeling procedure in which the researcher demonstrated how
to use each of the self-monitoring steps using researcher-generated writing samples. Finally, two pre-experimental, self-monitoring sessions were conducted (one performed with guidance and one independently) in order for the students to demonstrate proficiency in using the procedures. The researcher then used the same checklist to compare results. It was planned that if a student was not able to demonstrate proficiency after a maximum of three practice sessions, that student would not be included in the study and the researcher would suggest that the teacher consider alternative intervention procedures that may be more appropriate for the student. By the end of each training sequence, all five participants demonstrated fluency with the procedures and were therefore able to proceed in the study. Only one participant requested one additional independent practice session, however, that participant had already been judged to demonstrate proficiency.

**Self-Monitoring.** During the self-monitoring condition, the participants were each given a binder at the beginning of the writing period three days per week. The binder contained lined paper to write their essays and a student copy of the Writing Quality Checklist (Appendix E). Writing prompts were delivered in a manner identical to the baseline condition. Teacher instruction regarding the Good Writing Chart, which included reminders for each point on the chart, in addition to examples, remained in place in the intervention condition to ensure consistency of instruction and to attempt to control for possible confounding instructional variables.

After the 10 min writing period, the participants were given 3 min to compare their essay to the Writing Quality Checklist (Appendix E) and to circle either ‘Yes’ or ‘No’ for each item. First, they checked to see if they had used correct verb tense throughout their essay. Next, they checked to see if they had used apostrophes with contractions and possessives. The next three
items dealt with correct use of spelling, capitalization, and punctuation. When they had circled either ‘Yes’ or ‘No’ for each of these items, they then counted the total number of ‘Yes’s and entered that number in the space at the bottom of the checklist. The maximum number a student could receive for this variable was 5. Although the entire class engaged in the expository writing activity, only the participating students used the self-monitoring procedures.

After the students completed the self-assessment, they placed their binders on a designated bookshelf located in the back of the classroom. The researcher collected the binders at the end of each week and scored writing samples to confirm student accuracy with the self-monitoring procedures, using the Examiner Copy of the Writing Quality Checklist (Appendix G). The rater circled Yes for an item if the student circled Yes and used at least 75% accuracy. For example, if a student circled Yes and used ending punctuation in at least three out of four sentences, the rater would also circle Yes and that item would be counted as having 100% agreement. If, however, the student circled No and used ending punctuation in at least three out of four sentences, the rater would have also circled No. Therefore, the 75% accuracy rule was only applied when a student circled Yes on an item. If the student and experimenter reached 100% agreement on the total number of Yes’s and the total word count, the experimenter placed a checkmark on the student’s Point Tally Sheet (Appendix H). Each time a student obtained two check marks they were able to select a treat from a goodie bag (e.g. small tangible such as a sticker, skittles, dum-dums, etc.).

Student accuracy on the Writing Quality Checklist was very variable, with Student 4 displaying the highest degree of self-monitoring accuracy and Student 5 displaying the lowest amount, with only 0% accuracy on the total number of Yes’s counted. Students 1, 3, 4, and 5 achieved 100% accuracy and student 2 achieved 75% accuracy. Table 2 displays the results of
student accuracy checks. The numbers in the columns represent the percentage of samples in which the students reached 100% agreement.

Table 2

*Average Percent Agreement When Comparing Examiner Scores and Student Scores on Writing*

*Quality Checklist*

<table>
<thead>
<tr>
<th></th>
<th># of Yes’s</th>
<th>Total words written</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>86%</td>
<td>100%</td>
</tr>
<tr>
<td>Student 2</td>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>Student 3</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Student 4</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Student 5</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Intervention Adherence**

Intervention adherence data were collected by the researcher for approximately 20% of the intervention sessions. The observer used an adherence checklist (Appendix G) and calculated the percentage of steps completed correctly. The checklist contains steps for both the teacher and the participants. The teacher was given a copy of the checklist at the beginning of the study and was observed to use it as a reference during adherence checks. Adherence averaged 85% (range, 78% to 89%). Adherence did not reach 100% because the teacher had started giving the students 1 min of think time instead of the specified 3 min. During follow-up feedback, the teacher informed the researcher that when the students were given 3 min to brainstorm they would become noticeably restless and lose focus. The researcher and teacher both agreed to allow one minute, however, the item remained on the checklist as originally written. The student participants, on the other hand, reached 100% compliance during all observations. It was also
observed that the teacher consistently led a whole-class brainstorming session for a few minutes after individual brainstorming and before allowing the students to write. Students raised their hands to offer ideas they generated during individual brainstorming, which would then be written on the white board. Although this step was not included as part of the adherence checklist, it was a classroom practice that the teacher implemented routinely as a whole class and therefore should not have interfered with the results.

