

EXAMINING THREE TYPES OF CORRECTIONAL FEEDBACK ABOUT ERRORS
IN MECHANICS AND GRAMMAR IN STUDENTS WITH WRITING
DIFFICULTIES IN GRADES 4-8

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Abstract

The purpose of this study was to examine the relative effects of three correctional feedback approaches focusing on mechanics and grammar on the overall writing performance of students with writing difficulties. Twenty-eight students in grades 4-8, 71% with learning disabilities and 29% with other high-incidence disabilities, who had Individualized Education Program (IEP) goals in writing, were randomly assigned to one of the three conditions: Correction Only, Correction + Write Again, and Correction + Explanation + Write Again. Participants' writing performance on the pre- and posttest was measured using three scoring procedures: correct minus incorrect word sequences, percentage of correct word sequences, and quality rating. Further examination was conducted on changes in error patterns from pre- to posttest. Findings have implications for providing one-on-one correctional feedback about errors in mechanics and grammar through writing tasks for better writing.

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CHAPTER I

Introduction

Five thousand years ago, humans started to write by impressing cuneiform signs onto clay tablets. Today, approximately five billion people can read and write, representing approximately 85% of the world's population (Swerdlow, 1999).

People use writing to express thoughts and to receive new information. Writing touches many parts of our daily lives, including politics, law, education, business, religion, art, and entertainment (Smith, 1982). Because of its importance to many aspects of living, educators concern themselves with writing skills and regard writing as a fundamental literacy skill for communication and learning.

For students, writing is a necessity that serves as one predictor of academic success (Graham & Perin, 2007). As an important tool, students use writing not only to exchange information, but also to refine knowledge and explore ideas (Santangelo, Harris, & Graham, 2007). Students use writing as a primary means of demonstrating knowledge (Graham & Harris, 2005). Students also use writing as a learning tool for reflection, discovery, and analysis (Burke, 1999; Graves, 1978).

Because of the power of writing, good writing performance influences students' academic success at school (Alber-Morgan, et al., 2007; Graham, 2005). Students who have not acquired good writing skills cannot make full use of writing to support and extend their learning (Graham, 2006). Although students should be prepared with adequate writing proficiency to facilitate their learning, students' performance in writing is not optimal in the United States.

According to the Nation's Report card, only 28% of 4th grade students, 31% of 8th grade students, and 34% of 12th grade students were at or above the Proficient level on the National Assessment of Educational Progress (NAEP) writing examination of 2002 (Persky, Daane, & Jin, 2003). Based on these statistical facts, approximately 70% of students in grades 4-12 are low-achieving writers (Center for Comprehensive School Reform and Improvement, 2007), who do not display adequate writing skills to meet classroom demands (Graham & Perin, 2007). For high school graduates in the work force, approximately 38% of them believe that their writing ability does not meet the expectations of quality (Graham & Perin).

Although the Nation's Report Card of 2007 (Salahu-Din, Persku, & Miller, 2008) recorded improvement in writing in 8th grade and 12th grade at the Basic level as compared to their performance in 2002, the improvement was minor. Moreover, there was a large gap in writing performance between students with and without disabilities. In 8th grade, the average writing score for students without disabilities was 160 whereas the average score for students with disabilities was 119, a score at the bottom of the Basic level for 8th grade. In 12th grade, the average writing score for students without disabilities was 156 whereas the average score for students with disabilities was 118, a score below the Basic level for 12th grade. According to the National Assessment of Educational Progress, the cut scores for 8th grade writing were 173 for the Proficient level and 114 for the Basic level; the cut scores for the 12th grade writing were 178 for the Proficiency level and 122 for the Basic level (Loomis & Bourque, 2001).

In Minnesota, 89% of 10th-grade students who took the Basic Skills Test in writing met the minimum standard. However, only 11% of the students who took the

test were in special education, and only 59% of the special education students who took the state standard test met the minimum standard (Davison et al., 2004). Students with learning disabilities (LD) who experience writing difficulties and students with other mild disabilities who experience writing difficulties demonstrate problems in both higher level skills (composing strategies) and lower level skills (transcription skills) (Gersten & Baker, 2001; Newcomer & Barenbaum, 1991).

The main problems that students with writing difficulties experience include (a) lack of knowledge about the goal of writing (Gersten & Baker, 2001); (b) difficulty in planning, organizing, and revising (Baker, Gersten, & Graham, 2003; Graham & Harris, 2003; Schumaker & Deshler, 2003); and (c) a lack of knowledge of grammar (Anderson, 1988). Writing requires a writer to integrate basic writing skills and cognitive skills (Anderson & Keel, 2002). Students with writing difficulties usually have difficulty integrating all of these skills into their writing (Brice, 2004).

In a hierarchy of the four language skills of listening, speaking, reading, and writing, writing is usually the last skill that students acquire because of the complexity of writing (Johnson & Myklebust, 1967). Writing is a complex process during which a writer uses multiple mental processes simultaneously (Lane, Graham, Harris, & Weisenback, 2006). According to Smith (1982), a student should employ two types of skills to accomplish a writing task: (a) composing, which includes selecting words, using grammar, and expressing ideas in an organized way, and (b) transcribing, which is accomplished with correct spelling, capitalization, punctuation, meaningful paragraphs, and legibility. These two types of skills blend together in the writing process; each of these skill types affects the other and affects the successful outcome of the written

product. A weakness in either composition or transcription can make the written product less expressive than it should be. Given the difficulty of combining such complex skills, even a good writer can, at times, find writing to be a challenging task (National Writing Project & Nagin, 2003).

Writing is governed by the rules of written language. The ability to handle these rules is essential for good writing (Poplin, Gray, Larsen, Banikowski, & Mehring, 1980; Geist, 2005). Basic writing skills include the understanding and application of both mechanics and grammar in written forms (Anderson & Keel, 2002; Bradley-Johnson & Lesiak, 1989; Brice, 2004). Mechanics refers to the correct use of capitalization and punctuation (Mandell & Mandell, 1989; Walker, Shippen, Alberto, Houchins, & Cihak, 2005). Grammar refers to the knowledge of subject-verb agreement, verb tense, and the proper use of pronouns, adjectives, and adverbs (Fallahi, Wood, Austad, & Fallahi, 2006).

Skills in mechanics and grammar are among the key elements that contribute to good writing (Smedley, 1983). Capital letters serve as a type of punctuation to indicate the beginnings of sentences and distinguish proper nouns and titles (Naeem, 2007). Punctuation marks function as the “traffic signals of language” (Truss, 2003) to demonstrate literacy by separating sentences and parts of sentences with inserted, standardized marks (Johnson & Myklebust, 1967). Grammar makes written expressions meaningful by providing grammatical structures for words and sentences (Bradley-Johnson & Lesiak, 1989; Halliday & Hasan, 1976). Accordingly, improving skills in mechanics and grammar of students with writing difficulties would lead to improvement in their overall writing skills.

This study focused on the difficulties experienced by students with special needs in the areas of basic writing skills, particularly skills in mechanics and the knowledge of grammar. Specific definitions of mechanics and grammar vary slightly depending on the focuses of the individual researchers. This study adopts the approach taken by (a) Mandell and Mandell (1989) and Walker et al. (2005) who define the mechanics of writing as capitalization and punctuation, and (b) Fallahi et al. (2006) who define grammar as subject-verb agreement, verb tense, and proper use of pronouns, adjectives, and adverbs.

Purpose of the Study

The purpose of this study was to examine the relative effects of three correctional feedback approaches on selected aspects of students' writing in mechanics and grammar. Participants were students who had goals on their Individualized Educational Programs (IEPs) in the area of writing. Three correctional feedback approaches were examined: Correction Only, Correction + Rewrite, and Correction + Explanation + Rewrite. The research question that was addressed in the study was: What are the relative effects of three correctional feedback approaches on these aspects of writing performance of students with writing difficulties in grades 4-8?

Significance of the Study

This study was conducted on the premise that students with writing difficulties would benefit from instruction designed to improve their skills in mechanics and grammar, and that such instruction would lead to improved general writing performance.

Definition of Key Terms

Grammar - the knowledge of subject-verb agreement, verb tense, and the proper use of pronouns, adjectives, and adverbs (Fallahi et al., 2006)

Mechanics – the correct use of capitalization and punctuation in writing (Mandell & Mandell, 1989; Walker et al., 2005)

Capitalization - use of capital letters at the beginning of a sentence or as the first letter of a proper noun (Fergusson & Manser, 1998)

Punctuation - use of a system of symbols such as periods, commas, question marks, and quotation marks

Word Formation - use of word forms in a language context according to linguistic rules (Strumpf & Douglas, 2004)

Word Usage - use of words so that they are in agreement with other words in the sentence (Warriner, 1988)

Verb Tense - use of the appropriate verbs to indicate the time of action (Ackles, 2003)

Correct Word Sequences (CWS) - any two adjacent, correctly spelled words that were syntactically and semantically meaningful in the written context (Videen, Deno, & Marston, 1982)

Incorrect Word Sequences (IWS) – any two adjacent words that were not correct, or if the sequence did not make sense within the context of the sample

Correct Minus Incorrect Word Sequences (CIWS) - CWS minus IWS

Percentage of correct word sequences (%CWS) – number of CWS divided by the total number of word sequences (i.e. $CWS / (CWS + IWS)$) (Parker, Tindal, & Hasbrouck, 1991)

Quality rating – a judgment regarding the relative quality of a posttest writing sample compared to that of a pretest writing sample

Correction Only condition – Students in this condition received feedback in oral and written form on their writing. Students wrote a story in response to a prompt in the first session. After the session, the researcher underlined up to five coded errors in the writing sample and wrote a correction above each underlined error. In the subsequent session, the researcher read the corrections out loud to the student. Students then wrote on a new story prompt.

Correction + Write Again condition – Students in this condition received feedback in oral and written form on their writing, after which students wrote again on the same story prompt. As with the Correction Only condition, students wrote in response to a story prompt in the first session. After the session, the researcher corrected up to five coded errors in each writing sample and wrote a correction above each underlined error. In the subsequent session, the researcher read the corrections out loud to the student. Students then wrote on the same story prompt again.

Correction + Explanation + Write Again condition – Students in this condition received feedback in written and oral form on their writing and an explanation for each correction. Students then wrote again on the same story prompt. As with the Correction + Write Again condition, students wrote in response to a story prompt in the first session. After the session, the researcher corrected up to five coded errors in each writing sample and wrote a correction above each underlined error. In the subsequent session, the researcher read each correction

out loud to the student. The researcher also provided an explanation for the error and the correction using a standardized procedure. Students then wrote on the same story prompt again.

