Explicit Timing Variations in Curriculum-Based Measurement of Written Expression Administration

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I am submitting herewith a dissertation written by Peter Lawrence Ignacio entitled "Explicit Timing Variations in Curriculum-Based Measurement of Written Expression Administration." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in School Psychology.

Merilee McCurdy, Major Professor

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(Original signatures are on file with official student records.)
Explicit Timing Variations in Curriculum-Based Measurement of Written Expression

Administration

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Abstract

The majority of elementary and secondary school students across the United States fail to meet grade-level standards for written expression. Curriculum Based Measures in Written Expression are designed to identify and track the progress of struggling writers. Researchers have identified a number of modifications to Curriculum Based Measures in Written Expression administration that increase validity and reliability including the length of writing time, type of prompt, and method of scoring. One area that has not been explored is the timing procedure used during administration. Explicit timing procedures (i.e., telling students the time limit, displaying the time remaining, breaking up the session into short intervals) could be applied to WE-CBM administration to improve student performance. The purpose of the present study is to examine the effect of two variations of explicit timing on student writing production and fluency and to explore the interaction between the explicit timing procedures and the duration of WE-CBM administration.

Writing samples were collected from seventh and eighth grade students. The students were exposed to two of the four combinations of explicit timing and activity duration. Results indicate no significant differences in writing production between explicit timing conditions. Furthermore, no significant interaction between explicit timing conditions and writing activity duration was found. Average writing rate per minute was significantly lower when students were participating in a longer duration activity, regardless of explicit timing condition. Results of the social validity survey suggest that students prefer not to be timed. However, responses suggest that students found time-remaining prompts to be somewhat helpful and not distracting. Limitations, areas for future research, and implications for researchers and educators are discussed.
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CHAPTER I

Review of the Literature

Writing is one of the key skills that students develop during their time in school. Writing allows students to share and express thoughts and ideas. Students also use writing as a primary tool when completing a variety of learning activities and academic performance assessments. A wide range of academic performance assessments beyond English and Language Arts rely on students to write a response to demonstrate their skills and knowledge (Graham, Harris, & Hebert, 2011).

While writing is a crucial skill, it appears that a majority of students have difficulty writing at grade level standards. The National Center for Education Statistics (2011) reports that only 28% of fourth grade students have writing skills at or above grade level proficiency. Furthermore, three-quarters of eighth-grade students and twelfth-grade students write below grade level proficiency. These figures are consistent between public schools and private schools, as well as urban, rural, or suburban schools. Data from the National Commission on Writing (2006) estimate that half of high school graduates do not write at a level necessary for achievement in undergraduate education. The importance of writing skills is not limited to the classroom, but also the students’ post-school success. Data also suggest that writing skills are critical to job success in the majority of white-collar work places and some blue-collar professions (National Commission on Writing, 2006). Despite the importance of writing performance both academically and professionally, many education systems are leaving students unprepared for future writing demands.

To prevent students from falling behind in academic areas, rigorous standards and assessments to track progress toward those standards have been implemented in schools across
the nation. Progress monitoring is critical to identify struggling students, to determine what skills are deficient, and to identify the proper intervention services to ensure they catch up to grade level standards. Early identification and remediation can reduce or eliminate lasting academic impact of skill deficits (Catts, Corcoran, Bridges, Liu, & Bontempo, 2015). Educators need technically adequate writing assessments to ensure that students are progressing toward appropriate writing standards, and to inform targeted instruction and intervention for students who are struggling. One of the most researched progress monitoring assessments is curriculum-based measurement (Deno, 1985).

**Curriculum-Based Measurement in Written Expression**

Curriculum-based measurement (CBM) is a widely used and accepted assessment method that allows educators to monitor the progress of their students in reading, writing, and mathematics. CBMs are designed to be quick to administer, easy to score, and specific enough to inform targeted instruction and intervention. These assessments are typically administered often, resulting in many brief examples of a student’s performance in basic academic areas. For example, a school may choose to assess each student in the area of reading fluency by using a 1-minute reading accuracy sample, once every two weeks throughout the school year (Hosp, Hosp, Howell, 2007).

While CBMs are useful for identifying skill deficits, written-expression CBM (WE-CBM) has far less research concerning best practices, validity, and reliability compared to reading-CBM. Current WE-CBM procedures are comprised of the following: a narrative writing prompt, a 1-minute planning period with a reminder prompt at 30-sec (i.e., “You should be thinking about…”), and a 3-minute writing time with a reminder prompt at 90-sec (i.e., “You should be writing about…”) (Powell-Smith & Shinn, 2004). Traditional measures include Total
Words Written (TWW), Words Spelled Correctly (WSC), and Correct Writing Sequences (CWS; i.e., two adjacent words that are correct within the context of what is written).

McMaster and Espin’s (2007) broad review of WE-CBM technical adequacy addresses a number of the assessment’s strengths and limitations. First, WE-CBM is designed to be used as a screening and progress monitoring tool, and as such, must be able to quickly determine student writing skills to a degree similar to that of more robust and in-depth assessments. Concurrent validity is often used to examine how one measure correlates to another, often more established and researched, measure. McMaster and Espin’s review found that early studies of the WE-CBM had strong correlations to both the Test of Written Language (TOWL) and the Developmental Scoring System (DSS) for both 3-minute and 5-minute writing samples. These correlations were only strong when TWW or CWS were used as measures. Furey, Marcotte, Hintze, and Shackett (2016) explored the concurrent validity of WE-CBM and English Language Arts Composition test within the Massachusetts Comprehensive Assessment System and found higher correlations with longer duration WE-CBM probes (10 minutes) compared to short 3-minute probes. Contrary to McMaster and Espin’s review, Furey et.al. (2016) found that more complex measures, such as correct minus incorrect writing sequences (CMIWS), resulted in higher correlations with the criterion assessments than traditional procedures like TWW.

In addition to validity, reliability results for the WE-CBM are mixed (McMaster & Espin, 2007). Test-retest reliability is a common method for establishing reliability, calculated by administering the same test twice within a short time frame and correlating the results. WE-CBM test-retest reliability coefficients range from strong \( r = .91 \) at a 1-day test-retest interval to moderate \( r = .64 \) at a 3-week interval. Alternate-form reliability is another method of examining an assessment’s reliability; it is calculated by administering two equivalent versions of the
assessment (e.g., two different writing prompts) and correlating the results. Measures of alternate-form reliability also yielded mixed results ranging from strong \((r = .95)\) to moderate \((r = .51)\). These mixed reliability results may be due to different writing prompts. Different writing prompts may yield different results due to a student’s interest in the writing topic McMaster & Espin, 2007).

For an assessment to be useful for progress monitoring, it must be sensitive enough to detect minor changes in students’ abilities. McMaster and Espin (2007) found a lack of evidence supporting sensitivity to growth in the technical research of WE-CBM. The authors found that none of the scoring indices (e.g., TWW, WSC, CWS) could reliably discriminate students by grade level. Only TWW increased as students progressed through secondary school, but the differences were not substantial enough to differentiate the students’ grade level. Any results examining growth sensitivity have been limited by weak to moderate test-retest reliability (McMaster & Espin, 2007). Therefore, it is difficult to determine whether student growth or story prompt variability is the cause of changing scores over time.

Another use for WE-CBM is as a class-wide screener to identify struggling writers. Parker, Tindal, and Hasbrouck (1991) concluded that %WSC was the best scoring method to use for screening purposes with elementary and middle school students as it correlated well to qualitative teacher ratings, and was sensitive to change between more advanced writers and weaker writers. While WE-CBM are somewhat adequate for screening, lack of precision in scoring methods can lead to false negatives and false positives. Parker et al. (1991) suggested that standardization of writing prompts, increased structure of the writing task, and using scores from more than one writing sample per session would provide more stable and useful scores.
In a similar study exploring utility of WE-CBM as a universal screener, Keller-Margulis, Mercer, and Thomas (2016) analyzed variability in scores from the following sources: between students, between story prompts, between lengths of assignment, and across time of year benchmarks. The authors’ analysis provides evidence that using a single, 3-minute sample of writing is woefully inadequate for making educational decisions based on criteria or relative to other students. Reliability coefficients increase when the duration of each writing sample is increased from 3 minutes (e.g., $r = .18$) to 7 minutes (e.g., $r = .28$). Reliability increases even more (e.g., $r = .54$) when three, 7-minute probes are used instead of the single probe. Clearly, the most reliable use for WE-CBM as a screening tool is a far cry from conventional use, as a single, 3-min assessment.

**Improving WE-CBM**

In an effort to improve WE-CBM technical adequacy across grades, a number of variations and modifications to the assessment, scoring procedures, and administration procedures have been examined. Often the goal of these modifications is to increase the amount that students write or to increase the effort they put forth. Low effort and low production can lead to invalid measures of students’ skills. From a pragmatic perspective, invalid assessments can lead to false negative and false positive results. False negatives can be harmful as they result in struggling children not receiving the services they need to be successful. False positives, while not as problematic, will over identify students which can deplete a school’s resources in terms of available staff and space in intervention groups, potentially depriving students with real academic difficulty the help they need (Kettler & Albers, 2013).