**Inter-scorer Agreement**

Two school psychology graduate students assisted the PI in obtaining inter-scorer agreement data for TWW, WSC, and CIWS assessments for 28% of the assessment sessions. The graduate students had just completed their first year in the school psychology program and had already learned how to score writing samples using curriculum based measurement. Therefore, they had some knowledge and practice with the measures used in the study prior to co-scoring. The graduate students were provided with a copy of the AIMSweb written expression scoring procedures a few days prior to the session to give them the opportunity to clarify questions or concerns prior to co-scoring. In addition, the PI reviewed the rules with the graduate students and discussed different examples. The PI and graduate students then separately scored the writing samples and compared the results. In cases of disagreement, either the researcher’s score was ultimately entered in the results or, if an error was attributed the researcher, the appropriate correction would be made, if necessary. Inter-scorer agreement for total agreement was calculated using the following formula: 

\[ \text{Agreements} / (\text{Agreements} + \text{Disagreements}) \times 100 \]

Results are displayed in Table 3. Agreement was very high for all TWW and WSC with average agreements of 99% and 98%, respectfully. CIWS agreement was significantly lower at
an average of 91%, however, there were only a few low scores that brought down the average; most of the scores reached 100% agreement. The researcher and graduate students based scorings on AIMSweb scoring rules and, although it provides thorough guidelines and examples, it does not address every conceivable type of writing sequence that may or may not be counted as an error. Therefore, it was at times difficult to discern whether or not a particular sequence should be counted as an error and some amount of inference had to be used. In other research studies, inter-scorer agreement averages range from 88% to 92% (Espin, De La Paz, et al., 2008; Espin et al., 2000; Espin, Wallace, et al., 2008). Because agreement in this case falls within that range, 91% was considered an acceptable average.

Table 3

*Inter-scorer Agreement Percentages for Curriculum Based Measures*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWW</td>
<td>99%</td>
<td>97%-100%</td>
</tr>
<tr>
<td>WSC</td>
<td>98%</td>
<td>93%-100%</td>
</tr>
<tr>
<td>CIWS</td>
<td>91%</td>
<td>64%-100%</td>
</tr>
</tbody>
</table>

**Intervention Acceptability**

Participating students and teachers were administered a Social Validity Survey (Appendix H) at the end of the study. The questions addressed whether the students and teachers judged the intervention acceptable and whether they thought the self-monitoring techniques helped improve writing skills. The teacher was given the survey on the second to last week of school but did not return it to the researcher despite reminders. However, during regular informal communications, the teacher indicated that the intervention fit well in the curriculum,
that the students liked doing the activity, and that the ones who were not yet in the intervention phase would frequently ask, “When do we get our binders?” Table 4 displays student survey results. The participating students’ surveys were anonymous and students were told they did not have to put their names on the papers. Only three responses were obtained because one student moved out of the district and another student began having significant behavioral issues toward the last several weeks of the school year and eventually refused to participate in weekly assessments. Up until that point, there had been no previous issues with compliance. The homeroom teacher indicated that the behavior was consistent in other classes as well. All three students who completed the survey reported that they liked participating in the study and felt they were better writers after having participated. Two out of the three also reported that they would like to do another study like this in the future.

Table 4

*Student Satisfaction Survey Results*

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you like participating in the study?</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Do you feel you are a better writer after having participated in the study?</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Would you like to do another study like this in the future?</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Maintenance**

Maintenance was assessed using follow-up assessments the third and fourth weeks following the last intervention session. As previously mentioned, two of the students were unavailable at this point in the study and maintenance data was only collected for three of the five students.

**Data Analysis**

Visual analysis was the primary method of analysis for all dependent variables. After
data collection began, data were scored, entered into spreadsheets, and charted into graphic form. Line graphs were analyzed for level, trend, and variability. Mean, standard deviation, and percent non-overlapping data were calculated and displayed in tables. Percent of non-overlapping data points (PND) was used in addition to visual analysis in order to better determine the effects of the intervention as well as any effects across time. The PND method of quantitative synthesis has consistently shown to be a valid and meaningful procedure in single-subject research (Scruggs & Mastropieri, 2012). Scruggs, Mastropieri, Cook, and Escobar (1986) provide specific criteria for interpreting PND, which were applied to the present study. PND > 90% indicates highly effective intervention, 70-90% fairly effective, 50-70% questionable effectiveness, and <50% unreliable treatment. PND data were calculated by comparing data from baseline to intervention and from intervention to maintenance. Across all dependent variables, where the desired effect of the intervention was an increase in performance, the following formula was used: number of intervention points above the highest point in the previous phase divided by the total number of intervention points and multiplied by 100.