CHAPTER II

Review of the Literature

Writing is an essential skill for success in our society. Many students with high-incidence disabilities experience writing difficulties; these occur mainly in two areas: higher-level skills (i.e. cognitive writing strategies) and lower-level skills. Lower-level skills are sometimes identified as basic writing skills. Because the writing failures of students with writing difficulties are assumed to be related to cognitive problems (Hairston, 1999; Hillocks, 1984; Simmons, Kameenui, & Darch, 1988), most research into such failures has focused on a process-centered approach to dealing with cognitive processes (Graham, 2006; National Writing Project & Nagin, 2003; Wong, Butler, Ficzer, & Kuperis, 1996). Relatively, lower-level writing skills have received very little research attention (Ferreiro & Pontecorvo, 1999). As is obvious from books about writing skills, lower-level writing skills are an important aspect of competence in written language (Greene & Petty, 1975; Noguchi, 1991; Smedley, 1983; Truss, 2003; Warriner, 1988). More research is needed in the area of improving lower-level writing skills of students with writing difficulties. This study focuses on students with writing disabilities, particularly those with high-incidence disabilities who demonstrate writing difficulties.

Writing as an Essential Skill

Writing makes communication visible across space and time, exerting a strong influence on our life (Martlew, 1983). Many work fields require writing as a job skill for business communication. The National Commission on Writing (2005) surveyed human resource directors of 49 states regarding the role of writing in state government.

Findings revealed that writing was a basic consideration for hiring and promotion because more than two thirds of the professional employees had to use writing in their work. Applicants with poor writing skills were likely to lose their chances of being hired. Employees with good writing skills had a better chance for professional promotion.

A writing process is a “meaning-making process” (Jacobs, 2002) during which students are engaged in reflecting, discovering, and analyzing ideas (Burke, 1999; Graves, 1978). Students use writing as an essential tool to learn. Through writing, students demonstrate knowledge, express opinions to readers, and receive feedback. Writing can also facilitate learning in other subject areas in addition to English because learning and articulating are inseparable activities (Knoblauch & Brannon, 1983). The writing process involves students’ sustained learning effort to search for connections between expressing newly learned knowledge and the expression form that is constrained by grammar rules, logic, and rhetoric. Based on their provision of writing instruction to high school students, Fisher and Frey (2003) found that adolescent students with reading difficulties who had been engaged in a series of structured writing activities demonstrated improved writing and reading abilities. In his book, Graves (1978) stated that printing words on paper required a student to review the sound-symbol relationships and to write sentences in various structures, which could help to improve reading comprehension.

Writing contributes to school achievement. Because of the importance of writing, many standard tests, such as the Minnesota Basic Skills Tests (BST) and the Northwest Evaluation Association test (NWEA), assess students’ writing performance

for high-stake decisions. The National Assessment of Educational Progress (NAEP) evaluates students' writing performance as one component of the evaluation process to judge school achievement (Salahu-Din, Persky, & Miller, 2008).

Good writing skills prepare students for their future careers. Many colleges consider writing proficiency as one of the basic requirements for students to pursue higher education (Giuliano & Sullivan, 2007). To make admission decisions on students who apply for graduate school, faculties tend to depend on students' writing performance on the Graduate Record Examination (GRE) General Test (Rosenfeld, Courtney, & Fowles, 2004).

Although the importance of writing cannot be overstated, the role of writing does not receive due consideration. Writing remains an undervalued area (National Commission on Writing for America's Families, Schools, and Colleges, 2005). Students who are experiencing writing difficulties are at a disadvantaged status in school.

Students with Writing Difficulties

Academic success depends on an adequate degree of writing fluency (Martlew, 1983). Many students with special needs experience severe and persistent difficulties in writing (Graham, 1990). Their problems can be categorized as (a) difficulties with higher-level writing skills (Newcomer & Barenbaum, 1991), which include planning, organizing, and revising (Baker, Gersten, & Graham, 2003; Graham & Harris, 2003; Schumaker & Deshler, 2003), and (b) difficulties with lower-level writing skills (Newcomer & Barenbaum, 1991), which include grammar (Anderson, 1982), punctuation, capitalization, and spelling (Houck & Billingsley, 1989). All of these

problems may limit their ability to respond successfully to the demands of the general education curriculum (Schumaker & Deshler, 2003).

Difficulties with higher-level writing skills. Higher-level writing skills contribute to proficient writing (Troia, 2006). Higher-level writing skills refer to skills based on the cognitive strategies used in composing (Graham & Harris, 1988; Newcomer & Barenbaum, 1991). Higher-level writing skills help students manage the entire writing process of planning, goal setting, revising, and self-monitoring (De La Paz, 1999; Graham & Harris, 2002). Students who lack higher-level skills are not able to compose their writing with a well-organized, comprehensive discussion of the topic (Santagelo, Harris, & Graham, 2007).

Students with writing difficulties experience problems with higher-level writing skills. Compared to typically developing peers, students with writing difficulties are less likely to consider the needs of readers (Englert, Raphael, Fear, & Anderson, 1988). They experience difficulties with planning, organizing, reviewing, evaluating, and revising (Graham, Schwartz, & Charles, 1993). They use fewer self-regulation strategies of planning, monitoring, and evaluation in their writing process (Garcia & Fidalgo, 2008).

Over the years, researchers have conducted many studies aimed at improving students' higher-level writing skills, with a major focus on planning, drafting, and revising (Graham, 2006; Harris & Graham, 1996). Unfortunately, students with writing difficulties usually experience problems with both higher- and lower-level writing skills (Wong et al, 1996), and fewer studies have examined improvements in lower-level writing skills.

Difficulties with lower-level writing skills. Lower-level writing skills include handwriting, spelling, punctuation, and grammar (Anderson & Keel, 2002; Bradley-Johnson & Lesiak, 1989; Brice, 2004; Smedley, 1983). Some researchers refer to lower-level skills as surface-level skills (Lin et al., 2007) or skills in convention (Nelson & Feinstein, 2007).

Students with writing difficulties often demonstrate problems in lower-level writing skills such as handwriting, spelling, mechanics, and grammar. Compared to their typically developing peers, students with learning disabilities (LD) are less well developed in handwriting and spelling (Berninge et al, 1997; Deno, Marston, & Mirkin, 1982; Poplin et al., 1980). Their problems in handwriting and spelling appeared to hinder the fluency and quality of their written expression (Graham, Harris, & Fink, 2000; MacArthur & Graham, 1987). The mechanics of writing include capitalization and punctuation (MacArthur, 1999). Students with LD produced a significantly lower percentage of correct capitalizations than their typically developing peers (Houck & Billingsley, 1989). They often omitted necessary punctuation marks or added incorrect punctuation marks (Anderson 1982). When interviewed, students with LD reported that punctuation was one of the most difficult writing elements for them to master (MacArthur & Graham, 1987). Frequent grammatical errors were noted in writing samples completed by students with writing difficulties. Students with LD scored significantly lower on measures of syntax than their typically developing peers (Anderson, 1982; Morris & Crump, 1982). They also demonstrated significantly lower skills in word usage (Poplin et al., 1980).

Not surprisingly, given their difficulties with multiple aspects of writing, students with writing difficulties tend to produce shorter and less refined compositions than their typically developing peers (Garcia & Fidalgo, 2008; Graham, Harris, MacArthur, & Schwartz, 1998; Monroe & Troia, 2006; Newcomer & Barenbaum, 1991; Nodine, Barenbaum, & Newcomer, 1985). Although writing research has tended, especially in recent years, to focus on higher-level writing skills, there has been some research aimed at improving students' lower-level writing skills.

Interventions in Lower-Level Writing Skills

A search of the literature was conducted to locate empirical studies addressing interventions in lower-level writing skills, including capitalization, punctuation, and grammar. Spelling and handwriting were not the focus of this study; thus, studies addressing spelling and handwriting were not included. Studies that targeted students from primary grade levels through college level in both regular and special education settings were selected due to limited research conducted in special education settings. Electronic databases were searched, including the Digital Dissertations, ERIC, Expanded Academic Index, and PsycINFO. Key phrases used in the search procedure included *written expression, lower-level writing skills, lower level skills, lower order skills, mechanical skills, transcription skills, conventions, basic writing components, capitalization, punctuation, syntax, teaching grammar, grammar instruction, and grammar education*. The researcher scrutinized titles and abstracts to confirm the studies that were related to writing interventions in mechanics and grammar for improving overall writing performance. To locate studies that were not stored in the electronic databases, the researcher also manually explored unpublished doctoral

dissertations, master's theses, and early studies that were conducted decades ago. Early studies were included because grammar instruction was emphasized more in the past than is so presently. The studies reviewed as a part of this literature review are listed in Table 1.

Table 1

Interventions in mechanics and grammar to improve writing quality

Study	Grade	Participant		Treatment Focus	Outcome
		Type	<i>n</i>		
Elley et al. (1976)	7-9	General ed	166	<p>Group 1: Instruction of traditional grammar and transformational grammar rules (i.e. phrase structures, sentence structures), writing practice, and reading activities.</p> <p>Group 2: Reading and creative writing.</p> <p>Group 3: Instruction of parts of speech, function of words in sentences, sentence structures.</p>	No differences in writing quality among 3 groups. Groups 1 and 3 scored higher in English usage.

Study	Grade	Participant Type	<i>n</i>	Treatment Focus	Outcome
Fearn & Farnan (2007)	10	General ed	3 classes of 24-26	Group 1: Instruction of grammar terms and rules. Group 2: Same grammar knowledge that was taught in the process of identifying function of words in sentences.	No differences in grammar knowledge between 2 groups. Group 2 showed significantly higher quality of writing than group 1.
Feng & Powers (2005)	5	General ed	19	Error correction lessons focusing on errors in sentence structure, usage, and mechanics.	Students made fewer errors in sentence structure, usage, and mechanics from pre- to posttest.
Harris (1962)	7-10	General ed	228	Group 1: Instruction of parts of speech, function of words, and using grammar rules to revise compositions.	Group 1 performed significantly better than group 2 on grammar test. Group 2 showed significantly better writing quality and made

Study	Grade	Participant Type	<i>n</i>	Treatment Focus	Outcome
				Group 2: Correcting grammar errors in compositions by means of examples and imitations.	fewer errors in writing than group 1.
Lyman (1931)	6-9	General ed	1039	Error correction on 5 compositions, with a focus on 6 error categories: capitalization, punctuation, spelling, sentences, grammar, and miscellaneous.	Number of errors reduced from pre- to posttest. Rating scores on overall writing quality improved from pre- to posttest.
Maize (1952)	College freshmen	General Ed: lower-performing students	149	Group 1: Practice of grammar drills; wrote 14 compositions. Group 2: Analyses and comments on errors in spelling, grammar, mechanics, and overall organization	Group 2 performed significantly better than group 1 in spelling, punctuation, overall organization, and logic. Group 2 gained significantly in overall writing

Study	Grade	Participant Type	<i>n</i>	Treatment Focus	Outcome
				of writing samples; wrote 42 compositions.	from pre- to posttest. No change in writing quality in group 1.
Saddler, Behforooz, & Asaro (2008)	4	LD & low performing	6	Sentence combining instruction	Improved in sentence combining from baseline to posttest; overall writing quality improved from pre- to posttest.
Saddler & Graham (2005)	4	General ed	44	Group 1: Instruction of grammar definitions and rules Group 2: Intervention of sentence combining + peer tutoring	Group 2 performed significantly better than group 1 in constructing syntactically and semantically correct sentence. Group 2 scored higher than group 1 in writing quality rating on posttest.
Suggs	11	General ed	48	Group 1: Instruction of grammar	Group 2 showed significantly

Study	Grade	Participant Type	<i>n</i>	Treatment Focus	Outcome
(1961)				definitions, rules, and sentence drills; Group 2: Intervention of writing-related grammar through making sentences with correct conjunctions, connectors, and subordinate clauses.	better writing quality than group 1 from pre- to posttest.
Vernon et al. (2005)	2	General ed, Spanish context	21	Instruction on punctuation through writing jokes and completing punctuation exercises	Students increased awareness of punctuation use.