Variations on the type of writing prompt is one area that has been examined to improve the quality of these assessments (McMaster & Campbell, 2008). Picture prompts, expository...
prompts, and narrative prompts have been compared with mixed results. Specifically, McMaster and Campbell (2008) found that picture prompts have stronger reliability and validity, but are poor in their ability to indicate student growth. Expository prompts (e.g., “Write about what you would do on a day off from school”) have better technical adequacy with secondary school students than with elementary school students. The opposite is true of narrative prompts (e.g., “One day I woke up and found out school was cancelled, so I…”), showing strong reliability and validity, but were not as able to detect growth among secondary school students compared to elementary school students. The current recommendation is to use narrative prompts as they have the best technical adequacy across the widest range of grade levels; however, more research is required to further assess variations of WE-CBM prompts (McMaster & Campbell, 2008).

Another way in which WE-CBM have been modified is the method in which they are scored. TWW and WSC are traditional scoring measures and are the easiest to score. However, more complex scoring procedures such as CWS and correct minus incorrect writing sequences (CMIWS) are more likely to be more valid and reliable, especially for secondary school students (McMaster & Campbell, 2008). Luckily, WE-CBMs can be scored using more than one procedure and leave a permanent record so any new methods can be applied to old writing samples.

Increasing the duration of a WE-CBM writing session is one of the most successful ways researchers have increased validity and reliability. While a 3-min writing period for elementary school students is adequate, longer periods at 7-min and 10-min periods are best suited to students in higher grades (Espin et al., 2008). Specifically, Espin and colleagues (2008) encouraged tenth grade students to write for 10-min. The students marked their progress at 3, 5, 7, and 10-min. The results suggested that both alternate-form reliability and concurrent validity
with a statewide standardized exam of writing increased as the writing sample duration increased. McMaster and Campbell (2008) found similar results when comparing a number of procedural variations with students across grades three through seven. Across all combinations of procedural variations, longer writing sample durations produced higher alternate-form reliability results and concurrent validity with state standardized tests, grade in language arts class, and the Test of Written Language (TOWL).

Administration procedures are another aspect of the WE-CBM that could be modified in an attempt to create a more robust assessment. Modifications such as structuring the administration time, prompting students with the time remaining, or providing choices in the writing prompt are all potential areas which could improve the validity of WE-CBM. While there are many modifications that could be made, no studies have explored variations on the prompts of time remaining. Explicit timing is an intervention used to improve a student’s work rate in academic areas such as mathematics. It is possible that applying specific explicit timing procedures to WE-CBM may improve writing production, resulting in a better measure of writing skill. It is critical that administration procedures such as variations on timing and time remaining prompts are examined and the most effective solutions implemented so that more students can write to the best of their ability on WE-CBM.

Introduction to Explicit Timing

There are numerous methods used to increase writing production and quality but most of them are not easily integrated into assessment administration procedures. These successful intervention methods include strategy instruction, which teaches planning and drafting strategies as well as editing and revising techniques (Harris & Graham, 1996). Combining self-regulation (i.e., goal setting, self-monitoring, and self-instructions) with strategy instruction (SRSD) is a
well-supported method for improving writing (Graham, McKeown, Kiuhara, & Harris, 2012). Specific instruction in grammar and spelling has also been shown to improve writing quality (Campbell, Brady, & Linehan, 1991). Van Houten, Morrison, Jarvis, and McDonald (1974) suggested that goal setting and feedback are other effective methods for improving student writing production. These methods may be more appropriate for teaching and practice in the classroom but not for WE-CBM administration.

Explicit timing is a type of intervention procedure that could easily be incorporated into writing assessment administration and has been found to increase writing production (Van Houten, Morrison, Jarvis, and McDonald, 1974). Explicit timing is an administration procedure in which students are told what the assignment time limit is and shown a stopwatch to emphasize the time limit. This procedure is opposite to covert timing, in which a teacher may have students work until told to stop, without the students knowing the time limit, or that they are even being timed.

Currently there is no standard procedure for what constitutes explicit timing and a number of variations exist within the literature. For example, Rhymer, Henington, Skinner, and Looby (1999) use 1-minute intervals within a 4-minute time session while Rhymer and Cates (2006) use a 3-minute session without any intervals or interruptions. These variations have not been previously discussed in relation to each other. For the purpose of the current study, the following definitions will be used. Unstructured explicit timing involves telling students the time limit and showing them that they are being timed. Structured explicit timing adds to the unstructured procedure by including time intervals in which there are pauses and/or verbal prompts telling how much time is left. Researchers have used varying instructions related to structured timing dependent upon on the type of assignment, but any method that breaks the time
into intervals can be considered structured. Current WE-CBM administration procedures use explicit timing, in that the directions include “3 minutes to write your story” (Powell-Smith & Shinn, 2004). The procedures could be described as structured due to the prompts while planning and writing; however, these prompts include no information about the amount of time remaining. More information is needed about explicit timing in order for practitioners to make informed decisions about WE-CBM administration procedures.

While explicit timing is often used in concert with other interventions such as feedback and goal setting, there is some evidence that a timing procedure on its own can increase response rates while maintaining accuracy. Van Houten and Thompson (1976) used a reversal design to explore the effects of explicit timing on math fact completion rate and accuracy. Participants included 20, second-grade students, all of which were selected based on poor academic performance. Every day during school, the students had a 30-minute period devoted to work on single digit addition and subtraction math facts practice. During baseline, the teacher would covertly time the students until the 30-min had elapsed and direct the students to the next task.

The experimental phases in Van Houten and Thompson’s (1976) study employed a structured explicit timing administration. Specifically, the teacher explained to the students that they had 30-min work period divided into 1-min intervals. While the directions include describing the time limit, the authors do not describe whether a clock or stopwatch was plainly visible to the students. Each 1-min interval ended with the teacher telling the students to stop and draw a line after the last problem they answered. Afterward the end of interval directions were given and the teacher would immediately begin the next 1-min interval. While accuracy remained stable across all conditions, the number of problem completed per minute increased substantially during the explicit timing conditions. Problems completed per minute did not return
to baseline levels during the second baseline phase. Rate of problem completion increased even when not controlling for the time while the students were interrupted. Because the teacher stopped the students at the end of each minute, and instructed them to mark their papers, there was less total time for students to work on problems during the explicit timing condition than the covert timing condition.

Using a covert timing procedure after an explicit timing procedure may not cause a complete return to baseline levels due to some students behaving as if they were still being timed (Van Houten & Thompson, 1976). Students may believe that they are being timed and the teacher has simply failed to include the time limit in the directions. This effect could present serious limitations for any design that returns to covert timing after an explicit timing condition. Van Houten and Thompson (1976) also suggested that the use of 1-min intervals make changes in performance more salient to the students. Specifically, the authors believe the students may be more aware of their improvements per minute, than over the course of one longer time-period. Currently, no study has examined the effect of different length intervals used in a structured explicit timing condition.

Rhymer, Henington, Skinner, and Looby (1999) found comparable results to Van Houten and Thompson (1976) in that structured explicit timing alone could increase response rate in mathematics problem completion compared to a covert timing condition. The authors also avoided the pitfalls of reversals designs and covert/explicit timing by using an A-B design with 86 second grade students. The length of math assignment was significantly shorter at 4 minutes with 1-min intervals compared to Van Houten and Thompson’s (1976) 30-minute assignment. In both studies, explicit timing increased response rate; however, neither study provides evidence that 1-min intervals are the most effective variation of explicit timing.
In addition to increasing work rate in mathematics, explicit timing also can increase oral reading rate. Rhymer and Cates (2006) found explicit timing significantly increased the number of words read correctly per minute among four elementary school students who had been referred for reading difficulties. An unstructured explicit timing procedure was used during 3-min reading sessions. While the study used a very small sample, the powerful effect of explicit timing on accurate reading rates suggests that the intervention may be useful outside of its common context of mathematics.

**Explicit Timing as an Intervention Package Component**

Researchers have moved away from examining the efficacy of explicit timing alone as an intervention procedure, choosing instead to add explicit timing to other intervention components. None of these studies comparing components of intervention packages used an explicit timing-only condition (Van Houten, Morrison, Jarvis, & McDonald, 1974; Van Houten, Hill, & Parsons, 1975; Duhon, House, Hastings, Poncy, & Solomon, 2015). For example, Van Houten, Hill, and Parons (1975) first experiment on student writing composition compares covert timing, explicit timing with feedback, explicit timing with feedback and public posting of scores, and explicit timing with feedback, public posting of scores, and teacher praise. Lack of an explicit timing only conditions means no conclusions can be drawn about the role explicit timing plays either alone or in context of other interventions. Without evidence of explicit timing alone increasing work rate, the results are difficult to generalize to other academic scenarios such as CBMs or other in-class assessments, as many assessments do not lend themselves to public posting of scores or the use of teacher praise during administration.

Van Houten, Hill, and Parons (1975) second experiment suffers from the same limitations. The authors used a reversal design moving from covert timing, to a condition using
explicit timing, performance feedback, publicly posted scores, and back to covert timing. This study is one of the few examining explicit timing and reading fluency/comprehension yet the authors did not attempt to analyze each component of their intervention package separately. Duhon, House, Hastings, Poncy, and Solomon (2015) also failed to directly compare explicit timing alone to covert timing. In this study, explicit timing was again combined with goal setting and reward contingencies, and feedback to analyze the components of a multi intervention package on mathematics fluency among second grade students. However, there was no condition in which explicit timing was used on its own.