**Results**

The results are organized by dependent variable, beginning with CIWS as the primary variable, followed by TWW and WSC. The overall results demonstrate higher treatment effects on CIWS than on either TWW or WSC measures. For CIWS, Student 1 appeared to have made relatively the most significant gains with moderately effective results. Students 2 and 3 saw mildly effective results whereas Students 4 and 5 appeared to make no improvements as a result of the intervention. Maintenance data suggest that Student 1 continued to benefit while Student 3 saw a slight decrease in performance following the withdrawal of the intervention. Across all five participants, there did not appear to be any effect on TWW or WSC.
CIWS

Figure 1 presents a multiple baseline representation of the CIWS data across participants. Table 5 displays mean, standard deviation, and PND data for CIWS. The goal line on the graph represents the CWS fourth grade spring default cut scores used by AIMSweb (2011) researchers and falls at approximately the 45th percentile. There are currently no national norms available for CIWS, however, it may still be useful to use the CWS norms as a guide, with the assumption that CIWS scores are going to be at least slightly lower if the student makes any errors in writing sequences.

For Student 1, initial baseline levels of the dependent variable averaged 18.67 CIWS; the data were stable with a slight increasing trend. Upon implementation of the self-monitoring strategy, CIWS first decreased and then immediately increased significantly. The data continued to have very little variability in the intervention condition with an average of 32.56 and a PND value of 78%. While CIWS stayed below the goal line during baseline, the data either reached or exceeded the goal line in five out of the nine intervention points. When the maintenance phase was introduced, the data remained at intervention levels with a PND value of 0%.

Student 2’s initial baseline levels of CIWS were variable, showing a slight decreasing trend with an average of 17.60. All points remained below the goal line. Similar to Student 1, Student 2 decreased sharply during the first week of the intervention implementation and then increased immediately afterward. The data then continued to be highly variable for the remainder of the intervention phase with no discernible trend and only two of the seven data points falling at or above the goal line. For this phase, average CIWS was 25.00 with a PND value of 57%. Maintenance data were not collected due to student refusal.
Baseline data were highly variable for Student 3, ranging from 9 to 36 CIWS with an average of 22.00 and with no discernible trend. One baseline data point met the goal line. When the intervention was introduced, the data began a steady, moderately increasing trend that fell slightly right before the intervention was removed. However, the data point did not fall to the baseline level and the last three out of five intervention points fell at or above the goal line. The intervention average was 40.00 CIWS with a PND value of 60% as compared to baseline. During the maintenance phase, the level decreased slightly with a PND value of 0%.

For Student 4, initial baseline levels began with a slightly increasing trend before moving to a decreasing trend. The data ranged from 16 to 50 with an average of 32.11 CIWS. The goal line was met or exceeded in three of the nine assessment sessions. During the self-monitoring phase, the level of the data remained similar to the baseline with a moderately decreasing trend and an average of 33.50. The goal line was met or exceeded in three of the four sessions and the PND value fell at 0%. The overall maintenance level was slightly higher than the intervention phase with a PND value of 0%.

Student 5 had a relatively stable baseline consistently below the goal line with an average of 10.67 CIWS and a range of 0 to 24. The level did not improve with the implementation of the intervention and remained at an average of 10.50 CIWS; however, it is difficult to discern a trend with only two data points. Maintenance data were not collected on this student due to the student moving out of the district.
Figure 1. CIWS Multiple Baseline Graph
Table 5

CIWS: Means, Standard Deviations, and Percentage of Nonoverlapping Data

<table>
<thead>
<tr>
<th></th>
<th>Student 1 M (SD)</th>
<th>Student 2 M (SD)</th>
<th>Student 3 M (SD)</th>
<th>Student 4 M (SD)</th>
<th>Student 5 M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>18.67 (5.26)</td>
<td>17.00 (9.70)</td>
<td>22.00 (11.24)</td>
<td>32.11 (9.93)</td>
<td>10.76 (6.46)</td>
</tr>
<tr>
<td>Intervention</td>
<td>32.56 (9.46)</td>
<td>25.00 (14.68)</td>
<td>40.00 (9.21)</td>
<td>33.50 (11.37)</td>
<td>10.50 (4.50)</td>
</tr>
<tr>
<td>Baseline vs. Intervention PND</td>
<td>78%</td>
<td>57%</td>
<td>60%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Intervention vs. Maintenance PND</td>
<td>0%</td>
<td>N/A</td>
<td>0%</td>
<td>0%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

TWW

Figure 2 presents a multiple baseline representation of the TWW data across participants. Table 6 displays mean, standard deviation and PND data for TWW. As with CIWS, the goal line represents the TWW fourth grade spring default cut scores used by AIMSweb (2011) researchers.

