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Generalization Programming and the Instructional Hierarchy: A Performance Feedback Intervention in Writing

Rigby Dawn Malandrino
Syracuse University

Abstract

National assessments have indicated that a large number of students in the United States are underperforming in writing (National Center for Education Statistics, 2012; Persky, Daane, & Jin, 2003). Accordingly, there is a clear need for research to identify appropriate interventions targeting writing. One intervention that has received empirical support is performance feedback (Van Houten et al., 1974, 1975, 1979). However, few performance feedback studies have explicitly targeted generalization. The primary purpose of the current study was to examine the extent to which 116 third-grade students, randomly assigned to a generalization programming (n = 39), performance feedback (n = 38), or practice-only condition (n = 39), demonstrated gains in writing fluency and were able to demonstrate stimulus and response generalization. It was hypothesized that (a) students in both intervention conditions would significantly outperform the practice-only condition in writing fluency growth and (b) students in the generalization programming condition would demonstrate stronger performance on measures of stimulus and response generalization as a result of explicit programming tactics targeting generalized skills along the sequence of the Instructional Hierarchy (Haring & Eaton, 1978). There was mixed support for the hypotheses, as students in the performance feedback condition demonstrated statistically significant greater writing fluency growth in comparison to both the practice-only and generalization programming conditions. In comparison to students assigned to practice-only or performance feedback conditions, students assigned to the generalization programming condition demonstrated significantly greater performance on a measure of response generalization; however, there were no differences between the conditions on a measure of stimulus generalization.

Keywords: academic intervention, writing, performance feedback, generalization

GENERALIZATION PROGRAMMING AND THE INSTRUCTIONAL HIERARCHY: A PERFORMANCE FEEDBACK INTERVENTION IN WRITING

by

Rigby Malandrino

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Writing is a skill that is pertinent to everyday life. It is a way that we communicate with others, express ourselves, and respond to demands in our environment. Writing is important not only in our personal lives, but in our work lives as well. In fact, upwards of 90 percent of mid-career professionals cited that writing effectively is of great importance in their work (National Commission on Writing, 2003). Due to the importance placed upon writing skills, it is disheartening that most of our nation's students are not performing up to par. Results from national assessments of students' educational achievement indicate that many fourth-grade students struggle in the area of writing (Persky, Daane, & Jin, 2003), and that this trend continues through later grades (National Center for Educational Statistics, 2012). Furthermore, research indicates that upwards of 50% of freshmen in college are unable to write papers that are relatively free of language errors (National Commission on Writing, 2003).

To contribute to the betterment of students' writing skills, The National Commission on Writing (2003) suggested a number of educational reforms including (a) providing more support for the professional development of teachers in writing, (b) allocating instructional time for students to engage in writing activities, and (c) conducting fair and authentic assessments of students' writing skills. Most recently, the National Center for Education Statistics (2012) identified several factors that were correlated with greater writing outcomes amongst eighth and twelfth-grade students. For teachers, these factors included having students use word processor to draft and revise written assignments, and requiring them to write assignments of moderate length (i.e., 4-5 pages). Student factors included using an online thesaurus tool and reporting writing as a preferred activity.

Although several factors have been associated with positive writing outcomes, there are still a large number of students in the United States who struggle in the area of writing. In 2002, a national assessment of students' writing skills reported that 72% of fourth-grade students were functioning below grade level in writing (i.e., below the Proficient level) (Persky et al., 2003). More recently the National Center for Education Statistics (2012) reported that 74% of eighth-grade students and 73% of twelfth-grade students were functioning below grade level in a computer-administered writing assignment; the updated assessment did not include fourth-grade students.

The percentage of students struggling in writing increases when demographic factors are taken into account. For example, a higher percentage of students who were eligible to receive free or reduced-price lunch, which serves as a proxy for socioeconomic status, were found to be achieving at or below the Basic level in writing. Specifically, among fourth-grade students, 84% were reported to be functioning at or below the Basic level in writing (Persky et al., 2003). More recently, 88% of eighth-grade students and 90% of twelfth-grade students were functioning at or below the Basic level in writing (National Center for Education Statistics, 2012).

In this introduction, I will review theoretical conceptualizations of writing as well as research regarding the range of writing instructional practices used in schools. Next, I will review conceptualizations of generalization in relation to the development of academic skills, and then critically review the research on generalization programming in the broad areas of literacy (i.e., reading and writing). Lastly, I will review the present study, which incorporated generalization programming into a performance feedback intervention to increase the generalization of elementary-aged students' writing fluency skills.

Conceptualizations of Writing

In 1980, Hayes and Flower analyzed the writing process and concluded that competent writers generally follow a writing process consisting of three major components: (a) planning, (b) translating, and (c) reviewing (see Figure 1). Planning involves the use of information from long-term memory to generate and organize ideas, and to set goals. These goals guide the formulation of text, which takes place in the translation component. Ultimately, reviewing takes place, which consists of two sub-processes, which include reviewing and editing.

Although Hayes and Flower's (1980) conceptualization for writing was widely adopted and applied in the field of writing, the translation of this model for children was not apparent. Specifically, Abbott and Berninger (1993) argued that editing is a difficult skill for elementary-aged students and that they need to learn to be "authors before they are editors" (p. 480). Later, Berninger and colleagues (1997) criticized the model proposed by Hayes and Flower (1980) because it underestimated the importance of the transcription process for beginning writers. Relatedly, Graham, Berninger, Abbott, Abbott, & Whitaker (1997) specified handwriting and spelling as two critical transcription skills for elementary-aged students as they develop competence in writing fluency. They described that children have to master the mechanics of writing, before moving on to higher-order skills such as planning, content generation, and translation.

For elementary-aged students, an alternative conceptual model of writing was proposed that focused on the precursor skills that are important for beginning writers. Specifically, Berninger and colleagues (1992) highlighted the importance of focusing on lower-level developmental skills that serve as predictors of compositional fluency, such as rapid production of alphabet letters and coding of orthographic text. As a result, Berninger and colleagues

suggested that the translation process should be divided in to two sub-component parts: (a) text generation and (b) transcription (see Figure 1). Later research studies conducted by Berninger and colleagues (Berninger, Cartwright, Yates, Swanson, & Abbott, 1994; Berninger et al., 2006) supported the addition of these subcomponents to the conceptual model of writing for elementary students. Specifically, these studies demonstrated that transcription can be improved through different orthographic activities, and that skills involved in transcription, such as rate of letter writing and handwriting instruction, were indicative of increased writing fluency.

Writing Fluency

Writing fluency is a fundamental skill that is critical to writing competency and is typically developed at the elementary grade level. Fluency encompasses the ease and automaticity with which text is formulated and is generally defined as the ability to generate text in a rapid and comprehensive manner without expending a large amount of effort (Graham et al., 2012). For example, Graham et al. (1997) argued that writers must develop a mastery of mechanical skills before they can adequately engage in important higher order skills, which include planning and generation of content. Without this capacity, the writer would expend too much of their focus on lower-level skills, thus detracting from their written product as a whole. Further, based on research studies of emerging writers, Berninger et al. (2006) identified graphomotor planning and orthographic coding as important skills that contribute to writing fluency among elementary-aged students.

The area of writing fluency has been identified as an area of extreme importance and yet is in vast need of improvement. The National Commission on Writing (2003) specified writing fluency as a severely neglected practice in school, and recommended that the time spent on writing instruction be doubled, at minimum. Abbott and Berninger (1993) proposed that explicit

instruction be provided to develop children's writing fluency in the elementary grades, specifically with direct instruction concerning handwriting, spelling, and composition. In turn, Cutler and Graham (2008) have suggested that more time be dedicated to writing and that it be distributed among different facets of the writing process (e.g., basic writing skills, writing strategies, and text generation).

Although the need for increasing instructional time in writing fluency has been clearly specified, research studies have shown a gap between the amount of time that is necessary for developing this skill and the amount of time that is provided by teachers. Graham, Harris, Fink-Chorzempa, and MacArthur (2003) surveyed 153 primary grade teachers about the instructional practices that they used when teaching writing skills. The results of their study indicated that teachers reported spending an average of three hours per week on writing, however, there was considerable variability in these reports (range = 0.50 to 12.50 hours per week; SD = 2.2 hours per week). Similarly, Cutler and Graham (2008) surveyed 178 primary grade teachers regarding their instructional practices related to classroom writing activities. Results indicated that teachers reported spending a median of 21 minutes per day allotting time towards writing (range, 0 minutes to 380 minutes weekly, SD = 70.8 minutes weekly).

Additionally, the type of writing instruction that is being provided varies substantially among teachers. Graham and colleagues (2003) indicated that overall, teachers report providing a wide range of instructional practices including basic writing skill instruction (e.g., handwriting, spelling, grammar), writing processes (e.g., planning, revising, and reviewing) and other activities, such as peer support. Cutler and Graham (2008) also found that teachers reported using a variety of writing practices, with the majority of teachers (65%) reporting that they did not use a commercial program when teaching writing practices.

In summary, it is clear that writing instruction is a commonly neglected practice in school curricula both in terms of instructional time and strategies employed. As a result, it is not surprising that our nation's students are severely lacking in their ability to demonstrate writing proficiency on national assessments. It is important to note that although there is variability among teachers in terms of their instructional practices, research studies have identified a number of evidenced-based strategies to improve students' writing skills.

Evidence-Based Strategies for Improving Children's Writing Skills

The need for a fixed set of effective writing instruction strategies is great, given that there is not a distinct approach that is widely utilized throughout schools. As mentioned previously, research has evidenced variation in instructional time (Cutler & Graham, 2008; Graham et al., 2003) and practices (Graham et al., 2003); however, there are a number of empirically supported instructional techniques and interventions in the area of writing. These techniques include strategy instruction, process approach, and performance feedback and are summarized in more detail below.

Strategy Instruction. One widely supported instructional practice in the domain of writing is strategy instruction, which involves an explicit focus on the cognitive processes of writing as defined by Hayes and Flower (1980) (i.e., planning, content generation, revising, and editing). Each component is broken down into sets of strategies that students can utilize when writing. The ultimate goal of strategy instruction is to transition students from more explicit instruction (i.e., modeling) to independent strategy application. As a result, strategy instruction involves intensive instructional supports in the classroom (e.g., one-on-one instruction), necessitating extended periods of time.

In a meta-analysis that examined strategy instruction interventions, Graham (2006) analyzed results from 20 group and 19 single subject design studies that included students in grades 1 through 12. Participating students were heterogeneous, ranging from advanced writers to students with specific learning disabilities. Based on well-established criteria for interpreting effect sizes (Cohen, 1988) and percentage of nonoverlapping data (Scruggs et al., 1987), results indicated that overall, strategy instruction interventions resulted in large effects for the studies that employed group designs (mean overall effect size [ES] = 1.15) and were fairly effective in single subject designs (mean percent of non-overlapping data [PND] = 89%). In summary, the findings provide strong evidence that strategy instruction is an effective technique for improving the writing skills of students in grades 1 through 12.

In an attempt to further examine the effectiveness of strategy instruction, Rogers and Graph (2008) conducted a meta-analysis of 88 single subject design studies. Three types of strategy instruction practices were identified: (a) strategy instruction for planning/drafting, (b) strategy instruction for editing, and (c) strategy instruction in paragraph writing. The results of this study found strategy instruction for paragraph writing (PND = 97%) and strategy instruction for planning/drafting (PND = 95%) to be very effective instructional practices. Strategy instruction for editing was found to be fairly effective (PND = 84%).

Recently, Graham, Kiuhara, McKeown, and Harris (2012) updated their meta-analytic work identifying effective writing instruction practices with elementary-grade students. In this study, 115 studies writing intervention studies that targeted writing quality were examined. Results showed large effect sizes for strategy instruction (ES = 1.02) and peer assistance (ES = 0.89). Additionally, prewriting activities (ES = 0.54), incorporating writing product goals (ES = 0.76), self-regulation strategy incorporated into strategy instruction (ES = 0.50), instruction in

text structure (ES = 0.59), creativity/imagery instruction (ES = 0.70), and transcription instruction (ES = 0.55) resulted in medium effects on students' writing performance.

Process Approach. Another form of writing instruction is the process approach. Although a universal definition for the process approach has not been established (Graham & Sandmel, 2011), there are many common elements used in the strategy. Specifically, there is a focus on the cognitive processes of writing (i.e., planning, translating, revising), peer collaboration, and personal attention. The process approach is designed to increase intrinsic motivation involved in the writing process by emphasizing collaboration and creating a positive learning environment. Similar to strategy instruction, the process approach involves intensive instructional supports in the classroom (e.g., one-on-one instruction) and therefore necessitates an extended amount of time to implement.

Graham and Sandmel (2011) conducted a meta-analysis of 29 studies that implemented the process approach to writing instruction with general education students in grades 1-12. Across all studies included in the meta-analysis, common elements of the process approach included planning, translating, reviewing, and peer collaboration. Overall, the results indicated that students who received the process approach demonstrated small, positive effects in the quality of their writing (ES = 0.34). Additionally, the results of the meta-analysis demonstrated that the process approach yielded a small effect size for increasing the writing quality of students identified with disabilities and ELL students (ES = 0.29).

Performance Feedback. The concept of performance feedback originated as the Law of Effect (Thorndike, 1931), which described that learning is dependent on the outcome of an omitted response. Along those lines, performance feedback involves providing information regarding a student's performance or understanding of a concept (Hattie & Timperley, 2007).

Feedback can be provided for a number of purposes including to provide instruction or correction, or to increase motivation, engagement, and effort.

Hattie and Timperley synthesized results from 12 meta-analyses (a total of 196 studies) that examined the use of performance feedback in the classroom, and found moderate effects (average ES = 0.79). Of the different types of feedback examined in this study, the largest effects were found when feedback was implemented as a cuing strategy (average ES = 1.10) and the smallest effect sizes were obtained when feedback involved praise (average ES = 0.14), rewards (average ES = 0.34), or punishment (average ES = .20). It is important to note that this meta-analysis did not focus exclusively on academic skills and that other classroom outcomes were analyzed, such as task engagement.

Studies that have focused exclusively on using performance feedback to improve students' academic skills (Eckert et al., 2006; Van Houten, 1979; Van Houten, et al., 1975, 1974) have provided feedback to students regarding the total number of words written across various formats (e.g., classroom graph, individualized feedback sheet). Van Houten et al., (1974, 1975) were the first to examine the effects of performance feedback on students' compositional response rates (i.e., number of words written) using a single subject design. In the first study, Van Houten et al. (1974) provided second- and fifth-grade students with a performance feedback intervention during a 10-min writing period. The intervention included several components: explicit timing, immediate self-scoring of number of words written, and public posting of the highest student scores. A withdrawal design was used to examine the effectiveness of the performance feedback intervention and included four phases: (a) baseline, (b) multi-component performance feedback intervention, (c) baseline, (d) multi-component performance feedback intervention. Across both grades, students demonstrated substantial increases in the number of

words written as a result of the multi-component intervention. A limitation of this study was that multiple components were included in the intervention (i.e., timing, self-scoring, public display of scores, and instructions to beat previous scores), therefore it is impossible to determine which intervention components were responsible for the observed gains in students' writing.

To examine the individual effects of performance feedback in relation to the other components embedded in the performance feedback system used by Van Houten et al. (1974), Van Houten et al. (1975) used a withdrawal design with fourth-grade students enrolled in two classrooms. In this single subject design, three components were individually examined in relation to a baseline phase: (a) performance feedback, (b) performance feedback and public posting, (c) performance feedback, public posting, and praise. Results suggested that the greatest improvements in students' writing fluency occurred during the performance feedback and public posting condition. The effect of adding praise to performance feedback and public posting was variable across the two classrooms. As a result, this study provided initial evidence that providing students with performance feedback and public posting of scores produced increases in students' writing fluency in the format of a single subject design. Although this study was the first to provide empirical support for performance feedback as an intervention to improve elementary-aged students writing fluency, a limitation of this study is that public posting is difficult to implement in contemporary classrooms. Additionally, the extent to which the intervention effects generalized to other writing tasks was not examined.

Harris, Graham, Reid, McElroy, and Hamby (1994) used a multiple baseline design with four fifth- and sixth-grade students with learning disabilities to examine the effectiveness of a self-administered writing feedback intervention. The intervention required students to compose a story in response to a picture during a 15-min writing period. Following the writing task,

students self-scored their stories by counting the total number of words written. Results indicated substantial increases in students' writing from baseline (M = 50.25) to intervention (M = 109.50). This study demonstrated that self-scoring is an effective way to increase writing fluency in students with learning disabilities in the context of a single subject design. Given that the intervention was only utilized with students with learning disabilities, it is unclear if the results would generalize to a general education classroom. Additionally, similar to previously reviewed studies, the authors did not examine generalization of students' writing skills.

More recently, Eckert et al. (2006) examined the effects of providing weekly, individualized performance feedback on the compositional response rates of 50 third-grade students. Results indicated that students who received performance feedback demonstrated significantly greater gains in the number of words written in comparison to a control group, F (1, 49) = 10.82, p = .002. In a second study with 42 third-grade students, Eckert and colleagues examined the effects of varying the frequency of performance feedback by comparing three conditions: (a) control, (b) weekly feedback, and (c) feedback three times per week. Results indicated a statistically significant difference between the three conditions in their compositional response rate, F (1, 41) = 3.28, p = .03. Post hoc analyses indicated a statistically significant difference between the number of words written by the control and feedback conditions, with the feedback conditions writing more words. However, there was not a statistically significant difference between the weekly feedback condition and the condition that received feedback three times per week, which showed that weekly feedback was sufficient for improving students' writing fluency. Similar to the previously reviewed studies, the extent to which the intervention effects generalized to common classroom writing assignments was not assessed.

Although the work of Van Houten and colleagues (1974, 1975) and Eckert and colleagues (2006) indicate strong support for using performance feedback to improve students' writing fluency in the classroom, none of these studies examined the extent to which the intervention resulted in generalized responding on untrained writing tasks. Recently, Hier and Eckert (2014) examined the extent to which the performance feedback intervention resulted in generalized responding among 103 third-grade students. Intervention procedures similar to those reported by Eckert and colleagues (2006) were used and included providing students with feedback regarding the number of words that they wrote during the previous session, and an arrow indicating if that number represented an increase or decrease in the number of words written. The results of this study indicated that third-grade students in the performance feedback condition demonstrated significantly higher scores on a measure of stimulus generalization (i.e., a verbally administered CBM-WE writing prompt which was not self-referenced) in comparison to students assigned to a practice only condition. Although this study reflects one of the first studies to examine the generalization of students' writing skills following a performance feedback intervention, generalization tactics were not explicitly programed in this study (i.e., train and hope). However, these results suggest in the absence of explicitly programming for generalization, students are more likely to demonstrate generalization following improvement in writing fluency.

Theoretical Conceptualizations of Generalization

Generalization has been defined in the literature as a behavioral change that endures across a variety of settings and spreads to related behaviors (Baer, Wolf, & Risley, 1968). Although generalization has not always been recognized as a strategic component of intervention planning, it has long been a desired outcome. In fact, it is often critical to the functionality of an intervention that the effects generalize across time and place. In their seminal article, Baer,

Wolf, and Risley (1968) recognized the importance of explicitly programming and examining the generalization of behavioral change, rather than simply implementing an intervention and expecting it to have wide-spread effects.

Despite the conceptual and functional importance of generalization to intervention studies, it was not until the late 1960's that researchers began to direct attention towards implementing generalization programming as a key part of behavioral studies. Specifically, Stokes and Baer (1977) reviewed 270 intervention studies and categorized nine techniques that were used to train and assess generalization: (1) train and hope, (2) sequential modification, (3) introduce to natural maintaining contingencies, (4) train sufficient exemplars, (5) train loosely, (6) use indiscriminable contingencies, (7) program common stimuli, (8) mediate generalization, and (9) train "to generalize." In addition, Stokes and Baer identified three types of generalization that could be assessed in response to an intervention: (1) stimulus generalization (i.e., across subjects, settings, people), (2) response generalization (i.e., using the task in a different way), and (3) generalization across time. In their review of intervention studies, Stokes and Baer concluded that the majority of studies used either the train and hope technique (n = 135) or sequential modification (number was not specified in article). Given these findings, Stokes and Baer concluded that the prevailing problem among most of the intervention studies reviewed was that generalization was not always actively considered prior to the start of the interventions, nor was it properly analyzed at the conclusion of the study.

In 1989, Stokes and Osnes further revised the work of Stokes and Baer (1977) by creating three main goals for generalization programming that were centered on the basic principles of behavior as well as supporting subcategories, or tactics, which included: (1) exploit current functional contingencies (contact natural consequences, recruit natural consequences, modify

maladaptive consequences, and reinforce occurrences of generalization); (2) train diversely (use sufficient stimulus exemplars, use sufficient response exemplars, make antecedents less discriminable, and make consequences less discriminable); (3) incorporate functional mediators (incorporate common salient physical stimuli, incorporate common social stimuli, incorporate self-mediated physical stimuli, and incorporate self-mediated verbal and covert stimuli). Stokes and Osnes (1989) described generalization as the ultimate goal of intervention and one that requires thorough planning and analysis in order to be achieved. They specified that a crucial step for intervention researchers is to include generalization as a dependent variable and carefully pinpoint the specific independent variables that impact generalization.

Years later, Osnes and Lieblein (2003) reviewed the literature to examine the progression of generalization programming. Specifically, they reviewed 88 research studies from 1990 to 2002 that addressed maintenance and/or generalization of interventions that implemented tactics identified by Stokes and Baer (1977) or Stokes and Osnes (1989). This review selected articles from four journals: *Journal of Applied Behavior Analysis*, *Behavior Modification*, *Journal of Positive Behavior Interventions*, *and the Behavior Analyst Today*. Of the 88 research studies, only 16 (18%) focused on explicit generalization programming and utilized generalization probes. Promisingly, almost all of the studies reported successful generalization, although the authors did not provide details as to how these conclusions were drawn. These results suggest that when generalization was explicitly programmed, it was likely to occur. However, the authors concluded that generalization programming remains in a nascent state, necessitating further empirical evidence supporting the functionality of implementing generalization tactics. Although these studies were successful in promoting generalization, they all pertained to social

behavior; therefore, the extent to which the results generalize to other domains, such as academic skills, remains unclear.

Instructional Hierarchy. In a conceptual model that described generalization as it occurs in the sequence of learning, Haring and Eaton (1978) developed the Instructional Hierarchy. The model includes four stages that occur relatively sequentially as an individual is learning a new skill: (a) acquisition (i.e., learning to perform the skill), (b) fluency (i.e., producing the skill with automaticity), (c) generalization (i.e., demonstrating similar responding to novel stimuli), and (d) adaptation (i.e., engaging in a novel application of the skill). The premise for this model was based upon qualitative research observations suggesting that as students' increase their skill repertoire, instructional procedures that were effective during the beginning stages of learning were not as effective when individuals were required to apply the skill, and that skill application required a different set of procedural techniques.

Based on the work by Haring and Eaton (1978) instructional procedures were developed that could reliably improve students' performance at different proficiency levels along the Instructional Hierarchy (Daly, Lentz, & Boyer, 1996; Johnson & Layng, 1996; Martens & Witt, 2004). These procedures have been found to remediate basic academic skills in a considerable number of studies (Chard, Vaughn, & Tyler, 2002; Daly, Martens, Hamler, Dool, & Eckert, 1999; Lannie & Martens, 2008; Martens, Witt, Daly & Vollmer, 1999). As students advance through the Instructional Hierarchy, different instructional procedures should be implemented. For example, procedures targeting acquisition (e.g., modeling, cuing), fluency (e.g., drills, reinforcement), generalization (e.g., sufficient stimulus exemplars), and adaptation (e.g., sufficient response exemplars), should be implemented respectively, as students advance in their learning (Martens et al., 1999). Thus, this approach provides a conceptual framework for the

development of interventions that are suited to students' proficiency level (Ardoin & Daly, 2007).