All three of these experiments provide evidence that explicit timing is at least one component of an intervention package that can improve writing rate, reading comprehension and word-meaning exercises, and math facts completion rate during 10-min, 25-min, and 2-min assignments, respectively. However, none of the experiments are able to support explicit timing used on its own.

**Explicit Timing with Diverse Populations**

Because the initial explicit timing studies (Van Houten, Morrison, Jarvis, & McDonald, 1974; Van Houten, Hill, & Parons, 1975; Van Houten & Thompson, 1976) were conducted in Nova Scotia, there was a great need to explore the effects of explicit timing with more diverse populations. It is important that interventions to improve academic performance are validated with special education students. Having a wide variety of interventions available to use with these students is critical to improving their rate of learning. However limited, there is evidence that explicit timing is effective with special education students just as it is effective with general education students (Miller, Hall, & Heward, 1995). Unlike other studies, Miller, Hall, and Heward (1995) compared unstructured (i.e., 10-min timed work session) and structured explicit
timing (i.e., 10-min with 1 minute intervals). Results showed that students with intellectual disability increased their accuracy in solving math problems and generally were on task more often during the structured explicit timing condition. Although this study compared the two variations of explicit timing, there was no covert timing condition for comparison.

Explicit timing also requires validation among diverse ethnic groups. Rhymer, Henington, Skinner, and Looby (1999) explored one of the potential issues with explicit timing and African American students. A previous study also examined explicit timing with African American students but did not have a sample of Caucasian students for a comparison of results (Rhymer, Skinner, Henington, D’Reaux, & Sims, 1998). The authors suggested that African American students may have a different cognitive concept of time than Caucasian students. To determine if there was an interaction between ethnicity and the effects of explicit timing, seven second-grade classrooms in which over three-quarters of the students were African American were chosen as participants. Students in each classroom completed three math worksheets under covert timing, and three worksheets under structured explicit timing (i.e., 4, 1-min intervals per worksheet). Students completed all three worksheets under one condition in one day, completing the worksheets under the other condition the next day. Results showed no significant differences between African American and Caucasian students across either condition. There also was no significant difference in the increase in problem solving from covert to explicitly timed conditions between ethnic groups. Overall, explicit timing increased work rate equivalently, no matter the demographics of the student. The design of this study counterbalanced the order in which students were exposed to each condition, however, there are limitations in returning to covert timing after exposing participants to explicit timing. Specifically, students exposed to explicit timing first may behave as though they were still being timed even when timing was not
included in teacher instructions during the covert timing condition (Van Houten, Morrison, Jarvis, & McDonald, 1974).

**Risks of Time Limit Procedures**

While effective, explicit timing does have potential limitations which must be addressed. One potential drawback to the use of explicit timing is the impact on students with high academic anxiety. Students with anxiety related to writing will be less able to produce quality writing assignments (Aikman, 1985). Introduction of time constraints and prompts in explicit timing may exacerbate anxiety and lead to decreased performance. The literature is currently void of studies using experimental designs to explore the interaction of timing procedures, anxiety, and writing performance. However, this relationship has been explored in other academic areas. An interaction effect has been found between timed test/untimed test and low/high test anxiety among undergraduate students in a statistics course (Onwuegbuzie & Seaman, 1995). When controlling for previous course performance, Onwuegbuzie and Seaman (1995) found that students with low test anxiety had equal performance when they had unlimited time to complete a test or an explicit time limit. Students who self-reported as having high test anxiety performed worse when their testing session had a time limit compared to high anxiety students who had unlimited time. This study only examined the performance of 26 students, and therefore the results may be difficult to generalize. One strength of the study is the tests counted toward the students’ grade compared to other studies that use academic assignments that may not have any impact of the students’ grades.

A similar interaction between anxiety and time pressure was found among 173 third and fourth-grade students completing arithmetic test booklets (Plass & Hill, 1986). Specifically, students rated as highly and moderately anxious performed worse under a time pressure
condition than their peers rated as less anxious. Removing the time pressure resulted in all the boys in the study performing equally well regardless of anxiety rating. All the girls participating in the study performed better without time pressure, except those rated as highly anxious. It is unknown why the removal of time pressure did not increase the performance of highly anxious girls, or if these results will generalize to writing assignments.

While these results do provide some evidence that explicit timing procedures may not be an effective intervention for some students, there is also counter evidence to the interaction between time pressure and anxiety on academic performance. Grays, Rhymer, and Swartzmiller (2017) explored the effect of a structured explicit timing procedure on mathematics performance between groups of low, medium, and high math anxiety students. This study used a larger and more diverse sample of participants than the previous studies, including 116 suburban and 79 urban elementary school students in fourth and fifth grade. Students were exposed to covert and structured explicit timing conditions (counterbalanced in order). All conditions were 3 minutes long and each included directions to work as quickly as possible on the math problems. The explicit timing conditions also included telling the students they had 3 minutes to work, and were told when they had 2 minutes and 1 minute remaining. Consistent with previous studies comparing anxiety level and academic performance, levels of anxiety were negatively correlated with rate and accuracy of math problem completion; students rated as highly anxious performed worse. However, unlike previous studies, Grays, Rhymer and Swartzmiller (2017) did not find an interaction between anxiety level and timing procedure. Similar to other studies exploring explicit timing, students of all anxiety levels had slightly increased rates of problem completion under explicit timing procedures compared to covert timing. Accuracy remained the same across the timing conditions. There is no evidence that similar results would be found if the students
were completing in writing assignments instead of math. This study uses a specific explicit timing procedure instead of a general time pressure system and is the most generalizable to the current study.

Another possible weakness to the efficacy of explicit timing procedures is the interaction between explicit timing and task difficulty. Because of the nature of writing tasks, there is no set difficulty level for an open-ended writing assignment beyond the reading difficulty of the writing prompt. Some students may find some writing prompts more difficult than others because of the topic. The interaction between student and writing prompt makes it difficult to reliably determine the difficulty level of a writing prompt. Furthermore, individual difficulty level may be determined by each student’s ability level. Some struggling writers may find any writing prompt to be a challenging task.

While there is no literature on task difficulty and explicit timing with writing, the effect has been examined in the domain of math. Rhymer et al. (1998) developed mathematics works sheets including easy (i.e., one digit plus one digit), moderate (i.e., three digits minus three digits), and difficult (i.e., three-digits times three-digits) problems relative to the students’ grade level. Under the covert timing condition, the researchers instructed the students to try to work as many of the math problems as they could, but did not mention a specific time limit or imply that a timer was being used. During the final three sessions, the students completed each level of difficulty worksheet under a structured explicit timing condition. During this condition researchers told students they would have 3 minutes to work on as many problems as they could, and that they would be timed for 3, 1-minute intervals, with pauses between each interval. Total problems completed increased during the explicit timing condition for both easy and moderate worksheets. However, the difference between covert and explicit timing conditions was most
significant for the easy worksheets, less significant for moderate, and not significant for difficult worksheets. The results provide evidence that the power of explicit timing to increase work rate is strongest with tasks of lower difficulty. Explicit timing may be a suitable intervention for tasks in which students have some degree of accuracy but may be inappropriate for newly learned tasks or difficult tasks relative to current performance levels. It is unknown what effect student skill and/or story prompt difficulty will have on the impact of explicit timing on writing or if explicit timing alone can improve student writing production.

**Explicit Timing and Written Expression**

While various versions of explicit timing have been found to be successful in increasing response rate for math and reading, there is little known about its effect on writing production and writing quality. Van Houten, Morrison, Jarvis, and McDonald (1974) conducted one of the only studies examining the effect of explicit timing on writing production. One second-grade and two fifth-grade classrooms were examined, containing 21, 17, and 17 students respectively. A return to baseline design was used with the second-grade classroom, and a multiple baseline design was used between the two fifth-grade classrooms. Baseline phases included 10-min, covertly timed writing sessions. Unlike other covertly timed conditions in other studies, students were told explicitly that they were not being timed, instead of the teacher omitting any mention of time from the instructions. The intervention conditions used feedback in the form of students self-scoring total words written, posting their scores publicly, and being instructed to try to beat their previous scores. The authors combined this feedback intervention with unstructured explicit timing. Specifically, the teachers told their students they would have 10-min to write, and would be timed with a stopwatch. No mention was made if the students had visual access to a clock or stopwatch. Results showed marked increase in words written per minute during the feedback and
explicit timing condition, compared to baseline for all three classrooms. When the second-grade classroom returned to baseline, writing rate fell, but not to initial baseline phase levels. As with other studies that use reversal designs to explore explicit timing (Van Houten, Hill, & Parons 1975; Van Houten & Thompson, 1976), students who have been previously exposed to explicit timing conditions may still behave as if they are being timed, even if there are no instructions or if they are told they are not being timed. Because Van Houten, Morrison, Jarvis, and McDonald (1974) also implemented goal setting and a feedback procedure, it is impossible to draw conclusions on whether explicit timing was an effective aspect of the intervention package.

**Why Does Explicit Timing Work?**

The causal mechanisms that explain why explicit timing increases writing production, oral reading rate, and problem completion in mathematics is unknown. Few hypotheses have been presented, and no researchers have attempted to isolate and identify the casual mechanisms. Rhymer and Morgan (2005) presented a possible causal explanation. First, making a student aware of the time limit may facilitate on-task behavior. If students know that their time to complete an assignment is limited, they may focus their effort on completing the task before the time limit expires. However, there is limited evidence that explicit timing increases on-task behavior. Miller, Hall, and Heward (1995) found an increase in on-task behavior among the three participants when under explicit timing conditions. There also exists anecdotal evidence that teachers noticed a sharp decline in social interactions when children were writing under explicit timing conditions (Van Houten, Morrison, Jarvis, & McDonald, 1974).