Baseline levels of the dependent variable for Student 1 averaged 35.25 TWW with a range of 30-38; the data remained stable around the goal line. When the self-monitoring intervention began, TWW decreased sharply below baseline and then increased significantly to above the baseline level. The data then continued with a stable trend close to or above the goal line with an average of 36.67 and a PND value of 44%. During the maintenance phase, the data remained at approximately the same level as the intervention phase with a PND value of 0%.

For Student 2, all five baseline data points fell at or above the goal line with a mild increasing trend and an average of 46.00 TWW. Upon introduction of the intervention, the data
decreased slightly but remained above the goal line before increasing sharply and then assuming a steady decreasing trend. The average was 48.71 TWW with a PND value of 14%.

Maintenance data were not available.

For Student 3, baseline data had a stable trend that remained mostly above the goal line with only one point falling below the goal line. The average fell at 41.43 TWW. During the intervention phase, the data began a steady, increasing trend before decreasing slightly during the final week. The average was 46.60 TWW and a PND value of 40% in which the last two data points of the intervention fell above the highest baseline point and four out of the five points fell above the goal line. Performance on TWW dropped immediately during maintenance assessments, with a PND value of 0%.

Baseline data for Student 4 had an overall stable trend with some variability, remaining at or above the goal line with an average of 52.33 TWW. Upon implementation of the intervention, the data remained at approximately the same level as baseline with an average of 52.25 TWW and a PND value of 0%. The data also decreased slightly in the maintenance phase with a PND value of 0%.

Student 5 had a steady baseline level with an average of 36.33 TWW and four of the nine data points falling above the goal line. As with CIWS, the implementation of the intervention did not have an effect on performance but remained very close to baseline performance with an average of 34.50 TWW and a PND value of 0%. Maintenance data were not available.
Figure 2. TWW Multiple Baseline Graph
Table 6

*TWW: Means, Standard Deviations, and Percentage of Nonoverlapping Data*

<table>
<thead>
<tr>
<th></th>
<th>Student 1 M (SD)</th>
<th>Student 2 M (SD)</th>
<th>Student 3 M (SD)</th>
<th>Student 4 M (SD)</th>
<th>Student 5 M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>35.25 (3.11)</td>
<td>46.00 (6.99)</td>
<td>41.43 (6.76)</td>
<td>52.33 (7.23)</td>
<td>36.33 (6.31)</td>
</tr>
<tr>
<td>Intervention</td>
<td>36.67 (6.50)</td>
<td>48.71 (6.20)</td>
<td>46.60 (10.52)</td>
<td>52.25 (6.80)</td>
<td>34.50 (.55)</td>
</tr>
<tr>
<td>PND</td>
<td>44%</td>
<td>14%</td>
<td>40%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Intervention vs. Maintenance PND</td>
<td>0%</td>
<td>N/A</td>
<td>0%</td>
<td>0%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**WSC**

Figure 3 presents a multiple baseline representation of the WSC data across participants. Table 7 displays mean, standard deviation, and PND data for WSC. As with CIWS and TWW, the goal line represents the WSC fourth grade spring default cut scores used by AIMSweb (2011) researchers.

For Student 1, baseline levels of the dependent variable averaged 33.50 WSC; the data remained stable below the goal line. Upon implementation of the self-monitoring strategy, WSC first decreased below the baseline level and then immediately increased above the goal line. The remaining data continued to have little variability and stayed close to baseline level with an average of 35.89 and a PND value of 44%, indicating no effect. Maintenance data were similar to the previous condition in both level and trend with a PND value of 0%.

For Student 2, four of the five data points fell at or above the goal line with a mild increasing trend and an average of 40.80 WSC. Once the intervention was introduced, the data decreased slightly but remained stable at the goal line before assuming a slight increasing trend.
above the goal line. The average was 43.57 with a PND value of 14%. Maintenance data were not available.

Baseline data for Student 3 had little variability and a stable trend that remained close to the goal line. The average fell at 38.29 WSC. During the first week of intervention the data decreased slightly but then continued a steady, increasing trend at an average of 45.20 WSC and a PND value of 40% in which the last two data points of the intervention fell above the highest baseline point and the last three points fell above the goal line. Performance on WSC dropped immediately during maintenance assessments, with a PND value of 0%.

For Student 4, baseline levels were slightly more variable than for the other participants however, the trend was generally stable and the data remained at or above the goal line with an average of 47.78 WSC. During the intervention implementation, the data started to increase slightly before sharply declining below both the baseline and goal levels. The data also seemed to decrease slightly in the maintenance phase. The intervention average was lower than baseline at 46.50 WSC. Both the intervention and maintenance phases had PND values of 0%.