Teaching Mechanics

Mechanics is often used to refer to the use of capitalization and punctuation. Capitalization is sometimes considered to be a type of punctuation mark used to indicate the beginning of a sentence (Naeem, 2007). Punctuation is a system used to clarify the meaning of written materials by separating sentences and parts of sentences with inserted standardized marks (Johnson & Myklebust, 1967). Punctuation marks perform the following functions: (a) they help readers separate the written language into syntactically meaningful units, (b) they help readers determine statements and questions, and (c) they add extra emphasis to what is being written (Conlin, 1961). Correct punctuation facilitates communication between authors and readers (Smedley, 1983). Incorrect punctuation makes a writer appear uneducated (Larsen, 1987). A text without punctuation is an unsegmented text, making it difficult for readers to understand (Bradley-Johnson, 1989; Ferreiro & Pontecorvo, 1999).

Greene and Petty (1975) claimed that errors in punctuation, which were the most frequent type of error in writing, persisted through all educational levels. In general, the skill of using punctuation is difficult to acquire because punctuation is not well taught in school. In spite of the social importance of punctuation in written communication, punctuation receives too little attention in education. There is general agreement among educators that punctuation should be taught for literacy (Smedley, 1983). Students should learn to use punctuation effectively and be sensitive to the need for punctuation in writing (Conlin, 1961). To learn to use punctuation correctly, students need to understand the reason for each use of punctuation marks and to practice the correct use of punctuation in their written work.

Vernon, Alvarado, and Zermeno (2005) introduced the use of punctuation to a class of twenty-one 2nd grade native Spanish speakers in Mexico. They implemented the intervention for approximately 20 hours during a two-month period, 35 to 50 minutes for each session. The procedure started with the students telling and writing a favorite joke in Spanish. The students then completed exercises focusing on the use of capital letters, periods, exclamation marks, and question marks. Afterwards, the teacher provided instruction about how to identify direct and indirect speech in the jokes. Students then gave feedback to each other in pairs and proceeded to rewrite their jokes.

The participants wrote three drafts using direct and indirect speech to describe their jokes. From the first to the third draft, the number of students who used capital letters at the beginnings of their sentences, periods at the ends of sentences, and hyphens to indicate direct speech increased from 0 to 21, and the number of students who used exclamation points or question marks increased from 0 to 18. While the number of students who used quotation marks and commas did not change, this intervention appears to have increased the children's awareness and use of some types of punctuation marks. However, the study had no control group, so no firm conclusions can be drawn regarding the causes for the children's improvements. Further, the researchers only counted the number of students who used punctuation marks of any kind in each draft. There was no descriptive and statistical information about the number of *correct* punctuation marks in students' writing drafts. It was unclear how much improvement the participants made in using correct punctuation marks from the first to the third writing draft. Finally, the study was conducted in Spanish. It is unclear to what extent results would be generalized to English.

Teaching Grammar

Grammar, as one of the essential components of language, plays an important role in writing compositions (Bradley-Johnson & Lesiak, 1989; Smedley, 1983). Meaningful sentences are constructed with grammatical structures in which all grammatical units, including clauses, phrases, and words, are placed in a cohesive order (Halliday & Hasan, 1976). To write clearly, a student should put every word and sentence in the correct place based on the conventional rules of grammar. Students' lack of grammar knowledge can result in the students writing words and sentences in the wrong order. If students have good ideas about what to write, their good ideas deserve to be expressed with grammatically correct sentences (Leahy, 2005).

At one time, instruction of traditional grammar was taken for granted as one important component for improving children's ability to write. By the late 1960s, many researchers held the opinion that the grammar that most children learned was of no value to their writing performance (Hudson, 2001). Currently, grammar teaching receives limited attention from researchers due to the prevailing belief that traditional grammar education had not raised the quality of student writing (Hillocks, 1986). One reason could be that traditional grammar instruction focused merely on the rules of grammar, which was both "inadequate to the facts of written language" (Hartwell, 1985) and disconnected from other writing tasks (Noguchi, 1991). When teachers present grammar by providing only terms and definitions, it is impossible for students to master the use of grammar (Judy & Judy, 1983).

The success of grammar instruction in improving students' writing performance depends upon the grammar content provided and the teaching method used. The reviewed

studies focusing on grammar can be grouped into grammar instruction, sentence construction, and error correction.

Research in grammar instruction. Three early studies were located that compared different methods of grammar instruction on writing performance. Suggs (1961) compared the effectiveness of traditional grammar instruction to writing-related grammar instruction on student writing progress for 13 weeks. Forty-eight 11th grade students in regular classes were assigned to a control group and an experimental group, with more higher-performing students being assigned to the control group. Students in the control group were taught traditional grammar that stressed knowledge of definitions, rules, and sentence pattern drills. Students in the experimental group learned writing-related grammar focusing on constructing correct sentences with correct conjunctions, connectors, and subordinate clauses. Pre- and posttest on the Cooperative-Sequential Tests of Educational Progress-Writing showed that writing-related grammar instruction, which was based on language use, was significantly superior to traditional grammar instruction. The mean percentile of the experimental group increased from 70% to 83%, and that of the control group from pre- to posttest increased from 61% to 64%.

The results of this study suggested that writing-related grammar instruction, rather than isolated grammar instruction, was likely to help students improve their writing performance. However, the design and the outcome of this study remain questionable. The study did not describe how the participants were assigned to the two conditions, but reported with no explanation that the control group consisted of a greater number of higher-performing students who showed lower performance on the pretest than did

students in the experimental group. Moreover, the use of percentile ranks as the data results did not reveal any information about specific aspects of students' performance.

Harris (1962) investigated the relative usefulness of traditional grammar instruction not tied to writing versus non-traditional grammar instruction that was taught through writing. Participants were 12 years old at the beginning of this two-year study. Participants were recruited from five schools in London, two classes from each school. One class in each school was assigned to the experimental and one to the control condition. Students in the control condition ($n = 109$) received traditional grammar instruction focusing on the parts of speech and the functions of words. Students then used their knowledge of the grammar terms to revise compositions. Students in the experimental condition ($n = 119$) learned to identify common grammar errors in writing samples and practiced on error correction through observing teachers' examples and completing imitation exercises. The study was conducted over a period of for two years, with five 40-minute sessions occurring each week.

Pre- and posttest included the Formal Grammar Test and writing samples. The results of the Formal Grammar Test revealed that the control group gained significantly more than the experimental group in terms of knowledge of grammar terminology and correct use of grammar terms. Writing samples were scored in two ways. First, pre- and posttest writing samples were scored according to 11 criteria, including (a) number of omissions of periods, (b) number of words written, (c) number of words per common error, (d) average length of correct simple sentences, (e) number of different sentence patterns, (f) number of subordinate clauses, (g) number of non-simple sentences, (h) number of complex sentences, (i) number of simple sentences containing two or more

modifying phrases, (j) number of correct sentences, and (k) number of adjectival clauses and phrases. A t-test was conducted to compare the results across the 11 categories within each of the 5 schools, resulting in 55 comparisons. Results revealed that 11 of the 55 tests were statistically significant, all in favor of the experimental group. These significant differences included (c) number of words per common error, (e) number of different sentence patterns, and (j) number of correct sentences.

Next, the researcher counted the frequency of errors based on a self-developed list of common errors, which included errors in capitalization, punctuation (i.e. periods), parts of speech, subject-verb agreement, infinitive, tense, and use of participles. From pre- to posttest, students in the experimental group across schools made fewer errors than students in the control group across schools in 7 categories including punctuation, conjunctions, and use of the infinitive. For example, in the category of the “omission of period,” the experimental group made a total of 360 errors on the pretest and 277 errors on the posttest; the control group made a total of 458 errors on the pretest and 405 errors on the posttest. In the category of “misuse of conjunctions,” the experimental group made a total of 71 errors on the pretest and 58 errors on the posttest; the control group made a total of 89 errors on the pretest and 111 errors on the posttest. However, no information was provided regarding the changes in the amount written from pre- to posttest, so it was impossible to conclude whether the overall error rate was reduced.

The Harris’s study had several weaknesses in its design and methodology. The first was the use of non-random sampling and non-random assignment. As a result, students in the control condition had performed more poorly than students in the experimental condition on the pretest, calling into question the study result. Further,

rather than assigning student to condition, class was assigned to condition; however, student was used as the unit of analysis. Finally, the researcher conducted 55 t-tests, inflating the experimentwise error rate.

Elley, Barham, Lamb, and Wyllie (1976) investigated the effects of traditional grammar versus transformational English grammar on students' writing skills across a period of three years in New Zealand. Initially, 248 students were recruited for the study. Throughout the period of three years, 166 students completed the entire study. These 166 students were in the third-form year (equivalent to 7th grade in the U.S.) at the beginning of the study and in the fifth-form year (equivalent to 9th grade in the U.S.) when the study was finished.

Participants were divided into three groups. Students in group 1 learned traditional and transformational grammar, writing, and reading. Their learning activities included (a) analyzing and reviewing traditional grammar and transformation rules (e.g. deep and surface structure, sentence parts, and compound sentences) in a spiral manner, (b) writing practice in which students learned to address the needs of the audience, (c) structuring paragraphs, and (d) reading of poems, stories, and drama. Students in group 2 focused on curriculum readings and free readings of books, journals, and magazines, with a very small amount of creative writing. No grammar lessons were provided to this group unless needs arose regarding spelling, punctuation, and paragraphing. Students in group 3 followed a traditional grammar curriculum to learn the basic grammar rules about subject, predicates, objects, parts of speech, phrases, clauses, and sentence structure.

Each year, a variety of language-skills tests were administered to examine students' performance in the categories of vocabulary, spelling, mechanics, English

usage, sentence combining, reading comprehension, listening comprehension, and English literature. In addition, students' writing performance was assessed each year to evaluate their applied understanding of essay mechanics, essay style, essay structure, and essay content. The results of the language skills tests administered at the end of year 3 showed significant differences among the groups only in sentence combining and English usage. In sentence combining, group 1 ($M = 13.42$; $SD = 5.36$) and group 2 ($M = 12.81$; $SD = 4.36$) scored significantly better than group 3 ($M = 11$; $SD = 5.42$), indicating that traditional grammar instruction might not have an impact on students' ability to construct correct sentences. In English usage, group 1 ($M = 20.47$; $SD = 6.32$) and group 3 ($M = 20.24$; $SD = 6.93$) scored significantly higher than group 2 ($M = 17.69$; $SD = 5.83$), indicating that students who learned grammar, whether it was taught through traditional or transformational methods, gained a better knowledge of how to apply grammar rules than students who had received no grammar instruction.