In addition to increased on-task behavior, explicit timing may elicit some increase in internal and external competition within and among students (Rhymer & Morgan, 2005). Some students may have increased internal competition, and use the explicit time limit to try to beat
their previous efforts at the task. Van Houten and Thompson (1976) suggest that the 1-min intervals of structured explicit timing make changes in performance more salient. Specifically, with smaller time intervals, students can compare their past performance (either a previous writing assignment, or the most recent interval of the current assignment) to their current performance easier with a structured time limit. Other students may find competition with their peers. Some anecdotal evidence suggests that students under explicit timing conditions brag about how many math problems they completed under the time limit (Rhymer & Cates, 2006).

Finally, it is possible that students respond to explicit timing because of a history of reinforcement with time limits. Both inside and outside of school, strong effort while being timed is usually reinforced. If a student has a history of being reinforced for working hard or quickly while being timed, it is likely that this history will influence current responding (Pipkin & Vollmer, 2009). Students may be conditioned to put forth greater effort when a time limit is introduced due to this history of reinforcement. If this effect generalizes to timed writing activities, introducing a stopwatch and announcing a time-limit may result in increased writing production.

**Purpose of the Current Study**

The purpose of the current study is to explore explicit timing as an administration modification for writing assessments. Van Houten, Morrison, Jarvis, and McDonald (1974) conducted the only study examining explicit timing and written expression. The authors used a feedback intervention in tandem with explicit timing, so there is no evidence of the effect of explicit timing alone. The current study will explore explicit timing and its effects on writing production. Two variations of explicit timing will be used: (1) unstructured, a procedure in which the teacher or test administrator announces the time limit and displays the timer with current time
remaining in a prominent location, (2) structured, a procedure similar to unstructured with the addition of teacher/administrator prompts regarding the remaining time (i.e., “it has been 3 minutes, you have 2 minutes left”) and a short pause with a visual indicator of progress (i.e., “circle the last word you wrote and continue writing”). Previous studies have made no differentiation between these two procedures, or any other variations of explicit timing. It will be beneficial to practitioners to understand exactly which administration variation works best during different assignment lengths. This study also will compare these two explicit timing conditions between two lengths of writing assignment conditions. Specifically, a 5-min assignment reflective of short CBMs or other screening procedures and a 15-min assignment similar to longer assessments that some researchers recommend (Espin et al., 2008) and in class tests or essays. The effectiveness of explicit timing has not previously been explored between assignment time lengths in the same study. It is hypothesized that unstructured explicit timing will result in better student performance during short writing assignments. The time-remaining prompts used in the structured explicit timing may be viewed as interruptive, distracting, and unnecessary during a shorter assignment. Conversely, the structured condition may prove to be ideal for longer assignments, as the prompts will assist in time management, planning, and maintaining attention to the writing task.

**Research Questions**

The first research question this study will address is: Do time-remaining prompts increase writing production? Time-remaining prompts in structured explicit timing (e.g., “you have 3 minutes remaining”) may serve to increase on task behavior further compared to an assignment without those prompts. It is hypothesized that student writing production will increase under structured explicit timing conditions but not during unstructured explicit timing conditions.
The second question that will be addressed is: What is the effect of the duration of the writing activity on writing production per minute, as measured by TWW per minute? It is hypothesized that while students have an opportunity to write more words during a longer time period, words written per minute may be reduced compared to a shorter time limit. A longer task presents more opportunity for fatigue and off-task behavior.

The third research question is: What is the interaction between duration of writing activity and the type of explicit timing on writing production, as measured by TWW? It is expected that students will produce more words under a structured condition if the time limit is longer. The time-remaining prompts will serve as useful on-task reminders and help students manage their time. However, under shorter time limits, students may not find these prompts as useful, and the prompts may interrupt and distract them from otherwise on-task behavior.

The forth research question is: What is the effect of the various explicit timing procedures on writing quality, as measured by %CWS? While students may write more, it is not expected that they will write better. It is possible that writing speed may harm quality. However, it is not expected that writing quality will significantly differ between conditions. Time-remaining prompts should not significantly impact student spelling or grammar.

The fifth question is: Is there a preference for the type of timing procedure among the students? We hypothesize that students will find time-remaining prompts distracting during short assignments, but useful during long assignments when they may otherwise lose track of time.
CHAPTER II

Methods

Participants and Setting

Writing samples, social validity surveys, and demographics surveys were completed by 61 middle school students (30, 7th grade students and 31, 8th grade students from a middle school in east Tennessee. Over half (n = 33) of the students self-identified as female while the remainder identified as male. The mean age of students was 13 years old; student age ranged from 12 to 15 years old. Students identified as White/Caucasian (54%), Hispanic/Latino (23%), Biracial (18%), Black/African American (2%), Native American (2%), and Asian/Pacific Islander (2%).

The special education status of the current study’s sample was not collected. Across the entire school population, 9% of students are English Language Learners and 17% of students receive special education services. Two thirds of student population met eligibility for free or reduced lunch. As of 2015, 60% of students at the middle school passed the Tennessee Comprehensive Assessment Program (TCAP) across all subjects. This rate is higher than the Tennessee state average of 55%.

During data collection, students were in a typical classroom setting. Because groups were randomized by individual student, not all students were in their regularly scheduled classroom. All students were in classroom environments that they were familiar with regardless of where they were assigned during randomization. Class sizes remained the same after randomization.

Materials

A completed parent consent form was required to use a student’s writing sample for analysis. Because the writing activity is within the scope of the regular educational curriculum,
all students participated regardless of parent consent. The parent consent form included a brief description of the activity, risks and benefits to their children, and contact information (see Appendix A). The form was approved by the University of Tennessee Institutional Review Board before being sent to the school.

In addition to the parent consent form, a youth assent form was also required to use student materials for data collection (Appendix B). The youth assent form contained a brief description of the writing activity, including the duration and its purpose for research. Researchers read aloud the youth assent form before asking students to complete it.

Writing samples were collected using WE-CBM style writing prompt (Appendix C). Narrative (e.g., “My favorite game is…”) prompts were used due to higher reliability and validity across a wide range of grades compared to expository prompts (e.g., “Write about a favorite game, and why you enjoy it”) and picture prompts (McMaster & Campbell 2008). The available narrative prompts were counter balanced. Specifically, each student received a packet with two story prompts. Half of the students in each classroom had “My favorite game is…” as their first prompt while the other half had it as their second prompt. No student was assigned the same prompt twice.

A social validity survey was also completed by the students. This survey (see Appendix D) included a series of statements about the students’ preference for the writing conditions answered with a four-level Likert scale (i.e., strongly disagree, disagree, agree, strongly agree). The answers were used to determine if the students thought that any conditions were more stressful, interruptive, or helpful than other conditions.
Dependent Measures

Student writing samples were scored using Total Words Written (TWW) and Percent Correct Writing Sequences (%CWS). TWW is one of the most common scoring procedures for WE-CBM and is the least complex. Lower complexity means that scoring will be more accurate and interrater reliability will be stronger. TWW was scored according to AIMSweb WE-CBM scoring manual (Powell-Smith & Shinn, 2004). A word was defined as any letter or group of letters separated by a space, even if it is misspelled or a nonsense word. Hyphenated words were scored as multiple words if individual morphemes can stand alone. For example, son-in-law could be scored as three words while re-evaluate will be scored as one word. Common abbreviations were counted as one word. Story titles, endings, or re-written story prompts were also scored as words.

In addition to TWW, Average TWW per Minute was calculated. This procedure includes scoring TWW and dividing the result by the time taken to write the sample. For example, 100 words written during a 5-minute conditions would equal 20 Average TWW per Minute.

Percent Correct Writing Sequences (%CWS) was used to evaluate the accuracy of the students’ writing, independent of production. %CWS is a valid measure of accuracy at the middle school level (Jewell & Malecki, 2005). A correct writing sequence is two adjacent writing units (i.e., words or punctuation) that are correct with respect to grammar and mechanics in the context of what is written. Both writing units must be spelled correctly and capitalized correctly, in addition to being syntactically and semantically correct. Errors that result in mechanically and syntactically correct sequences will be scored as correct even if the error appears to have changed the intended meaning (e.g., “there was a dad storm”). As with TWW, story titles, common abbreviations, endings, or re-written prompts are subject to scoring by
%CWS. %CWS corrects for students writing unnecessary or repetitive words. Repeated words in phrases such as “I am very very very very tired” inflate TWW and WSC scores but are not scored as additional correct writing sequences. Examples and practice exercises for scoring writing sequences are included in Powell-Smith and Shinn’s (2004) WE-CBM manual. %CWS was calculated by dividing correct writing sequences by total writing sequences.

**Interrater Reliability**

Prior to data collection, each researcher was trained to score TWW and %CWS to 80% accuracy over 3 consecutive practice writing samples. To ensure that writing samples were scored accurately, 33% of writing samples were scored by a second researcher. Interrater agreement (agreement / agreement + disagreement) ranged from 95% to 100% for all measures. Average agreement between raters was 99% for both TWW and %CWS. In addition, interrater reliability was calculated using a Pearson Correlation between two scorers. Significant positive correlations were found between raters for TTW, \( r(40) = .999, p < .001 \); and %CWS, \( r(40) = .974, p < .001 \).