Student 5 had a steady baseline level with an average of 30.56 WSC. Only one of the nine data points fell above the goal line. The implementation of the intervention did not appear to have an effect on performance but remained very similar in level to and even slightly lower than the baseline condition with an average of 29.50 WSC and a PND value of 0%. Maintenance data were not available.
Figure 3. WSC Multiple Baseline Graph
Table 7

WSC: Means, Standard Deviations, and Percentage of Nonoverlapping Data

<table>
<thead>
<tr>
<th></th>
<th>Student 1 M (SD)</th>
<th>Student 2 M (SD)</th>
<th>Student 3 M (SD)</th>
<th>Student 4 M (SD)</th>
<th>Student 5 M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>33.50 (2.18)</td>
<td>40.80 (6.91)</td>
<td>38.29 (6.80)</td>
<td>47.78 (7.55)</td>
<td>30.56 (6.83)</td>
</tr>
<tr>
<td>Intervention</td>
<td>35.89 (6.97)</td>
<td>43.57 (7.50)</td>
<td>45.20 (9.95)</td>
<td>46.50 (7.63)</td>
<td>29.50 (1.50)</td>
</tr>
<tr>
<td>Baseline vs. Intervention PND</td>
<td>44%</td>
<td>14%</td>
<td>40%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Intervention vs. Maintenance PND</td>
<td>0%</td>
<td>N/A</td>
<td>0%</td>
<td>0%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Discussion

It appears that the self-monitoring procedure had moderately positive effect on CIWS for Student 1 and mildly positive effect on Students 3. No apparent effects were seen for Students 2 and 4 and only two intervention points for Student 5 makes it difficult to draw accurate conclusions. Student 1 also seemed to maintain positive effects over time while Student 2 saw a slight decrease in performance across time. It is important to note that maintenance data were collected during the last two weeks of school prior to summer vacation. This is not the ideal time to collect academic performance data, as the overall intensity of instruction is diminished compared to the rest of the school year.

There did not appear to be any meaningful effects on either TWW or WSC for the participants, with the exception of Student 3, who had the greatest change in performance from baseline to intervention across both measures. After examining the graphs, it appears that results for the two measures are very similar and even in the baseline phase Students 2-4 were able to perform either at or above the goal line at the 45th percentile, indicating that writing production
and spelling were not areas of concern prior to the intervention. Student 5 appeared to have more difficulty with TWW, while both Students 1 and 5 had lower scores on WSC. The self-monitoring intervention had greater effect on accuracy and content rather than the amount produced, which was not unexpected. Although the students did monitor the total words written, this was not the focus of self-monitoring as the majority of questions on the checklist addressed mechanics. The students were also not told they needed to increase the amount of words they wrote. However, because one of the questions on the checklist addressed spelling accuracy, it was expected that some positive improvements would be made with correct spelling word usage.

In an attempt to prevent students from simply circling items on the checklist without reflecting on their work, regular accuracy checks were conducted so that students had some degree of motivation to answer the questions honestly and thoughtfully. The fact that the students were often inaccurate perhaps says less about their motivation than about the actual knowledge required to recognize errors. For instance, students may know to use an apostrophe for one contraction but not another, less frequently used contraction. As for spelling, students appeared to be honest in circling the words they were unsure how to spell. The fact that there were sometimes other misspelled words uncircled shows that these students were not always aware of when they had spelled a word incorrectly. Whenever there were noted disagreements, the students tended to rate their writing more positively than the researcher. Accuracy for total words written was much higher for all participants, most likely due to the fact that it is easier for students to accurately count words than it is to accurately identify errors in their writing. Low accuracy on self-monitoring may be less of a concern, as some research shows little correlation between accuracy and intervention effectiveness (e.g., Ballard & Glynn, 1975; Kneedler &
Hallahan, 1981; Marshall, Lloyd, & Hallahan, 1993). However, it has also been suggested that a minimum degree of accuracy is useful (Shapiro, Durnan, Post, & Levinson, 2002).

There did not appear to be a difference in effects based on the level of baseline performance. Interestingly, the students who performed the highest and the lowest in the baseline condition showed the least amount of improvement. This could have also been due to the fact that these were also the last two students added to the intervention condition and more data would have helped create a more stable trend.