The results of the assessment of students' essays at the end of year 3 showed no differences among the three groups in mechanics, style, structure, and content. The mean range of scores for essay mechanics for the three conditions was between 20.45 and 21.49; the mean range of scores for essay style for the three conditions was between 19.45 and 19.64; the mean range of scores for essay structure for the three conditions was between 19.45 and 19.60; the mean range of scores for essay content for the three conditions was between 18.98 and 19.21. At the end of the fourth year when participants were in the sixth-form year (equivalent to 10th grade in the United States), 58 participants' essays were analyzed on syntactic structures by identifying the average number of words written in the first 10 T-units in each sample. Descriptive statistics for

conditions 1, 2, and 3 (mean of 12.7, 13.8, and 12.9) were similar. There was no difference in the average length of T-units among the three groups.

Although the findings indicated that the teaching of traditional and transformational grammar did not influence writing quality as compared to the curriculum without grammar instruction, the similar outcomes of the three conditions at least suggested that the teaching of grammar did not harm students' writing performance (Mellon, 1979). However, the study did not indicate that the curriculum focusing on reading and writing was more effective on improving students' writing performance than the curriculum that included grammar instruction. And, as with the earlier studies reviewed, the design of the study was weak in that the study did not involve random assignment of student to treatment group.

The researchers of the above three studies intended to investigate the effects of different types of grammar instruction on student writing performance. Although all three studies were conducted between a control group and a treatment group, the researchers did not employ random assignment. As their assessment tools showed flaws, it was impossible to draw conclusive decisions in terms of the grammar components and the method of grammar instruction. To provide valuable information about how to help students improve their writing performance, an experimental study should be conducted with appropriate design and reliable assessment tools.

As one of the grammar components, sentence structure is necessary for students to understand. A good composition consists of well-constructed sentences. The following studies illustrated a few methods of teaching sentence construction and the relative effects of sentence construction on writing performance.

Research in sentence construction. Despite the fact that recent studies have tended to focus more on higher-level than on lower-level writing skills, there have been some recent studies focusing on lower-level writing skills, including those focusing on the functions of different parts of speech (Fearn & Farnan, 2007) and sentence combining (Saddler & Graham, 2005; Saddler, Behforooz, & Asaro, 2008).

A good understanding of the function of words requires grammar knowledge about the functions that each word plays in a sentence. Students who understand the grammar functions of nouns, pronouns, verbs, adjective, adverbs, and articles may be more likely to use all words correctly within a sentence. Fearn and Farnan (2007) examined the effect of teaching the grammatical function of words in sentences on students' writing. Three classes of 10th grade students participated in the study. Each class consisted of 24-26 students. One class was assigned to the control condition, and two classes were assigned to the treatment condition. Students in both conditions studied similar units of grammar including nouns, verbs, adjectives, dependent clauses, and independent clauses; however, these units were taught with two different teaching methods. The control class learned about these units of grammar via a traditional grammar teaching process of identification, definition, and description. The two treatment classes learned these grammar units by focusing on the functions of words in sentences. For example, the treatment procedure used to teach the function of verbs included group discussion about the function of a verb in an example sentence; students were then directed to write sentences using particular verbs. When the teacher found that students had obtained a correct understanding of the function of verbs, the teacher used the same procedure to instruct students about the functions of the other parts of speech.

The three classes in both conditions received approximately 22 minutes of instruction and 18 minutes of guided practice each week for five weeks.

Pre- and posttest in this study included a grammar knowledge test and writing samples. The grammar test consisted of seven items, with a focus on grammar application. Each of the seven items required students to write a sentence that contained one or two words with specified grammar features. For example, item 1 asked students to write a sentence that contained exactly two nouns, one of which should be modified by a prepositional phrase. Item 4 asked students to write a sentence that contained one adjective and one adverb, and the adverb should not be the last word of the sentence. The test results showed no significant differences in grammar knowledge between the two conditions on the pre- and posttest.

Pre- and posttest writing samples were scored using two procedures, analytic scoring and holistic rating. Analytic scoring included writing fluency, which was scored by the number of words written for five minutes, and mechanical control, which was measured by the number of errors in each sentence. The scored mechanical errors were those in punctuation, capitalization, spelling, and verb tense. Descriptive data for the five-minute interval showed that, on average, the students in the experimental group wrote 71 words on the pretest and 91 words on the posttest, and the students in the control group wrote 62 words on the pretest and 88 words on the posttest. The mean number of mechanical errors that the experimental group made was 1.45 on the pretest and 1.3 on the posttest, whereas the mean number of mechanical errors that the control group made was 1.3 on the pretest and 1.2 on the posttest.

Holistic rating was conducted on the participants' pre- and posttest writing samples using a 6-point scale focusing on four attributes: writing objectives, elaboration, organization, and sentence complexity. Results indicated that the mean rating score for the experimental group from pre- to posttest improved significantly from 2.95 ($SD = .87$) to 3.55 ($SD = 1$). The mean rating scores for the control group between the pretest ($M = 2.78$; $SD = 1.06$) and posttest ($M = 2.61$; $SD = 1.7$) were not significantly different. The results implied that traditional grammar instruction and grammar-related writing instruction had similar effects on students' learning of grammar knowledge, but the grammar-related writing instruction seemed to help students improve overall writing performance more than did traditional grammar instruction. Grammar-related writing instruction might have driven students to think about using their grammar knowledge to compose during the writing process.

Unfortunately, this study used a convenient sample of three classes. No information was provided regarding the academic performance of the three classes before the intervention. It was unclear how and why two of the three classes were assigned to the experimental condition. As the study used only two frequency-counting scoring procedures, number of words written and number of errors per sentence, no detailed information was provided in terms of the effect of the intervention-delivered grammar knowledge on students' writing ability.

Some researchers have examined the effects of sentence combining on writing quality. A sentence consists of a group of words with different functioning elements, such as subject, predicate, and object. It takes work and practice to gain the ability to construct meaningful sentences (Reiking & von der Osten, 2005). By practicing sentence

construction, students learn to transform ideas and intentions into written sentences with accurate words and correctly functioning elements. The following two studies related to sentence construction examined the particular effects of sentence combining on students' writing quality.

The first study was conducted by Saddler and Graham (2005), who compared the effects of instruction on sentence combining versus the effects of traditional grammar instruction on students' writing quality. Participants were forty-four 4th grade students. Of these 44 participants, 22 were identified as more-skilled writers and 22 identified as less-skilled writers, based on their performance on the Sentence Combining Subtest of the Test of Written Language-3. These participants were randomly assigned to two conditions, a sentence-combining treatment versus a grammar-instruction comparison. Within the sentence-combining treatment group, a less-skilled writer was paired with a more-skilled writer based on teachers' judgments. Students in the treatment condition received 30 lessons of sentence combining for 10 weeks, 25 minutes per lesson, 3 lessons each week. Students learned sentence combining skills in the sequence of combining kernel sentences with adjectives, combining kernel sentences with phrases, and combining sentences using connectors. Following the instruction, student pairs worked together to complete their oral and written practice of sentence combining. Students also wrote a story every other week. In the comparison condition, one less-skilled writer was also paired with one more-skilled writer. They received 30 lessons of grammar focusing on parts of speech: verbs, nouns, adjectives, adverbs, and subject-verb agreement, which were designed to enhance students' precise use of vocabulary in their writing. Students in

the comparison group went through the same types of learning activities as did students in the treatment group.

Pre- and posttest measures were sentence combining and story writing. The sentence combining measures included five 5-item progress-monitoring tests and the Sentence Combining Subtest of the Test of Written Language-3. The assessment of story writing consisted of three scoring procedures on initial and revised drafts on both the pre- and posttest: (a) holistic rating on an 8-point scale based on the student's writing quality in ideation, organization, grammar, sentence structure, aptness of word choice, and mechanics; (b) total number of words written; and (c) total number of revisions involving sentence combining.

Findings from the tests that monitored sentence-combining progress revealed significant differences between the sentence-combining group ($M = 3.8$; $SD = 0.95$; $ES = 1.31$) and the comparison group ($M = 2.1$; $SD = 1.2$). Results of the Sentence Combining Subtest of the Test of Written Language-3 on the posttest showed a statistically significant main effect for the treatment condition. From pre- to posttest, the mean score of the treatment group on the Sentence Combining Subtest of the Test of Written Language-3 increased from 8.55 ($SD = 0.6$) to 12.7 ($SD = 2.5$). The mean score of the comparison group on the Sentence Combining Subtest of the Test of Written Language-3 increased from 8.95 ($SD = 0.85$) to 10.3 ($SD = 2.65$).

Holistic ratings of students' initial and revised drafts on both the pre- and posttest showed that students in the treatment condition significantly improved the writing quality of their posttest stories after revision ($M = 4.1$; $SD = 1.25$; $ES = 0.64$), and the mean for the comparison group was 3.55 ($SD = 1.3$). The writing length showed significant effects

for the Time \times Draft interaction. On the posttest, the mean of words written from the initial to the revised draft for the treatment group increased from 92.9 ($SD = 28.9$) to 95.25 ($SD = 29.1$); the mean of words written from the initial to the revised draft for the comparison group increased from 98.75 ($SD = 40.9$) to 103.35 ($SD = 44.6$). The number of sentence-combining revisions showed significant effects for the Treatment \times Time interaction. On the posttest, students in the treatment condition, on average, made 0.6 sentence-combining revisions ($SD = 1.1$; $ES = 0.69$), whereas students in the comparison condition made no sentence-combining revisions.

This study indicated that the treatment group was more likely to produce syntactically and semantically correct sentences than the comparison group after the intervention, and the sentence-combining instruction seemed to have a positive impact on students' skills of sentence constructing. This study was a well-designed and carefully conducted study, unlike the studies reviewed until this point. One limitation of the study was that it was not known whether there was a peer effect on students' performance because students in both conditions paired less-skilled writers with more-skilled writers. Would the participants, particularly those more skilled writers, perform differently if they completed all sentence combining exercises individually?

Saddler, Behforooz, and Asaro (2008) replicated and extended the previous study (Saddler & Graham, 2005) using a single-subject design. Six 4th grade students with writing difficulties, 3 with LD and 3 as low performing, were randomly assigned to 3 pairs to receive a 6-week treatment of 18 lessons, 3 lessons per week, and 25 minutes per lesson. Students learned the sentence-combining skills in a gradual process, from combining kernel sentences with adjectives to combining kernel sentences with phrases,

and finally to combining sentences using connectors. Pre- and posttest measures included: (a) sentence-combining ability, (b) writing complexity, (c) story quality, and (d) sentence-combining constructions in the connected text. The results of the Test of Written Language-3 sentence-combining subtest on the pre- and posttest showed that all students improved their sentence-combining abilities from the mean of 6.3 at the baseline to the mean of 11.5 on the posttest. The percentage of nonoverlapping data (PND) was 100%, indicating a very strong effect of the treatment. Sentence complexity was assessed by T-units, for which the PND was 91.6%, indicating the treatment was very effective. Writing quality was rated on an 8-point scale. The PND for writing quality was 87.5%, indicating the treatment was effective. The use of sentence-combining constructions, particularly in the area of adjective use, showed a 71% PND, indicating the treatment was effective.