In 2014, Parker and Burns examined the application of the Instructional Hierarchy in the context of a reading acquisition intervention using a multiple baseline across participants design with three third-grade students. The authors were interested in evaluating the necessity of establishing a proficient level of accurate reading responding (i.e., a minimum of 93% of words read correctly over the course of five consecutive sessions) before targeting fluency. Three phases were used in this study: (a) repeated readings with error correction, (b) supported cloze procedure (i.e., the examiner read a word, then the student read the following word, until the passage was complete), and (c) repeated readings with error correction. Throughout the study, two metrics were used to determine if students were increasing their reading accuracy (i.e., percent words read correct) and fluency (i.e., number of words read correct per minute). Results indicated that students did not demonstrate increases in accuracy or fluency in response to the initial repeated readings intervention. However, reading accuracy increased in response to the supported cloze procedure, which included intense modeling. Following students' demonstration of a proficient level of accurate responding, the repeated readings intervention was reinstated; thereafter, students demonstrated steady increases in their reading fluency. These findings demonstrated that the use of targeted intervention tactics based on proficiency levels resulted in improvements. More specifically, the study demonstrated that an intervention targeting reading fluency (i.e., repeated readings) was not effective for students prior to the development of reading accuracy.

In the context of writing, the Instructional Hierarchy can be used explain how emerging writers develop text generation skills. For example, as students are beginning to engage in text

generation, they must first learn how to accurately form words into sentences. As students become fluent writers, the act of text generation becomes less cumbersome, and they are able to generate text more quickly. In generalization, students are able to generate text across novel writing tasks. Finally, in adaptation, students are able to modify their writing skills in response to novel writing tasks. It is important to note that although Haring and Eaton (1978) stipulated that learning occurs hierarchically, they recommend implementing strategies to enhance generalization during the fluency stage of learning. They also recommended generalization and adaptation promoting tactics that were similar to generalization programming tactics (i.e., use sufficient stimulus and response exemplars) (Stokes & Osnes, 1989).

Generalization Programming in Academic Interventions

Generalization programming is of particular importance in academic interventions as students are expected to learn material and adapt that knowledge in a functional manner (Poncy, Duhon, & Key, 2010). Additionally, given that teachers simply do not have the necessary amount of instructional time to teach every skill individually, generalization programming is a fundamental step towards enabling students to be successful. Although generalization programming is crucial, it remains relatively sparse in the field of academic research. Often, when generalization is assessed, outcomes are not analyzed in response to a specific programming tactic, nor are they analyzed in conjunction with the Instructional Hierarchy; which denotes the sequence in which generalized responses can typically be expected.

In the following section, I will review research studies that have examined generalization within two broad literacy skills: reading and writing. Reviewing research from both areas will provide a more comprehensive view of the present state of generalization as it applies to literacy-based interventions, as each area contains relatively few studies. Reading interventions will be

examined first, followed by writing. The writing studies examined will not include studies that assessed mechanical aspects of the writing process (i.e., spelling, handwriting, punctuation). It is important to mention that although "sufficient exemplar training" is often the terminology used by in the original theoretical conceptualizations of generalization (Stokes & Baer, 1977; Stokes & Osnes, 1989), more recent research on generalization have interchangeably used the terms "sufficient" and "multiple" within the context of exemplar training.

Generalization Programming in Reading Interventions

There have been several research studies examining generalization in the domain of reading. Some studies have examined spontaneous generalization effects, occurring as a result of specific reading interventions (Noell et al., 2006; Peterson-Brown & Burns, 2011), and others have implemented specific generalization programming tactics (e.g., Ardoin et al., 2008, 2007; Silber & Martens, 2010). The studies outlined below examined generalization in reading interventions and are split into two categories; studies which used a "train and hope" method and studies which utilized specific generalization programming tactics.

Reading intervention studies using train and hope tactics. Noell et al. (2006) used a multi-element single-subject design with three first-grade students to examine spontaneous response generalization associated with whole word based instruction that targeted the percentage of words read and spelled correctly. In this study, the primary focus was on examining whether greater generalization occurred from reading to spelling or from spelling to reading. As a result, the whole word based instruction was held constant across reading and spelling. Students were provided with 10 words and were directed to read or spell them. If the student was unable to provide an accurate answer, the experimenter would provide it for them, and the student would be asked to repeat it; each word was practiced five times. During the

generalization sessions, students were provided with the targeted reading or spelling words and asked to provide the alternate response (i.e., targeted spelling words were read, targeted reading words were spelled). Control sessions were also employed throughout the experiment, in which students' reading and spelling accuracy of non-targeted words was assessed. The results of this study indicated substantial generalization across non-targeted reading and spelling words; but no discernable differences in the two types of response generalization assessed (i.e., spelling to reading generalization or reading to spelling generalization). That is, participants were just as likely to demonstrate generalized responding across reading and spelling. A major limitation of this study was that word difficulty was not formally assessed.

Ardoin, Williams, Klubnik, and McCall (2009) used an alternating treatments design to examine the generalization effects of two multicomponent repeated readings interventions with four male students who attended a residential facility for students with emotional and behavioral disorders. Two of the participants were in the second grade, one participant was in fourth grade, and one participant was in fifth grade. The two repeated readings interventions differed only by the number of times that the students read the passages (i.e., three versus six repeated readings). Generalization was assessed immediately following each intervention session with high word overlap passages, which were created by the authors. The same passages were administered a week later to examine maintenance. Results indicated that students demonstrated increases in their reading fluency as a function of both repeated reading interventions. In addition, generalization effects were not significantly different between the two repeated readings interventions. Overall, results suggested that increased practice opportunities (i.e., six versus three repeated-readings) did not lead to statistically greater generalization effects, which suggests that three repeated readings were a sufficient number of practice opportunities. A limitation of

this study is that the generalization passage difficulty was not controlled, so outcomes may have been confounded by variation in passage difficulty.

In a reading intervention that incorporated sufficient response exemplars (although not explicitly referred to as such) to promote stimulus generalization, Peterson-Brown and Burns (2011), used incremental rehearsal with vocabulary to promote the retention of word decoding in 61 second- and third-grade students. Using a between-subjects design, incremental rehearsal (i.e., flashcards with eight known words and seven unknown words) was used in two groups: one that received the normal incremental rehearsal procedure, and the other, which included an added vocabulary component (i.e., students were asked to provide definitions for the words; if they could not, a short definition was provided for them). Generalization was assessed by having the students read a sentence that contained the previously rehearsed word. Results showed that incremental rehearsal with vocabulary was more effective than incremental rehearsal alone in increasing students' retention ($d = 0.71$) and generalization of accurate word decoding ($d = 0.83$), leading the authors to emphasize the importance of implementing a semantic component (i.e., an abbreviated definition and short sentence) to improve word decoding. It is important to note that the sample was high achieving (i.e., their baseline reading fluency exceeded national norms). As such, it is unclear whether the results would generalize to second- and third-grade students with more heterogeneous reading skills.

Reading intervention studies using specific generalization tactics. In a study that specifically evaluated alternative procedures to promote generalization, Ardoin et al. (2007) compared six third-grade students' reading fluency on generalization passages. Using an alternating treatments design, two variations of a repeated readings intervention were compared: (a) reading one passage four times; (b) or reading two similar passages (i.e., high percentage of

overlapping words) two times. It was hypothesized that students reading two similar passages twice would demonstrate greater generalized responding because the intervention included multiple exemplars (i.e., multiple passages). During both interventions, the experimenter previewed the passage, provided phrase drill error correction, and administered token reinforcement for improved reading performance on the generalization reading passage. In addition to assessing generalization as a function of the multiple exemplar tactic, the authors assessed generalization along the theoretical conceptualization of the Instructional Hierarchy (Haring & Eaton, 1978), specifying that generalized effects were more likely to occur following the development of fluency. Generalization was measured by determining the gain in students' oral reading fluency on each generalization passage from pre- to post-session (i.e., within session). The results of this study indicated that the multiple exemplar intervention did not produce greater generalization effects. In fact, half of the students demonstrated greater generalized effects after reading the same passage four times. Although these findings were somewhat surprising, the authors indicated that the lack of clear generalization effects for the multiple exemplar intervention might have been attributed to lack of stimulus control, given that students did not receive the same exposure to words contained in the passages despite the high content overlap.

Expanding on the results of the previous study, Ardoin et al. (2008) compared the immediate and generalized effectiveness of repeated readings (i.e., reading the same passage three times) and multiple exemplar (i.e., reading three different passages one time) interventions on students' oral reading fluency using a within-subjects group design with 42 second- (n = 25) and fourth- (n = 17) grade students. Generalization was assessed using medium and high word overlap reading passages. Results indicated that relative to the multiple exemplar intervention,

the repeated readings intervention led to statistically significant improvements in students' oral reading fluency. However, on the generalization assessment containing medium word overlap passages, students evidenced greater reading fluency following the multiple exemplar intervention. No differences between the two interventions were observed on students' generalized responding on the high word overlap passages. These results indicated that although more robust increases in fluency were observed with repeated readings, practice with multiple exemplar passages resulted in students demonstrating a greater ability to generalize their reading skills. Limitations of this study include that there may have been differences in the difficulty level of the medium word overlap passages that followed the repeated readings and multiple exemplar interventions. As a result, the observed differences in performance may have been related to passage difficulty and not intervention type. Additionally, given that no control condition was implemented, it is impossible to conclude that the outcomes were directly associated with the intervention tactics employed.

In a between-subjects group design, Silber and Martens (2010) compared a multiple exemplar intervention (i.e., sufficient stimulus exemplars) and a repeated readings intervention in promoting the stimulus generalization of 111 first- and second-grade students' oral reading fluency. Students were randomly assigned to one of three conditions: (a) a multiple exemplar condition (i.e., listening passage preview, repeated readings with four sentences, which were representative of the intervention passage, and rewards), (b) a listening passage preview/repeated readings condition (i.e., listening passage preview, guided practice with 16 representative sentences, and rewards), and (c) a control condition (experimenter-administered mathematics probes, and rewards). Both the multiple exemplar and listening passage preview / repeated readings interventions were conducted in a small group format. Generalization was assessed

directly following the intervention session with a high word overlap passage, which was created by the authors. Results indicated that students in both intervention conditions demonstrated statistically significant greater gains in their reading fluency on the intervention passage than students assigned to the control condition. Although results for the generalization measure indicated that students in the multiple exemplar condition outperformed students in the control condition, there were no statistically significant differences in performance on the generalization measure between the two intervention conditions. An analysis of learning rates (i.e., the change in WCPM on both intervention and generalization passages from pre- to post-intervention) was highest for students in the multiple exemplar condition, despite an increased number of practice opportunities for key words in the listening passage preview / repeated readings condition (i.e., 16 practice opportunities versus 4). Thus, outcomes examining learning rates demonstrated that the multiple exemplars intervention was more efficient at increasing fluency, as a faster learning rate was established than in the learning passage preview / repeated readings condition. These results provide support for using multiple exemplar training as a generalization programming tactic.

Mesmer et al. (2010) examined the effects of incorporating common salient physical stimuli to promote stimulus generalization of word decoding among four second-grade students. Using a multiple baseline design across three students (with a replication of the procedures with a fourth student), the authors examined the effects of highlighting common word-endings (i.e., end, en, et, ell) with color to improve the accuracy and generalization of students' word reading. During intervention, experimenters used flashcards with color-coded endings to direct students' attention to common stimulus features of targeted words as instructional reading decoding procedures were provided (i.e., experimenter model, practice, error correction). Following each

session, students' decoding accuracy was assessed on the same words but the flashcards did not contain the color-coding. During the generalization phase, identical intervention procedures were followed, except all of the word endings presented on the flashcards were color-coded as a means of prompting (i.e., common salient physical stimuli). Results of this study indicated that three of the participants evidenced some spontaneous generalization during the intervention phase (i.e., their percentage of generalized words read correctly increased relative to baseline), whereas all of the participants showed increased responding during the generalization phase. Results indicated that although some spontaneous generalization occurred, explicit programming increased the likelihood of generalized effects. Limitations of this study include that insufficient baseline data were collected to establish a stable baseline for half of the participants. Additionally, three of the participants were classified with a specific learning disability in reading, which makes it unclear if the results would transfer to general education students. Lastly, as the same material was used throughout the study, gains may have been partially attributed to practice effects.

In a single-subject design that incorporated the generalization tactics of using sufficient response exemplars and cuing procedures (a tactic similar to common salient social stimuli), Duhon et al. (2010) examined response generalization as a result of a letter sound fluency intervention that was implemented with three first-grade students. Similar to Noell et al. (2006), this study examined whether response generalization would occur across related academic skills; in this case, letter sound fluency and letter sound blending. After establishing a fluency criterion, the generalization phase began, wherein the authors implemented generalization tactic/s that varied as a function of students' responses. The phase began with a cueing procedure, which involved the experimenters presenting instructions that were similar to those provided during the

LSF intervention (i.e., "read the whole word"). If the students did not demonstrate increased letter sound blending per minute in response to this tactic, the authors incorporated sufficient response exemplars. The latter tactic was only implemented for one participant who did not meet the fluency criterion prior to the generalization phase.

Two of the students demonstrated generalized responding as a function of using the cuing procedure. The authors demonstrated that upon reaching a mean fluency criterion of 52 correct letter sounds per minute, moderate "spontaneous" generalized effects occurred for one student (i.e., gains on an alternative measure of letter sound blending prior to the implementation of generalization programming tactics). Results of this study showed that students were more likely to demonstrate generalized responding following generalization programming. A limitation of this study is that one participant did not meet the established fluency criterion prior to the generalization phase, and thus, did not demonstrate skill generalization in response to either of the generalization programming tactics. Despite this limitation, these results provide preliminary support for establishing fluent responding prior to assessing generalization. These results also demonstrate how differing rates of skill development can affect intervention outcomes.

Summary of Generalization Programming in Reading Interventions

Of the reading studies reviewed, five studies (Ardoin et al., 2008, 2007; Silber & Martens, 2010; Mesmer et al., 2010; Duhon et al., 2010) examined generalized outcomes as a function of generalization programming and implemented a variety of tactics (i.e., sufficient response and stimulus exemplars, common salient social stimuli). Three studies (Noell et al., 2006; Ardoin et al., 2009; Peterson-Brown & Burns, 2011) examined generalized outcomes as having occurred spontaneously (i.e., train and hope). Although all studies provided some evidence to support improvements in students' generalized reading responding, regardless of

inclusion or absence of specific generalization programming tactics, explicit programming was found to result in the most substantial generalization effects. That is, students demonstrated greater generalization in response to specific programming tactics as opposed spontaneous generalization assessments (Duhon et al. 2010; Mesmer et al., 2010). Additionally, generalized responding was more likely to occur if students achieved a minimum fluency criterion level (Duhon et al., 2010; Peterson-Brown & Burns, 2011), supporting the theoretical conceptualization of the Instructional Hierarchy, wherein as fluent skill development occurs, generalized responses are enhanced. These findings provide preliminary support for the notion that specific generalization tactics programmed during the reading fluency stage will increase the likelihood of generalization. Although these findings may inform other academic skill areas, such as writing, it is important to directly examine research regarding generalization programming in the area of writing.

Generalization Programming in Writing Interventions

Although there has been a fair amount of research regarding generalization in the area of writing, few studies have focused on examining the written product as opposed to the mechanical components of the writing process (i.e., handwriting, spelling, punctuation). Additionally, for studies that have examined the written product, even fewer studies have focused on interventions as they apply to the general education population or examined generalization as a function of explicit programming tactics. The studies reviewed below represent writing intervention studies that have analyzed generalization as it applies to the written product and are divided in to two areas: (a) studies that did not explicitly program for generalization (i.e., train and hope), and (b) studies that implemented programming tactics.

Writing intervention studies using train and hope tactics. In one of the first studies to examine generalization effects, Van Houten (1979) implemented a performance feedback

intervention to improve the writing fluency of 60 students in grades second through fourth. Although the author did not specifically program for generalization, stimulus generalization measures were included. This study utilized a multiple baseline design across settings that included classes of mixed grades. The intervention included explicit timing, self-scoring, and performance feedback that was publicly posted. During all phases of the study, story-writing tasks were administered during two separate times of the day. Outcomes were assessed by measuring two dependent variables: (a) total number of words written during intervention sessions, and (b) the percentage of different action words used during generalization writing probes. Results indicated that total words written increased substantially following implementation of the intervention across all classes relative to baseline levels of responding, however, students did not demonstrate an increase in the percent of different action words following the performance feedback for number of words written; the third- and fourth-grade students demonstrated an increase when feedback was introduced regarding different action verbs, relative to baseline. This did not occur with the second- and third-grade classes. In terms of generalized responding, clear and immediate changes in level of responding were only observed for one dependent variable (i.e., words written per minute). Given the lack of experimental control evidenced in this study, there are few conclusions that can be drawn regarding generalization programming. The variability of generalized responding could have been due to many factors, including the specificity of the generalization skill, the limited generalization programming, or the combined grade levels of participants.

Using a between-subjects group design, Schunk and Swartz (1993) examined the effectiveness of strategy instruction to increase 40 fourth-grade students' writing achievement. Although this study did not specify the use of a tactic for generalization programing, across all

conditions, four different strategies (i.e., multiple response exemplars) for writing paragraphs (i.e., descriptive, informative, narrative story, and narrative descriptive) were embedded in the instruction, as well as two different topics for each of the instructed writing strategies (i.e., multiple stimulus exemplars). Students were randomly assigned to either: (a) product goal (i.e., learning to apply correct strategies for different types of writing), (b) process goal (i.e., composing paragraphs), (c) process goal plus product feedback, or (d) instructional control (i.e., working productively). Students' writing performance was assessed along the following dimensions: (a) organization, (b) sentence structure, (c) word choice, (d) creativity, and (e) use of correct writing style to fit the purpose. In addition, response generalization was assessed by students' writing performance on two different types of writing tasks (i.e., compare and contrast, expressive). Unfortunately, only the overall treatment effects were reported in this study. No comparison tests were conducted to determine which experimental conditions resulted in differences in students' responding. However, the authors noted a trend based on their descriptive findings, which suggested that students assigned to the process goal plus feedback condition outperformed students in the other conditions, followed by students assigned to process goal condition. These results provide some preliminary evidence that performance feedback and goal-setting interventions may increase generalized responding in writing; however, additional studies are needed to confirm these results.

In another study that did not specifically program generalization, Medcalf, Glynn, and Moore (2004) examined stimulus generalization as a result of peer-tutoring (i.e., incorporating common salient social stimuli) on 6-year-olds' writing skills in a between-subject group design. There were two conditions in this study: a peer-tutor intervention condition (n = 7), and a control condition (n = 4). Students assigned to the peer-tutor intervention received assistance and

guidance from peer tutors during the writing the process (i.e., assisting with planning, text-generation, and editing) and were provided reinforcement in the form of praise for the utilization of proper writing skills. Students assigned to the control group practiced writing without the help of peer-tutors. Sessions occurred four times per week and lasted roughly 20 min. Performance was assessed during the tutees' regularly scheduled class time and was analyzed with measures of rate (i.e., total words written, total sentences written), accuracy (% correct punctuation, % words spelled correct), and quality (i.e., teacher ratings of enjoyment, clarity). However, limited analyses were conducted in this study to determine whether the students assigned to the peer-tutor intervention condition outperformed the students assigned to the control condition. Similar to the previously reviewed study, the authors relied primarily on analyzing the trends in the descriptive findings. Students in the peer-tutor condition demonstrated gains in punctuation (i.e., an increase from 4.8% to 62.8%) and spelling accuracy (i.e., an increase from 53% to 91%) from baseline to intervention. This study had many limitations that preclude drawing firm conclusions, however, it is the one of the few writing studies that have incorporated social mediated stimuli. Although it is difficult to have much confidence in the findings reported, it is possible that incorporating peers into writing interventions may assist with generalization outcomes in the content area of writing.

Writing intervention studies using specific generalization tactics. In one of the first writing intervention studies to interrelate generalization programming tactics and the Instructional Hierarchy (Haring and Eaton, 1978); Jackson (1995) implemented a performance feedback intervention which incorporated self-mediated physical stimuli (i.e., self-recording of specific compositional variables) to examine response generalization of writing fluency using a multiple baseline design across behaviors (total words written, action verbs, describing words)

with six students. During this study, three phases were examined: (a) baseline, (b) self-management intervention of compositional variables, and (c) generalization programming. Generalization programming was implemented during the baseline and self-monitoring phases with the administration of teacher-generated writing assignments (i.e., stimulus response exemplars), which were completed during their regularly scheduled class time and were not followed by self-management/performance feedback. Generalization probes commenced once reinforcement (i.e., points) was applied to all three compositional variables. However, conclusions are limited regarding the effectiveness of the intervention due to considerable variability in participants' responding during the baseline and intervention conditions. Descriptively, students who showed increases in rate of responding during training were more likely to demonstrate generalized responding following intervention. These results suggest that generalization programming may be more effective for behaviors brought under stimulus control during training. Additionally, results of the intervention demonstrated that increases in fluent responding during the intervention lead to an increased likelihood to develop generalized responding, and skills that were in the acquisition phase were less likely to generalize.

In a study that assessed response generalization, Graham, Harris, and Mason (2005) examined the effects of a Self-Regulated Strategy Development intervention with 73 general and special education students in the third grade. This study utilized a between-subjects group design with students randomly assigned to one of three conditions: (a) SRSD instruction only, (b) SRSD plus peer support (i.e., incorporating common salient social stimuli), and (c) comparison group of students who received typical writing instruction (i.e., Writer's Workshop) from their teachers. Students in both SRSD conditions received instruction geared towards composing stories and persuasive essays, with a focus on planning. The students in the SRSD

plus peer support group received additional guidance from a peer that focused on providing prompts for clarifying and expanding upon ideas. Generalization was assessed with two novel writing tasks: informative writing and personal narratives. Dependent variables included compositional length (i.e., number of words written), compositional quality, and the use of basic story elements necessary for the given genre.

Overall, the results indicated that students in the two SRSD conditions consistently outperformed the students assigned to the comparison condition on all dependent variables (i.e., length, story elements, and quality). In terms of generalization effects, the results of this study indicated that both SRSD groups showed statistically significant gains relative to the comparison group with respect to length of informative essays (ES = 1.57 for SRSD and 1.58 for SRSD plus peer support), number of story elements used in personal narratives (ES = 1.28 for SRSD plus peer support), and personal narratives quality (ES = 1.08 for SRSD and 1.15 for SRSD plus peer support). However, the only statistically significant difference between the two SRSD conditions on the generalization outcomes was for the number of elements used in personal narratives, with students assigned to the SRSD plus peer support condition writing more elements in their personal narratives than students assigned to the SRSD condition.

It is important to note that although peer support (i.e., incorporating common salient social stimuli) was explicitly used as a tactic to enhance the students' generalization in writing, other generalization programming tactics are inherent in the SRSD intervention. That is, students are taught self-regulatory skills during writing by asking themselves questions to facilitate text generation (e.g., "Who are the main characters?") and expanding upon ideas (e.g., "What do the main characters want to do?"). Both of these skills are examples of self-mediated verbal and covert stimuli generalization strategies. Additionally, sufficient stimulus and

response exemplars are used during the SRSD intervention given that students receive practice with different types of writing prompts, as well as instruction and practice with different writing strategies (e.g., planning, revising, and genre specific writing strategies). Thus, it is not necessarily surprising that there were few differences between the two SRSD groups on measures of generalization. Rather, the study provides some indication regarding the amount of growth that may occur when common social stimuli are incorporated with the other generalization tactics.

In summary, of the five writing studies reviewed, only two studies (Graham et al., 2005; Jackson, 1995) examined generalized outcomes as a function of specific generalization programming tactics. The remaining three studies (Medcalf et al., 2004; Schunk & Swartz, 1993; Van Houten, 1979) examined generalized outcomes but did not explicitly program for generalization (i.e., train and hope). Of the studies that incorporated specific generalization programming tactics, self-mediated physical stimuli (Jackson, 1995), and common salient social stimuli (Graham et al., 2004) were used. Jackson (1995) demonstrated some support for using self-mediated physical stimuli, however, generalized results were more likely following increased fluency levels, suggesting that learning occurs in a somewhat linear fashion, as described in the Instructional Hierarchy. In addition, Graham and colleagues (2004) found that incorporating common salient social stimuli with SRSD increased the generalization of story elements, however, the SRSD condition implicitly included sufficient stimulus and response exemplars in addition to self-mediated verbal and covert stimuli. As a result, the findings inadvertently provide support for implementing sufficient stimulus and response exemplars, and demonstrated that intervention and generalization effects can be increased when another tactic is added explicitly (i.e., salient common social stimuli).