**Comparison to Previous Research**

Ballard and Glynn (1975) used self-management procedures in a regular education classroom and found that self-management increased the number of sentences written, the number of different action words, and the number of different describing words only when it was paired with self-reinforcement. The present study appeared to support the results that self-monitoring writing quality, when not tied to consequences, may only be mildly effective. It did not support the research by Goddard and Sendi (2008), however, which indicated a significant increase in the number of words written across all participants and an increase in the number of quality constructs for three of the four participants. There are a number of differences between the two studies that could account for different results. For one thing, the present study was implemented in the general education classroom with students who were not identified with learning disabilities. Secondly, the present study did not use self-graphing. Third, as with Ballard and Glynn (1975), Goddard and Sendi (2008) used performance on self-monitored writing passages as the dependent variable whereas the present study used weekly curriculum based measures.
Practical Implications

Results from this study show that self-monitoring writing conventions may have some usefulness in the general classroom environment and some implications can be made for interventions. First, teachers should use student performance data to determine which students would benefit from a self-monitoring checklist. This study did not include students who fell significantly below their peers in the area of CIWS and it would likely be more beneficial for students who have the skills in their repertoire but are not practicing them consistently.

Second, although in this case it was used as a Tier 2 intervention, a checklist could also be used by the entire class following the introduction of a specific skill; this could help to promote retention and encourage practice of a newly learned skill. Because this intervention is low-intensity and requires limited teacher time and effort, it could easily be embedded in the existing writing curriculum immediately following any extended writing activity. Although in the current study self-monitoring was implemented specifically during expository writing, it could also be used in narrative or journal writing when students are encouraged to “free write”. Conducting the procedure with the entire class could also reduce the risk of students rushing through the checklist. Although the students were given extra time to self-monitor, they could have completed the checklist hastily so as not to appear behind the rest of the class; this is pure speculation, however, and it may not be possible to know whether or not students used all the time that was needed.

Third, although not specifically addressed in this study, generalization across subject areas is another point to consider. Writing is used in regular instruction across a range of academic areas, including science, social studies, and English. For struggling learners, a simple checklist could be used across multiple writing assignments and settings.
Fourth, in the future, it may be interesting to compare the results of scores on in-class self-monitored writing assignments and weekly curriculum based measures. Had the present study used the in-class writing assignments as the dependent variable, it is possible there would have been more positive results.

Limitations and Suggestions for Future Research

In summary, although self-monitoring appeared to have positive effects for some of the students, it is difficult to make broad conclusions regarding the overall effectiveness of the intervention. Further research is still needed in order to address limitations of this study. It would be beneficial to conduct the research on a larger sample of students, across various demographics and age groups. There still remains only a paucity of research on self-managed writing conventions at the high school and upper middle school level and including these populations would add to the literature and hopefully provide more practical, effective strategies for students who continue to struggle with conventions. Indeed, it is possible such an intervention may have a more positive effect on middle school or even high school students who have had more experience producing written products and have had more opportunities to develop their knowledge of the correct use of writing mechanics. For fourth graders who had just recently learned some of these rules, it may be more beneficial to add a component in which students are also provided direct follow-up feedback and error correction.

Several limitations were identified, the first of which was related to time constraints. For one thing, the study did not begin until February, which left little time to collect an adequate number of intervention data for all students. Student 5 only had two weeks of intervention and, had the student continued for a longer period of time, there may have been greater improvement. Moreover, during the end of the year academic instruction begins to wind down and student
engagement may not be at peak levels. There were also a total of eight snow days, the majority of which fell within the timeframe of the research study. Whenever a snow day occurred, there would typically be one less intervention session that week as the teacher used that time to make up for other instruction that was missed. Additionally, there were a couple weeks in which the teacher implemented the intervention two days instead of three. In the future, it may be better to have four or five days of implementation so that the loss of one day would not have a significant impact. Student attendance may have also been a factor. A review of attendance data shows that Student 1 missed 11 days of school and Student 3 missed 12 days.

Another limitation was related to recruitment procedures. Because the original selection criteria for CIWS had to be widened in order to allow for more student participants, it is possible that some of the students’ performance was not low enough during baseline to allow for significant growth. Perhaps this type of intervention would be more effective for students performing closer to the 25th percentile. Another problem was that only one data point was collected during recruitment. Typically, it is beneficial to use the median of three data points in order to have an accurate level of performance; three is also the typical number of data points collected during benchmarking periods when using DIBELS or AIMSweb CBMs.

Lack of motivation could have also led to lower outcomes. Standardized writing assessments using CBMs require the use of one story starter. Although the researcher made attempts to ensure that the writing prompts had as little bias as possible, many times a topic is not going to be interesting or relevant to every student. This is particularly a problem for lower-performing writers, who struggle even when writing about topics that interest them. Finally, Student 4 was originally scheduled to begin the intervention following Student 1; however, due to an absence during the day of training, Student 2 was added instead. Student 2 had an
increasing trend in baseline data prior to the intervention implementation, which compromises the ability to interpret intervention effects. If there had been no time constraints, it would have been preferable to wait to establish a more stable baseline to which the intervention could be compared.