The outcomes of the above two studies suggested that sentence combining seemed to be effective in helping students improve sentence complexity and overall writing quality. However, more research evidence is needed in terms of how structured instruction can be provided to a larger population of students with writing difficulties across grade levels. It would also be helpful if future studies compare the effects of sentence-combining instruction delivered to students in pairs versus individually, to students with writing difficulties versus to typically developing writers.

In general, the above three studies focused on helping students understand function of parts of speech for constructing meaningful sentences. This type of grammar instruction seemed to be beneficial for writing in that students learned to form grammatically correct sentences using properly functioning words. However, one of the

three studies was not conducted with random assignment. More research with good design is needed on sentence construction. Actually, grammar instruction should and can be conducted in various forms to meet the need of improving writing performance. Error correction is another type of grammar instruction.

Research in error correction. Students learn by doing. Effective grammar instruction is a matter of what to teach, and how to teach (Feng & Powers, 2005; Weaver, McNally, & Moerman, 2001). One method of grammar instruction that appears to show promise for improving writing quality is error correction. Teachers can implement error correction as part of self-correcting, peer-correcting, or error-based instruction.

To investigate the effects of self-correcting on writing errors, Lyman (1931) recruited 1,039 students in grades 6-9 for the study. These participants wrote 5 stories, one story per week. When writing the first story, teachers instructed students to identify and correct all errors in the draft; students then submitted a revised copy. Students wrote the other 4 stories using the same error-correction procedure on their own with no help from teachers. Errors in the pre- and posttest writing samples were identified on 6 categories including capitalization, punctuation, spelling, sentences, grammar, and miscellaneous. From pre- to posttest, the average number of errors in capitalization reduced from 303 to 128; the average number of errors in punctuation reduced from 556 to 187; the average number of grammar errors reduced from 177 to 72. Overall writing quality was assessed on the pre- and posttest writing samples using an 8-point scale. The results showed that the median score for 6th grade students increased from 4.59 to 5.09, for 7th grade students, increased from 5.35 to 5.46, for 8th grade students, increased from 5.39 to 5.40, and for 9th grade students, increased from 5.99 to 6.2.

Although this study suggested that error correction, based on authentic writing, was likely to have a positive impact on writing quality, given the fact there was no control group included in the study, no firm conclusions could be drawn regarding the effectiveness of the intervention.

Regarding the impact of peer correction on writing quality, Maize (1952) compared the effects of a writing laboratory method versus a grammar drill method on the writing performance of college students who were identified to be “slow and retarded” by the college. Participants were 149 college students who were randomly selected from the freshmen scoring below the 30th percentile on both the American Council on English Psychological Examination and the Purdue Placement Test in English. These participants also failed a theme-writing test during the entrance examination period. Seventy-four participants were randomly assigned to the control condition, in which participants practiced grammar drills and wrote 14 compositions. Seventy-five participants were assigned to the experimental condition, where a writing laboratory method was employed requiring multiple writing practices. Students in the experimental group wrote 42 compositions. The instructor coached students to analyze their peers’ writing errors in punctuation, spelling, overall organization, and logic, and make comments on these errors. An outside instructor rated the overall quality of compositions completed by students in the control group. The in-class instructor rated the overall quality of compositions completed by students in the experimental group. Both raters used the same numerical grade scale. The intervention for the two conditions lasted for one semester.

Six t-tests were administered on pre- and posttest to assess students' changes in vocabulary, capitalization, punctuation, verb forms, tense, pronouns, sentence structure, organization, and overall writing quality. Results of the t-tests showed that the experimental group performed significantly better than the control group on all tests except vocabulary. From pre- to posttest, the mean score of the experimental group on the test of capitalization and punctuation changed from 55 to 62.8; on the test of verb forms, tense, and pronouns, from 49.3 to 54.9; and on the test of sentence structure and organization, from 24.9 to 33.2. From pre- to posttest, the mean score of the control group on the test of capitalization and punctuation changed from 55.4 to 59; on the test of verb forms, tense, and pronouns, from 53.1 to 55.2; and on the test of sentence structure and organization, from 29.5 to 28. Holistic rating from pre- to posttest for the experimental group increased from 10.1 to 11.9, whereas holistic rating for the control group increased from 9.7 to 9.1.

This study supported the potential effectiveness of integrating error correction into grammar education through writing practice. When the students tried to analyze their peers' errors in their compositions, they learned to apply grammar rules to their writing. Unfortunately, this study did not address the question of how students specifically applied their learned grammar knowledge to their writing tasks because their writing samples were only evaluated on overall quality. The holistic rating scores were unlikely to provide accurate information about the effectiveness of the intervention on students' ability to apply grammar knowledge to writing. Although participants took multiple tests of grammar knowledge, their performance on these tests might not necessarily correlate with their ability to apply the learned grammar knowledge to their writing tasks. As with

the earlier study (Harris, 1961), the researcher conducted multiple t-tests, inflating the experimentwise error rate.

Feng and Powers (2005) examined the effects of error-based grammar instruction on the writing performance of nineteen 5th grade students. Participants wrote three stories at three time points: the beginning of the school year, after the mini-lessons of error correction intervention, and the end of the school year. Grammar errors in the first time-point writing samples were coded into three major categories: sentence structure, usage, and mechanics. Based on the errors in the first time-point compositions, the researchers designed and provided mini-lessons of error correction through teacher modeling and student practice. For example, to address the errors in capitalization and punctuation, every day the teacher presented a short paragraph on an overhead projector and let students work in groups to correct the errors in capitalization and punctuation in this paragraph. Following the mini-lessons, students received their stories and learned to identify and correct the errors in their stories. One week after the intervention was completed, students wrote a second story. At the end of the school year, students wrote a third story. Descriptive data summarized from the first and the third story showed that students' mean number of errors decreased in the category of sentence structure from 22 to 1, in the category of usage from 12 to 8, and in the category of mechanics from 63 to 35. As with earlier studies, no control group was included in the study; thus no firm conclusions about the effectiveness of the intervention could be drawn.

To sum up, error correction as a method of grammar instruction seemed to be helpful for students to increase their awareness of error prevention. In the above three studies, error correction was conducted individually, in peers, or in groups separately.

Although all three studies showed effectiveness of error correction in relation to writing performance, the problems with either the design or assessment methods in these studies led to the question of how educators should employ the method of error correction appropriately. Should educators help students focus on correcting their errors in their own writing samples? Or should educators provide relevant mini-lessons after each error correction task? More research is needed in terms of increasing learning through error correction.

Summary

The reviewed studies focused on investigating the effects of teaching mechanics and grammar on improving writing quality. The overall conclusion drawn from the reviewed studies is that mechanics and grammar, when taught as lower-level writing skills through relevant writing practice, show promise in improving students' overall writing quality. For students with writing difficulties, the instruction should be skill-specific and supplemented with writing practice of the taught skills. Much research evidence is needed in terms of how to teach mechanics and grammar to improve writing quality, particularly in the special education setting.

The multi-step literature search in this study helped to obtain and review 10 studies, which examined the effects of teaching mechanics or grammar to improve writing quality. Of these 10 studies, five studies were conducted between 2005 and 2008, and the other five were conducted between 1931 and 1973. No study was located that had been conducted during 1980s and 1990s, implying that little attention was devoted to the teaching of mechanics and grammar in this periods. Regarding grammar instruction, three studies compared different methods of grammar instruction in relation to writing quality;

three studies examined the effects of error correction on writing quality; three studies examined the effects of sentence construction on writing quality. The only study that examined the teaching of punctuation was conducted in a non-English context, suggesting that research evidence is needed in helping students use correct punctuation to improve their writing quality. As for the grade levels of the participants in these studies, of the nine studies that were conducted in the native English context, seven were conducted on students in grades 4-11 in the general education setting, and one was conducted on lower performing college students. The only study conducted in the special education setting was with the single subject design, and the participants were six 4th-grade students who were either less skilled writers or identified as having LD.

Perhaps most noticeable regarding the literature search was the lack of well-designed research studies. Only two studies were found that made use of random assignment. One of these studies focused on sentence combining in an experimental design; the other study, which showed the chance of inflating the experimentwise error rate, focused on using error correction to help college students with special needs improve their overall writing quality. Another well-designed study was a single-subject study, which also focused on sentence combining. All other studies either included no control group, or did not use random assignment, or assigned classroom rather than student to condition and then analyzed data using student as unit of analysis, or used multiple t-tests without controlling for inflation of Type I error. In general, there is a paucity of well-designed, experimental research studies examining the effects of instruction addressing lower-level writing skills on the overall writing performance of

students in general, not to mention on the writing performance of students with writing difficulties.

The purpose of the present study was to experimentally examine the relative effects of three correctional feedback approaches on the writing performance of students with writing difficulties. Students in the study were randomly assigned to one of three correctional feedback conditions: Correction Only, Correction + Rewrite, and Correction + Explanation + Rewrite. The research question addressed in the study was: What are the relative effects of three correctional feedback approaches on the writing performance of students with writing difficulties in grades 4-8? Writing performance was measured using two counts of correct and incorrect word sequences, and a quality rating in which pre- and posttest writing performance was compared.

CHAPTER III

Method

Research Question

The purpose of the study was to examine the effects of correctional feedback on the writing performance of students with writing difficulties. The study addressed the following research question: What are the relative effects of three approaches to providing correctional feedback (Correction Only, Correction + Write Again, and Correction + Explanation + Write Again) on the writing performance of students with writing difficulties in grades 4-8?

Participants and Setting

The initial sample consisted of 30 students (20 males and 10 females) from two middle schools (grades 6-8) and one intermediate school (grades 4-5) in two suburban school districts. Four students were in Grade 4, 6 students in Grade 6, 12 students in Grade 7, and 8 students in Grade 8. After the pretest was administered, one 7th grade student (male) dropped from the study. After five sessions of intervention, another student (8th grade male, Feedback + Explanation + Write Again condition) dropped from the study. The final sample for data analysis was thus 28 participants for this study.

All 28 participants had Individualized Education Program (IEP) goals in writing. Twelve participants (42.9%) received free/reduced lunch service. Special education classifications of the participants were learning disabilities (n = 18), learning disabilities with speech and language impairments (n = 2), speech and language impairments with English language learning (n = 1), autism (n = 1), and other health impairments (n = 6).

For two students, the home language was not English; one of the two students was an English language learner.

Demographic information for the three schools is presented in Table 2. In this table, schools 1 and 2 refer to the two middle schools. School 3 refers to the intermediate school.