Summary of Generalization Programming in Academic Interventions

To date, the generalization programming tactics that have been most frequently implemented (implicitly or explicitly) in studies examining the generalization of academic interventions for elementary-aged students are sufficient stimulus or response exemplars. This makes sense intuitively, given that students are generally expected to respond similarly across stimuli. However, only studies that examined generalization as a function of a specific programming tactic (Ardoin et al., 2008; Mesmer et al., 2010; Peterson-Brown & Burns, 2011, Silber & Martens, 2010) were able to demonstrate a functional relationship between the tactic and generalized outcomes.

In regard to reading and writing interventions that did not explicitly program generalization, the authors often indicated that generalization effects were evidenced when implicit tactics were embedded within an intervention (i.e., sufficient stimulus and response exemplars, common salient social stimuli). However, support for generalized outcomes were often reported descriptively or anecdotally (Noell et al., 2006; Schunk & Swartz, 1993), and results were often variable across participants (Ardoin, et al., 2007). Additionally, because it was impossible to dismantle the intervention effects from the generalization tactic, the conclusions that can be drawn are limited. On the contrary, research studies that explicitly programmed generalization with specific tactics often demonstrated generalization effects when using sufficient stimulus exemplars (Ardoin et al., 2008; Silber & Martens, 2010), sufficient response exemplars (Peterson-Brown & Burns, 2011), and common salient physical stimuli (Mesmer et al., 2010). Additionally, Jackson (1994) provided some support for using sufficient self-mediated physical stimuli in increasing the generalized responses of student writing fluency (i.e., total words written), although results were not replicated when more specific measures of writing (i.e., different action words, different describing words) were examined.

It is notable that in a number of studies it was reported that generalized outcomes were more likely to occur following increased levels of fluency (Ardoin et al., 2007; Jackson, 1994; Peterson-Brown & Burns, 2011). These findings are consistent with the sequence of learning as defined in the Instructional Hierarchy (i.e., fluency → generalization). However, the reviewed studies provide clear support for the need to explicitly program generalization tactics.

Purpose of the Present Study

Given the long-term relevance of writing skills, it is unfortunate that such a great number of students are lacking in this domain (National Center for Education Statistics, 2012; Persky et al., 2003). However, a number of effective intervention strategies have been developed to strengthen the writing skills for typically developing students. One intervention that has been shown to be effective is performance feedback. However, no studies have examined the extent to which students are able to demonstrate stimulus and response generalization of writing fluency as a result of incorporating explicit generalization programming tactics into the intervention (Hier & Eckert, 2014).

It has been argued that an essential component of academic interventions is incorporating explicit programming tactics to promote the generalization of treatment outcomes (Stokes & Osnes, 1989). Specifically, studies have demonstrated support for generalized outcomes in relation to sufficient stimulus exemplars (Ardoin et al., 2008; Silber & Martens, 2010), sufficient response exemplars (Peterson-Brown, & Burns, 2011), and common salient physical stimuli (Mesmer et al., 2010). Based on these findings, the present study incorporated explicit tactics to promote generalization of writing fluency utilizing three strategies: (a) common salient physical stimuli (i.e., including a 42 inch, stand-up cardboard pencil during sessions); (b) sufficient

stimulus exemplars (i.e., visual-only presentation of CBM-WE story starters); and (c) sufficient response exemplars (i.e., expository writing prompts).

There were two main aims of this study. The first study aim was to add to the existing research on the effects of performance feedback interventions on the writing fluency of elementary-aged students. The second study aim was to explore the benefits of explicitly programming for generalization. By exploring the benefits of explicitly programing for generalization, more information can be gathered about the effectiveness of generalization programming tactics within the context of writing interventions. Results from this study can make meaningful contributions to the current theoretical understanding of performance feedback interventions among elementary-aged students, as well as programming generalization into academic interventions. To address the study aims, two research questions and corresponding hypotheses were posed.

The first research question examined whether providing students with performance feedback on their writing would improve their writing growth over time to a greater extent than what would occur without intervention or practice. Because previous research suggests that performance feedback positively affects students' writing fluency growth (Eckert et al., 2006; Harris, 1994), it was hypothesized that students in both intervention conditions (i.e., performance feedback condition; generalization programming condition) would demonstrate improvements in their writing fluency over time compared to students in the practice-only condition receiving no intervention. Specifically, it was predicted that students in two performance feedback conditions would make significantly more improvement than students in the practice-only condition in terms of: (a) writing fluency growth over time; and (b) change in instructional level (i.e.,

frustrational, instructional, mastery; Shapiro, 2004), with more students demonstrating upward instructional level shifts following intervention.

The second research question examined differences regarding whether incorporating generalization tactics into a performance feedback intervention (i.e., generalization programming condition) improves students' generalized responding across stimuli and responses to a greater extent than what would occur with performance feedback alone (i.e., performance feedback condition) or in the absence of intervention (i.e., practice-only condition). Previous research suggests that using common salient physical stimuli, incorporating sufficient stimulus exemplars, and using sufficient response exemplars (Ardoin et al., 2008; Mesmer, et al., 2010; Peterson-Brown & Burns, 2011; Silber & Martens, 2010) increases generalized responding. For these reasons, it was hypothesized that statistically significant differences in generalized responding would be observed, with the students assigned to the generalization programming condition demonstrating greater responding than the students assigned to the performance feedback condition or practice condition.

Method

Participants and Setting

Approval was sought from the Institutional Review Board and the participating school district. Students in third-grade general education classes were recruited to participate in the study. Parent consent (Appendix A) and student assent (Appendix B) was obtained prior to the beginning of the intervention. Participating students were screened for eligibility prior to the start of the study. Eligibility criteria included the following: (a) no serious motor deficits which interfere with motor skills needed for writing; (b) no serious cognitive deficits which classify the students as being eligible for special education classes; (c) primary language spoken by the child

is English; (d) not classified as learning disabled; (e) does not require an instructional aide or 504 plan which requires modification of instruction; (f) no significant vision or hearing impairment; (g) demonstrated at least minimum proficiency by writing seven words on baseline measure; and (h) legibly write a subset of alphabet letters. These criteria were assessed based on information gathered from the students' records and teacher interviews, or collected during the baseline assessment, which is later described. Ineligible students completed an alternate instructional activity, which was assigned by their teachers.

A total of 116 students participated in the study. Most of the students were female (54.3%) and self-identified their race as Black or African American (67.2%) or White (31%). In terms of ethnicity, most students were not Hispanic or Latino (86.2%). There was a smaller portion of students who were identified as Somali (6.9%), Arab (2.6%), Hispanic or Latino (0.9%), Hutu (0.9%), Krgrgyz (0.9%), Maithili (0.9%), or "other" (0.9%). The average age of the students was 8 years, 3 months (range, 8 years, 2 months to 11 years, 2 months). A small percentage of students (7.8%) were eligible for special education services (i.e., speech or language impairment) but still met the inclusionary criteria.

Of the participating teachers ($N = 6$), all had a master's degree in special education and three teachers (50%) held an additional certification in special education. The mean number of years of teaching experience was 19.2, with a range of 4 to 38 years.

All of the students recruited for this study were enrolled in two elementary schools located in a moderately sized city in the northeast. The schools were selected due to their proximity to the university, and represented a sample of convenience.

Experimenters

Doctoral students in the School Psychology Department and advanced undergraduate Psychology majors served as research assistants. As required by Syracuse University, all research assistants were required to complete a formal training in research ethics prior to the start of data collection. This training (Collaborative Institute Training Initiative) consists of online courses emphasizing the protection and ethical treatment of human research participants. All research assistants were required to submit documentation of successful completion of the Social and Behavioral Focus and Responsible Conduct of Research courses. This documentation was submitted to the Institutional Review Board.

Research assistants received training in administering and scoring dependent measures, conducting procedural integrity observations, and entering data. In addition, all research assistants were provided with procedural scripts for the administration of dependent measures and procedural integrity observations, and a manual, which detailed the scoring procedures for the dependent measures. Following training, research assistants were required to practice and receive feedback on scoring writing probes. Research assistants were required to demonstrate 100% proficiency administering and scoring dependent measures, and conducting procedural integrity observations prior to beginning data collection.

Materials

Several assessments were administered during baseline in order to measure students' writing abilities before intervention sessions begin. Specifically, an informal measure of handwriting accuracy, the paragraph-copying portion of the Monroe-Sherman Group Diagnostic Reading Aptitude and Achievement Test (Monroe and Sherman, 1966), and the Essay Composition subtest from the Wechsler Individual Achievement Test – Third Edition (WIAT-

III; Pearson, 2009) was administered. Curriculum-Based Measurement in Written Expression (CBM-WE) probes were the primary assessment tool used to evaluate students' writing fluency throughout the intervention sessions in addition to modified CBM-WE probes to assess response generalization. Teachers were asked to complete the Writing Orientation Scale (Graham, Harris, MacArthur, & Fink, 2002) in order to provide information about their instructional beliefs and practices in the context of written expression. Lastly, students were asked to complete an intervention acceptability measure to assess their opinions of the intervention.

Informal writing screening measure. Students completed a measure of handwriting. To complete this task, students were asked to print 10 lower-case alphabet letters (i.e., f, c, r, m, v, y, i, h, e, o) as they were spoken aloud by the experimenter. The commonly reversed letters "b" and "d" were excluded and the remaining letters were chosen at random by a generator. No psychometric evidence is currently available for this measure (see Appendix C).

Paragraph copying task. The paragraph-copying task from the Monroe-Sherman Group Diagnostic Reading Aptitude and Achievement Test (Monroe-Sherman, 1966) was administered during baseline as a measure of orthographic skill (see Appendix D). This test measures the number of words that are copied correctly in 90 seconds and was compared to normative data from same-grade peers. This is the only copying test that has been normed for elementary-aged students. Two studies have demonstrated that students' performance on this task significantly predicts performance on other standardized writing measures (Berninger, Hart, Abbott, & Karovsky, 1992; Graham et al., 1997).

Wechsler Individual Achievement Test – Third Edition. The Wechsler Individual Achievement Test – Third Edition (WIAT – III; Pearson, 2009) is a standardized, norm-referenced writing measure that is used to measure the academic skills of children aged 4 to 19

years. For the purposes of this study, only the Essay Composition subtest of the WIAT-III was used to assess students' writing skills. During this subtest, students were required to attend to a verbal writing prompt before planning and composing an essay for 10 minutes. Following administration, the test was scored for (a) word count, (b) theme development and text organization, and (c) grammar and mechanics.

The technical adequacy of the Essay Composition subtest was reported by the test developers (Pearson, 2009). This measure has been shown to have strong test-retest reliability (r = .88) among children eight to nine years of age, with a test-retest interval that averaged 13 days and ranged from 2 to 32 days. Additionally, performance on the Essay Composition subtest has been shown to reliably differentiate students who are typically developing in the area of writing from those who are classified with a Specific Learning Disability in written expression

Curriculum-Based Measurement in written expression probes. Curriculum-Based Measurement in Written Expression (CBM-WE) probes measure students' writing fluency by asking students to create a written response to brief story starters (e.g., "One day when I got home from school…") (see Appendix E). Each story starter was read aloud by an experimenter. The students were instructed to spend one minute planning what they would write and were then given three minutes to write a narrative response. If they paused during the three minutes, they were prompted to continue writing. A total of 9 CBM-WE probes were used in this study (see Appendix F). The psychometric properties of these probes were previously evaluated and were shown to have strong alternate-form reliability (r = .73 to .90) and low to moderate criterion validity (range, r = .29 to .63) (McMaster et al., 2010).

Stimulus generalization assessment probes. Stimulus generalization was assessed with modified CBM-WE writing probes. The probes were intended to be similar to commonly used

school-based assessments, which require students to read and respond to writing tasks without verbal instructions from teachers. Administration of the probes was identical to those previously described; however, one aspect of administration was modified so that the story-starter was only presented visually. As a result, students were required to independently read the story starter prior to creating their narrative response. The students were instructed to spend one minute planning their writing and were given three minutes to write a narrative response. If they paused during the three minutes, they were prompted to continue writing. A total of 5 stimulus generalization probes were used in this study. Because this measure was developed for the purpose of the present study, no psychometric information is available.

Response generalization assessment probes. Response generalization was assessed with CBM-WE expository writing probes (see Appendix G). These probes differed from traditional CBM-WE probes in that students were expected to respond to a prompt requiring them to produce a composition geared toward explaining their position on a certain issue, whereas the typical CBM-WE probes require students to respond to a fragmented story-starter. Similar to the administration of the CBM-WE probes, each story starter contained in the probe was read aloud by an experimenter. The students were instructed to spend one minute planning what they would write and were then given three minutes to write an expository response. If they paused during the three minutes, they were prompted to continue writing. A total of 5 response generalization assessment probes were used in this study. The psychometric properties of these probes were previously evaluated and were shown to have strong alternate-form reliability (r = .75 to .85) and low to moderate criterion validity (range, r = .38 to .64) (McMaster et al., 2010).

Student intervention acceptability measure. The Kids Intervention Profile (KIP; Eckert, Hier, Malandrino, & Hamsho, 2015), a brief intervention acceptability measure, was administered to students assigned to the performance feedback conditions to assess their perceptions of the interventions used in the study (see Appendix H). The KIP contains 8 items and incorporates a 5-point Likert-type scale that ranges from 'Not at All' to 'Very, Very Much.' Boxes of increasing sizes are used in conjunction with the Likert-type scale. Item content is varied such that marking 'Very, Very Much' could indicate a negative or positive view of the intervention depending on the statement. Due to these reverse-worded statements, recoding of 2 items is required (Item 3, 8).

Previous research (Eckert et al., 2015) examining the psychometric properties of the KIP suggested adequate internal consistency (Cronbach's alpha = .76) and adequate test-retest reliability (r = .69) across a 3-week interval. Subsequent analysis of the factor structure using a principal components factor analysis with varimax rotation, indicated that factor loadings for items reside with two factors labeled "General Intervention Acceptability" and "Intervention Skill Improvement," that accounted for 54% of the variance in the rotated solution.

Intervention Rating Profile - 15. The Intervention Rating Profile – 15 (IRP-15; Martens, Witt, Elliot, & Darveaux, 1985) was administered to participating teachers to gauge their perceptions of the acceptability of the performance feedback intervention administered to their students. The abbreviated scale included 15 questions that were rated with a six point Likert-scale. For the purposes of this study, the scale was modified so that questions related to behavior were reframed to reference difficulties in the area of writing. Because modifications were made to the questionnaire, Cronbach's alpha reliability coefficient was calculated (α = .97).

Teacher questionnaire. Due to the linkage between teachers' instructional practices and beliefs about instruction (Graham, Harris, MacArthur, & Fink, 2002) teachers were asked to complete the Writing Orientation Scale in order to measure their classroom instructional methods and writing orientation (see Appendix I). The items contained on the Writing Orientation Scale load on to three factors: (a) Correct Writing, (b) Explicit Instruction, and (c) Natural Learning (Graham et al., 2002). Higher scores indicated teachers regard that factor as being more important and is reflected in classroom instructional practices. The internal consistency of the measure has ranged from .60 to .70.

In addition to assessing teachers' instructional practices and beliefs about instruction, teachers were also asked to respond to a series of descriptive questions regarding: (a) professional and education experiences; (b) professional and educational credentials; (c) writing curricula or writing programs used for instructional purposes in the classroom; and (d) instructional time allocated for writing activities.

Procedures

The study was conducted over the course of 7 weeks, which included 13 biweekly sessions (see Figure 2). The first three sessions were designated to conducting the eligibility and baseline assessments. Following the eligibility and baseline assessments, students were randomly assigned to one of three conditions: (a) practice only condition (n = 39); (b) performance feedback condition (n = 38); and (c) generalization programming condition (n = 39). Bi-weekly sessions were conducted by trained research assistants in the students' classrooms and lasted approximately 25 min, with 10 to 15 mins specifically dedicated to administration of the intervention, and the remaining time designated to classroom management

and material preparation. Of the remaining sessions, eight focused on intervention procedures, and two assessed generalization.

Eligibility assessment. Prior to the start of intervention sessions, students completed measures to assess their eligibility to participate in the study. First, the experimenter administered an informal measure of handwriting. During this assessment, the experimenter read aloud 10 alphabet letters and students were instructed to print each letter in lower-case on response sheets provided by the experimenter. Students were deemed ineligible to participate in this study if less than 80% of their letters were legible. Additionally, a CBM-WE probe was administered. For this assessment, students were provided with a writing prompt and were given approximately five minutes (including planning time) to write a composition. Results from this probe were used to provide performance feedback during the intervention sessions for those students who met eligibility criteria. Students who wrote less than seven words were deemed ineligible to participate in the study.

Baseline assessment. In conjunction with the eligibility phase, the experimenter obtained baseline measures of the students' writing skills prior to the start of intervention. First, the paragraph copying task was administered. For this task, students were given 90 sec to copy a paragraph as quickly and as accurately as they could. In addition, baseline stimulus generalization and response generalization assessments were conducted. Stimulus generalization was assessed with a modified CBM-WE probe (i.e., stimulus generalization probe), and response generalization was assessed an expository writing probe (i.e., response generalization probe). Lastly, the Essay Composition subtest of the WIAT – III (Pearson, 2009) was administered.

Practice only condition. During each session, students assigned to the practice only condition were provided with a writing packet. The first page of the packet contained students'

identifying information (see Appendix J) and was followed by a sheet with a stop sign (see Appendix K). The following sheet had a thought bubble at the top (Appendix L), which listed the prompt for the CBM-WE. Students were administered nine CBM-WE probes over the course of the study. Research assistants followed a procedural script (see Appendix M) and students completed CBM-WE probes without being informed of their progress.

Individualized performance feedback condition. In this condition, students were provided with a packet containing individualized performance feedback (see Appendix N) and a CBM-WE probe. Research assistants followed a procedural script to provide participants with instructions (see Appendix O). The first page of the writing packet contained students' identifying information. The second page contained information regarding feedback of the students' performance. This page depicted a box containing the number of words the participant wrote during the previous session and an arrow pointing up or down or an equal sign. The research assistants explained to the students what the arrow or equal sign meant (i.e., an upward facing arrow sign indicates they wrote more, a downward facing arrow means they wrote less, and an equal sign means they wrote the same amount of words as the week prior). During the first week of intervention, the number of words in the box indicated how many words they wrote during the baseline phase and no arrow or equal sign was provided. Students in this condition received CBM-WE probes for eight intervention sessions. As discussed below, intervention sessions were suspended and no performance feedback was provided during the stimulus generalization (week 6) and response generalization (week 10) assessments.

Generalization programming condition. Procedures for the generalization programming condition included all of the elements of the individualized performance feedback condition in addition to tactics to explicitly program stimulus and response generalization.

Specifically, following two performance feedback training sessions, stimulus generalization probes, which included the tactic of training sufficient stimulus exemplars, were administered and students were provided performance feedback for three sessions. An additional generalization programming tactic, incorporating common salient physical stimuli (i.e., a 42 inch, stand-up cardboard pencil) was placed at the front of the classroom and referred to during the administration of the writing directions as a prompt. The experimenter emphasized the stimuli by pointing to the pencil and saying, "This pencil is going to be here throughout our writing session today to help you to remember to keep writing…"

Following stimulus generalization training, intervention and all generalization programming was suspended, and stimulus generalization was assessed. During the remaining intervention sessions, response generalization probes, which included the tactic of training sufficient response exemplars, were administered and students were provided with performance feedback. At the conclusion of response generalization training, response generalization was assessed.

Stimulus generalization assessment. Students in all three conditions were administered a stimulus generalization probe to assess stimulus generalization. The stimulus generalization probe included a CBM-WE story-starter that was presented only visually, rather than following the standard visual and auditory administration. Research assistants followed a procedural script (see Appendix P) and students were not informed of their progress prior to the administration of the writing probe. The common salient physical stimuli (i.e., 42 inch cardboard pencil) was present for those students in the generalization programming condition.

Response generalization assessment. All students were administered a response generalization probe to assess response generalization. The response generalization probe

required students to write about something that they liked and to explain why they liked it. Research assistants followed a procedural script (see Appendix Q) and students were not informed of their progress prior to the administration of the writing probe. The common salient physical stimuli (i.e., 42 inch cardboard pencil) was present for those students in the generalization programming condition.

Procedural acceptability assessment. At the conclusion of the study, research assistants administered a brief procedural acceptability measure to the students to assess their perceptions of the procedures used during the study.

Intervention Rating Profile - 15. At the conclusion of the study, all participating teachers were asked to complete a modified version of the Intervention Rating Profile – 15 Teacher Version (Martens, Witt, Elliot, & Darveaux, 1985).

Dependent Measures

Primary measures. To address the primary research aims of the study, students' writing fluency on Curriculum-Based Measurement in Written Expression probes, stimulus generalization assessment probes, and response generalization assessment probes was assessed by calculating the total number of words written and the total number of correct writing sequences (see Appendix R for detailed scoring manual). Based on scoring procedures outlined by Shapiro (2011), the total number of words written was calculated be counting each grouping of letters separated by a space, even if the words were spelled incorrectly. Numbers were not included in the total word count. In addition, based on procedures outlined by Shapiro (2011), the total number of correct writing sequences was also computed. Two comprehensive reviews (McMaster & Espin, 2007; Powell-Smith & Shinn, 2004) of the reliability and validity of these

writing fluency indicators demonstrated considerable psychometric support (see Table 1 for a review of these studies).

Secondary measures. In order to examine whether students demonstrated changes in their instructional levels over the course of the study, students' writing fluency on the baseline CBM-WE probe was categorized into one of the three instructional levels: (a) frustrational (i.e., less than 37 total words written), (b instructional (i.e., 37 to 40 words written), and (c) mastery (i.e., more than 40 words written). These classifications are based on normative recommendations developed by Mirkin et al. (1981).

Experimental Design

This study used a repeated measures design to examine students' writing growth over the course of 10 intervention sessions. An a priori power analysis was conducted to determine adequate power when examining slope differences between the three experimental conditions. The power analysis was conducted based off of the procedures developed by Diggle, Liang, and Zeger (1994) for multilevel modeling with α set to .05 and power set to .80. Based on pilot work by Eckert et al. (2006), the sample size was calculated to detect a minimum meaningful difference in slopes of 0.60. Results indicated that a total of 96 participants were required (i.e., 32 participants per condition). A total of 116 third-grade students (n = 39 for the practice only condition, n = 38 for the performance feedback condition, n = 39 for the generalization programming condition) participated in this study, which exceeded requirements set by the power analysis.

At the beginning of the study, 141 students were assessed for eligibility. A total of 25 students were excluded due to not meeting inclusionary criteria (n = 10), being absent for much of baseline data collection (n = 14), or moving (n = 1). A random number generator was used to

randomly assign eligible participants (N = 116) to the performance feedback (n = 38), generalization programming (n = 39), or the practice only conditions (n = 39). As a result, students, regardless of classroom assignment, were randomly assigned to condition. Detailed information regarding recruitment and condition assignment are reported according to standards identified by the Consolidated Standards of Reporting Trials Guidelines (Figure 3).

Procedural Integrity

To assess procedural integrity, primary research assistants completed a procedural script for each session in which they checked off each individual step upon completion. Secondary research assistants observed a total of 52.17% of the sessions (n = 48) and completed a procedural script. Specifically, procedural integrity checks were conducted for 62.50% of practice-only sessions, 31.25% of performance feedback sessions, and 37.50% of generalization programming sessions. Overall, procedural integrity was very high across all sessions (M = 99.68%, range, 98.09% to 100%). Table 2 provides a detailed summary across the conditions.

Interscorer Agreement

Following data collection, 40% of the CBM-WE probes were randomly selected and rescored for correct writing sequences. Interscorer agreement was calculated by dividing the number of agreements by the sum of agreements and disagreements. The mean percentage of interscorer agreement was 98% (range, 64% to100%). Additionally, kappa coefficients were calculated in order to account for chance agreements (M = .94, range, .45 to 1.00).