**Independent Variables**

The first independent variable was the type of timing procedure: unstructured and structured explicit timing. During the unstructured explicit timing condition, researchers told students the time limit and showed them that they were being timed. During the structured explicit timing condition, researchers told students the time limit, showed them that they were being timed, and verbally announced the time elapsed and time remaining four times per session. For example, a researcher would say: “It’s been 1 minute, you have 4 minutes left.” The interval between time-remaining prompts varied depending on the length of the writing session.
Specifically, 1 minutes between prompts during the 5-minute condition, and 3 minutes between prompts during the 15-minute session.

The second independent variable was the length of the writing time: 5-minute and 15-minute periods. Espin et al. (2008) found that a 5-minute writing session was more reliable and valid than a traditional 3-minute session for middle school students. The 5-minute condition represents a short but valid WE-CBM administration with secondary school students. A 15-minute writing session was used to reflect a longer version of a WE-CBM administration as well as general classroom writing sessions such as in-class essays.

**Procedures**

During data collection, researchers were grouped into pairs so one researcher could collect procedural integrity data while the other delivered the directions to the students. During screening, all students stayed in their regularly assigned classrooms. Researchers first introduced themselves and the project according to the screening prompt script (Appendix E). The researchers then read aloud the youth assent form, answered any questions, and collected the assent forms. To ensure group equivalency, a writing sample was administered to serve as a screener. The screener assignment was a 5-minute CBM writing assessment following typical administration from AIMSweb. One writing prompt was be used for all students (i.e., The best thing about summer is”). Researchers followed the appropriate script, informing the students of the 5-min time limit. Students were instructed to circle the last word written at 3 minutes to compare scores to norms using 3-minute writing session. Completed writing samples were collected and the researchers thanked the students and informed them that they will be back with two new stories in the following weeks.
During the experimental conditions, each student wrote two stories under two of the four conditions during one class period. Each student only wrote two stories to avoid burnout and reduced effort on later tasks. The four experimental conditions were unstructured/5-minute session (Appendix F), structured/5-minute session (Appendix G), unstructured/15-minute session (Appendix H), and structured/15-minute session (Appendix I). Students were randomly assigned to a classroom in which all students were exposed to two of the conditions. The order of the conditions was counter balanced (Table 1 in Appendix K).

During the experimental phase, graduate student researchers worked in pairs to collect procedural integrity data. The researchers introduced themselves to the students and handed out packets containing two writing prompts (counter balanced order), social validity survey, and demographic information form. The researchers then began the appropriate script for the first writing condition of the session. When the time limit was met, researchers allowed for a quick break before beginning the appropriate script for the second writing condition. When the final writing condition was completed, researchers gave instructions on for the social validity survey, read each item to the class, and answered any questions about the survey. After students completed the social validity survey they were instructed to complete the demographics survey. Once finished, researchers collected all the packets. Student names were removed from all samples and replaced with a research number before being removed from the school building.

**Procedural Integrity**

Before data collection, researchers were trained in the delivery of the writing prompt and survey instructions. Secondary researchers used the script as a checklist to ensure that the experimental conditions were delivered with 100% accuracy (See Appendix J). During data
collection the researchers worked in pairs, one delivering directions and the other using a copy of the script as a checklist. Procedural Integrity was 100% across all conditions and scripts.

Analysis

A repeated measures mixed effects ANOVA was used to answer the first three questions. In the first research question, concerning the effect explicit timing condition on writing production, the main effect of explicit timing condition on Average TWW per Minute was examined. In the second question, concerning the effect of activity duration on writing production, the main effect of duration on Average TWW per Minute examined. To answer the third research question, the interaction effect of timing condition and activity duration was explored.

A paired samples t-test was used to answer the fourth research question. Differences in writing quality, as measured by %CWS, was compared between the two explicit timing conditions.

The fifth research question will be based on the results of the social validity survey. Frequency of student answers will be examined to determine if a majority of students agree or disagree with particular items.
CHAPTER III

Results

The purpose of the current study was to explore explicit timing as an administration modification for writing assessments. Two explicit timing conditions were examined: unstructured explicit timing and structured explicit timing. Both 5-minute and 15-minute writing activities were administered to examine the interaction between explicit timing procedures and the duration of writing activity. Group equivalence within gender, grade level, and experimental condition group are analyzed below. Results are then presented in the order of the research questions. Results and means are also presented in table format (Tables 2–5 in Appendix K)

Group Equivalence

To ensure group equivalence, all student completed a writing sample screening assessment. Due to school absence, 60 (98%) students completed the screener. The mean total words written (TWW) on the screener task was 70, with a range from 20 to 130. An independent samples t-test was used to determine if screener scores between gender were significantly different. The mean TWW was 64.2 for males and 75.6 for females. The difference between genders was not significantly different, \( t(58) = -1.95, p = .06 \). An independent samples t-test was also used to determine if screener scores were significantly different between grades levels. No significant difference was found between 7th grade (\( M = 68.9 \)) and 8th grade (\( M = 71.9 \)), \( t(58) = -49, p = .62 \).

Group equivalence was also analyzed between student groups based on experimental conditions. Each student was exposed to two of the four experimental conditions. Half of the students were exposed to the Unstructured Short and Structured Long conditions, while the other half were exposed to the Structured Short and Unstructured Long conditions. TWW on the
screener writing sample was examined to ensure group equivalence between the two groups. No significant difference was found between students exposed to the Unstructured Short and Structured Long conditions ($M = 73.5$) and those exposed to the Structured Short and Unstructured Long conditions ($M = 67.4$), $t(58) = 1.03, p = .31$.

**Questions 1, 2, and 3**

The first three research questions were: (1) Do time-remaining prompts increase writing production? (2) What is the effect of the duration of writing activity on writing production? and (3) What is the interaction between duration of writing activity and the type of explicit timing procedure on writing production? A repeated measures mixed effects ANOVA, using an autoregressive covariance structure, was used to test the main effects of timing structure on Average TWW per Minute (Tables 2 and 3 in Appendix K). Average TWW per Minute for writing samples completed under Structured timing ($M = 12.0$) did not differ significantly from samples completed under Unstructured timing ($M = 11.8$), $F(67) = .12, p = .730$. When comparing length of writing activity administration, students wrote an average of 14.5 TWW per minute during the short writing time and an average of 9.3 TWW per minute during the long writing time. The effect of writing time length on Average TWW per minute is significant, $F(67) = 75.97, p < .001$. No significant interaction effect was found between length of writing time and timing structure, $F(61) = .33, p = .57$.

**Question 4**

The fourth research question was: What is the effect of the various explicit timing procedures on writing quality? A paired samples t-test was used to compare the %CWS between unstructured timing writing samples and structured timing writing samples. The difference between unstructured timing (92.6 %CWS) and structured timing (92.4 %CWS) was not
statistically significant, \( t(60) = -0.22, \ p = .83 \). Mean \( \% \text{CWS} \) for each condition are presented in Table 4 in Appendix K.

**Question 5**

The fifth question was: Is there a preference for the type of timing procedure among the students? A frequency analysis was conducted to examine the pattern of responses on the social validity survey (Table 5 in Appendix K). The majority of students (72.1%) disagreed or strongly disagreed with the statement “I write at my best when being timed.” More than half of students (68.9%) agreed or strongly agreed with the statement “I find prompts such as ‘It’s been 2 minutes, you have 3 minutes left’ helpful when I’m writing.” For the statement “I think prompts such as ‘It’s been 2 minutes, you have 3 minutes left’ are distracting”, 62.3% of students disagreed or strongly disagreed. Most students (78.6%) agreed or strongly agreed with the statement “I feel stressed while being timed”. The majority of students responded agree or strongly agree with the final statement “I prefer a quiet classroom without prompts or interruptions while writing.”
CHAPTER IV

Discussion

WE-CBM plays an important role in assessing and monitoring the writing skills of students from elementary to secondary school grade levels. The research examining the technical adequacy of WE-CBM has been mixed. McMaster and Espin (2007) found strong concurrent validity with other writing assessments such as the Test of Written Language and Developmental Scoring System, but weak test-retest reliability over 3-weeks and poor sensitivity to student growth, both of which are necessary for progress monitoring. In an effort to improve WE-CBM, authors have studied various types of prompts and scoring techniques (McMaster & Campbell, 2008) as well as increased duration of the assessment session (Espin et al., 2008). Other aspects of WE-CBM must be explored to improve its ability to accurately assess student writing without sacrificing practicality or ease of use.

Introduction of explicit timing procedures to WE-CBM administration may be a method for improving student writing and limiting false positive and false negative findings within the assessment results. Explicit timing is an administration procedure in which students are told the assignment time limit and shown a stopwatch to emphasize the time limit. Van Houten, Morrison, Jarvis, and McDonald (1974) implemented explicit timing in concert with goal-setting in a second-grade classroom and found significant increases in writing production among students. The literature exploring explicit timing as an academic intervention uses two distinct timing procedures: unstructured explicit timing, in which students are told they are being timed and are shown a stopwatch, and structured explicit timing, which subdivides the activity session into short intervals. The current study created intervals within a writing activity by giving the students time-remaining prompts (i.e., “it’s been 2 minutes, you have 3 minutes left”). To further
explore the effect of explicit timing on writing, the length of the writing session varied from 5 minutes to 15 minutes. The current study’s goal was to explore the effects of the two explicit timing procedures on writing and the interaction of those procedures in relation to the length of time allotted for each writing session.