Table 2

Demographic Information of the Three Schools

	School 1	School 2	School 3
Setting Information			
Total Students	977	943	617
Grade Ranges	6-8	6-8	4-5
Participants	18	6	4
Ethnicity (%)			
Asian	12.9	10	9
Black	3.6	10	9
Hispanic	2.1	7	8
Native American	0.3	2	2
White	81	71	71
Special Education (%)	8.6	16	16
ELL (%)	1.8	8	11
Free/Reduced Lunch (%)	9.2	33	34

Independent and Dependent Variables

Independent variable. The independent variable in the study was the approach used to provide correctional feedback to students on their writing samples. The three approaches for students were (a) Correction Only, (b) Correction + Write Again, and (c) Correction + Explanation + Write Again.

In the Correction Only condition, feedback was provided to students in written and oral form on their writing. Students wrote a story in response to a prompt in the first session. After the session, the researcher underlined up to five coded errors in the writing sample and wrote a correction above each underlined error (see Appendix A). In the subsequent session, the researcher read the corrections out loud to the student. Students then wrote on a new story prompt.

In the Correction + Write Again condition, feedback was provided to the students in written and oral form on their writing, after which students wrote again on the same story prompt. As with the Correction Only condition, students wrote in response to a story prompt in the first session. After the session, the researcher corrected up to five coded errors in each writing sample and wrote a correction above each underlined error. In the subsequent session, the researcher read the corrections out loud to the student. Students then wrote on the same story prompt again.

In the Correction + Explanation + Write Again condition, feedback was provided to the students in written and oral form on their writing, but in this condition, an explanation was provided for each correction. Students then wrote again on the same story prompt. As with the Correction + Write Again condition, students wrote in response to a story prompt in the first session. After the session, the researcher corrected up to five

coded errors in each writing sample and wrote a correction above each underlined error. In the subsequent session, the researcher read each correction out loud to the student. The researcher also provided an explanation for the error and the correction. Students then wrote on the same story prompt again.

Feedback provided to students fell into five categories: (a) *capitalization*, use of capital letters at the beginning of a sentence or as the first letter of a proper noun (Fergusson & Manser, 1998); (b) *punctuation*, use of a system of symbols such as periods, commas, question marks, and quotation marks; (c) *word formation*, use of word forms in a language context according to linguistic rules (Strumpf & Douglas, 2004); (d) *word usage*, use of words so that they are in agreement with other words in the sentence (Warriner, 1988); and (e) *verb tense*, use of the appropriate verbs to indicate the time of action (Ackles, 2003).

In this study, errors of capitalization included (a) the first letter of a sentence not being capitalized, (b) common words that were mistakenly capitalized, (c) “I” as a word not being capitalized, and (d) proper nouns the first letter of which was not capitalized. Examples of errors in capitalization include “minnesota” and “the dog kept running.”

Errors of punctuation in this study included (a) a comma at the end of a sentence, (b) no punctuation mark at the end of a sentence, and (c) incorrect punctuation marks for statements, questions, or quoted sentences. Examples of errors in punctuation included “*We were just about to jump over the fence when we saw a policeman We were scared but he went away fast.*”

Errors of word formation included (a) compound words mistakenly split up, (b) words that were spelled correctly but not meaningful in a sentence (e.g. *how_ever*, *in_side*,

somebody), and (c) incorrect use of the words that were derived from their root words in the language context. Examples of correctly derived words are: busy → busily, big → bigger → biggest. Errors of word formation in this study were not related to spelling. Examples of errors in word formation included “*I said to myself...*,” “*the schools pond,*” “*I was earliest than my friends.*”

Errors of word usage included (a) words and phrases that were not in subject-verb agreement, and (b) prepositional phrases, pronouns, modifier, and connectors that were either missing in a sentence or used incorrectly. Examples of errors of word agreement included “*The little turtle don’t sleep,*” and “*He looked at me did not say anything.*”

Errors of verb tense focused on an inappropriate use of present tense, past tense, or future tense. Examples of errors of verb tense included “*I look at the video game store and found one that I could do tricks on.*” “*When I came out, I see an older man fall down. He was not moving*”

Dependent variables. The dependent variables in the study were measures of the changes in participants’ writing performance from pre- to posttest. Students’ pre- and posttest writing samples were scored in three ways: number of correct minus incorrect word sequences (CIWS), percentage of correct word sequences (%CWS), and writing quality rating. CIWS and %CWS were continuous variables; quality rating was a categorical variable. In addition to the analysis of changes on those three dependent variables, students’ error patterns in their pre- and posttest writing samples were examined so as to obtain a better understanding of students’ writing performance before and after the intervention.

CIWS was the number of correct minus incorrect word sequences in the writing sample (Videen, Deno, & Marston, 1982). A correct word sequence (Videen et al., 1982) was defined as any two adjacent correctly spelled words that were syntactically and semantically meaningful in the writing context. CIWS scores took into account errors in capitalization, punctuation, and grammar. CIWS scores were obtained through four steps. First, incorrect words for each writing sample were underlined. Incorrect words were those that were either incorrectly spelled or correctly spelled but not meaningful in the sentence. Second, correct word sequences (CWS) were marked between any two adjacent correct words, and incorrect word sequence (IWS) were marked between any two adjacent words that were not correct or if the sequence did not make sense within the context of the sample. Third, CIWS was calculated by subtracting IWS from CWS. Fourth, the mean scores across the two CIWS scores for pre- and posttest were calculated. Mean scores were used for all analyses.

Percentage of correct word sequences (%CWS) was the number of CWS divided by the total number of word sequences (i.e. CWS + IWS). This scoring procedure was considered to be “production independent” (Tindal & Parker, 1989) and controlled for the length of writing. The mean scores across the two writing samples were used for all analyses.

The writing quality rating was intended to provide a holistic evaluation of the changes in writing performance of each student. The purpose was to investigate whether the intervention in capitalization, punctuation, word formation, words agreement, and verb tense would lead to improvements in overall writing quality. Recall that students wrote two stories at pretest and posttest. Packets containing pretest and posttest pairs of

writing samples for each student were given to a rater with no information regarding which pair was written at pretest and which at posttest. The rater was asked to compare the two sets of writing samples and judge which pair was of higher quality. The rater was instructed to consider the five writing characteristics specified by the Minnesota Department of Education on the state writing test in her judgment: clarity of central idea, focus, organization, support or elaboration, and language conventions (Minnesota Department of Education & Pearson Educational Measurement, 2004-2005). The rater assigned 1 to the pair that appeared to be of higher quality and 0 to the pair of lower quality. A higher percentage of posttest marked as “1” was taken to imply a more effective intervention.

The examination of error patterns was conducted to examine changes in error patterns from pre- to posttest. The errors were coded using the same categories used in the interventions: (a) capitalization, (b) punctuation, (c) word formation, (d) word usage, and (e) verb tense. The examination of the changes in error patterns was conducted to better describe where improvements in writing tended to occur for students across conditions.

Design

A pretest-posttest group design (Campbell & Stanley, 1963) was used to examine the effects of each condition on writing performance of participants. Participants were randomly assigned to one of the three conditions. Nine students were in condition 1, 10 in condition 2, and 9 in condition 3.

A stratified random assignment approach was used. Students were rank ordered based on their mean CIWS scores on the pretest. The mean scores were then divided into

three levels: high, middle, and low. Scores within each level and within each school were randomly assigned to one of the three conditions. This stratified approach was used because of the large range of scores and the small sample size.

Materials

The materials used in the study were ten story prompts (see Table 3). The prompts were intended to reflect life experiences that students with writing difficulties who attended a U.S. public school would likely be able to describe. The prompts were also intended to be appropriate for students representing a wide range of ages and skill levels, including English language learners.

Four of the 10 prompts were selected from previous research studies (McMaster, Du, & Petursdottir, 2009; McMaster & Campbell, in press). These four prompts had been approved by two elementary teachers whose students had participated in previous research. The other six prompts were selected from a pool of 21 prompts that were developed with the help of six graduate students studying special education who had experience working with students with special needs. The researcher then asked the six graduate students to rank order the prompts from highest to lowest, giving consideration to the fact that the prompt should stimulate students to generate ideas from their life experiences and act as an easy starter for students to respond to. Afterwards, the researcher showed the 12 prompts with the highest rankings to three general education students in grades 2-5. The researcher read each story prompt out loud to the students and asked whether they could write on the prompt. Students voted for the six story prompts used in the study. These six in combination with the other four prompts from the previous research were the 10 used in the study.

Table 3

Story Prompts for Intervention

Session	Story Prompts	Condition*
Pre- & Posttest 1	One day, we were playing outside the school and...	All
Pre- & Posttest 2	On my way home from school, a very exciting thing happened...	All
1	I was walking down the street when I saw...	All
2	One night, I had a dream about...	CO
3	It was the last day of school so I decided to.....	All
4	I was watching TV when...	CO
5	One day, when I opened my closet, I found...	All
6	Yesterday, when I looked in the mirror and...	CO
7	One day, I found a \$100 bill on the sidewalk...	All
8	I was talking to my friends when...	CO

*All: participants in all three conditions. CO: participants in the Corrections Only condition. Students in the CO condition wrote on a new prompt in each session. Students in the other two conditions wrote on the same story prompt in two consecutive sessions.

Of the ten story prompts, two were selected for the pre- and posttest. These two prompts had been used for the pre- and posttest in one of previous studies (McMaster & Campbell, in press). The other eight were used in a random order for the intervention sessions. In sessions 1, 3, 5, and 7, all students wrote on the same prompts. In sessions 2, 4, 6, and 8, students in the Correction Only condition wrote on a new prompt; students in

the other two conditions wrote on the same prompt that they had been given in the previous session.

Each prompt was printed in bold at the top of a sheet of paper, followed by lines printed on the same sheet (see Appendix A). In each session, students were given a three-page packet of lined paper for writing. Extra lined paper was provided when needed.

Procedures

Parent consent and student assent were obtained before the study. Participants completed the pretest at the beginning of the study. Participants were given one writing packet. Then the researcher provided the following directions: *“You are going to write a story using the given story starter. Please think about how you should start a sentence, how you should end a sentence, and how each word makes sense in a sentence. Please try your best to write a good story.”* The researcher read the story prompt to the students and asked if students had any questions about the prompt. Students had 10 minutes to write. Students wrote on two story prompts that were marked as Form A and Form B on two separate days for the pretest. The order in which the two story prompts were administered was counterbalanced across students.

For the posttest, the same two prompts were given to the participants in the same order. Directions were changed as follows: *“You are going to write a story using a story starter. You used this story starter a few weeks ago. You may write the same story that you wrote before, or you can write a different story with this story starter. We give you the same story starter because we want to know how much progress you have made in writing.”* The procedure of administering the two story prompts for the posttest was the same as for the pretest. The researcher first read the story prompt to the students and

made sure all students understood the prompt by asking whether each student had any questions about the prompt. Students then had 10 minutes to write. Students wrote on two story prompts that were marked as Form A and Form B on two separate days.

Eight sessions of intervention were provided for groups of 3-8 students over a 3-week period. These groups consisted of students in all three conditions. While the researcher worked one on one with each student, the rest of students in the group either worked with their special education teachers or completed a task provided by the researcher.