Results

Data Preparation

Data input and consistency checks. The primary researcher and trained research assistants entered raw data into Microsoft Excel. All data were double-checked by another research assistant in order to ensure accuracy. Data in Excel will be transferred to SPSS 21

(SPSS Inc., 2012) to compute descriptive analyses, generate graphs, and conduct a regression analysis. Information was also transferred to SAS 9 (SAS Institute Inc., 2002-2004) for hierarchical linear modeling to examine students' fluency progress over time and to conduct secondary analyses.

Data inspection. Data from baseline was analyzed to test for assumptions of normality and homogeneity of variance. The assumption of normality was evaluated by computing skewness and kurtosis of the data. Skewness and kurtosis values ranged from .33 to .51 and -.88 to .60, respectively. Data were considered normal if skewness and kurtosis values were within the range of +1 to -1. The assumption of homogeneity of variance was examined using the Levene's Test of Homogeneity of Variances.

Descriptive Analyses

Demographic information associated with the students was compared across the three conditions using non-parametric and parametric statistics. Results indicated that there were no significant differences between conditions with regard to sex, χ^2 (2, N = 116) = 1.09, p = .58, race, χ^2 (6, N = 116) = 5.68, p = .45, ethnicity, χ^2 (14, N = 116) = 12.30, p = .58, special education status, χ^2 (2, N = 116) = .78, p = .69 or age, F (3, 115) = 1.14, p = .33. Table 3 presents these results.

Additionally, students' baseline writing performance was compared across conditions using descriptive and inferential statistics (see Table 4). A one-way ANOVA was conducted to assess whether there were significant differences between conditions on students' measures of baseline writing performance, including the Essay Composition Subtest (WIAT – III; Pearson, 2009), the paragraph coping task, and the initial CBM-WE probe, and the stimulus and response

generalization assessments. There were no statistically significant differences between the three conditions on any of the baseline measures (see Table 5).

Teachers' writing orientation and instructional practice. Results of the Writing Orientation Scale (Graham et al., 2002) indicated that teachers regarded planning and revision as important (factor score $M = 5.66$, $SD = 0.51$) in addition to letter writing practice (factor score $M = 5.25$, $SD = 0.41$), and formal writing instruction (factor score $M = 5.16$, $SD = 0.40$). Teachers reported using three different writing curricula: (a) guidelines provided by the respective school district; (b) the 6+1 Writing Trait Model; and (c) the Pearson curriculum. Teachers also reported that students spent most of their writing instructional time on composition practice ($M = 96.66$, $SD = 48.02$), followed by spelling practice ($M = 89.16$, $SD = 50.43$), and handwriting practice ($M = 24.16$, $SD = 31.68$). Regarding writing practices, teachers reported that students often used invented spelling (factor score $M = 5.33$, $SD = 1.21$). They also reported that they often had to re-teach skills and strategies (factor score $M = 5.33$, $SD = 1.36$), and model specific writing strategies (factor score $M = 5.08$, $SD = 1.35$).

Performance Feedback Results

The trajectory of students' writing fluency growth over the course of the intervention was examined for students in each of the three conditions. The slope was computed to examine students' growth in correct writing sequences over the course of the study. Multilevel modeling was used to determine if there was a statistically significant difference in slope between conditions. These differences were examined using a mixed-model repeated measures design (PROC MIXED function in SAS 9.4 software, SAS Institute, 2013). Level 1 and Level 2 analyses were used to examine the first research hypothesis. Specifically, Level 1 analyses examined intra-individual growth with a linear model, which contained the estimated baseline

performance (i.e., the intercept) and the rate of change across session (i.e., the slope). Level 2 analyses were conducted to examine between condition differences in the intercept and slope.

The empty model containing only the intercept was analyzed first. The intraclass correlation (ICC), a measure of within-person variability, was computed using intercept and residual estimates contained in the empty model. Results indicated that approximately 50.82% of the variance was accounted for by within person variability. In accordance with standards put forth by Lee (2000), these results support the use of multilevel modeling for these data. Next, intervention session was included into the model for Level 1 analyses. The addition of the session variable accounted for a significant amount of variance (pseudo $R^2 = 0.15$). Results suggest that students demonstrated statistically significant gains in their writing fluency over the course of the intervention, t (115) = 5.84, $p < .01$.

Results of the final conditional growth model indicated that students assigned to the performance feedback condition demonstrated significantly greater writing fluency growth over the course of sessions than students assigned to the practice-only t (444) = 2.95, $p < .01$, and generalization programming conditions, t (457) = -1.89, $p < .05$. However, results showed that students assigned to the generalization programming condition did not evidence significant growth in comparison to those students assigned to the practice-only condition t (469) = 1.33, p = 1.33 over the course of the intervention (see Figure 4). The average increases for students assigned to the practice-only condition was 0.33 correct writing sequences per session, 1.33 correct writing sequences for students assigned to the performance feedback condition, and 0.76 correct writing sequences per week for the students assigned to the generalization programming condition. However, as a function of the generalization programming tactics used in this study, students in the generalization programming condition were assessed on different types of writing

measures over the course of the study. Therefore, their outcome measures differed in comparison to students assigned to the other conditions, thereby limiting the comparability of the results.

Generalization of Treatment Effects Results

Stimulus and response generalization differences between groups were examined with two one-tailed analyses of covariance (ANCOVAs) with an alpha of .05. The ANCOVAs were conducted to examine group differences on post intervention measures of stimulus and response generalization, while controlling for baseline performance.

Stimulus generalization results. Prior to conducting the ANCOVA, the data were examined and it was determined that all of the statistical assumptions were met. First, the relationship between the covariate and the dependent variable (i.e., CWS on the stimulus generalization probe at baseline and CWS on the post CBM-WE) was examined. The covariate was found to be significantly correlated with the dependent variable, $r = .41$, $p = < .01$. Additionally, a scatterplot was created to evaluate linearity between the covariate and the dependent variable. Visual inspection of the scatterplot indicated that there was a linear relationship between the covariate and dependent variable. Homogeneity of regression was analyzed to ensure that no interaction existed between the covariate and the conditions. Univariate analysis of variance results indicated that this assumption was met, $F(2, 86) = .04$, $p = .96$. Levene's test of equality of error variances indicated that there was homogeneity of variance between groups, $F(2, 89) = .72$, $p = .49$.

After adjusting for baseline scores, there was not a statistically significant difference between the three conditions on the post-stimulus generalization measure, $F(2, 88) = 0.93$, $p = .39$, with similar adjusted mean scores observed for the practice only (adjusted $M = 24.38$, $SD =$

12.89), the performance feedback (adjusted $M = 26.29$, $SD = 15.19$) and generalization programming (adjusted $M = 27.97$, $SD = 13.02$) conditions (see Figure 5). However, it is important to note that several students were absent during either the baseline or stimulus generalization assessment, and their outcomes could not be included in the analyses. Thus, for the purpose of these analyses, the groups were underpowered to detect between-condition differences (practice only condition $n = 34$; performance feedback $n = 28$; generalization programming $n = 24$).

Response generalization results. Prior to conducting the ANCOVA, the data were examined and it was determined that the underlying statistical assumptions were met. First, the relationship between the covariate and the dependent variable (i.e., CWS on the response generalization probe at baseline and CWS on the post response generalization probe) was examined. The covariate was found to be significantly correlated with the dependent variable, $r = .33$, $p = < .01$. Additionally, a scatterplot was created to evaluate linearity between the covariate and the dependent variable. Visual inspection of the scatterplot indicated that there was a linear relationship between the covariate and dependent variable. Homogeneity of regression was analyzed to ensure that no interaction existed between the covariate and the conditions. Univariate analysis of variance results indicated that this assumption was met, F (2, 94), = .61, $p = .55$. Levene's test of equality of error variances indicated that there was homogeneity of variance between groups, F (2, 97) = 1.83, $p = .16$.

After adjusting for baseline scores, there was a statistically significant difference between the conditions on the post-response generalization measure, F (2, 96) = 3.82, $p = .03$, partial eta squared = .07, with adjusted mean scores varying by condition; performance feedback (adjusted $M = 26.56$, $SD = 13.32$) and generalization programming (adjusted $M = 32$, $SD = 17.44$) (see

Figure 5). Pairwise comparisons indicated that students in the generalization programming condition significantly outperformed students in the practice only condition (p = .02), but not students assigned to the performance feedback condition (p = .82). Table 6 presents the results of the ANCOVA.

Secondary Analyses

Instructional level. A McNemar-Bowker test was conducted to assess if there were significant changes in students' instructional levels (i.e., frustrational, instructional, mastery) from baseline to the final intervention session. Results indicated that both the practice-only and performance feedback conditions demonstrated a significant number of shifts in instructional level; $\chi MB^2 = (2, n = 116) = 10.30, p < .01$ and $\chi MB^2 = (2, n = 116) = 6.40, p < .05$. There were no statistically significant shifts in instructional levels for students in the generalization programming condition $\chi MB^2 = (3, n = 116) = 6.37, p = .09$, although shifts in instructional level were in a positive direction. At baseline, the majority of students (80%) performed at the frustrational level of writing fluency. Following completion of the intervention, 43.8% of students assigned to the generalization programming condition, 57.1% of students assigned to the performance feedback condition, and 53.3% of students assigned to the practice-only condition were functioning at either the mastery or instructional level. Table 7 displays the percentage of students classified at each level at baseline and following the intervention.

Student acceptability. To assess students' overall acceptability of the writing intervention, all participating students were asked to complete a rating form. Results showed that students assigned in performance feedback condition (M = 3.98, SD = .98) and generalization programming (M = 3.97, SD = 1.02) conditions rated the intervention as slightly

acceptable. There were no statistically significant differences in the students' acceptability ratings between the two intervention conditions, t (63) = 0.06, p = .94 (see Table 8).

Intervention Rating Profile - 15. All participating teachers were asked to complete a modified version of the Intervention Rating Profile – 15 Teacher Version (Martens, Witt, Elliot, & Darveaux, 1985). Overall, teachers indicated that the procedures were moderately acceptable (M = 4.63, SD = 0.81). The aspects of the intervention that were rated highest by teachers included that they liked procedures that were used in the intervention (M = 5.25, SD = 0.95) and that they would be willing to use the intervention in their classroom (M = 5, SD = 0.81). An aspect that was rated lower was that the intervention would prove effective in changing students' writing difficulties (M = 4, SD = 0.81). See Table 9 for full analyses.

Discussion

Results from national assessments have shown that the majority of our nation's students are underperforming in their writing skills (National Center for Education Statistics, 2012; Persky et al., 2003), demonstrating a clear need for empirically-supported interventions in this area. Performance feedback has been shown to increase students' writing fluency (Eckert et al., 2006; Van Houten et al., 1974, 1975), which is a fundamental skill in the development of writing proficiency (Graham et al., 1997). However, few intervention studies have incorporated tactics to explicitly program and assess generalization of intervention gains, despite the importance of doing so (Baer et al., 1968).

There were two primary aims of the current study. The first aim was to add to the existing literature on performance feedback as an effective intervention for increasing elementary students' writing fluency. The current results showed that students receiving performance feedback demonstrated greater writing fluency growth over the course of the study

than students not exposed to performance feedback. The second aim was to examine the extent to which incorporating explicit generalization programming tactics into a performance feedback intervention increased students' ability to demonstrate stimulus and response generalization. Stimulus generalization was targeted first, followed by response generalization (i.e., adaptation). Results showed that students who received explicit generalization programming demonstrated stronger performance on measures of generalization in comparison to students who received performance feedback alone or writing practice alone. However, for the most part, these results were not robust enough to demonstrate statistical significance. The discussion revolves around the main hypotheses of the study and will conclude with limitations and future research aims.

Effectiveness of Performance Feedback in Improving Students' Writing Fluency

Previous studies demonstrated that performance feedback is an effective intervention for improving students' writing fluency (Eckert et al., 2006; Van Houten et al., 1974; Van Houten, 1975). As such, it was hypothesized that students assigned to both the performance feedback and generalization programming conditions would demonstrate stronger growth in writing fluency over the course of the study in comparison to students who received writing practice alone, as both of the intervention conditions included a performance feedback component. The results of this study were mixed, with students assigned to the performance feedback condition demonstrating significantly greater growth in writing fluency over the course of the study in comparison to the practice-only and generalization programming conditions. These findings were similar to results reported by Ardoin et al. (2008), in which a repeated readings demonstrated stronger fluency growth at the conclusion of the intervention in comparison to a generalization programming condition that included multiple exemplars. There was not a statistically significant difference between the generalization programming and practice-only

condition in terms of growth in writing fluency. Furthermore, a significant change in instructional level was observed for both the practice-only and performance feedback conditions at the conclusion of the intervention. Students assigned to the generalization programming condition also demonstrated shifts in instructional level, albeit to a lesser degree. These results support previous research findings that performance feedback, in isolation, is beneficial in increasing students' writing fluency growth (Eckert et al., 2006).

A potential reason that more robust growth rates were not observed for the generalization programming condition is that these students received different types of writing probes throughout the course of the study in an effort to program generalization. More specifically, students assigned to the practice-only and performance feedback conditions were administered standard CBM-WE probes throughout the course of the intervention, aside from the two sessions in which generalization was assessed, whereas students assigned to the generalization programming condition received only two standard CBM-WE probes, followed by three stimulus exemplar probes and three response exemplar probes. Thus, results for the generalization programming condition are difficult to interpret when comparing them to the other conditions. In order to make a more direct comparison between the three conditions, future studies should incorporate generalization programming measures in addition to measures that are being used in all of the conditions.

Effectiveness of Generalization Programming Tactics in Increasing Stimulus Generalization

Due to the fact that previous research studies identified common salient physical stimuli (Mesmer et al., 2010) and multiple stimulus exemplars (Ardoin et al., 2008; Silber & Martens, 2010) as tactics that positively affect students' ability to demonstrate stimulus generalization, it

was hypothesized that students in the generalization programming condition would outperform students assigned to the performance feedback and practice-only conditions on a measure of stimulus generalization. This hypothesis was not supported, as students in the generalization programming condition did not significantly outperform students assigned to the practice-only or performance feedback conditions.

There are a couple of possible explanations for these outcomes. First, the procedures used to program and assess stimulus generalization may have been developmentally inappropriate, as students were required to independently read the writing prompts prior to composing their written work. Pilot testing of the stimulus generalization assessment was not completed to ensure that students were able to accurately decode and comprehend the prompts that were used in this study. Therefore, it is unclear if the non-significant results were due to difficulties with the students' reading skills versus a lack of ability to demonstrate stimulus generalization in writing fluency.

Second, the skills targeted during the stimulus generalization assessment reflected a complex application of the skill, such that students were required to write in response to independent reading. As such, one could argue that this may have been an assessment of response generalization, given that application of the skill was modified to suit the task (i.e., writing in response to a verbally and visually administered writing prompt versus writing in response to a visually administered writing prompt).

Third, it is possible that students were not exposed to the common salient stimuli (i.e., large cardboard pencil) enough in order for it to function in the way that it was intended. In previous studies that utilized common salient physical stimuli, the stimuli were implemented and explicitly referred to during each training session (Mesmer et al., 2010). In the present study, the

tactic was not included until the fourth session, which was the session prior to the stimulus generalization assessment. As a result, future studies should continue to assess the utility of this generalization programming tactic by examining whether immediate and continued exposure improves students' stimulus generalization.

Fourth, it is possible that the multiple exemplars (i.e., stimulus generalization probes) were not implemented a sufficient number of times in order for students to maximally strengthen their performance on the stimulus generalization assessment. These results are similar to those reported by Ardoin et al. (2007) and Jackson (1995), which suggested that generalization outcomes were related to the development of stimulus control, such that few exposures to generalization programming procedures inhibits generalization.

Finally, a considerable number of students were absent during either the pre-assessment (n = 7) and/or the post-assessment of stimulus generalization (n = 20). As a result, these students could not be included in the analyses because of their missing data. This reduction in sample size for the stimulus generalization analysis resulted in limited power to detect significant difference between conditions.

Effectiveness of Generalization Programming Tactics in Increasing Response Generalization

Due to the fact that previous researchers have identified common salient physical stimuli (Mesmer et al., 2010) and multiple response exemplars (Peterson-Brown & Burns, 2011) as tactics that positively affect students' ability to demonstrate generalization, it was hypothesized that students in the generalization programming condition would outperform students' assigned to the performance feedback and practice-only conditions on a measure of response generalization. Although the generalization programming condition demonstrated higher

adjusted mean scores in comparison to the other two groups, group differences were only statistically significant when comparing performance of the generalization programming and practice-only conditions. There was not a statistically significant difference in performance between the generalization programming and performance feedback conditions.

There are a couple of possible explanations for these outcomes. First, it is important to consider the fact that the study was implemented class-wide, in a group setting. Because of this, the flow of the intervention could not be individualized to match the students' respective skill levels with the Instructional Hierarchy (Haring & Eaton, 1978). Therefore, the sequence in which generalization programming tactics were implemented was predetermined based on an estimated length of time that would be necessary for students to build skills (i.e., fluency, generalization, adaptation). Review of the instructional level data support this contention, wherein over half of the students assigned to the generalization programming condition continued to perform at a frustrational level during the final intervention session.

Second, these results are similar to those from previous studies, which show the added utility of explicit generalization programming in addition to increases in fluency (Duhon et al., 2010; Mesmer, 2010), and to a previous study that did not find statistically significant differences between intervention conditions, yet observed higher mean scores for the treatment condition that included multiple exemplars (Silber & Martens, 2010). It is possible that response generalization probes were more difficult than the regular CBM-WE probes and suppressed students' writing fluency. It is also possible that given the relatively brief exposure to the response generalization programming (i.e., three sessions) was not sufficient to produce generalized responding. Future research studies should examine the benefit of implementing the intervention over a longer span of time, such that students are first provided with the

performance feedback intervention to increase their writing fluency, and then exposed to the stimulus and response generalization programming tactics.

Although the results of the present study did not find statistically significant differences in performance between the generalization programming and performance feedback conditions, these results provide some initial insights regarding the timing of generalization programming, which is important, as Haring and Eaton (1978) described uncertainty regarding when these tactics should be incorporated into an intervention. They postulated that these tactics could potentially be paired with fluency building. The results of the current study support this notion, as students who were exposed to generalization programming demonstrated increases in their performance on a measure of response generalization.

Limitations

A number of limitations were associated with the present study. First, although this study sought to assess the benefits of specifically incorporating generalization tactics while implementing a performance feedback intervention, administration of the common salient stimuli tactic (i.e., a 42 inch, stand-up cardboard pencil) was not introduced until the fourth intervention session. As a result, the extent to which this tactic was beneficial in increasing students' ability to demonstrate stimulus generalization is unclear. Second, the expository writing probes that were used to program and assess response generalization may not fit the conventional definition of expository writing, which typically requires students to first research a topic before completing a written product. Third, although the aim of the study was to add to the existing literature regarding the utility of providing performance feedback to general education students, the population in the current study was third-grade students from an urban school setting, which included a large percentage of students who were eligible for free or reduced-price lunch. As a result, the results of the present study cannot be generalized to other grades or to other student

populations from differing socio-economic backgrounds. Fourth, because several intervention components were included in the present study, the results are specific to the combined grouping of generalization programming tactics, rather than an individual tactic. Additionally, the stimulus generalization measure may have been developmentally inappropriate for the students participating in the study, given that students were required to independently read the writing prompts and students' reading skills were not assessed. Finally, although the performance feedback intervention has been demonstrated as effective for general education students in urban school settings, it is unclear how the intervention would affect students determined ineligible for the current study (e.g., English Language Learners, students receiving special education programming).

Directions for Future Research

Previous researchers have demonstrated that there is often a small amount of instructional time that is designated to the area of writing (Cutler & Graham, 2008; Graham et al., 2003), which is disheartening, given that so many students are underperforming in this domain (National Center for Education Statistics, 2012). Given the importance of the development of writing fluency in early grade levels (Berninger et al., 2006), this is an important area to target with beginning writers. Additionally, Haring and Eaton (1978) described that generalization programming should occur at some point during fluency training. Results of this study demonstrated that 10 performance feedback sessions that were approximately 25 min in duration were effective in improving third-grade students' writing fluency growth, and these students outperformed students assigned to a condition receiving only writing practice, as well as students assigned to a performance feedback condition that contained generalization programming. However, the generalization programming condition demonstrated higher mean scores relative to

other sessions on measures of stimulus and response generalization. Future studies should continue to assess for an optimal point in which to commence generalization programming.

The results of the current study were curious in that students assigned to the performance feedback intervention, which did not receive explicit generalization programming tactics, demonstrated higher mean scores on measures of stimulus and response generalization relative to a session receiving writing practice alone. These results provide some support for the notion that the development of a functional fluency criterion may contribute to students' ability to demonstrate stimulus and response generalization (Duhon et al., 2010; Peterson-Brown & Burns, 2011), as the performance feedback condition demonstrated the greatest overall increases in writing fluency throughout the intervention. Future studies should examine the impact of functional fluency criterion in relation to students' writing fluency generalization and how this operates with and without the addition of explicit generalization programming.

Results of generalization assessments in the current study were such that students in the generalization programming condition outperformed students in the practice-only condition on a measure of response generalization following only three training sessions. However, they did not outperform students assigned to the performance feedback condition on a measure of response generalization, nor did they outperform either of the other conditions on a measure of stimulus generalization. It is possible that group differences would have been more substantial if the generalization programming tactics were implemented over a greater number of sessions. Evidence for increasing intervention time and exposure to generalization programming can be found in the work of larger instructional programs, such as SRSD. Several commonly used generalization programming tactics are inherent to this model (i.e., multiple stimulus and response exemplars, self-mediated verbal and covert stimuli). Thus, future research studies

examining class-wide interventions, such as performance feedback, should consider modifying some of these existing techniques. This could involve increasing the amount of exposure to generalization programming tactics.

Conclusion

Many of our nation's students are performing at or below the basic level in the area of writing (National Center for Education Statistics, 2012). Given the importance of writing for students' academic success, it is important that evidence-based interventions target this area. Individualized performance feedback has been found effective for increasing students' writing fluency (Eckert et al., 2006), however, few studies have examined the generalization of students' writing fluency gains. This is an important area to address because the ability to generalize gains is often an expectation of intervention studies, but is not typically programmed or assessed (Stokes & Osnes, 1989). This remains true despite researchers having asserting the importance of generalization programming since the early 1960s (Osnes & Lieblein, 2003; Stokes & Baer, 1977).

Currently, no previous research studies examining performance feedback in writing have explicitly programmed and assessed stimulus and response generalization. Even more generally, few academic intervention studies targeting literacy have explicitly programmed and assessed generalization (Ardoin et al., 2007; 2008; Duhon et al., 2010; Graham et al., 2005; Jackson, 1995; Mesmer et al., 2010; Silber & Martens, 2010). The current study sought to extend upon previous studies that have incorporated performance feedback and to incorporate strategies to explicitly program generalization. Results of the study showed that students who received generalization programming demonstrated stronger performance on a measure of response generalization; however, stimulus generalization results were not statistically significant.

Additionally, students who received individualized performance feedback demonstrated stronger growth in writing fluency over time than individuals who received writing practice alone. Future research studies should continue to examine the effectiveness of incorporating multiple exemplars into a performance feedback intervention targeting both fluency and generalization in the area of writing.