The first research question was: Do time-remaining prompts increase writing production? This question was examined by comparing the average TWW per minute between structured (5 and 15 minutes) and unstructured (5 and 15 minutes) writing samples. It was hypothesized that student writing production would be greater under structured explicit timing compared to unstructured explicit timing. The time-remaining prompts were predicted to remind the students to stay on task, thereby increasing on-task behavior and writing production (Rhymer & Morgan, 2005). However, results showed no significant difference in average TWW per minute between the two explicit timing conditions. This finding could be due in part to time-remaining prompts failing to increase on-task behavior in the current study. It is also possible that students in the current study may have been using all the available time to write, regardless of the timing conditions they experienced. This is in line with Van Houten, Morrison, Jarvis, and McDonald’s (1974) observation that students under explicit timing engaged in fewer social interactions and were less off task. Researchers in the current study also did not observe significant social or off-task behavior under any conditions. It may be the case that on-task behavior, and therefore writing production, had reached a ceiling under both structured and unstructured explicit timing conditions.

The lack of significant differences in writing production across explicit timing conditions could be explained by other limiting factors. Students may have reached the limit of their efforts under either condition. Specifically, because the writing activity was not graded, there was no
pressure to write more or better to achieve a desired grade. Furthermore, there were no behavioral ramifications for students stopping writing prior to time ending. Each student may have had a fatigue threshold, writing only up to a certain point then stopping, regardless of the time-remaining prompts or the total allotted time to work. The students, therefore, had no reason to write beyond their own level of fatigue. Additionally, given that the activity was a creative writing assignment, students may have stopped writing at the natural end of their story or when they had exhausted their ideas. Any of these limits on student writing production may have been met independently of the experimental conditions.

The second research question examined the effect of the duration of writing activity on writing production. To answer this question, average TWW per minute was compared between all 5-minute activities and all 15-minute activities. The hypothesis predicted lower average TWW per minute during 15-minute sessions compared to 5-minute sessions. The results support the hypothesis. Average TWW per minute was significantly lower in 15-minute writing sessions. It may be that the longer sessions increased fatigue and allowed for more off-task behavior. Additionally, other limiting factors such as lack of academic consequences, effort, and content as previously discussed may have resulted in lower average TWW per minute in the 15-minute sessions.

While significant differences in writing production were found between 5-min and 15-min writing activities, all researchers made similar observations regarding students not writing for the full time period. While administering the 15-min writing activity, researchers observed that majority of, if not all, students stopped writing by 10 minutes. To account for this observation, Average TWW per minute was recalculated assuming a 10-min writing activity instead of 15-min. No significant difference in Average TWW per minute between 5-min (M =
14.5) and 10-min (M = 13.9) writing activities was found. This corrected analysis suggests that
students wrote at a similar pace under both duration conditions. Instead of adapting their writing
rate to suit the extended time, students wrote at their regular rate but stopped early. It is possible
that there is a point of diminishing returns regarding duration of writing activity; 7-min or 10-
min CBM-WE may improve assessment results but it appears that a 15-min administration
would waste both the students and educators time while yielding little improvement in writing
production in return.

The third research question was: What is the interaction between duration of
writing activity and the type of explicit timing on writing production, as measured by average
TWW per minute? It was predicted that the structured/15-min and unstructured/5-min conditions
would have the highest writing production of the four experimental conditions. Essentially, it
was expected that the time-remaining prompts would be helpful for time management and would
increase writing production during the 15-minute activity but would be too frequent and
distracting during the 5-minute activity. No significant interaction was found between the timing
structure and the length of writing activity with regard to average TWW per minute. It appears
that limiting factors such as fatigue, effort, and lack of academic consequences may have been
more powerful factors than the experimental conditions in determining how much students
would write.

Because the writing assignments in the current study were not graded, student effort may
have been impacted. Liu, Allspach, Feigenbaum, Oh, and Burtin (2004) found that students
performed worse on the SAT college admission assessment when they were completing it for a
voluntary study compared to when they took the exam under an authentic administration. When
the test impacted their life, the students performed better. This suggests that some students may
not put forth their best effort if they know an assignment or assessment has no impact on their grades. Furthermore, the effect of fatigue may interact with the effect of academic consequences. Students who are more motivated to complete an academic task (if achieving a particular grade is motivating to them) may be able to work past a level of fatigue in which they might otherwise stop (Wohlhueter, 1966). Boksem, Meijman, and Lorist (2006) found that fatigued participants, once motivated with monetary gain, were able to regain some of their previously lost performance on a cognitively taxing task. If this effect generalizes to written expression, properly motivated students might push through their mental (and physical) fatigue to write more.

The fourth research question was: What is the effect of the various explicit timing procedures on writing quality? Writing quality was examined by comparing %CWS between timing conditions. The hypothesis was that writing quality would not differ significantly between timing conditions. The results support the hypothesis in that no significant differences in %CWS were found. The time-remaining prompts introduced by structured explicit timing did not impact the quality of students’ writing quality. Even if students felt distracted by the prompts, the quality of their writing did not suffer.

The fifth research question examined if students had a preference for timing procedure. The pattern of responses on the social validity survey were analyzed to answer this question. The majority of students disagreed with the first statement on the survey, “I write at my best when being timed.” It appears that overall, students believe that time reminders will detract from their writing performance. There is little evidence comparing untimed writing activities to timed writing activities; however, the existing literature does not suggest that timing negatively impacts writing production (Van Houten, Morrison, Jarvis, & McDonald, 1974). Regarding the second
survey item, we hypothesized that students exposed to the 5-minute structured timing condition would find the time-remaining prompts less helpful and more distracting than those students who were exposed to the 15-minute structured timing condition. Counter to this hypothesis, the majority of students (68.9%), regardless of which structured timing condition they participated in, found the prompts useful. It is unclear how the time-remaining prompts were useful to the students (e.g., on-task prompts, time management, or planning). Similarly, results of the third survey item do not differ based on condition assignment. Overall, 62% of students disagreed with the statement that time-remaining prompts were distracting. While most students did not find prompts distracting, most students also responded that they preferred a quiet classroom without prompts or interruptions while writing. This response pattern, in concert with the other student responses, suggests that there is a middle ground in which time-remaining prompts are useful, not too distracting, and only interrupt an otherwise quiet classroom when necessary.

One of the potential drawbacks of explicit timing is the anxiety created by introducing time pressure on students. There is evidence that explicit timing can detract from performance instead of improving it if used with students with high self-reported test anxiety (Onwuegbuzie & Seaman, 1995; Plass & Hill, 1986). The fourth item on the social validity survey addressed stress created by explicit timing. Most students agreed or strongly agreed that being timed while writing was stressful. This statement is an important consideration within the classroom, as there will likely be a number of students who have increased anxiety when being explicitly timed. This anxiety has the potential to detract from their academic performance.

The results of the current study do not support a differential effect between unstructured and structured explicit timing. However, there are a number of limitations which restrict the manner in which the results are interpreted. Addressing these limitations may also direct future
research with regard to explicit timing, assessment administration modifications, and other academic interventions.

**Limitations and Future Research**

Small sample size is a major limitation of the current study. In total, 140 seventh grade students and 111 eighth grade students were approached when recruiting participants. Only 21% of seventh grade students \((n = 30)\) and 28% of eighth grade students \((n = 31)\) returned parent consent forms and assented to participate in the study. This small sample of the school’s population may not be representative of the writing skills of the all students in the school or students across the country. It is possible that students who returned parent consent forms and assented to participate in this study shared a number of characteristics not controlled for in the methodology. For example, students who enjoy writing or are strong writers may have put forth more effort to have a parent/guardian sign the consent form and return it to the school. These same students may be more likely to assent to participate, versus students who viewed the writing task as high effort and undesirable, and therefore, did not assent in an attempt to escape participation. It is extremely likely that students who successfully returned a signed consent form share characteristics such as higher organization and planning skills. Students who both returned consent forms and assented to participate could have skewed the participant sample toward those with higher academic achievement or higher average effort on academic tasks. A larger sample of the school’s population may have resulted in different effects of the timing procedures on writing. A more representative sample size should account for a range of academic achievement, classroom behavioral characteristics, and other personal characteristics that remain unaccounted for in the current study. Future studies should ensure that the sample is large enough to be representative of the general school population.
While the results of the current study should generalize to WE-CBM type writing tasks, the ability to generalize to other academic writing tasks is limited. Specifically, the impact of timing on creative story writing may not be the same as writing academic content (e.g., a history or language arts essays). When writing a graded assignment, time-remaining prompts may prove to be more useful in assisting with planning and time management. Students also may be more inclined to write past a level of fatigue in an attempt to achieve a higher grade, versus a non-academic assignment with no incentive to push through that fatigue. It is also possible that the opposite is true, that academic content writing activities may have a more defined natural end. During an academic activity, students may stop writing after they have successfully answered a question or satisfied a prompt.

Future research should address the generalization between creative WE-CBM writing and class-specific academic content writing. WE-CBM is designed to assess writing skills independent of academic knowledge; however, writing in the classroom is often used to communicate learned academic concepts. It is important to make distinctions about which administration modifications are effective with WE-CBM and which also work with general classroom writing assignments. Future research may address these two writing activities separately when examining the efficacy of writing interventions. Additionally, researchers may wish to explore writing interventions in the context of writing activities that are part of students’ grades. Students may approach a writing activity that impacts their grade differently than one which is a voluntary activity.