Intervention began the week following the pretest. In the first session, students in all three conditions received individual correctional feedback on the errors they made on Form A of the pretest. For the Correction Only and Correction + Write Again conditions, the researcher would point to one error and read the correction written above the error aloud. The researcher would say to the student, "*I would write it this way.*" or "*This is the correct form.*" If the student was confused, the researcher would first write down the error and the correct form on a piece of paper. The researcher would then let the student look at his or her error and the correction. A sample of marked errors and written corrections are in Appendix A.

For the Correction + Explanation + Write Again condition, the researcher would point to the error and read the correction written above the error out loud. The researcher would also provide a brief explanation to the student by saying "*I would write it this way because...*" For example, when helping a student in this condition who mistook "i" for "I" in his writing, the researcher first pointed to the wrong letter, and then pointed to the correction while explaining: "I would write this letter this way because this letter should

always be capitalized when it is a word.” Students’ errors in mechanics and grammar varied. To standardize the explanation-providing procedure, each explanation was given with no more than three sentences to draw students’ attention to the error, the corrected form, and the reason for the correction.

After receiving the correction intervention, students wrote for 10 minutes. At 5 minutes and 7 minutes, students were told to put a slash mark across the word they were writing. If a student stopped writing before the 10 minutes was up, the researcher would prompt this student once by saying “Can you think of any more details?”

Fidelity of written corrections and oral explanations. Fidelity checks were conducted on both the written corrections and oral explanations. Each written correction was examined to determine whether (a) an actual error was corrected, (b) the error fell into one of the five identified categories, and (c) the error was corrected accurately. One out of the 8 stories that each student completed in the 8 intervention sessions was randomly selected for fidelity check on written corrections. A researcher who had been engaged in research in basic academic skills of students with special needs conducted the fidelity check. This coder was provided definitions for the five categories of errors (capitalization, punctuation, word formation, word usage, and verb tense). The coder first read each marked error and the correction. She then checked whether the correction met each of the three criteria. Fidelity for all selected samples was 100% for each of the three criteria.

Fidelity check on oral explanations provided for the errors in the Correction + Explanation + Write Again condition was conducted to examine whether (a) there was an error, (b) the error was corrected accurately, and (c) the error was explained

appropriately. Fidelity check on oral explanation was only conducted on the students in the Correction + Explanation + Write Again condition because the feedback provided to the students in the other two conditions did not contain oral explanation. Four out of the eight sessions of oral feedback provided to each student in the Correction + Explanation + Write Again condition were recorded. Of these four recorded oral feedback sessions, one session for each student was randomly selected. The same coder who conducted fidelity check on written corrections conducted fidelity check on oral explanation. The coder listened to the recorded feedback and then checked whether the oral explanation about each corrected error met each of the three criteria. Fidelity for all selected samples was 100% for each of the three criteria.

Scoring and Interscorer Agreement

Scoring. The researcher scored all the writing samples for CIWS and %CWS. Interscorer agreement on CIWS and %CWS was obtained between the researcher and another coder who used to be a special education teacher and who was currently enrolled in a doctoral program in special education. The coder scored 10% of randomly selected writing samples. Interscorer agreement was calculated by dividing the smaller score by the larger score. The range of interscorer agreement was 92% to 100% for CIWS, and 90% to 100% for %CWS. The mean interscorer agreement was 98% for CIWS and 97% for %CWS.

Quality rating. One rater who used to teach special education students and was enrolled in a doctoral special education program conducted quality rating. For each student, pairs of writing samples (i.e. pretest pair and posttest pair) were arranged under one ID number. Half of students' pretest writing pairs were randomly selected to have the

posttest writing pair first and the pretest second, the other half to have the pretest first and posttest second. Student packets were given to the rater in a random order. The rater read through each pair of writing samples and made a judgment as to which pair was better in overall quality. That pair with better quality was assigned a rating of 1, the other pair a rating of 0. For reliability purposes, seven students' writing samples were re-rated by a second rater who used to teach writing to special education students and who was currently enrolled in a special education doctoral program. This second rater used the same criteria to judge the writing pairs. Percentage agreement between the two raters was 100%.

Data Analysis

Data were analyzed in three steps. First, changes for each condition on CIWS and %CWS from pre- to posttest were tested using a repeated-measures analysis of variance (RM-ANOVA). Second, differences in ratings related to writing quality were examined using a Chi-square analysis. Third, changes in error rates in the pre- and posttest writing samples were described.

CHAPTER IV

Results

The purpose of this study was to examine the relative effects of three approaches to providing correctional feedback on the writing performance of students with writing difficulties in grades 4-8. The three approaches used in the study were (a) Correction Only, (b) Correction + Write Again, and (c) Correction + Explanation + Write Again.

The primary analysis focused on changes in the dependent variables, which were correct minus incorrect word sequences (CIWS), percentage of correct word sequences (%CWS), and quality ratings -- from pre- to posttest. A secondary analysis focused on the types of errors made by students and changes in these error types from pre- to posttest.

Changes in Writing Performance

Descriptive data of the participants' overall writing performance across conditions were first calculated. Across conditions, students wrote on average 118.57 ($SD = 55.28$) words on the pretest with 11 spelling errors, 89.79 CWS ($SD = 48.28$), and 43.61 IWS ($SD = 28.37$). On the posttest, students wrote on average 123.39 ($SD = 64.49$) words, with 7 spelling errors, 101.13 CWS ($SD = 55.99$) and 34.16 IWS ($SD = 21.50$). In Table 4, means and standard deviations broken down by group for CIWS and %CWS are reported.

As displayed in Table 4, the largest obtained gain in CIWS was for the Correction + Explanation + Write Again condition. On average, students in this condition increased 38 CIWS from pre- to posttest. This was in comparison to students in the Correction Only condition who increased 15.5 CIWS from pre- to posttest, and students in the Correction

+ Write Again condition who increased 10.5 CIWS from pre- to posttest. On %CWS, students in both the Correction Only and the Correction + Explanation + Write Again conditions increased 10% CWS. Students in the Correction + Write Again condition increased 4% CWS.

Table 4

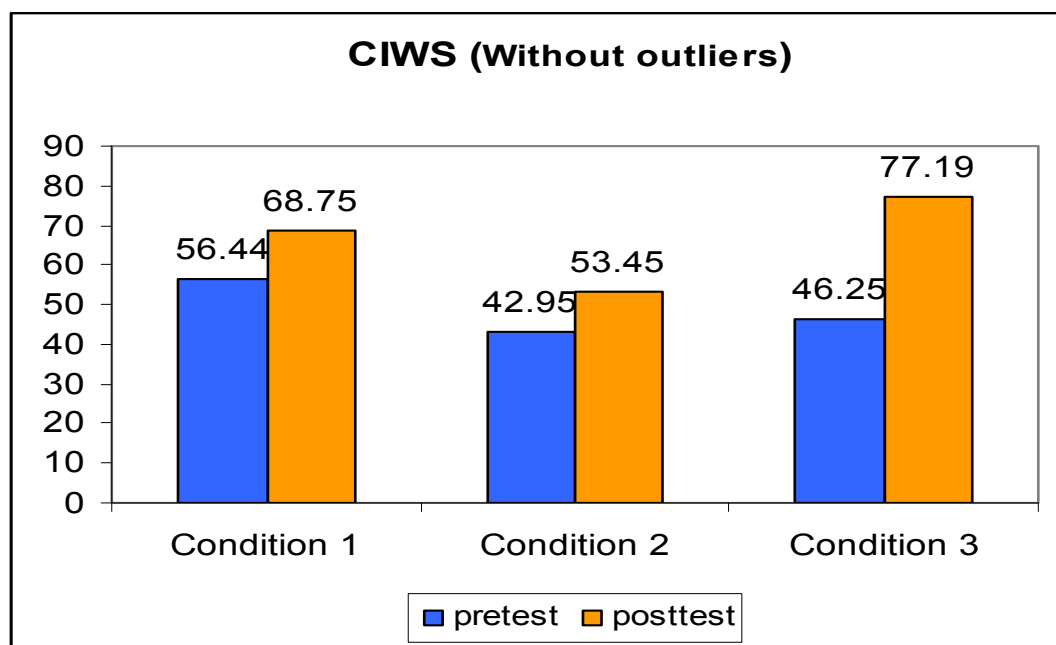
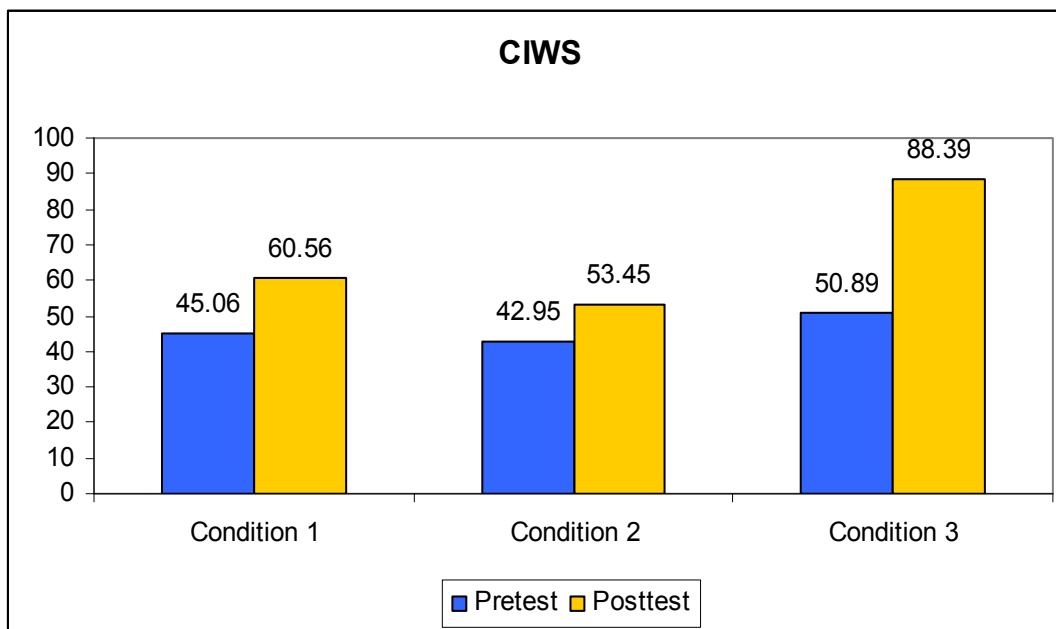
Means and Standard Deviations (SD) for Pretest and Posttest Writing Scores Within and Across Conditions