Despite limitations of the study, self-monitoring interventions are attractive because students become the intervention agents and require training only in the initial stages. In this case, students were able to learn the procedures in a fairly short amount of time. In addition to the general acceptability by both the teacher and students, the students in this study spent no more than five minutes engaging in the procedures. It would be well worth the time to continue to investigate the various ways in which self-monitoring can be used to improve writing.


Appendix A

Parent Permission for Child’s Participation in Research
University of Cincinnati
Department: School Psychology
Principal Investigator: Meghan Purple, M.Ed.
Faculty Advisor: Renee Hawkins, Ph.D.

Title of Study: Effects of Self-Monitoring on the Writing Performance of Elementary Students

Introduction:
You are being asked to allow your child to take part in a research study. Please read this paper carefully and ask questions about anything that you do not understand.

Who is doing this research study?
The person in charge of this research study is Meghan Purple of the University of Cincinnati (UC) Department of School Psychology. She is being guided in this research by Renee Hawkins. There may be other people on the research team helping at different times during the study.

What is the purpose of this research study?
The purpose of this research study is to examine the effectiveness of self-assessment and self-recording behaviors to improve the writing performance of elementary students as measured by total words written, words spelled correctly, and correct minus incorrect writing sequences.

Who will be in this research study?
About ten children will take part in this study. Your child may be in this study if he or she is in the third or fourth grade and may benefit from additional help with writing.

What will your child be asked to do in this research study, and how long will it take?
Your child will be asked to count the number of words he or she has written at the end of a 10-minute in-class writing session and answer questions about his or her writing. This will occur three times per week and will be held in your child’s classroom. Once per week they will be asked to write an essay for three minutes and the researcher will count the total number of words written, the number of words spelled correctly, and the number of correct minus incorrect writing sequences. This will take about 5 minutes and will take place in a separate room.

Are there any risks to being in this research study?
It is not expected that your child will be exposed to any risk by being in this research study.

Are there any benefits from being in this research study?
Because of being in this research study your child might see some improvements in his or her writing skills.

What will your child get because of being in this research study?
Your child will not be given anything to take part in this research study.
**Does your child have choices about taking part in this research study?**
If you do not want your child to take part in this research study he or she will not be treated any differently and there will not be any effect on his or her grades.

**How will your child’s research information be kept confidential?**
Information about your child will be kept private by the researcher. Each individual’s data will show a study ID number instead of a name and a master list of names and ID numbers will be kept in a locked filing cabinet. This list will not be kept with the data and will be destroyed by the researcher after the last data is obtained and entered into a spreadsheet. Signed permission and assent forms will also be kept in a locked filing cabinet and will be destroyed three years after the research study is closed. After two years, raw data will be destroyed by shredding paper research files and deleting computerized files. Agents of the University of Cincinnati may inspect research study records for audit or quality assurance purposes.

**What are your and your child’s legal rights in this research study?**
Nothing in this consent form waives any legal rights your child may have. This consent form also does not release the investigator, the institution, or its agents from liability for negligence.

**What if you or your child has questions about this research study?**
If you or your child has any questions or concerns about this research study, you should contact Meghan Purple at (513) 420-4564 Ext. 3651. Or, you may contact Renee Hawkins at (513) 556-3342. The UC Institutional Review Board reviews all research projects that involve human participants to be sure the rights and welfare of participants are protected. If you have questions about your child's rights as a participant or complaints about the study, you may contact the UC IRB at (513) 558-5259. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.

**Does your child HAVE to take part in this research study?**
No one has to be in this research study. Refusing to take part will NOT cause any penalty or loss of benefits that you or your child would otherwise have. You may give your permission and then change your mind and take your child out of this study at any time. To take your child out of the study, you should tell Meghan Purple at (513) 420-4564 x3651. Your child will be asked if he or she wants to take part in this research study. Even if you say yes, your child may still say no.

**Agreement:**
I have read this information and have received answers to any questions I asked. I give my permission for my child to participate in this research study. I will receive a copy of this signed and dated Parent Permission form to keep.
Your Child's Name (please print) ______________________________________

Your Child's Date of Birth ___________ (Month / Day / Year)

Parent/Legal Guardian's Signature ______________________________ Date ______

Signature of Person Obtaining Permission ___________________________ Date ______
Appendix B

Child Assent Form for Research
(Ages 8-11 Years)
University of Cincinnati
Department: School Psychology
Principal Investigator: Meghan Purple, M.Ed.
Faculty Advisor: Renee Hawkins, Ph.D.