Table 1

Studies Examining the Validity and Reliability of Curriculum-Based Measurement in Written Expression

Study	Grade Level	Metric	Criterion Measure	Validity Coefficient	Reliability Type	Reliability Measure
Deno, Mirkin, & Marston (1980)	3 to 6	TWW CSW	TOWL	.41 - .82 .45 - .88		
Marston & Deno (1981) – Study 1	1 to 6	TWW CSW			Parallel Forms	.95 .95
Marston & Deno (1981) – Study 2	1 to 6	TWW CSW			Split Half	.99 .96
Videen, Deno, & Marston (1982)	3to 6	CWS	DSS TOWL Holistic rating	.49 .69 .85	Interscorer	.90
Tindal, Germann, & Deno (1983)	4	TWW			Parallel Form	.70
Shinn, Ysseldyke, Deno, & Tindal (1982)	1 to 5	TWW			Parallel Form	.51 - .71
Fuchs, Deno, & Marston (1982)	3 to 6	CSW			Parallel Form	.55 - .89
Marston, Deno, & Tindal (1983)	3 to 6	TWW CSW			Interscorer	.96 .91
Tindal, Martson, & Deno (1983)	1 to 6	TWW CSW			Parallel Form	.73 .72

Study	Grade Level	Metric	Criterion Measure	Validity Coefficient	Reliability Type	Reliability Measure
Tindal & Parker (1991)	3 to 5	TWW	Stanford	.18 - .25		
		CSW		.22 - .30		
		CWS		.31 - .41		
Parker, Tindal, & Hasbrouk (1991)	2 to 5	TWW	Holistic rating	.36 - .49		
		CSW		.43 - .64		
		CWS		.58 - .61		
Gansle, Noell, VanDerHeyden, Naquin, & Slider (2002)	3 to 4	TWW	Teacher Ratings	.08	Parallel Form & Interscorer	.62 - .96
		CSW		.21		.53 - .95
		CWS		.36		.46 - .86
Gansle, Noell, VanDerHeyden, Slider, Hoffpauir et al. (2004)	3 to 4	TWW	WJ-R Writing Samples	.23		
		CWS		.36		
Malecki & Jewell (2003)	1 to 8	TWW			Interscorer	.99
		CSW				.99
		CWS				.98

Note. TWW = Total Words Written, CSW = Correctly Spelled Words, CWS = Correct Writing Sequence

Table 2

Descriptive Statistics for Procedural Integrity Assessments

	Sessions Assessed			Percentage of Steps Completed		
Phase/Condition	%	(n)	(N)	*M*	*(SD)*	Range
Baseline	56.25	(18)	(32)	100.00	(0)	N/A
Practice-Only	62.50	(10)	(16)	100.00	(0)	N/A
Performance Feedback	31.25	(5)	(16)	100.00	(0)	N/A
Generalization Programming	37.50	(6)	(16)	98.09	(1.9)	95.65-100
Stimulus Generalization Assessment	100.00	(6)	(6)	100.00	(0)	N/A
Response Generalization Assessment	50.00	(3)	(6)	100.00	(0)	N/A
Overall	52.17	(48)	(92)	99.68	(1)	95.65-100

Notes: Baseline procedural integrity assessment contained between 4 and 13 steps. Practice-only procedural integrity assessment contained 19 steps; performance feedback procedural integrity assessment contained 22 steps; generalization programming procedural integrity contained 23 steps; both stimulus and response generalization integrity assessments contained between 19 and 20 steps.

Table 3

Student Demographic Information (*N* = 116)

			Condition							
	Total Sample		Practice-Only		Performance Feedback		Generalization Programming			
Characteristics	%	(n)	%	(n)	%	(n)	%	(n)	X^2	*p*
Sex									1.08	.58
Male	45.70	(53)	46.20	(18)	39.50	(15)	51.30	(20)		
Female	54.30	(63)	53.80	(21)	60.50	(23)	48.70	(19)		
Race									5.68	.45
American Indian or Alaska Native	0.90	(1)	2.60	(1)	0.00	(0)	0.00	(0)		
Asian	0.90	(1)	2.60	(1)	0.00	(0)	0.00	(0)		
Black or African American	67.20	(78)	69.20	(27)	60.50	(23)	71.80	(28)		
White	31.00	(36)	25.60	(10)	39.50	(15)	28.20	(11)		
Ethnicity									12.30	.58
Hispanic or Latino	0.90	(1)	0.00	(0)	2.60	(1)	0.00	(0)		
Not Hispanic or Latino	86.20	(100)	87.20	(34)	84.20	(32)	87.20	(34)		
Somali	6.90	(8)	5.10	(2)	7.90	(3)	7.70	(3)		
Arab	2.60	(3)	0.00	(0)	2.60	(1)	5.10	(2)		
Hutu	0.90	(1)	2.60	(1)	0.00	(0)	0.00	(0)		
Krgrgyz	0.90	(1)	0.00	(0)	2.60	(1)	0.00	(0)		
Maithili	0.90	(1)	2.60	(1)	0.00	(0)	0.00	(0)		
Other	0.90	(1)	2.60	(1)	0.00	(0)	0.00	(0)		
Special Education Eligibility	7.80	(9)	5.10	(2)	10.50	(4)	7.70	(3)	.78	.67
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	F	*p*
Age	8.33	.54	8.41	.67	8.34	.48	8.23	.42	1.14	.33

Table 4

Means and Standard Deviations for Each Condition Across Baseline and Intervention Sessions

	Practice-Only		Performance Feedback		Generalization Programming	
Session	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Baseline	19.28	(10.12)	17.95	(7.87)	19.10	(8.93)
1	21.00	(10.92)	22.21	(9.78)	21.63	(11.03)
2	31.29	(13.73)	31.07	(11.54)	26.94	(13.36)
3	24.46	(12.37)	27.91	(13.03)	28.86	(12.63)
4	26.18	(15.12)	33.53	(13.50)	29.77	(12.72)
5	21.41	(13.64)	33.26	(14.50)	30.76	(14.18)
6	--		--		--	
7	24.00	(14.78)	30.67	(16.48)	25.46	(14.62)
8	26.77	(13.88)	32.97	(14.14)	31.84	(12.12)
9	25.17	(13.40)	31.84	(12.12)	27.89	(15.07)
10	--		--		--	

Notes. Baseline scores are CWS from the initial CBM-WE probe.

Table 5

Students' Average Scores on Initial Measures of Writing Performance

	Practice-Only		Performance Feedback		Generalization Programming			
Measure	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*df*	F
CBM-WE	19.28	(10.12)	17.95	(7.87)	19.10	(8.93)	2	.24
Stimulus Generalization Probe	17.22	(9.54)	17.22	(9.88)	17.42	(11.07)	2	.00
Response Generalization Probe	22.58	(10.99)	19.92	(9.37)	19.14	(11.32)	2	1.04
WIAT	105.36	(12.23)	106.83	(8.59)	104.15	(6.86)	2	.31
Paragraph Copying Task	99.62	(16.62)	99.47	(15.24)	102.56	(15.92)	2	.46

Note. Curriculum-Based Measurement in Written Expression, as measured by number or correct writing sequences. Standard score on the Wechsler Individual Achievement Test – Third Edition with $M = 100$ and $SD = 15$. Measured by number of correctly copied words.

*$p < .05$.

Table 6

Adjusted Means, Standard Deviations, and ANCOVA Results for Stimulus and Response Generalization Measures

	Practice-Only		Performance Feedback		Generalization Programming		ANCOVA Outcomes	
	M	(SD)	M	(SD)	M	(SD)	F	partial n^2
Measure								
Stimulus Generalization								
							(2,88) .02	.02
Baseline	24.67	(12.17)	26.29	(15.18)	27.06	(13.09)		
Post-Intervention	24.38	(12.89)	26.29	(15.19)	27.97	(13.02)		
Response Generalization								
							(2, 96) 3.82	.07
Baseline	24.79	(11.89)	26.56	(13.31)	30.89	(17.67)		
Post-Intervention	25.10	(11.67)	26.56	(13.32)	32.00	(17.44)		

Table 7

Changes in Instructional Level

	Practice-Only Condition			
	Baseline		Post-Assessment	
Instructional Level	%	(*n*)	%	(*n*)
Frustrational	76.70	(23)	46.70	(14)
Instructional	10.00	(3)	3.30	(1)
Mastery	13.30	(4)	50.00	(15)

	Performance Feedback Condition			
	Baseline		Post-Assessment	
Instructional Level	%	(*n*)	%	(*n*)
Frustrational	82.10	(23)	42.90	(12)
Instructional	3.60	(1)	10.70	(3)
Mastery	14.30	(4)	46.40	(13)

	Generalization Programming Condition			
	Baseline		Post-Assessment	
Instructional Level	%	(*n*)	%	(*n*)
Frustrational	81.30	(26)	56.30	(18)
Instructional	6.30	(2)	12.50	(4)
Mastery	12.50	(4)	31.30	(10)

	Total Sample			
	Baseline		Post-Assessment	
Instructional Level	%	(*n*)	%	(*n*)
Frustrational	80.00	(72)	48.90	(44)
Instructional	6.70	(6)	8.90	(8)
Mastery	13.30	(12)	42.20	(38)

Note: Frustrational level = 36 or fewer words written per 3 minutes. Instructional level = 37 to 40 words written per three minutes. Mastery level = 41 or more words written per 3 minutes.

Table 8

Students' Acceptability Ratings

	Practice Only		Performance Feedback		Generalization Programming	
Questions provided to all three conditions	M	(SD)	M	(SD)	M	(SD)
How much do you like writing stories with us each week?	3.56	(1.66)	4.11	(1.50)	3.70	(1.60)
How much do you like being told what to write about?	2.87	(1.54)	3.22	(1.75)	3.35	(1.66)
Were there times when you didn't want to write with us?	3.40	(1.56)	3.48	(1.57)	3.87	(1.43)
Were there times when you wished you could work more on writing stories with us?	3.37	(1.66)	3.47	(1.76)	3.69	(1.77)
Do you think your writing has improved?	4.35	(1.11)	4.54	(1.01)	4.11	(1.32)
Do you think your writing has gotten worse?	4.48	(1.06)	4.40	(1.16)	4.38	(1.12)
Questions provided only to intervention conditions						
How much do you like being told how many words you wrote?	--	--	4.30	(1.32)	4.26	(1.35)
How much do you think it helps when you were told how many words you wrote?	--	--	4.22	(1.26)	4.17	(1.26)
Overall acceptability	3.66	(0.95)	3.98	(0.98)	3.97	(1.02)

Table 9

Teachers' Intervention Acceptability Ratings

Item	*M*	*(SD)*
This would be an acceptable intervention for students' writing difficulties.	4.75	(0.50)
Most teachers would find this intervention appropriate for writing difficulties in addition to the one described.	4.75	(0.50)
This intervention should prove effective in changing students' writing difficulties.	4.00	(0.81)
I would suggest the use of this intervention to other teachers.	4.75	(0.50)
The students' writing difficulties are severe enough to warrant the use of this intervention.	5.00	(0.81)
Most teachers would find this intervention suitable for the writing difficulties described.	4.75	(0.50)
I would be willing to use this intervention in my classroom.	5.00	(0.81)
This intervention would not result in negative side effects for the students.	4.75	(1.25)
This intervention would be appropriate for a variety of students.	4.75	(0.95)
This intervention is consistent with those I have used in school.	3.37	(0.47)
The intervention is a fair way to handle the students' writing difficulties.	4.62	(0.75)
This intervention is reasonable for the writing difficulties described.	4.50	(1.00)
I like the procedures used in this intervention.	5.25	(0.95)
This intervention is a good way to handle the students' writing difficulties.	4.75	(0.50)
Overall, this intervention would be beneficial for the students.	4.50	(1.00)
Overall acceptability	4.63	(0.81)

Notes. $N = 4$. Answers were based on a Likert-type scale with 1 = strongly disagree, and 6 = strongly agree

Figure 1. Hayes and Flower (1980) Model of Writing and Berninger et al. (1992) Component Processes of Writing

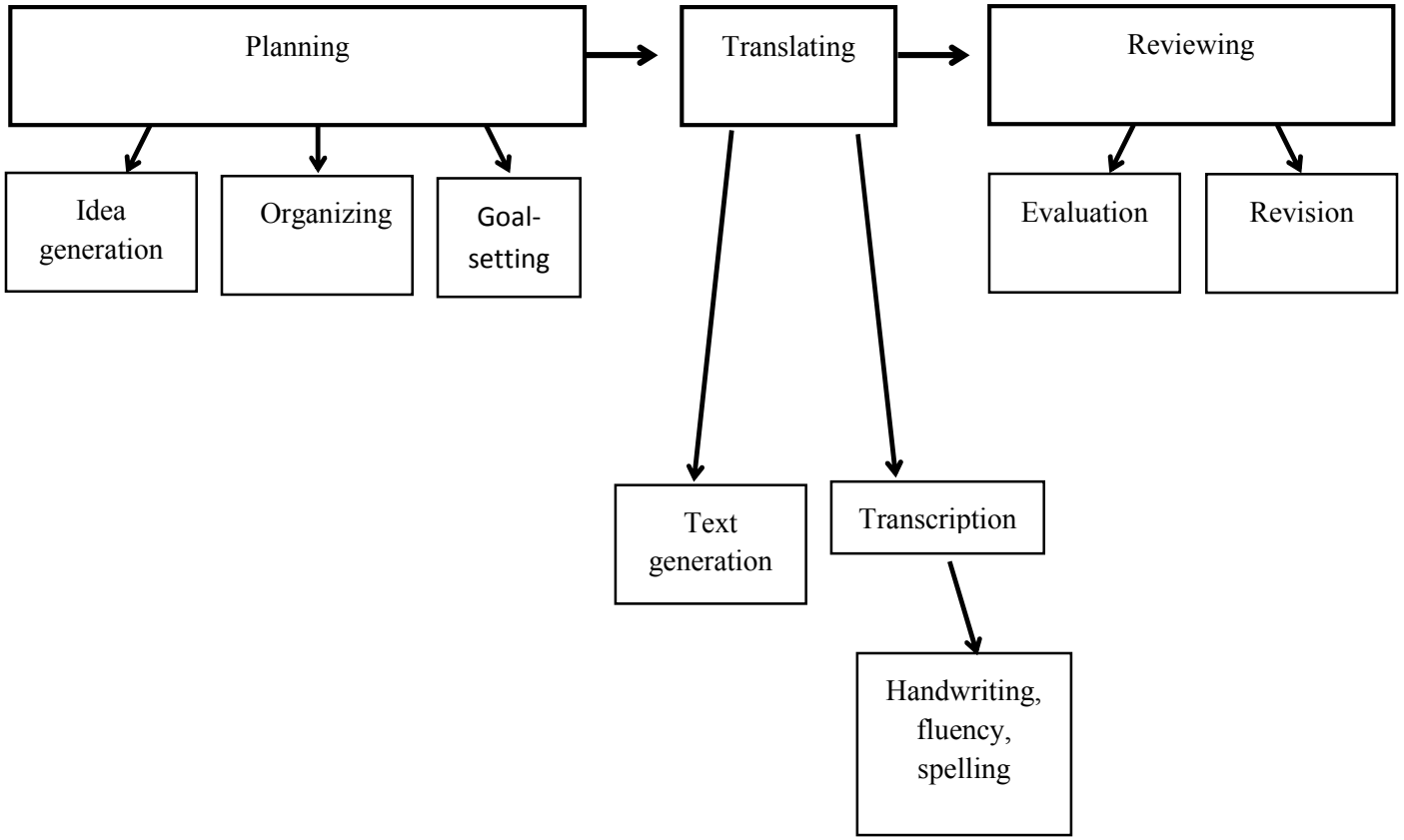


Figure 2. Description of Sessions by Condition

Session #	Practice Only Condition	Performance Feedback Condition	Generalization Programming Condition
Eligibility and Baseline Assessments			
1	CBM-WE probe	CBM-WE probe with performance feedback	
2		CBM-WE probe with performance feedback	
3			Stimulus generalization probe with performance feedback
4			
5			
6	Stimulus generalization assessment		
7	CBM-WE probe	CBM-WE probe with performance feedback	Response generalization probe with performance feedback
8			
9			
10	Response generalization assessment Acceptability assessment		

Figure 3. Particpant Flow Chart Following Consolidatd Standards of Reporting Trials Guidelines

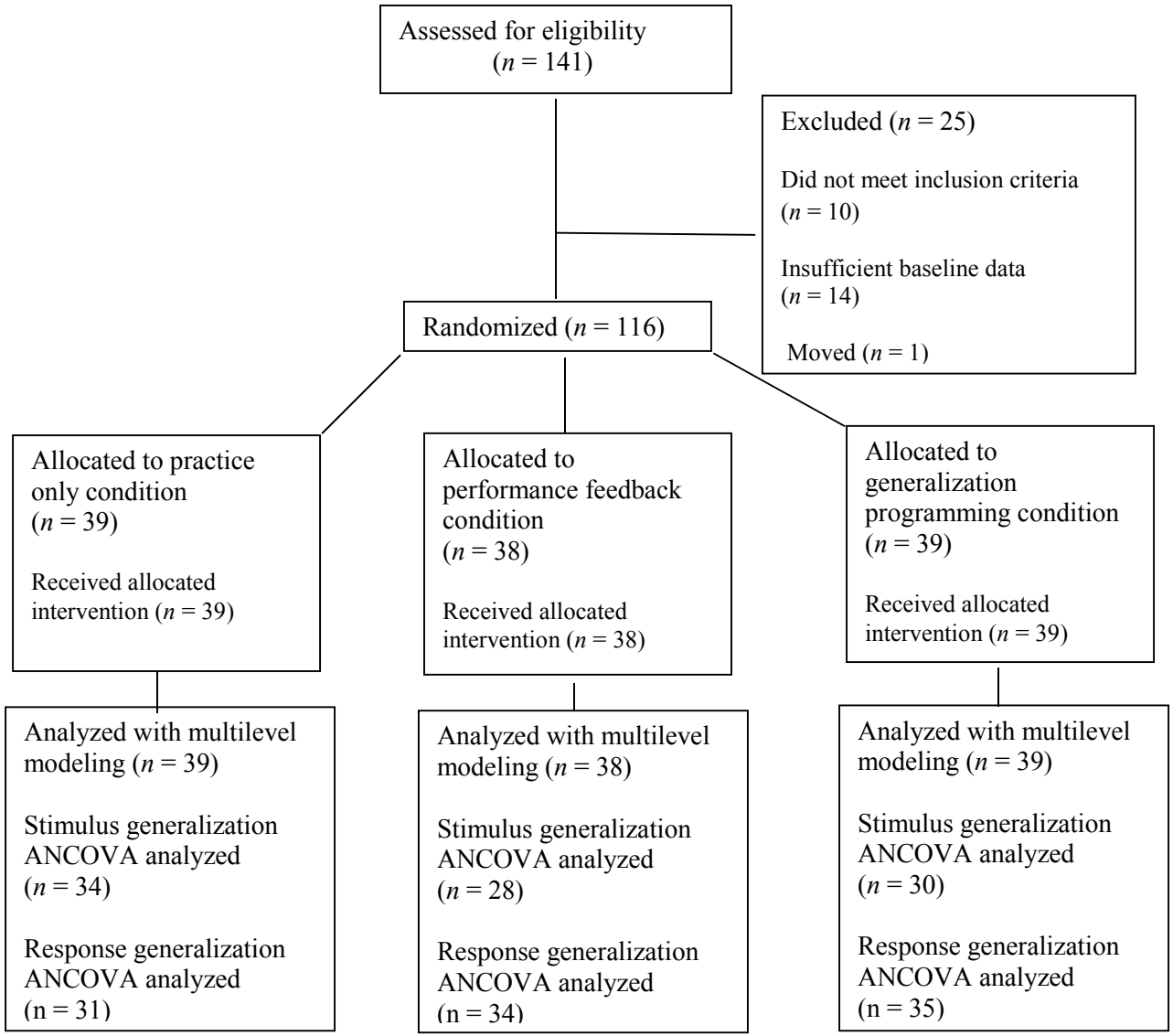


Figure 4. Growth trajectories by condition, reflecting students' average gains of correct writing sequences.

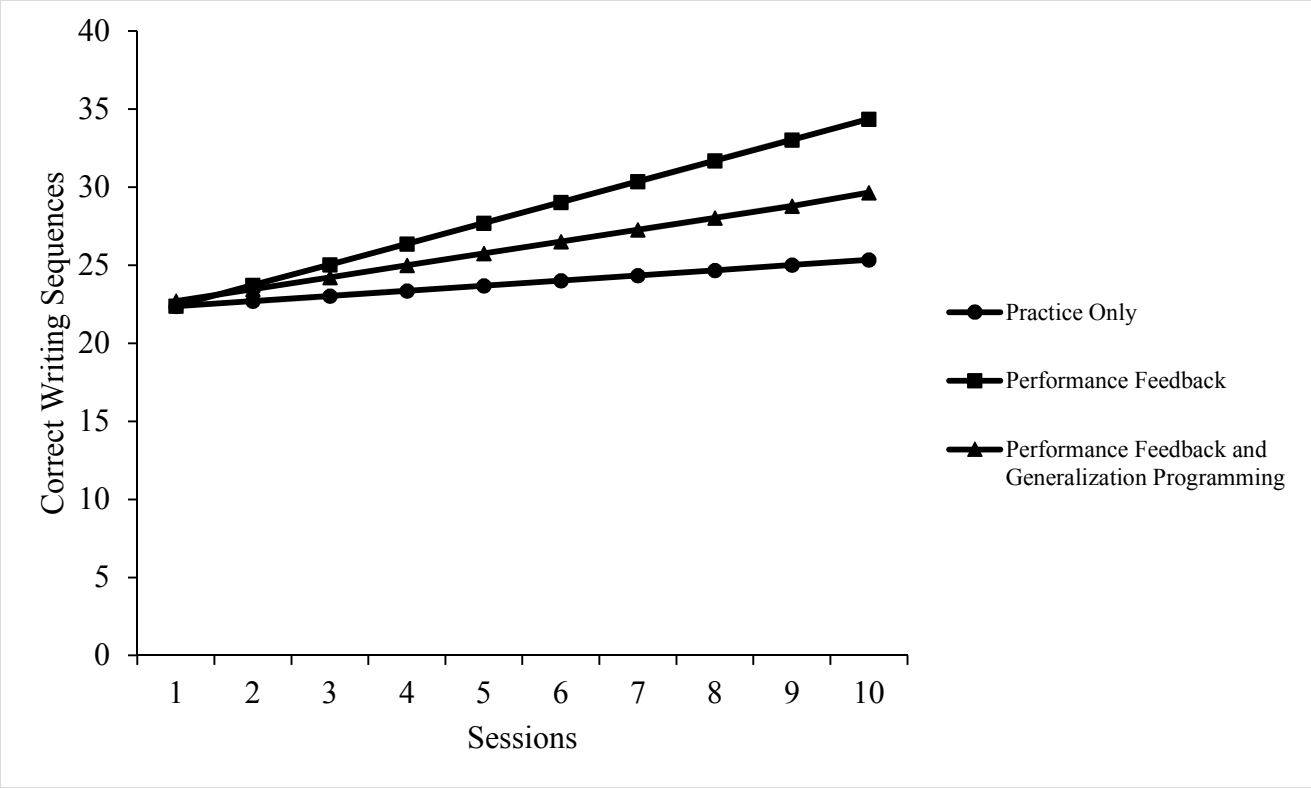
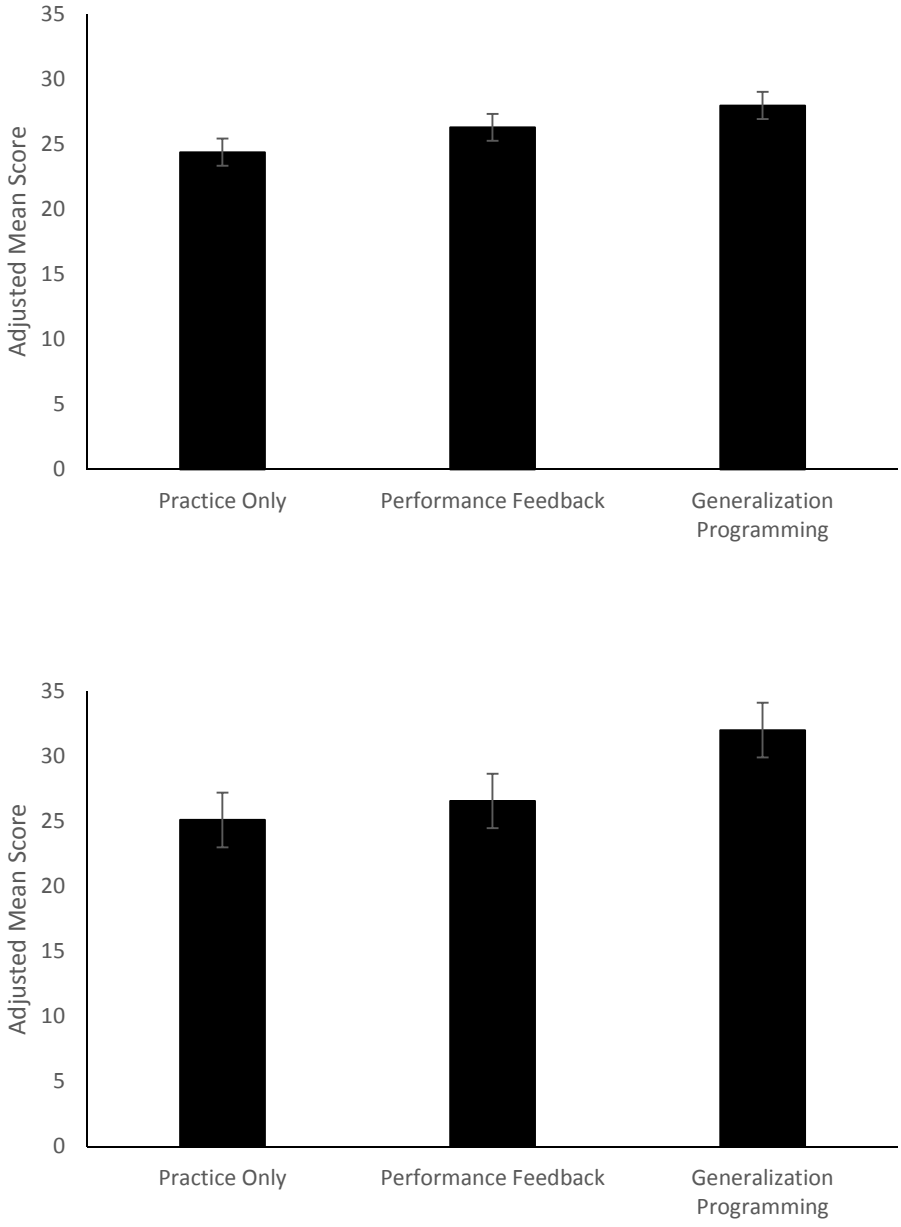


Figure 5. Top panel illustrates students' adjusted mean score by condition on the stimulus generalization assessment. Bottom panel illustrates students' adjusted mean score by condition on the response generalization assessment.