In addition to the academic weight of a writing assignment, researchers should also consider how students will react to a writing activity administered by researchers compared to one administered by their teacher. It is possible that some students will put forth greater effort for
researchers than for their teacher. For example, students may want to impress researchers who have introduced themselves as graduate students from a well-known university. On the other hand, other students may purposefully put forth low effort when given an assignment from a researcher who has no influence on their grade. To control for the effect a researcher’s presence has on student effort, future researchers should enlist teachers to administer assignments in order to emulate regular classroom activities as closely as possible.

The lack of an untimed or covertly timed condition is another limitation of this study. Without a covert timing conditions, this study is unable to support the notion that students complete more academic work when they know they are being timed. Attempting to compare explicit timing and covert timing introduces order effects that are unavoidable if conditions are compared within subjects. Specifically, if students are exposed to a covert timing task first and an explicit timing task next, order effects such as fatigue and novelty of the task would impact the analysis. The order of conditions could be randomized to account for those order effects; however, students who are exposed to explicit timing first and covert timing second might still behave as if they are being timed (Van Houten, Morrison, Jarvis, & McDonald, 1974). The belief that they are being timed would potentially be difficult to remove.

In an attempt to minimize order effects and fatigue among students, students were exposed to only two of the four possible conditions. Each condition was always presented in the same pairing, which is another limiting factor; students who were exposed to the 5-minute structured condition were always exposed to the 15-minute unstructured condition. Ideally, if there are four conditions then students should have the potential to be exposed to six different combinations of those conditions without repetition (twelve combinations when counterbalancing for order). This limitation is accepted in the current study because the
alternatives of fatigue and order effects are less desirable in comparison. In order to avoid this limitation in the future, researchers may wish to collect data using separate sessions for each condition. If students write over the course of multiple days fatigue effects should decrease. Additionally, writing over multiple days may also allow researchers to expose students to all the possible conditions now that fatigue is no longer a concern.

Finally, future research should aim to explore explicit timing procedures among specific populations. Age, gender, and special education eligibility categories are all areas which could be explored with regard to the effects of explicit timing procedures. For example, it may be the case that time-remaining prompts are particularly effect among students who struggle with hyperactivity and attention problems. If a large enough sample size can be found, analyzing the impact of explicit timing procedures by demographic and diagnosis dimensions may yield useful results.

Conclusion

While the conclusions made from the results of the current study are restricted by weaknesses and limitations, there are some implications for educators and researchers. While there was no significant difference in writing production between explicit timing procedures, this indicates that time-remaining prompt neither helped nor hindered student writing. One concern was that time-remaining prompts would distract students, lowering their on-task behaviors and therefore writing production. No evidence of this was found.

Even if no significant differences were found between the two explicit timing conditions, students clearly had distinct preferences about timing. Overall, students prefer a quiet classroom without interruptions and like to write without being timed. However, if timed, they find time-remaining prompts useful and not distracting. With this in mind educators may wish to speak
with their students about timing procedures and get a sense of their students’ specific preferences. If performance is not impacted to a significant degree, adapting timing procedures to fit student preference may be the best practice.

There is a great deal more research that must be conducted examining writing and timing procedures. Any and all options to modify and improve WE-CBM should be examined in an effort to design a reliable, valid, efficient, and practical writing assessment. Educators are in need of administration modifications which can be used to improve student writing and it yet remains if explicit timing is one of them.
REFERENCES


APPENDIX
Appendix A

Parent Informed Consent Form
Evaluating Variations on Writing Prompt Administration

Purpose of the Research:
This research project will examine the impact of different writing assessment styles to help students show their best writing skills. Good measures of writing skills are important to make sure students receive the academic supports they need.

Procedure:
I understand that my child will write two essays during school hours, which will take no more than 15 minutes each. If I give permission, my child’s writing will be scored. My child will take a short survey asking them their opinions of the activities. My child’s survey responses will be scored if I give permission. All students in your child’s class will take part in the writing activities. We are asking your permission to use your child’s data in our research project.

Risks and/or Discomforts:
Participation in the study poses no known risks to your child. We will monitor your child for frustration levels while writing and provide frequent breaks, if needed.

Benefits:
Through your child’s participation, you will be helping us to learn more about the conditions that help students to do their best writing. Additionally, these data could change writing prompt administration procedures at your child’s school.

Confidentiality:
Any information gathered during this study, which may identify your child, will be kept strictly confidential. We will provide your child a research code so his/her name will not be connected to his/her writing. The information obtained in this research may be published in scientific journals or presented at professional meetings, but data reported will not identify any individual participant.

Contact Information:
If you have questions at any time about the study or the procedures, you may contact the researcher, Dr. Merilee McCurdy - 520 Bailey Education Complex or 865-974-8144. If you have questions about your rights as a research participant, you may contact the UT Office of Research IRB Compliance Officer at utkirb@utk.edu or (865) 974-7697.

Parent’s Initials _________
**Participation:**
Your child’s participation in this study is voluntary; you may decline for your child to participate without penalty. If you decide that your child should not participate, you may withdraw him/her from the study at any time without penalty and without loss of benefits to which your family is otherwise entitled. If you withdraw your child from the study before data collection is completed, your child’s data will be returned to you or destroyed.

**CONSENT**

I have read the above information. I have received a copy of this form. I give permission for my child’s writing and survey data to be scored.

__________________________________________________
Child’s name – printed

__________________________________________________
Parent/Guardian name – printed

__________________________________________________       ___________
Signature of parent/guardian       Date
Appendix B

Youth Assent Form

Hello, my name is (student researcher’s name). I'm a researcher and student at the University of Tennessee. Your guardian/parent and your teacher say you might be willing to help me with a research project. With your teacher, we are going to ask all students to write two stories that will take not more than 15 minutes each. I will also have a survey for you to fill out that will ask you about your opinions of the essays you wrote today. If you agree to help me with this project, then I will use information from your stories and survey in my research project. I would appreciate your help!

Are you willing to help me with this project and let me use your stories and survey? (circle one)

YES      NO

If you sign this form, it means you have decided to let me use your stories and survey in my research project.

_________________________________________
Signature of student

_________________________________________
Signature of researcher
Appendix C

My favorite game is…

______________________________________________________________________________

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Appendix D

Questionnaire

Please circle the response that most closely reflects how you feel about the statement

1. I write at my best when being timed.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

2. I find prompts such as “It’s been 2 minutes, you have 3 minutes left” helpful when I’m writing.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

3. I think prompts such as “It’s been 2 minutes, you have 3 minutes left” are distracting.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

4. I feel stressed when being timed.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

6. I prefer a quiet classroom without prompts or interruptions while writing.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree
Appendix E

Screening
Data Collection Script

1. Give each student a paper with the writing prompt written at the top, face down.
2. Give them the following instructions:

“I want you to write a story. The beginning of your story is written on your paper, you will write about what happens next. You will have 1 minute to think about the story you will write, and then you’ll have 5 minutes to write it.”

Do your best work. If you don’t know how to spell a word, you should guess. Use the words written at the top of your paper as your first sentence. Are there any questions? Flip your paper. For the next minute think about the story you want to write” Begin timing.

3. If students start writing, instruct them to “Wait until I tell you to begin writing.”
4. After 30 seconds say, “You should be thinking about the story you are going to write.”

5. After 1 minute, say, “Now begin writing.” (Restart the stopwatch at 5 min) Walk around the classroom to ensure the students are writing.

6. After 90 seconds say: “You should be writing about the story at the top of your page”
7. After 3 minutes, say “Circle the last work you wrote, then keep writing”
8. After 5 minutes, say, “Stop and put your pencils down.”
Appendix F

Unstructured Explicit Timing SHORT
Data Collection Script

1. Introduce Researchers. Give each student a packet, face-up: “Please write your name on the small piece of paper on the top of your packet.”

2. Give them the following instructions:

   “Turn to the next page. I want you to write a (another) story. The beginning of your story is written on your paper, you will write about what happens next. You will have 1 minute to think about the story you will write, and then you’ll have 5 minutes to write it.”

   “I’m going to time you and see how much you can write in 5 minutes!

   Do your best work. If you don’t know how to spell a word, you should guess. Use the words written at the top of your paper as your first sentence. Are there any questions? For the next minute think about the story you want to write.” Begin timing.

3. If students start writing, instruct them to “Wait until I tell you to begin writing.”

4. After 30 seconds say, “You should be thinking about the story you are going to write.”

5. After 1 minute, say, “On your mark, get set, GO! Begin writing.” (Start the stopwatch at 5 minutes, counting down.) Walk around the classroom to ensure the students are writing.

6. After 5 minutes, say, “Stop and put your pencils down.”
Appendix G

Structured Explicit Timing SHORT
Data Collection Script

1. Introduce Researchers. Give each student a packet, face-up: “Please write your name on the small piece of paper on the top of your packet.”

2. Give them the following instructions:

“Turn to the next page. I want you to write a (another) story. The beginning of your story is written on your paper, you will write about what happens next. You will have 1 minute to think about the story you will write, and then you’ll have 5 minutes to write it.”

“I’m going to time you and see how much you can write in 5 minutes!