Title of Study: Effects of Self-Monitoring on the Writing Performance of Elementary Students

You are being asked to do a learning project. You may ask questions about it. You do not have to say yes. If you do not want to be in this learning project, you can say no.

This learning project might help you write better essays.

Your whole class will write essays in the classroom. About five children in your class will count all the words they write as soon as they stop writing. You will also be asked to answer some questions about your writing. This will take about 20 minutes. Sometimes you will be given a writing test to see if counting the words you wrote and answering questions about your writing helps you write better essays. We will count how many words you wrote and how many words you spelled right. These tests will take about 5 minutes.

If you have any questions you can ask Mrs. Purple.

You do not have to be in this learning project. You may start and then change your mind and stop at any time. No one will be upset with you. To stop being in the learning project, you should tell Mrs. Purple.

If you want to be in this learning project, write your name and birthday. If you do not want to be in this learning project, leave the lines blank.

Your Name (please print) ________________________________

Your Birthday ______________ (Month / Day / Year)

Your Signature ___________________________________________ Date ___________

Signature of Person Obtaining Assent ___________________________ Date ________
Appendix C

Assessment Form

Date ____________  Assessor_______________________

Story Starter______________  Condition______________________

Total words written __________________

Words spelled correctly ______________

Correct minus incorrect writing sequences __________
Appendix D

Assessment Steps

1. Give the student a copy of the story starter and writing paper. Say, “I’m going to read you the first sentence of an essay. Please finish the essay using the sentence I read as your first sentence. I will give you 1 minute to think about what to write.”

2. Read the first sentence. Then start the timer for 1 minute.

3. When the time is up, say, “Now you will have 3 minutes to write your essay. Please try to write for the entire 3 minutes. I will tell you when to stop. Ready? Begin.”

4. Begin timing for 3 minutes. When the time is up, say, “Stop.”

5. Count and record the total number of words, words spelled correctly, and correct minus incorrect writing sequences.
Appendix E

Writing Quality Checklist (Student Copy)

Did I use correct verb tenses (past, present, and future)?  YES  NO

Did I use apostrophes with contractions and possessives?  YES  NO

Did I spell all words correctly?  YES  NO

- If you answered NO, circle the words you’re not sure how to spell.

Did I capitalize proper nouns and the first word in each sentences?  YES  NO

Do all my sentences end with a punctuation mark?  YES  NO

Total number of Yes’s ___
Total words written _____
Appendix F

Point Tally Sheet

Student _______________
Appendix G

Writing Quality Checklist (Examiner Copy)

Are verb tenses used correctly?  YES   NO

Are apostrophes used with contractions and possessives?  YES   NO

Are all words spelled correctly?  YES   NO

- If NO, check to see if incorrect words are circled.

Is capitalization used with proper nouns and the beginning of sentences?  YES   NO

Do all sentences end with a punctuation mark?  YES   NO

Total number of Yes’s ___

Total words written _____
Appendix H

Good Writing Chart

Good Writing Has…

• A topic sentence
• Supporting details
• Sentences that are on topic
• A concluding sentence or final thought
• Correct verb tense (past, present, and future)
• Apostrophes with contractions and possessives
• Correct spelling
• Capitalization of proper nouns and the beginning words of each sentence
• A punctuation mark at the end of each sentence
Appendix I

Adherence Checklist

Teacher…

___ Hands out binders to participants at the beginning of the writing period

___ Reviews Good Writing Chart with the entire class

___ Writes 2 writing story starters on the board and tells the students they will have 3
    minutes to pick one story starter and brainstorm their ideas on scrap paper

___ Starts the timer for 3 minutes

___ At the end of 3 minutes, tells the class they will now have 10 minutes to write about
    the topic they have chosen

___ At the end of 10 minutes, tells students to stop writing

___ Collects students’ papers and participants’ binders

Participants…

___ Count the total number of words they had written and record the number on their
    Writing Quality Checklist

___ Circle either ‘Yes’ or ‘No’ for each question on the Checklist

___ Record the total number of ‘Yes’s on the Checklist
Appendix J

Social Validity Survey

Teacher Satisfaction

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel this self-monitoring study targeted skills that are important for the students to improve</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel the students enjoyed the study</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>The researcher was communicative and easy to work with</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>The study activities fit well into normal class routines</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I would be willing to have more of my students participate in similar studies in the future</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Overall, this study was beneficial for the students</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Student satisfaction

Directions: Please circle ‘yes’ or ‘no’ for each of the following questions. Answers will be anonymous.

1. Did you like participating in the study?  YES  NO

2. Do you feel you are a better writer after having participated in the study?  YES  NO

3. Would you like to do another study like this in the future?  YES  NO