Appendix A

Parent Consent Form

SYRACUSE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES
Department of Psychology

Improving Third-Grade Children's Academic Competence in Written Expression

Principal Investigator: Dr. Tanya Eckert
Dept. of Psychology, Syracuse University
Phone: (315) 443-3141
Co-Principal Investigators: Alisa Alvis and Rigby Malandrino
Dept. of Psychology, Syracuse University
Phone: (315) 443-1050

Dear Parent or Guardian,

My name is Tanya Eckert and I am a faculty member in the department of Psychology at Syracuse University. I am working on a research study in your child's school in an attempt to better understand how to improve children's writing skills. I am trying to see how much children's writing skills improve over time and across different types of writing tasks.

Taking part in this study is completely voluntary, so you can choose to say 'yes' or 'no' to this invitation. Your decision will **NOT** affect your child's grades or your child's educational program. This consent form will explain the project to you. Please feel free to call me (315-443-3141) if you have any questions. I will be happy to answer any questions you might have.

Purpose of the Study

The purpose of this study is to determine how much children's academic skills change over time when given either: (a) weekly writing practice that involves writing brief stories that are similar; (b) weekly writing practice and feedback that involves writing brief stories that are similar; and (c) weekly writing practice and feedback that involves writing brief stories that are slightly different.

Description of Procedures

First, if you agree to allow your child to participate, we ask that you sign this form and return it to school with your child. If you choose not to have your child participate in the study, please indicate that on the form and return it to school with your child. You should feel free to call me to ask any questions you may have. Beginning in March, myself and other students from Syracuse University will be working with your child's classroom for 15 minutes per week. During those 15 minutes, some students will be practicing writing brief stories that are similar, some students will be told how they are doing in writing in addition to practicing writing brief stories that are similar, and some students will be told how they are doing in writing in addition to practicing writing brief stories that are slightly different.

Benefits of Participation

There are several benefits of your child participating in this study. Your child will get extra practice with writing stories. As a result, your child's writing skills may improve over time. In addition, you child's motivation toward writing may also improve over time.

Risks of Participation

The risks of participating in this study are minimal and are similar to the risks your child may experience on a daily basis at school. For example, your child may experience discomfort, such as becoming mildly frustrated or tired, while participating in the project. We will attempt to reduce these risks by working with you child for a small amount of time (15 minutes), and allowing all children to withdraw from the study without penalty.

Number of Participants

All of the third grade students at your child's school as well as one other elementary schools in the Syracuse City School District are being asked to participate in this study. This will result in a total of approximately 300 third grade students participating in the study.

Duration of Participation

Each week for a period of nine weeks, we will be working with your child in a group setting (20-25 students per group) for about 15 minutes.

Confidentiality of Records

Any information obtained in this study will be kept confidential. That is, the work that your child produces when working with us, will not be shared with anyone. Your child's work will be kept in a locked office at Syracuse University and only our research team will have access to it. Your child's work will not be shared with school staff. Furthermore, your child's school grades will not be based on the work he/she does while working with us. Please note that this promise of confidentiality does not apply if your child discloses (a) an intention to harm himself/herself or another person, and (b) an incident of child abuse or neglect. In the event of a disclosure, we are mandated by the state of New York to notify the appropriate agencies.

At the completion of this study we will be writing a report about the results. This report will not include any identifiable information about your child. All information in this report and the summary that is presented to your child's school will be in the form of group averages, with each group containing approximately 20-25 students.

Cost and Payment

Participation in this study does not involve any cost to you or your child. At the conclusion of the study, your child will receive a small writing journal and writing instrument for participating in the study.

Contact Persons

If you have any questions, concerns, or complaints about the research, please contact the primary investigator: Dr. Tanya Eckert at Syracuse University, 430 Huntington Hall, Syracuse, NY 13244 by telephone: (315) 443-3141 or email: taeckert@syr.edu. If you have any questions about your rights as a research participant, if you have questions, concerns, or complaints that you wish to address to someone other than the investigator, or if you cannot reach the investigator, please contact the Syracuse University Institutional Review Board at 315-443-3013 or 116 Bowne Hall, Syracuse, NY 13244.

Voluntary Participation

Your child's participation in this study is voluntary. You are free to choose not to have your child's work included in this study. You may also withdraw your child from the study at any time, for whatever reason, without risk to your child's school grades or relationship with the school. In the event that you do not give consent or withdraw consent, your child's work will be kept in a confidential manner. You can also discontinue your child's participation in this study at any time by contacting us or your child's teacher. Furthermore, if you choose not to have your child participate in this study, your child's teacher will choose an educationally relevant activity for your child during the time your child's classmates are participating in our study. By signing this consent form, you give permission to allow your child to participate in the study.

PARENT CONSENT FORM

Improving Third-Grade Children's Academic Competence in Written Expression

I, _____ give my consent for my child, _____

(please print your name) (print child's name)

to participate in this project.

_____ _____

Parent/Guardian signature Date

OR

I, _____do **NOT** give my consent for my child, _____

(please print your name) (print child's name)

to participate in this project.

_____ _____

Parent/Guardian signature Date

Appendix B

Student Assent

Important Question

I would like to work with you each week on a research project that is looking at how different types of story writing improve your writing skills.

I would be working with you for the next two months, twice a week, for about 15 minutes. You will be asked to write stories during this time.

Your parent has said that it would be okay if I worked with you on this project. However, I want to make sure that it is okay with you. If you change your mind it is okay to stop working with me at any time. Your grade at school will not be affected if you choose not to work with me.

Would it be okay if I work with you on writing each week?

Yes **No**

Name:_____

Appendix C

Handwriting Proficiency Screening Measure

Please wait for our directions.

Please print each letter that is spoken.

1.	**2.**	**3.**
4.	**5.**	**6.**
7.	**8.**	**9.**
	10.	

Appendix D

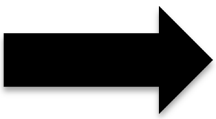
Paragraph Copying Task

A little boy lived with his father in a large
forest. Every day the father went out to cut
wood. One day the boy was walking through
the woods with a basket of lunch for his father.
Suddenly he met a huge bear. The boy was
frightened, but he threw a piece of bread and
jelly to the bear.

Appendix E

Writing Packet: Story Starter with Compositional Lines

One day when I got home from school

Keep going 

Appendix F

Baseline Writing Probes

One day, when I got home from school (CBM-WE probe)

Write about your favorite day of the week and why you like it (Response generalization probe)

One night I had a strange dream about (Stimulus generalization probe)

Intervention Writing Probes (Sessions 1-5)

One day my friend told me the strangest story (CBM-WE probe, Intervention session 1)

I was walking home when I found a $100 bill on the sidewalk and (CBM-WE probe, Intervention session 2)

One day I went to school but nobody was there except me, so I (CBM-WE and stimulus generalization probe, Intervention session 3)

I was watching TV when I heard a knock at the door and (CBM-WE and stimulus generalization probe, Intervention session 4)

I was talking to my friends when all of a sudden (CBM-WE and stimulus generalization probe, Intervention session 5)

Intervention Writing Probes (Sessions 7-9)

One day I went on a trip and (CBM-WE probe, Practice only and performance feedback conditions, Intervention session 7)

Describe the friends you have and tell why they are your friends (Response generalization probe, Generalization programming condition, Intervention session 7)

I was walking down the street when I saw (CBM-WE probe, Practice only and performance feedback conditions, Intervention session 8)

Describe your favorite time of the year and why you like it (Response generalization probe, Generalization programming condition, Intervention session 8)

It was a dark and stormy night (CBM-WE probe, Practice only and performance feedback conditions, Intervention session 9)

Describe your favorite thing to do and why you like it (Response generalization probe, Generalization programming condition, Intervention session 9)

Generalization Assessment Probes (Sessions 6 and 10)

One day I woke up and was invisible and (Stimulus generalization assessment, Session 6)

Describe a place you like to go and tell why you like to go there (Response generalization assessment, Session 10)

Appendix G

Response Generalization Probe

WRITTEN COMPOSITION

Describe the friends you have and tell why they are your friends.

The information in the box below will help you remember what you should think about when you write your composition.

REMEMBER TO –

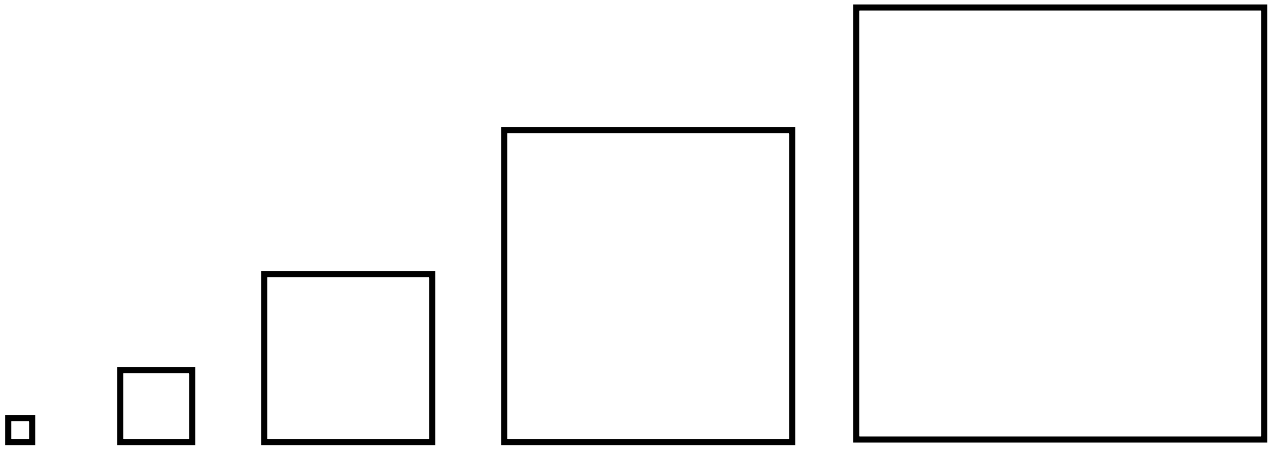
- write about the friends that you have and explain why you are friends with them
- make sure that every sentence you write helps the reader understand your composition
- include enough details to help the reader clearly understand what you are saying
- use correct spelling, capitalization, punctuation, grammar, and sentences

Appendix H

Kids Intervention Profile

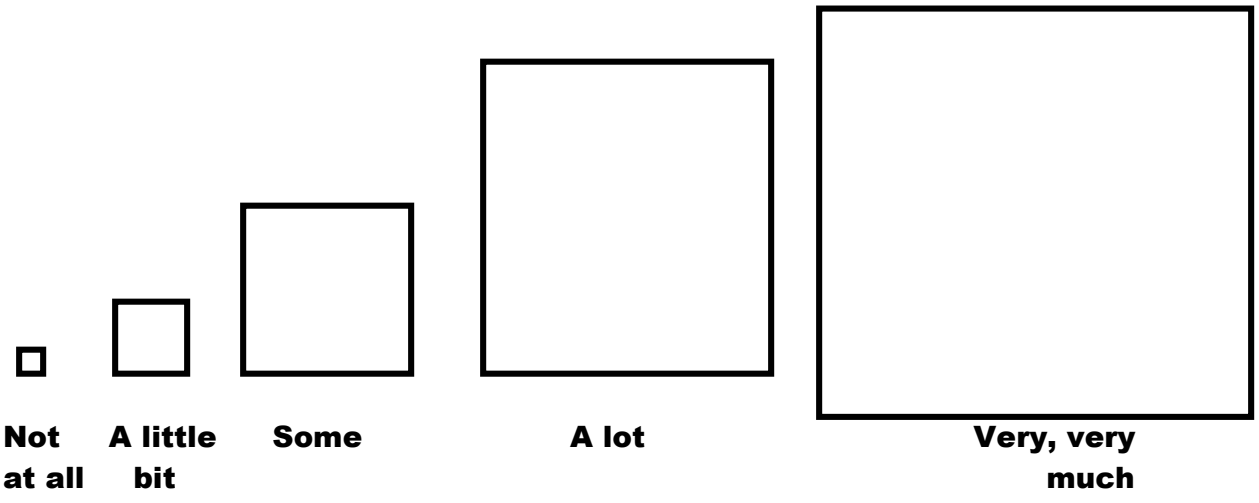
Question #1

How much do you like writing stories with us each week?



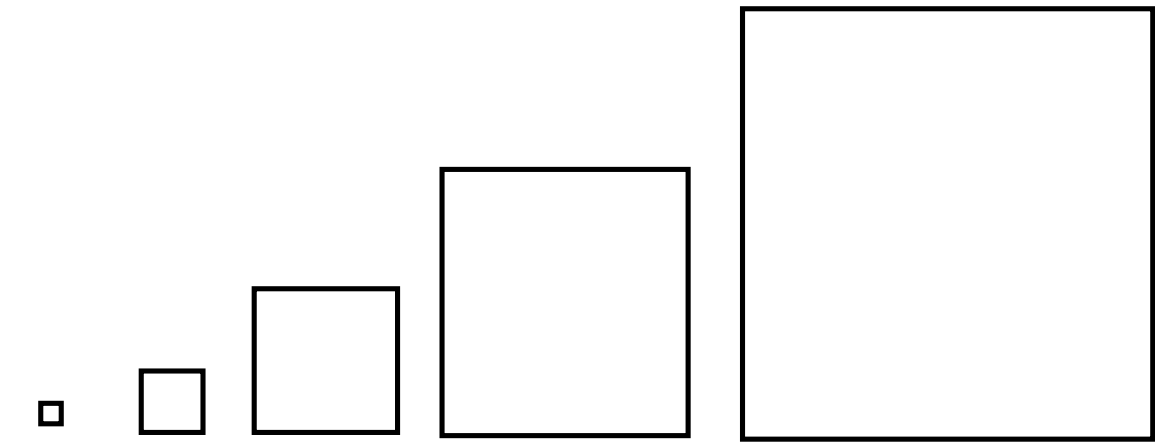
Question #2

How much do you like being told what to write about?



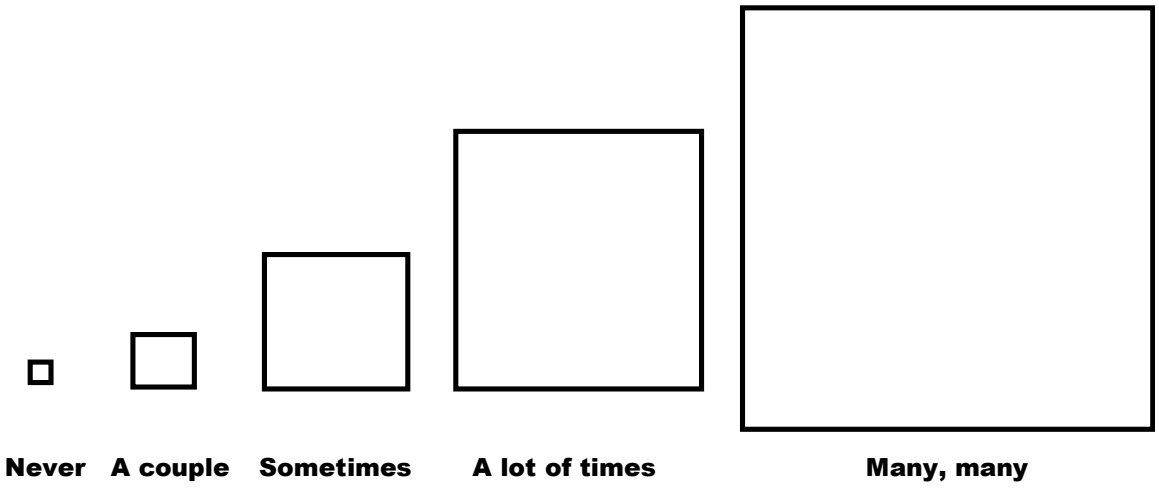
Question #3

Were there times when you didn't want to write stories with us?



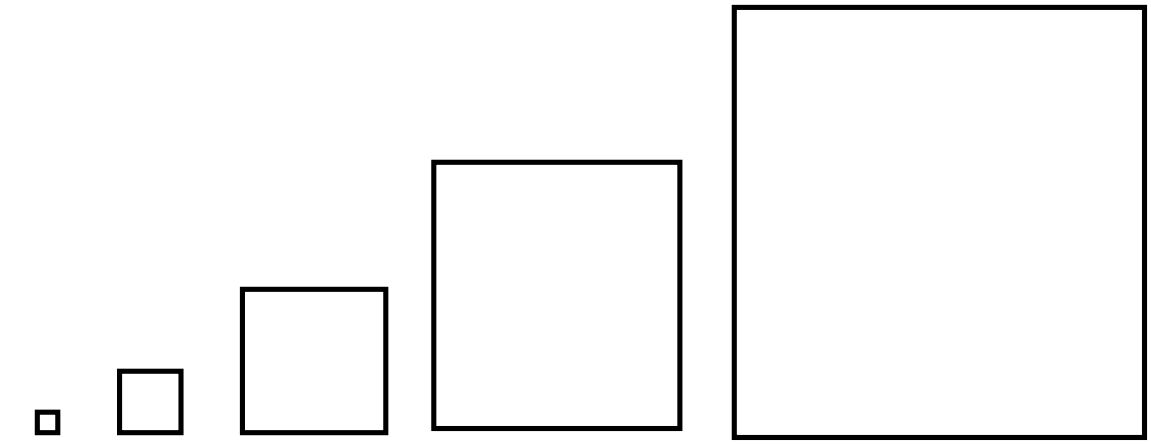
Question #4

Were there any times when you wished you could work more on writing stories with us?



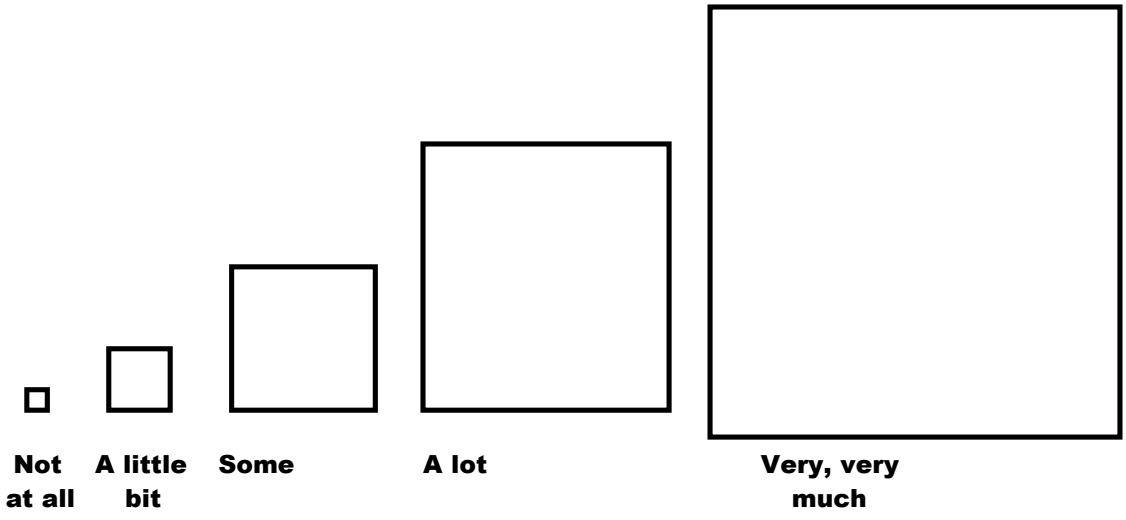
Question #5

How much do you like being told how many words you wrote?



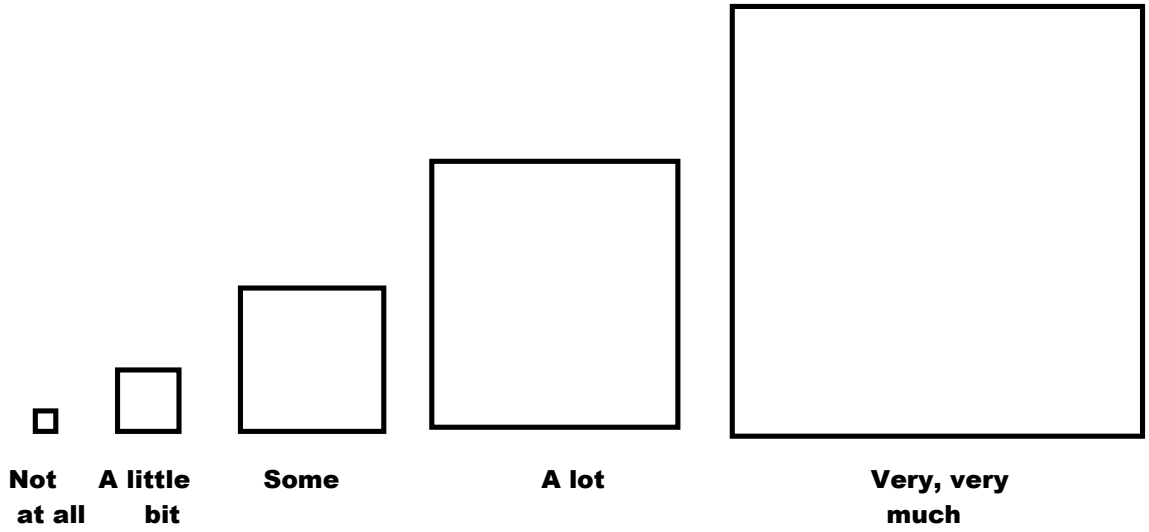
Question #6

How much do you think it helps you when you were told how many words you wrote?