Do your best work. If you don’t know how to spell a word, you should guess. Use the words written at the top of your paper as your first sentence. Are there any questions? For the next minute think about the story you want to write” Begin timing.

3. If students start writing, instruct them to “Wait until I tell you to begin writing.”

4. After 30 seconds say, “You should be thinking about the story you are going to write”

5. After 1 minute, hold up the stopwatch or point to the board/screen with time and say, “On your mark, get set, GO! Begin writing.” (Restart timer) Walk around the classroom to ensure the students are writing.

6. At 1 minutes, say, “It’s been 1 minute, you have 4 minutes left”

7. At 2 minutes, say, “It’s been 2 minutes, you have 3 minutes left”

8. At 3 minutes, say, “It’s been 3 minutes, you have 2 minutes left”

9. At 4 minutes, say, “It’s been 4 minutes, you have 1 minutes left”

10. At 5:00 minutes, say, “It’s been 5 minutes, stop and put your pencils down.”
Appendix H

Unstructured Explicit Timing LONG
Data Collection Script

1. Introduce Researchers. Give each student a packet, face-up: “Please write your name on the small piece of paper on the top of your packet.”

2. Give them the following instructions:

   “Turn to the next page. I want you to write a (another) story. The beginning of your story is written on your paper, you will write about what happens next. You will have 1 minute to think about the story you will write, and then you’ll have 15 minutes to write it.”

   “I’m going to time you and see how much you can write in 15 minutes!

   Do your best work. If you don’t know how to spell a word, you should guess. Use the words written at the top of your paper as your first sentence. Are there any questions?

   For the next minute think about the story you want to write.” Begin timing.

3. If students start writing, instruct them to “Wait until I tell you to begin writing.”

4. After 30 seconds say, “You should be thinking about the story you are going to write.”

5. After 1 minute, say, “On your mark, get set, GO! Begin writing.” (Start the stopwatch at 5 minutes, counting down.) Walk around the classroom to ensure the students are writing.

6. After 15 minutes, say, “Stop and put your pencils down.”
Appendix I

Structured Explicit Timing LONG
Data Collection Script

1. Introduce Researchers. Give each student a packet, face-up: “Please write your name on the small piece of paper on the top of your packet.”

2. Give them the following instructions:

   “Turn to the next page. I want you to write a (another) story. The beginning of your story is written on your paper, you will write about what happens next. You will have 1 minute to think about the story you will write, and then you’ll have 15 minutes to write it.”

   “I’m going to time you and see how much you can write in 15 minutes!

   Do your best work. If you don’t know how to spell a word, you should guess. Use the words written at the top of your paper as your first sentence. Are there any questions? For the next minute think about the story you want to write” Begin timing.

3. If students start writing, instruct them to “Wait until I tell you to begin writing.”

4. After 30 seconds say, “You should be thinking about the story you are going to write”

5. After 1 minute, hold up the stopwatch or point to the board/screen with time and say, “On your mark, get set, GO! Begin writing.” (Restart timer) Walk around the classroom to ensure the students are writing.

6. At 3 minutes, say, “It’s been 3 minutes, you have 12 minutes left”

7. At 6 minutes, say, “It’s been 6 minutes, you have 9 minutes left”

8. At 9 minutes, say, “It’s been 9 minutes, you have 6 minutes left”

9. At 12 minutes, say, “It’s been 12 minutes, you have 3 minutes left”

10. At 15:00 minutes, say, “It’s been 15 minutes, stop and put your pencils down.”
Appendix J

Structured Explicit Timing SHORT
Procedural Integrity Checklist

1. Introduce Researchers. Give each student a packet, face-up: “Please write your name on the small piece of paper on the top of your packet.”

2. Give them the following instructions:

   “Turn to the next page. I want you to write a (another) story. The beginning of your story is written on your paper, you will write about what happens next. You will have 1 minute to think about the story you will write, and then you’ll have 5 minutes to write it.”

   “I’m going to time you and see how much you can write in 5 minutes!

   Do your best work. If you don’t know how to spell a word, you should guess. Use the words written at the top of your paper as your first sentence. Are there any questions? For the next minute think about the story you want to write” Begin timing.

3. If students start writing, instruct them to “Wait until I tell you to begin writing.”

4. After 30 seconds say, “You should be thinking about the story you are going to write”

5. After 1 minute, hold up the stopwatch or point to the board/screen with time and say, “On your mark, get set, GO! Begin writing.” (Restart timer) Walk around the classroom to ensure the students are writing.

6. At 1 minutes, say, “It’s been 1 minute, you have 4 minutes left”

7. At 2 minutes, say, “It’s been 2 minutes, you have 3 minutes left”

8. At 3 minutes, say, “It’s been 3 minutes, you have 2 minutes left”

9. At 4 minutes, say, “It’s been 4 minutes, you have 1 minutes left”

10. At 5:00 minutes, say, “It’s been 5 minutes, stop and put your pencils down.”
### Appendix K

Table 1

**Condition Counterbalancing**

<table>
<thead>
<tr>
<th></th>
<th>First Activity</th>
<th>Second Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Unstructured/5 min</td>
<td>Structured/15 min</td>
</tr>
<tr>
<td>Group 2</td>
<td>Structured/5 min</td>
<td>Unstructured/15 min</td>
</tr>
<tr>
<td>Group 3</td>
<td>Unstructured/15 min</td>
<td>Structured/5 min</td>
</tr>
<tr>
<td>Group 4</td>
<td>Structured/15 min</td>
<td>Unstructured/5 min</td>
</tr>
</tbody>
</table>
Table 2

Average TWW per Minute Means by Experimental Conditions

<table>
<thead>
<tr>
<th></th>
<th>5-Minute</th>
<th>15-Minute</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured</td>
<td>14.7 (n = 30)</td>
<td>8.9 (n = 31)</td>
<td>11.8 (n = 61)</td>
</tr>
<tr>
<td>Structured</td>
<td>14.3 (n = 31)</td>
<td>9.6 (n = 30)</td>
<td>12.0 (n = 61)</td>
</tr>
<tr>
<td>Total</td>
<td>14.5 (n = 61)</td>
<td>9.3 (n = 61)</td>
<td>11.9 (n = 122)</td>
</tr>
</tbody>
</table>

*Note.* All students who were exposed to the 5-minute, Unstructured conditions were also exposed to the 15-minute, Structured condition. All students who were exposed to the 5-minute, Structured conditions were also exposed to the 15-minute, Unstructured condition.
Table 3

*Repeated Measures Mixed Effects ANOVA Results*

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>67</td>
<td>.12</td>
<td>.73</td>
</tr>
<tr>
<td>Duration</td>
<td>67</td>
<td>75.97</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Duration * Structure</td>
<td>61</td>
<td>.33</td>
<td>.57</td>
</tr>
</tbody>
</table>

*Note.* Significant at the $p$<.05 level.
Table 4

% CWS Means by Experimental Conditions

<table>
<thead>
<tr>
<th></th>
<th>5-Minute</th>
<th>15-Minute</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured</td>
<td>91.8% (n = 30)</td>
<td>93.5% (n = 31)</td>
<td>92.6% (n = 61)</td>
</tr>
<tr>
<td>Structured</td>
<td>92.5% (n = 31)</td>
<td>92.4% (n = 30)</td>
<td>92.4% (n = 61)</td>
</tr>
<tr>
<td>Total</td>
<td>92.1% (n = 61)</td>
<td>92.9% (n = 61)</td>
<td>92.5% (n = 122)</td>
</tr>
</tbody>
</table>

Notes. All students who were exposed to the 5-minute, Unstructured conditions were also exposed to the 15-minute, Structured condition. All students who were exposed to the 5-minute, Structured conditions were also exposed to the 15-minute, Unstructured condition.
<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Disagree/Strongly Disagree</th>
<th>Agree/Strongly Agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>I write at my best when being timed.</em></td>
<td>44 72.1%</td>
<td>17 27.9%</td>
<td>61</td>
</tr>
<tr>
<td><em>I find prompts such as ‘It’s been 2 minutes, you have 3 minutes left’ helpful when I’m writing.</em></td>
<td>19 31.1%</td>
<td>42 68.9%</td>
<td>61</td>
</tr>
<tr>
<td><em>I think prompts such as ‘It’s been 2 minutes, you have 3 minutes left’ are distracting.</em></td>
<td>38 62.3%</td>
<td>23 37.7%</td>
<td>61</td>
</tr>
<tr>
<td><em>I feel stressed while being timed.</em></td>
<td>13 21.4%</td>
<td>48 78.6%</td>
<td>61</td>
</tr>
<tr>
<td><em>I prefer a quiet classroom without prompts or interruptions while writing.</em></td>
<td>20 33.3%</td>
<td>40 66.7%</td>
<td>60</td>
</tr>
</tbody>
</table>
VITA

Peter Ignacio was born in Rhode Island and grew up outside of Buffalo, New York. He attended the State University of New York, College at Geneseo and graduated with a Bachelor of Arts degree in Psychology. After graduation, Peter worked at Massachusetts General Hospital as a Research Assistant in the department of Psychiatry and as a Youth Outreach Coordinator for one of the community after-school programs. In 2014, Peter accepted a position in the University of Tennessee, Knoxville’s School Psychology doctoral program. In May of 2017, he received a Master of Science degree in Applied Educational Psychology. Peter will begin his internship in the fall of 2018 with the Tennessee Internship Consortium in Psychology.