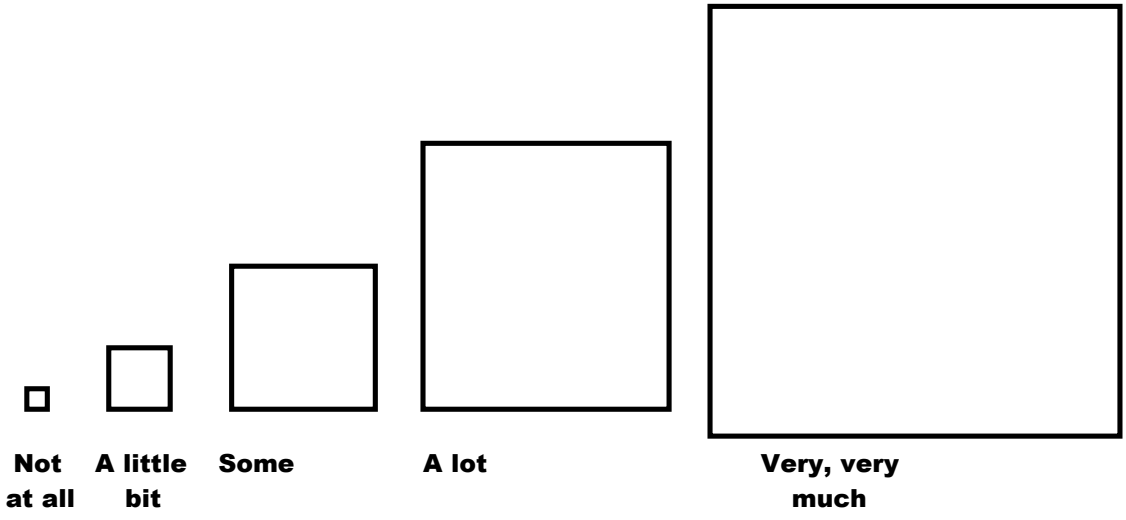
Question #7

Do you think your writing has improved?



Question #8

Do you think your writing has gotten worse?



Appendix I
Teacher Questionnaire

Teacher's name: _____ Date: _____

Directions: Please answer the following questions so we may know more about your professional and educational experiences and credentials.

1) Total number of years of teaching: _____ years
2) Total number of years at current school: _____ years
3) Teaching degree(s): _____
4) Additional certification(s): _____

Writing Instruction

The purpose of our work is to examine effective writing strategies for students in elementary school. It would be helpful if you could identify any specific writing curricula or programs that you use to develop your writing lesson plans:

_____

_____

Teaching Philosophy in Writing

In addition, we are interested in learning more about your teaching philosophy regarding written expression. Please answer the following questions:

#	Item	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	A good way to begin writing instruction is to have children copy good models of each particular type of writing.	**1**	**2**	**3**	**4**	**5**	**6**
2	Instead of regular grammar lessons, it is best to teach grammar when a specific need for it emerges in a child's writing.	**1**	**2**	**3**	**4**	**5**	**6**
3	Students need to meet frequently in small groups to react and critique each other's writing.	**1**	**2**	**3**	**4**	**5**	**6**
4	The act of composing is more important than the written work children produce.	**1**	**2**	**3**	**4**	**5**	**6**

5	Before children begin a writing task, teachers should remind them t use correct spelling.	**1**	**2**	**3**	**4**	**5**	**6**
6	With practice writing and responding to written messages, children will gradually learn the conventions of adult writing.	**1**	**2**	**3**	**4**	**5**	**6**
7	Being able to label words according to grammatical function (e.g., nouns and verbs) is useful in proficient writing.	**1**	**2**	**3**	**4**	**5**	**6**
8	It is important for children to study words in order to learn their spell	**1**	**2**	**3**	**4**	**5**	**6**
9	Formal instruction in writing is necessary to insure adequate development of all the skills used in writing.	**1**	**2**	**3**	**4**	**5**	**6**
10	Children need to practice writing letters to learn how to form them correctly.	**1**	**2**	**3**	**4**	**5**	**6**
11	Teachers should aim at producing writers who can write good compositions in one draft.	**1**	**2**	**3**	**4**	**5**	**6**
12	Before they begin a writing task, children who speak a non-standard dialect of English should be reminded to use correct English.	**1**	**2**	**3**	**4**	**5**	**6**
13	It is important to teach children strategies for planning and revising.	**1**	**2**	**3**	**4**	**5**	**6**

Instructional Practices in Writing

Next, we are interested in learning more about your instructional practices in writing. Please answer the following questions:

#	Item	Never	Several times a year	Monthly	Weekly	Several times a week	Daily	Several times a day
1	How often are specific writing strategies modeled to your students?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2	How often do you re-teach writing skills	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	and strategies?							
3	How often do you conference with students about their writing?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4	How often do students share their writing with their peers?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5	How often do students help each other with their writing?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6	How often do students select their own writing topics?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7	How often do students use invented spelling in their writing?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8	How often do you specifically teach handwriting skills?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9	How often do you specifically teach spelling skills?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10	How often do you specifically teach grammar skills?	**1**	**2**	**3**	**4**	**5**	**6**	**7**
11	How often do you specifically teach planning and revising strategies in writing?	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Instructional Time in Writing

Finally, we are interested in learning how much instructional time is allocated for different writing activities. Please estimate **how many minutes per week** students in your classroom are engaged in:

(1) Handwriting practice: _____ minutes

(2) Spelling practice: _____ minutes

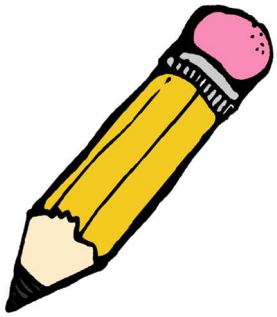
(3) Composition writing: _____ minutes

Appendix J

Writing Packet Page 1, Identification Information

Syracuse University

2013-2014 Writing Project



_____ Elementary School

3rd Grade

Name: _____

Classroom: _____

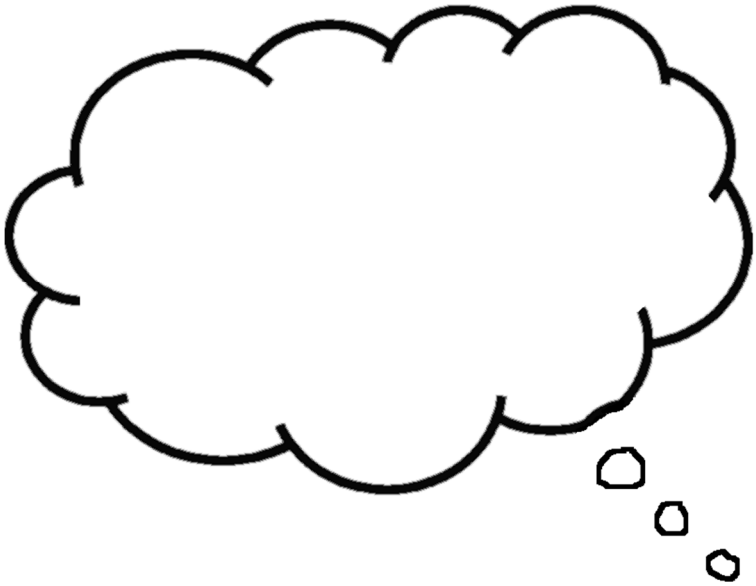
Probe # _____

Appendix K

Writing Packet: Page 2, Stop Sign

Appendix L

Writing Packet: Story Starter Page with Stop Sign



One day my mom surprised me and brought home a…

Appendix M

Procedural Script for Practice-Only Condition

Directions: Please fill out each area detailed below. Please make sure that the identifying information (box 1) is complete before you submit the form.

I.	Identifying Information		
Name of primary research assistant:			
Name of secondary research assistant:		or N/A	
School/Classroom:			
Date:			
Notes:			
II.	Data Collection – Material Preparation	Circle	
a.	Five (5) sharpened pencils	Yes	No
b.	Assessment packets	Yes	No
c.	Experimenter's copy of packet	Yes	No
d.	Two (2) stopwatches	Yes	No
e.	Insert names	Yes	No
Notes:			

III.	Data Collection Procedures [Please check [✓] each box as you complete each step]✓	
1.	State to the students: "*Hello. If you have not already done so, please clean off the top of your desk, except for a pencil. Please listen for your name as _____ and I hand out the packets. Raise your hand when we call your name.* "	
2	Both research assistants should distribute the packets. (This should be very quick and not take longer than 2-3 minutes.	
3.	After all of the packets have been distributed, State to the students:	

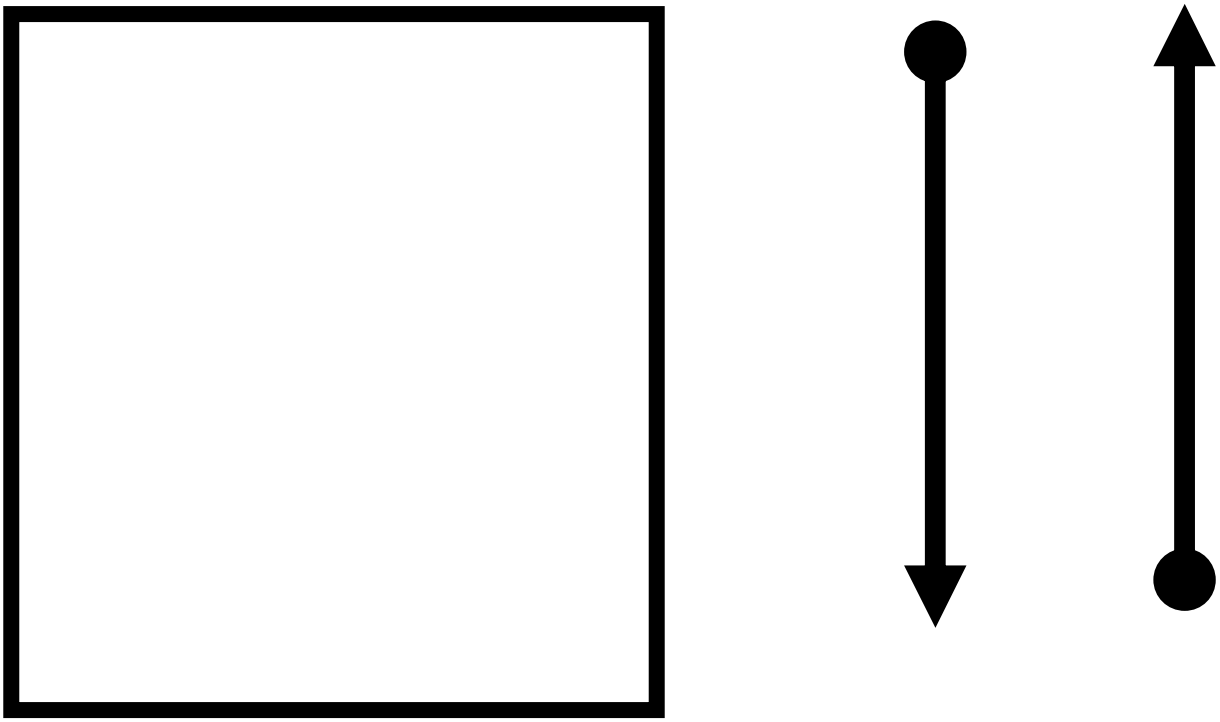
	"*Today we will be splitting into groups. Please look at your packet; you will see a color listed. Please listen for instructions as I call your group color."* *"The _____ group will be staying in this classroom to work with us. Please stay in your seats if you are in the _____ group."* *"The _____ group will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ ."* *"The _____ group will be will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ ."*	
4.	As students from other classes enter the classroom, the research assistant should direct students to sit down at the nearest desk in a systematic fashion. Do not let students talk you into letting them sit next to friends. Once the desks fill up, place any remaining students at tables in the room. The other research assistant should be standing outside the classroom holding up the sheet of paper that says the _____ group. The research assistant should assist students with quickly getting to the appropriate classroom.	
5.	Once you have confirmed that all the students from the other classrooms have arrived, state to the students: "*Welcome to the _____ group. Please turn to the page of your packet that has stop sign in the middle of the page. Today I want you to write another short story. You will have some time to think about the story you will write and then you will have some time to write it."*	
6.	The research assistant should scan the room to make sure all of the students are on the correct page.	
7.	State to the students: "*Please turn to the next page of your packet. This page has a thought bubble at the top of the page."*	
8.	State to the students: "*For the next minute think about writing a story that begins with this sentence –* <u>One day my friend told me the strangest story. . .</u> *Remember, take time to plan your story. A well-written story usually has a beginning, a middle, and end. It also has characters that have names and perform certain actions. Use paragraphs to help organize your story. Correct punctuation and capitalization will make your story easier to read.* *Please do not write the story. Just think of a story that begins with this sentence - –* <u>One day my friend told me the strangest story. . .</u>"	
9.	The research assistant should begin the stopwatch and time the students for 1 minute.	

10.	At the end of 1 minute, state to the students: "*Okay, stop thinking, turn to the next page of your packet, and raise your pencil in the air."*	
11.	State to the students: *"When I tell you to start, please begin writing your story. Remember, if you don't know how to spell a word, you should try your best and sound it out. It is important that you do your best work. If you fill up the first page, please turn to the next page and keep writing. Do not stop writing until I tell you to. Do your best work."*	
12.	State to the students: "*Okay, you can start writing.*" The research assistant should begin the stop watch and time the students for 3 minutes.	
13.	The research assistant should monitor the students during the 3-minute period and make sure students are following the directions Also monitor the students to make sure that they are not re-copying the story starter. If a student is re-copying the starter, state to the student *"you do not need to copy the words that have been provided"*	
14.	After 1 minute, 30 seconds has elapsed, state to the students: "*You should be writing about* - – <u>One day my friend told me the strangest story..</u>"	
15.	After 3 minutes has elapsed, state to the students: "*Please stop writing. That is all of the writing we are going to do today. All of you did a very nice job following my directions."*	
16.	State to the students: "*Please hand in your packets. Thank you for working with us today.*"	
17.	The research assistant should collect all of the packets.	
18.	State to the students: *All of the students in _____'s classroom, please pick up your pencil and line up to the left side of the door. All of the students in _____'s classroom, please pick up your pencil and line up to the right side of the door. All of the students in _____'s classroom, please line up in the middle.*	
19.	The research assistants should then assist the students in getting back to their classrooms quickly and quietly. Make sure that they stand very quietly **outside** of the rooms if the classroom is not yet complete with their session.	
Total number of steps completed:		

Appendix N

Feedback Page for Performance Feedback Condition

Here is how you are doing in writing:



Appendix O

Procedural Script for Individualized Performance Feedback Condition

Directions: Please fill out each area detailed below. Please make sure that the identifying information (box 1) is complete before you submit the form.

I.	Identifying Information		
Name of primary research assistant:			
Name of secondary research assistant:		or N/A	
School/Classroom:			
Date:			
Notes:			
II.	Data Collection – Material Preparation	Circle	
a.	Five (5) sharpened pencils	Yes	No
b.	Assessment packets	Yes	No
c.	Experimenter's copy of packet	Yes	No
d.	Two (2) stopwatches	Yes	No
e.	Insert names	Yes	No
Notes:			
III.	Data Collection Procedures [Please check [✓] each box as you complete each step]✓		
1.	State to the students: "*Hello. If you have not already done so, please clean off the top of your desk, except for a pencil. Please listen for your name as _____ and I hand out the packets. Raise your hand when we call your name.* "		
2	Both research assistants should distribute the packets. (This should be very quick and not take longer than 2-3 minutes.)		
3.	After all of the packets have been distributed, State to the students: "*Today we will be splitting into groups. Please look at your packet; you will see a color listed. Please listen for instructions as I call your group color.*"		

	"The _____ group will be staying in this classroom to work with us. Please stay in your seats if you are in the _____ group. *"The _____ group will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ .* *"The _____ group will be will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ .*	
4.	As students from other classes enter the classroom, the research assistant should direct students to sit down at the nearest desk in a systematic fashion. Do not let students talk you into letting them sit next to friends. Once the desks fill up, place any remaining students at tables in the room. The other research assistant should be standing outside the classroom holding up a sheet of paper that says _____ group. The research assistant should assist students with quickly getting to the appropriate classroom.	
5.	Once you have confirmed that all the students from the other classrooms have arrived, state to the students: "*Welcome to the _____ group. Please turn to the page of your packet that has stop sign in the middle of the page. Today I want you to write a story. Before we do that I want to tell you how you are doing with your writing skills. Last week we took all your stories back to SU and we counted all of the words that each of you wrote in your stories. Please turn to the next page of your packet. This page has a funnel with some numbers going into it at the top of the page.*"	
6.	The research assistant should scan the room to make sure all the students are on the correct page.	
7.	State to the students *"The box in the middle of the page* [<u>The research assistant should point to the box.</u>] *tells you how many words you wrote last week. Next to the box you will see an arrow.* *If the arrow is pointing up towards the sky, you wrote more words since the last time I worked with you.* *If the arrow is pointing down towards the floor, that means you wrote fewer words since the last time I worked with you.* *Every week when I work with you, I will tell you how you are doing with your writing."*	
8	The research assistant should monitor the students for questions.	
9.	State to the students: "*Now I want you to write another story. I am going to read a sentence to you first, and then I want you to write a story about what happens next. You will have some time to think about the story you will write and then you will have some time to write it."*	

10.	State to the students: "*Please turn to the next page of your packet. This page has a thought bubble at the top of the page.*"	
11.	State to the students: "*For the next minute think about writing a story that begins with this sentence –* <u>One day my friend told me the strangest story. . .</u> *Remember, take time to plan your story. A well-written story usually has a beginning, a middle, and end. It also has characters that have names and perform certain actions. Use paragraphs to help organize your story. Correct punctuation and capitalization will make your story easier to read.* *Please do not write the story. Just think of a story that begins with this sentence - –* <u>One day my friend told me the strangest story. . .</u>"	
12.	The research assistant should begin the stopwatch and time the students for 1 minute.	
13.	At the end of 1 minute, state to the students: "*Okay, stop thinking, turn to the next page of your packet, and raise your pencil in the air."*	
14.	State to the students: *"When I tell you to start, please begin writing your story. Remember, if you don't know how to spell a word, you should try your best and sound it out. It is important that you do your best work. If you fill up the first page, please turn to the next page and keep writing. Do not stop writing until I tell you to. Do your best work."*	
15.	State to the students: "*Okay, you can start writing.*" The research assistant should begin the stopwatch and time the students for 3 minutes.	
16.	The research assistant should monitor the students during the 3-minute period and make sure students are following the directions Also monitor the students to make sure that they are not re-copying the story starter. If a student is re-copying the starter, state to the student *"you do not need to copy the words that have been provided"*	
17.	After 1 minute, 30 seconds has elapsed, state to the students: "*You should be writing about* – <u>One day my friend told me the strangest story</u>"	
18.	After 3 minutes has elapsed, state to the students: "*That is all of the writing that we are going to do today. All of you did a very nice job following my directions.*	
19.	State to the students: "Please hand in your packets. *Thank you for working with us today.*"	
20.	The research assistant should collect all of the packets.	

21.	State to the students: *"All of the students in _____'s classroom, please pick up your pencil and line up to the left side of the door. All of the students in _____'s classroom, please pick up your pencil and line up to the right side of the door. All of the students in _____'s classroom, please line up in the middle."*	
22.	The research assistants should then assist the students in getting back to their classrooms quickly and quietly. If the other classrooms are not complete when you get there, please try to keep the students waiting quietly outside of the room.	
Total number of steps completed:		

Appendix P

Procedural Script for Stimulus Generalization Assessment

Directions: Please fill out each area detailed below. Please make sure that the identifying information (box 1) is complete before you submit the form.

I.	Identifying Information		
Name of primary research assistant:			
Name of secondary research assistant:		or N/A	
School/Classroom:			
Date:			
Notes:			
II.	Data Collection – Material Preparation	Circle	
a.	Five (5) sharpened pencils	Yes	No
b.	Assessment packets	Yes	No
c.	Experimenter's copy of packet	Yes	No
d.	Two (2) stopwatches	Yes	No
e.	Insert names	Yes	No
Notes:			

III.	Data Collection Procedures [Please check [✓] each box as you complete each step]✓	
1.	State to the students: "*Hello. If you have not already done so, please clean off the top of your desk, except for a pencil. Please listen for your name as _____ and I hand out the packets. Raise your hand when we call your name.*"	
2	Both research assistants should distribute the packets. (This should be very quick and not take longer than 2-3 minutes.	
3.	After all of the packets have been distributed, State to the students:	

	"*Today we will be splitting into groups again. Please look at your packet; you will see a color listed. Please listen for instructions as I call your group color."* *"The blue group will be staying in this classroom to work with us. Please stay in your seats if you are in the blue group."* *"The green group will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ ."* *"The red group will be will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ ."* *"If you did not receive a packet, you will be going to Mrs. _____'s classroom. Please line up."*	
4.	As students from other classes enter the classroom, the research assistant should direct students to sit down at the nearest desk in a systematic fashion. Do not let students talk you into letting them sit next to friends. Once the desks fill up, place any remaining students at tables in the room. The other research assistant should be standing outside the classroom holding up the sheet of paper that says the blue group. The research assistant should assist students with quickly getting to the appropriate classroom.	
5.	Once you have confirmed that all the students from the other classrooms have arrived, state to the students: "*Welcome to the blue group. Please turn to the page of your packet that has stop sign in the middle of the page. Today I want you to write another short story. You will have some time to think about the story you will write and then you will have some time to write it."*	
6.	The research assistant should scan the room to make sure all of the students are on the correct page.	
7.	State to the students: "*Please turn to the next page of your packet. This page has a thought bubble at the top of the page."*	
8.	State to the students: "*For the next minute think about writing a story that begins with the sentence that is listed at the top of your page."* *Remember, take time to plan your story. A well-written story usually has a beginning, a middle, and end. It also has characters that have names and perform certain actions. Use paragraphs to help organize your story. Correct punctuation and capitalization will make your story easier to read.* *Please do not write the story. Just think of a story that begins with the sentence that is listed at the top of your page."*	
9.	The research assistant should begin the stopwatch and time the students for 1 minute. After 30 seconds, say, *"You should be thinking about the story that is listed at the top of your page."*	

10.	At the end of 1 minute, state to the students: "*Okay, stop thinking, turn to the next page of your packet, and raise your pencil in the air."*	
11.	State to the students: *"When I tell you to start, please begin writing your story. Remember, if you don't know how to spell a word, you should try your best and sound it out. It is important that you do your best work. If you fill up the first page, please turn to the next page and keep writing. Do not stop writing until I tell you to. Do your best work."*	
12.	State to the students: "*Okay, you can start writing.*" The research assistant should begin the stop watch and time the students for 3 minutes.	
13.	The research assistant should monitor the students during the 3-minute period and make sure students are following the directions Also monitor the students to make sure that they are not re-copying the story starter. If a student is re-copying the starter, state to the student *"you do not need to copy the words that have been provided"*	
14.	After 1 minute, 30 seconds has elapsed, state to the students: "*You should be writing about the story that is listed at the top of your page..."*	
15.	After 3 minutes has elapsed, state to the students: "*Please stop writing. That is all of the writing we are going to do today. All of you did a very nice job following my directions."*	
16.	State to the students: "*Please hand in your packets. Thank you for working with us today.*"	
17.	The research assistant should collect all of the packets.	
18.	State to the students: *All of the students in _____'s classroom, please pick up your pencil and line up to the left side of the door. All of the students in _____'s classroom, please pick up your pencil and line up to the right side of the door. All of the students in _____'s classroom, please line up in the middle.*	
19.	The research assistants should then assist the students in getting back to their classrooms quickly and quietly. Make sure that they stand very quietly **outside** of the rooms if the classroom is not yet complete with their session.	
Total number of steps completed:		

Appendix Q

Procedural Script for Response Generalization Assessment

(Generalization Programming Condition)

Directions: Please fill out each area detailed below. Please make sure that the identifying information (box 1) is complete before you submit the form.

I.	Identifying Information		
Name of primary research assistant (general classroom teacher):			
Name of secondary research assistant:		or N/A	
School/Classroom:			
Notes:			
II.	Data Collection – Material Preparation	Circle	
a.	Five (5) sharpened pencils	Yes	No
b.	Assessment packets	Yes	No
c.	Experimenter's copy of packet	Yes	No
d.	Two (2) stopwatches	Yes	No
e.	Pencil picture	Yes	No
Notes:			
III.	Data Collection Procedures [Please check [✓] each box as you complete each step]	✓	
1.	State to the students: "*If you haven't already done so, please clear everything off of your desk except for a pencil. I will be passing around packets. When you get yours, please keep it closed and quietly wait for my instructions.*"		
2	Research assistant should distribute the packets.		
3.	After all of the packets have been distributed, state to the students: "*Today we will be splitting into groups again. Please look at your packet; you will see a color listed. Please listen for instructions as I call your group color."*		

	"The _____ group will be staying in this classroom to work with us. Please stay in your seats if you are in the _____ group. *"The _____ group will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ .* *"The _____ group will be will be going to _____'s classroom. Please line up now and show me how you walk quietly through the halls at _____ .* *"If you did not receive a packet, please line up. You will be going to Mrs. _____'s classroom."*	
4.	As students from other classes enter the classroom, the research assistant should direct students to sit down at the nearest desk in a systematic fashion. Do not let students talk you into letting them sit next to friends. Once the desks fill up, place any remaining students at tables in the room. The other research assistant should be standing outside the classroom holding up a sheet of paper that says red group. The research assistant should assist students with quickly getting to the appropriate classroom.	
5.	Once you have confirmed that all the students from the other classrooms have arrived, state to the students: *"Welcome to the red group. Please turn to the next page of your packet that has stop sign in the middle of the page. Today I want you to write a story. Before we do that I want to tell you how you are doing with your writing skills. Last week we took all your stories back to SU and we counted all of the words that each of you wrote in your stories. Please turn to the next page of your packet. This page has a funnel with some numbers going into it at the top of the page."*	
6.	The research assistant should scan the room to make sure all the students are on the correct page.	
7.	The research assistant should monitor the students for questions.	
8.	State to the students: "*Now I want you to write another story. First, you are going to read a sentence, and then I want you to write a story about what happens next. You will have some time to think about the story you will write and then you will have some time to write it."*	
9.	State to the students: "*Please turn to the next page of your packet. This page has a thought bubble at the top of the page."*	
10.	State to the students: "*For the next minute think about writing about* <u>the friends you have and tell why they are your friends.</u> " **Point to the pencil and say:** *This pencil is going to be here throughout our writing session today to help you to remember to keep writing. First, take time to plan what you are going to write. A well-written story usually has a beginning, a middle, and end. Use paragraphs to help organize your story. Correct punctuation and capitalization will make your story easier to read.*	
11.	*Please do not write the story. Just think of a story about* <u>the friends you have and tell why they are your friends.</u> Research assistant should start the stopwatch and time students for 1 minute.	

	After 30 seconds, say: *"you should be thinking about* the friends you have and tell why they are your friends." During this time, research assistant should monitor students to ensure they are following directions, and to ensure they are not writing on the composition pages with lines.	
12.	At the end of 1 minute, state to the students: *"Please put your pencils in the air and turn to the next page with lines on it."*	
13.	State to the students: *"When I tell you to start, please begin writing your story. Remember, if you don't know how to spell a word, you should try your best to sound it out. It is important that you do your best work. If you fill up the first page, please turn to the next page and keep writing. Do not stop writing until I tell you to. Do your best work."*	
14.	State to the students: *"Okay you can start writing."* The research assistants should begin the stopwatch and time the students for 3 minutes.	
15.	The research assistant should monitor the students during the 3-minute period to make sure students are following directions. Also monitor the students to make sure they are not re-copying the story starter. If a student is recopying the story starter, state to the student, *"you do not need to copy the words that have been provided."*	
16.	After 1 minute, 30 seconds have elapsed, state to the students: *"You should be writing about* the friends you have and tell why they are your friends."	
17.	After 3 minutes have elapsed, state to the students: *"That is all of the writing that we are going to do today. All of you did a very nice job following my directions."*	
18.	State to the students: "Please hand in your packets. Thank you for working with us today."	
19.	The research assistant should collect all of the packets. State to the students: *"All of the students in Mrs. _____'s classroom, please pick up your pencil and line up at the left side of the door. All of the students in Mrs. _____'s classroom, please pick up your pencil and line up at the right side of the door. All of the students in Mrs. _____'s classroom, please line up in the middle."*	
20.	The research assistants should then assist the students in getting back to their classrooms quickly and quietly. Make sure that they stand very quietly **outside** of the rooms if the classroom is not yet complete with their session.	
Total number of steps completed:		

Appendix R

Scoring Manual

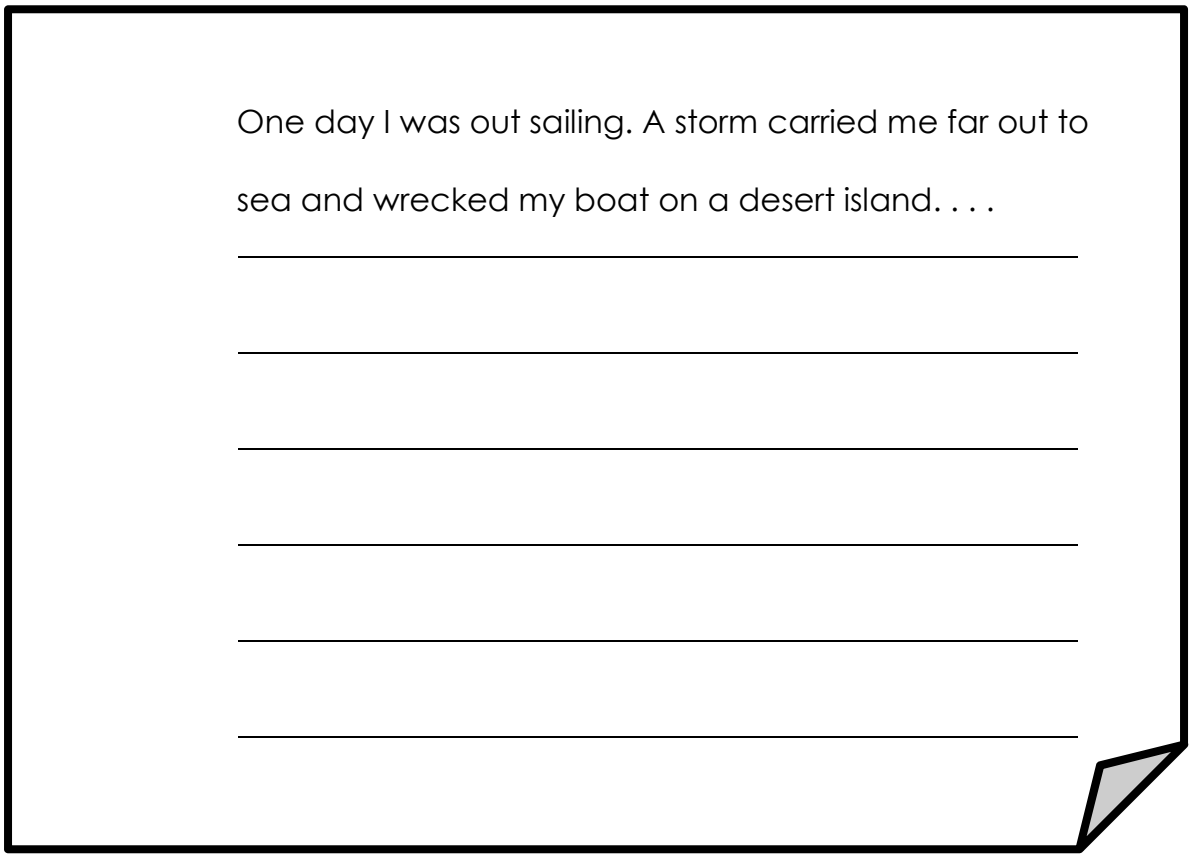
2013-2014 TRAC RESEARCH PROJECT

RA Training Manual: Administration and Scoring of Curriculum-Based Measurement in Written Expression Probes

Curriculum-Based Measurement - Introduction

Curriculum-Based Measurement (CBM) is an alternative measurement system that has been developed for assessing students' academic skills. CBM is designed to provide a reliable and direct estimate of students' skills. In addition, CBM is sensitive to measuring student growth over time. The measures collected are brief and repeatable, and generally consist of timed skill worksheets. These worksheets are often referred to as "**probes.**"

For the purposes of this project, we will be focusing on using CBM in the academic area of written expression (CBM-WE). CBM-WE emphasizes assessing basic writing fluency as the foundation upon which success in other aspects of writing are developed. To assess basic writing fluency, we will be providing students with a "**story starter**" and asking students to complete one story from the story starter during a relatively short period of time. The story stem appears at the top of a lined composition sheet. The student is instructed to think for **1 minute** about a possible story to be written from the story starter, then spends **3 minutes** writing the story. The examiner collects the writing sample for scoring. A sample CBM-WE probe appears below:



CBM-WE - Administration

Materials:

The following materials are needed for administering CBM-WE probes:

(1) the student's copy of the CBM-WE probe containing the story starter

(2) a stopwatch for the examiner

(3) a writing instrument (i.e., pencil) for the student

Administration:

The examiner distributes copies of the CBM-WE probes to all students being assessed. The examiner provides the following directions to the students:

I want you to write a story. I am going to read a sentence to you first, and then I want you to write a short story about what happens. You will have 1 minute to think about the story you will write and then have 3 minutes to write it. Do your best work. If you don't know how to spell a word, you should try your best to sound out the word. Are there any questions?

For the next minute, think about . . . [insert story starter]. The examiner starts the stopwatch.

At the end of 1 minute, the examiner says, *Start writing.*

While the students are writing, the examiner and any other adults helping with the data collection circulate around the room. If students stop writing before the 3 minute timing period has ended, the adults encourage them to continue writing.

After 3 additional minutes, the examiner says, *Stop writing. Please put your pencils down.*

CBM-WE probes are collected for scoring.

Curriculum-Based Measurement - Scoring

There are several options when scoring CBM-WE probes. Student writing samples may be scored according to the:

(1) number of total words written (TWW)

(2) number of correctly spelled words (CSW)

(3) number of writing units placed in correct sequence – correct word sequences (CWS)

(4) incorrect writing sequences (ICWS)

Scoring methods differ both in the amount of time that they require of the examiner and in the quality of the information that they provide about a student's writing skills. Advantages and limitations of each scoring system are presented below.

1 – Total Words Written (TWW):

The examiner counts and records the total number of words written during the 3-minute writing probe. Calculating total words written is the quickest of scoring methods. A drawback, however, is that it yields only a rough estimate of writing fluency – that is, how quickly the student can put words on paper – without examining the accuracy of spelling, punctuation, and other writing conventions.

Rules:

a) Any grouping of letters separated by a space is counted.
b) Misspelled words **are counted** in the tally.
c) Numbers written in numeral form (e.g., 5, 17) **are not counted**.
d) The words "The End" **are not counted**.
e) If the student rewrites the story starter, these words **are counted**.
f) **UNDERLINE** each total word written when scoring.

A CBM-WE sample scored for total words written is provided below:

```
Iwouddrinkwaterfromtheocean . . . . .   07

andIwoudeatthefruitoffof . . . . . .    08

thetrees.  ThenIwoudbilita . . . . . .  07

houseoutoftrees, andIwoud . . . . . .   07

gatherfirewoodtostaywarm.  I . . . . .  06

woudtryandfixmyboatinmy . . . . . .     08

sparetime.  . . . . . .    02
```

Using the total words scoring formula, this sample is found to contain **45 words** (including misspellings).

2 – Correctly Spelled Words (CSW):

The examiner counts up and records only those words in the writing sample that are spelled correctly. Words are considered separately, not within the context of a sentence. Assessing the number of correctly spelled words has the advantage of being quick. Also, by examining the accuracy of the student's spelling, this approach monitors to some degree a student's mastery of written language.

Rules/Considerations:

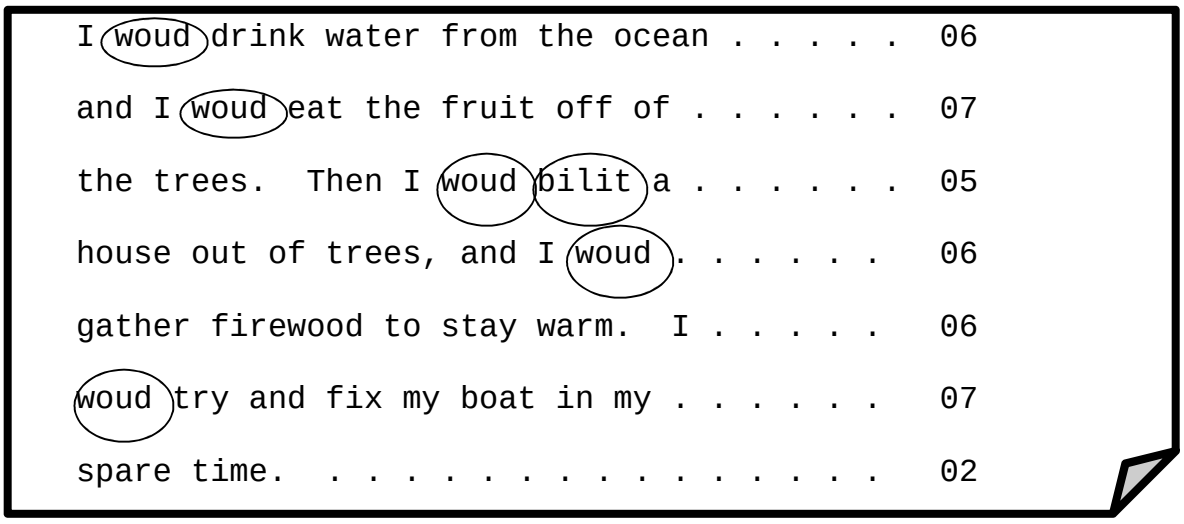
a) When scoring a word according to this approach, a good guideline is to determine whether, in isolation, the word represents a ***correctly spelled term*** in English. If it does, the word **is included** in the tally.

b) For contractions, proper use of apostrophes is ignored. For example, in the sentence, "*That isnt a red car*," 5 correctly spelled words would be recorded.

c) Assume all names of people **are correctly** spelled.

d) **CIRCLE** incorrectly spelled words.

A CBM-WE sample scored for correctly spelled words is provided below:

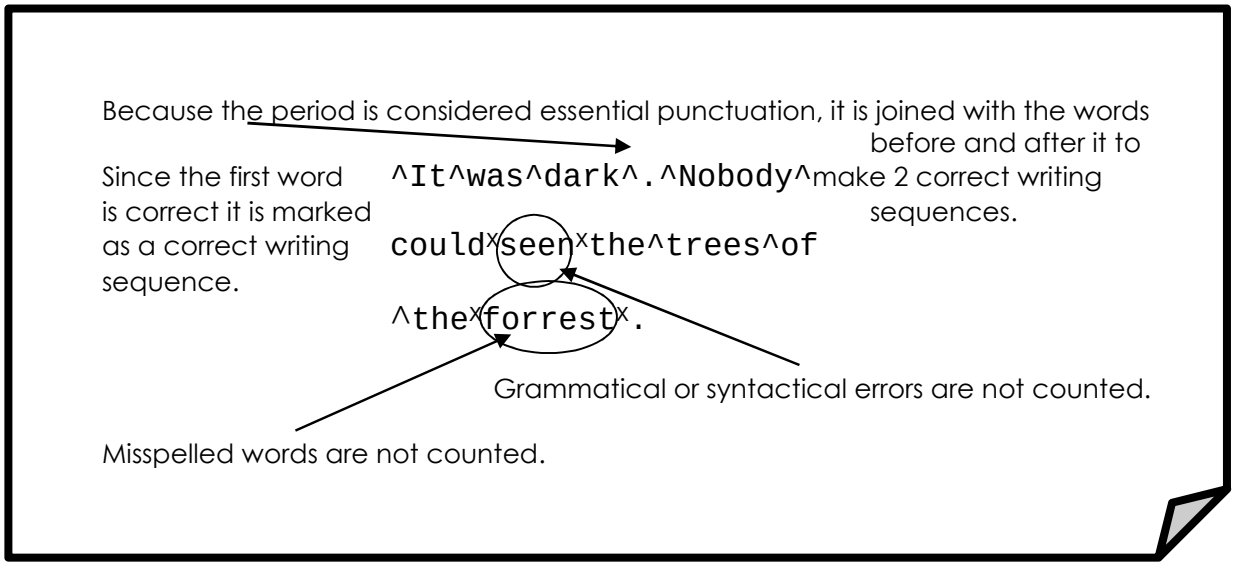


This sample is found to contain **39 correctly spelled words**.

3 – Correct Writing Sequences (CWS):

When scoring correct writing sequences, the examiner goes beyond the confines of the isolated word to consider units of writing and their relation to one another. Using this approach, the examiner starts at the beginning of the writing sample and looks at each successive pair of writing units (writing sequence). Words are considered separate writing units, as are essential marks of punctuation. To receive credit, writing sequences must be correctly spelled, and be grammatically correct. The words in each writing sequence must also make sense within the context of the sentence. In effect, the student's writing is judged according to the standards of informal standard American English. A caret (^) is used to mark the presence of a correct writing sequence.

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



3 – Correct Writing Sequences (CWS):

Rules:

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

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

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

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

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

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

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

☑ Syntactically correct words make up a correct writing sequence:

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

^Is^that^a^car^{x}red^{x}?

☑ Semantically correct words make up a correct writing sequence:

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

^Is^that^a^{x}read^{x}car^?

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

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

Capitalization Rule: Only those words that begin a sentence and the word "I" are expected to be capitalized. Do not penalize other capitalization mistakes.

Example:^Is^that^a^Red^ford^car^?

3 – Correct Writing Sequences (CWS):

Rules:

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

Example: ^The^Terrible^Rotten^Day

☑ For this measure, numerals **will be counted**.

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

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

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

^I^{X}woud^{X}drink^water^from^the^ocean 05

^and^I^{X}woud^{X}eat^the^fruit^off^of 06

^the^trees^. ^Then^I^{X}woud^{X}bilit^{X}a 05

^house^out^of^trees,^and^I^{X}woud 06

^{X}gather^firewood^to^stay^warm^.^I 06

woud^{X}try^and^fix^my^boat^in^my 06

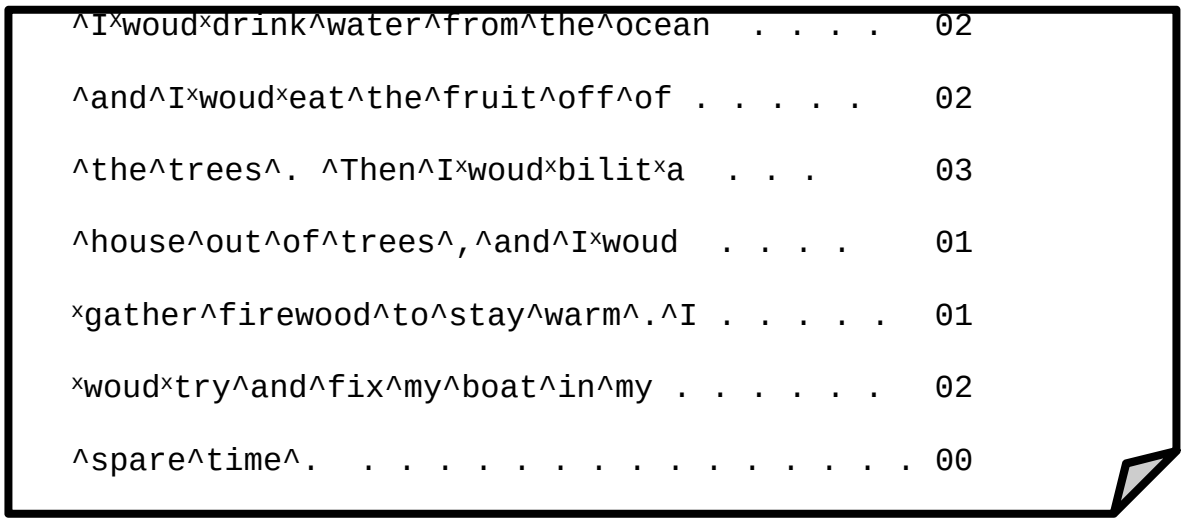
^spare^time^. 03

This sample is found to contain **37 correct writing sequences**.

4 –Incorrect Writing Sequences (ICWS):

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

Here is the same sample with the incorrect writing sequences marked as well:



This sample contains **10 incorrect writing sequences**.

By adding the number of correct writing sequences (i.e., 37) to the number of incorrect writing sequences, we know the total number of writing sequences made was 47.

GENERAL SCORING NOTES

1) Beginning sentences with conjunctions such as 'and' & 'because' is acceptable.
2) Letter reversals (i.e., writing a letter backwards) should not be penalized.
3) Words that represent sounds (e.g., mmmmm) or create new nouns or names (e.g., a new animal called a catbit) should be counted as correct.
4) If the story ends mid-sentence, this is ok, count correct writing sequences up until the last writing unit but do not count a sequence following the last writing unit.

Example: ^A^red^car

Capitalization

1. ONLY count capitalization as incorrect if capitalization is missing

    a. For the word "I"
    b. Proper names, like Jen or Florida
    c. First word of sentence

2. If you can't distinguish these letters ('c', 'w', 'm' , 'o', 's', 'u', 'v', 'z') as upper or lower case at the beginning of a sentence, mark it as correct.

3. If a word is capitalized that should not be, just continue like it's correct.

Spelling

1. If a letter is reversed, it is still considered a correctly spelled word (e.g., I bon't like writing).

Hyphens

1. Count a hyphenated word as ONE word (even if it is located in the middle of the sentence).

2. Count the hyphenated word as ONE correctly spelled word (even if it is located in the middle of the sentence).

Punctuation

1. Ignore all incorrect apostrophes.

2. Commas should be given credit when they are used correctly in a series, a date, or to set off punctuation. If used incorrectly, just ignore it.

    a. Example: `^I^like^dogs^,^cats^,^and^x^canaroos^x^.`

    b. Example: `^My^mom,^went^to^school`

Grammar

1. If a word is missing a possessive 's' mark the incorrect sequence but count the word as spelled correctly

    a. Example: `went ^ to ^ grandma ^x^ house`

2. If a verb tense is incorrect, then only count an incorrect sequence for the incorrect noun-verb combination.

    a. Example: `he ^x^ help ^ mom ^ in ^ the ^ kitchen`

Run-On Sentences

1. If the sentence is a run-on sentence, the scorer must decide where the sensible ending is located. Place a vertical line at this point.

    a. Example:^ Murray ^ takes ^ the ^ train ^ to ^ school ^{x}**|**
    ^{x} Mom ^ rides ^ the ^ bus ^ . ^

2. If a run-on sentence is connected by conjunctions, the scorer must determine where to break the sentence apart. Place a vertical line at this point. As a general rule, allow only one or two conjunctions per sentence.

    a. Example: ^ She ^ went ^ to ^ the ^ store ^ and ^ asked ^ for ^ bread ^{x}**|**^{x} and ^{x} looked ^ at ^ books ^ and ^ went ^ home ^ . ^

Spacing Issues

1. If a student separates a word like 'homework' into 'home work', follow the scoring example below:

    a. Example: ^I ^ did^ my^ home ^{x} work^

2. If a student combines 2 words into 1 word, score an ICWS on both sides of the word, for example:

    a. Example: ^There^ were ^{x} alot ^{x} of^ pencils

    b. Example: Common mistakes: a lot a few no one

Unfamiliar Names and Slang Words or Phrases

1. Children often make up names in their stories, or use unfamiliar names. In general, do not count a proper name as misspelled unless it's obvious that it is

incorrect (e.g., spelling "Sue" incorrectly or misspelling a name that was spelled differently earlier in the passage).

2. Slang words, such as ***gonna***, ***yeah***, ***kinda***, are okay in dialogue only.

3. ***Like*** in the middle of the sentence is incorrect.

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

Concluding Sentence

1. At the end of the story, the student had to stop writing mid-word. Only count this for total words for the incomplete word.

   a. Example:`^We ^ went ^ to ^ the  sc`

      TWW= 5, CSW = 4, CWS = 4, ICWS = 0

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Rigby Malandrino

Vita

Contact:
430 Huntington Hall
Syracuse, NY 13244

Education:

Syracuse University 2012-current
Department of Psychology, School Psychology Ph.D. Program

West Virginia University 2006-2010
Department of Psychology, B.A.