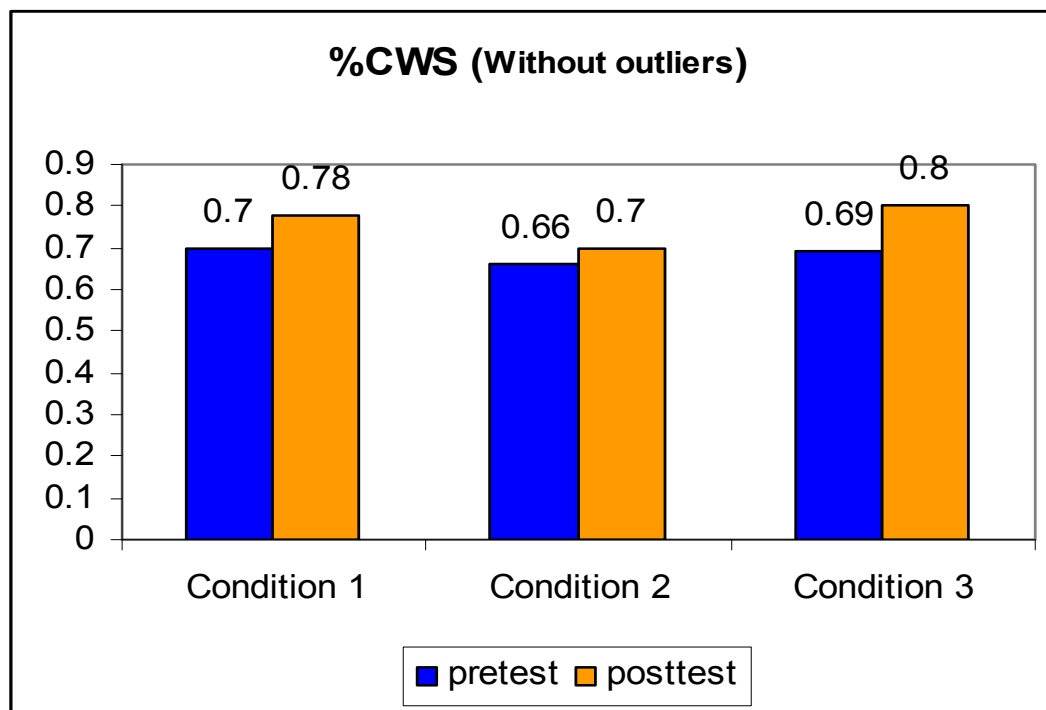
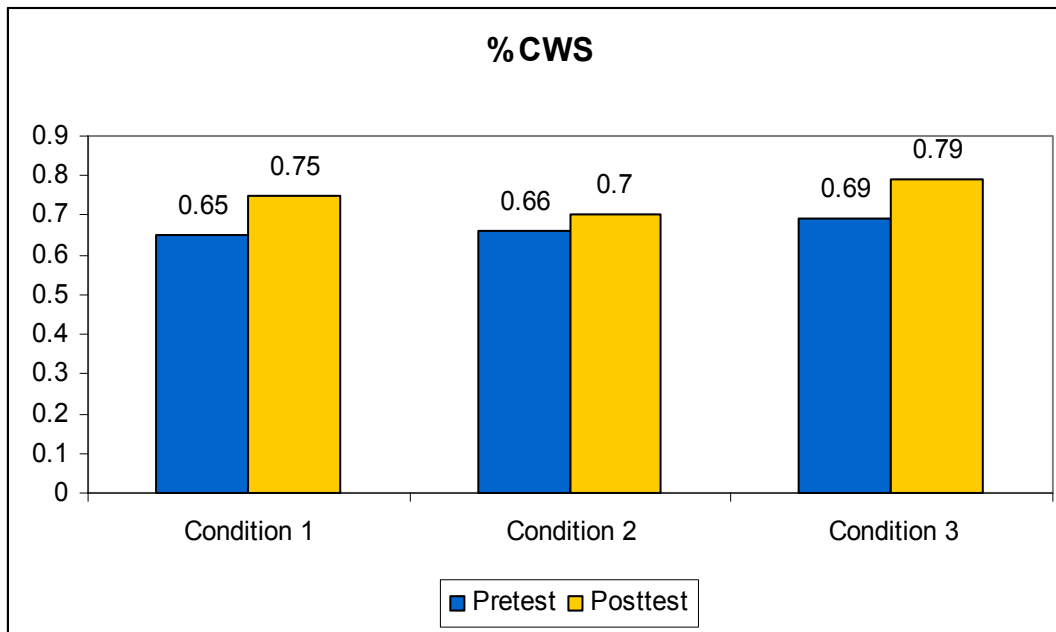
Condition	All participants					Outliers deleted				
	<i>n</i>	Pretest		Posttest		<i>n</i>	Pretest		Posttest	
		Mean	<i>SD</i>	Mean	<i>SD</i>		Mean	<i>SD</i>	Mean	<i>SD</i>
CIWS										
1	9	45.06	49.34	60.56	58.05	8	56.44	38.07	68.75	56.2
2	10	42.95	48.83	53.45	53.85	10	42.95	48.83	53.45	53.9
3	9	50.89	37.49	88.39	40.38	8	46.25	37.77	77.19	23.9
Mean	28	46.18	44.09	66.96	51.79	26	48.12	41.06	65.46	46.9
%CWS										
1	9	0.65	0.25	0.75	0.17	8	0.7	0.21	0.78	0.16
2	10	0.66	0.16	0.7	0.18	10	0.66	0.16	0.7	0.18
3	9	0.69	0.13	0.79	0.07	8	0.69	0.14	0.8	0.07
Mean	28	0.66	0.18	0.75	0.15	26	0.68	0.17	0.75	0.15

Note. Condition 1 = Correction Only condition, Condition 2 = Correction + Write Again condition, Condition 3 = Correction + Explanation + Write Again condition.

As the SPSS output showed one outlier in the Correction Only condition on the pretest and one outlier in the Correction + Explanation + Write Again condition on the posttest, descriptive data without outliers were also calculated and reported in Table 4. The largest obtained gain in CIWS was still for the Correction + Explanation + Write Again condition. On average, students in the Correction + Explanation + Write Again condition increased 31 CIWS from pre- to posttest. On average, students in the Correction Only condition increased 12 CIWS from pre- to posttest, and students in the Correction + Write Again condition increased 11 CIWS from pre- to posttest. On %CWS, students in the Correction + Explanation + Write Again condition increased 10%CWS. Students in the Correction Only condition increased 8%. Students in the Correction + Write Again condition increased 4% CWS. The results with and without outliers were graphically presented in Figure 1. The distribution for each condition with and without outliers on pre- and posttest are presented in Appendix B.

Figure 1: Changes for CIWS and %CWS from Pretest to Posttest Across Conditions.





Note. Condition 1 = Correction Only condition, Condition 2 = Correction + Write Again condition, Condition 3 = Correction + Explanation + Write Again condition.

Repeated-measures analyses of variance (RM-ANOVA) with one within factor (time) and one between factor (condition) were conducted to examine the significance of the obtained differences for CIWS and %CWS. The RM-ANOVA results are summarized in Appendix C. The results for CIWS on all participants' performance revealed a significant effect for time ($F(1,25) = 10.44, \rho < .01$) with students across all three conditions scoring higher on the posttest than on the pretest, but no significant effect for condition ($F(2,25) = .57, \rho = .57$) and no interaction effect for time by condition ($F(2,25) = 1.6, \rho = .22$).

Although no reliable conditional effect was obtained due to small sample sizes and low power, it would be worthwhile to calculate the effect size within each condition from pre- to posttest rather than comparing effect sizes among the three conditions. The larger effect size on one condition would provide useful information for future studies on a larger sample. The effect sizes for changes in CIWS within condition from pre- to posttest were as follows: Correction Only ($ES = .32$), Correction + Write Again ($ES = .22$), Correction + Explanation + Write Again ($ES = .78$).

CIWS without the two outliers were analyzed using RM-ANOVA in the same procedure. The results revealed a significant effect for time ($F(1,23) = 7.27, \rho < .01$) with students across all three conditions scoring higher on the posttest than on the pretest, but no significant effect for condition ($F(2,23) = .34, \rho = .71$) and no interaction effect for time by condition ($F(2,23) = .95, \rho = .40$). The effect sizes for changes in CIWS within condition without outliers from pre- to posttest were as follows: Correction Only ($ES = .28$), Correction + Write Again ($ES = .24$), Correction + Explanation + Write Again

($ES = .7$). The results of CIWS with and without the two outliers were similar in terms of significance levels and effect sizes.

Results for %CWS on all participants' performance revealed a significant effect for time ($F(1,25) = 22.50, \rho < .01$) with students across all three conditions scoring higher on the posttest than on the pretest, but no significant effect for condition ($F(2,25) = .34, \rho = .71$), and no significant interaction effects for time by condition ($F(2,25) = 1.20, \rho = .32$). The effect sizes for changes in %CWS within condition from pre- to posttest were as follows: Correction Only and the Correction + Explanation + Write Again ($ES = .63$), Correction + Write Again condition ($ES = .25$).

Results for %CWS without the two outliers were analyzed using RM-ANOVA in the same procedure. Again, the results revealed a significant effect for time ($F(1,23) = 18.81, \rho < .01$) with students across all three conditions scoring higher on the posttest than on the pretest, but no significant effect for condition ($F(2,23) = .5, \rho = .61$) and no interaction effect for time by condition ($F(2,23) = .98, \rho = .39$). The effect sizes for changes in CIWS within condition without the two outliers from pre- to posttest were as follows: Correction Only ($ES = .5$), Correction + Write Again ($ES = .25$), Correction + Explanation + Write Again ($ES = .69$). Without the two outliers, the effect size for the Correction Only condition changed to be slightly smaller than that for the Correction + Explanation + Write Again condition.

The different effect sizes on CIWS but similar effect sizes on %CWS for the Correction Only and the Correction + Explanation + Write Again conditions could be related to the different changes in WW and CWS for these two groups. From pre- to posttest, the Correction Only group decreased WW from 116.83 ($SD = 71.08$) to 105.5

($SD = 67.09$), but showed similar CWS results on both the pretest ($mean = 86.06$, $SD = 54.83$) and the posttest ($mean = 85.06$, $SD = 63.54$). From pre- to posttest, the Correction + Explanation + Write Again group increased WW from 122.56 ($SD = 54.92$) to 143.22 ($SD = 69.22$), and also increased CWS from 98.72 ($SD = 50.89$) to 122.72 ($SD = 55.69$). As CIWS counted the length while %CWS controlled for the length, students' scores on CIWS and %CWS might not be highly related.

Changes in Overall Writing Quality

Rating scores were assigned to pre- and posttest writing samples. Across conditions, the rater assigned a higher quality rating to posttest pairs for 57% of the students. Within condition, the rater assigned a higher quality rating to posttest pairs for 56% of the students in the Correction Only condition, 50% in the Correction + Write Again, and 67% in the Correction + Explanation + Write Again. The Chi square contingency test associated with the obtained differences among the three conditions in the percentages of higher ratings on the posttest writing was not statistically significant ($\chi^2 = .55$, $df = 2$, $p = .76$).

Changes in Error Patterns

In a secondary analysis, the types of errors made by students in each condition and changes in those types of errors from pretest to posttest were examined. This analysis was conducted to examine whether the interventions had a differential effect on the types of errors made by students. Errors made by the students on the pre- and posttest were marked and coded using the five categories used within the intervention: capitalization, punctuation, word formation, word usage, and verb tense. The mean number of errors made across the 5 categories and across conditions was 18.39 ($SD = 12.74$) on the pretest

and 12.59 ($SD = 9.36$) on the posttest. The percentage of errors made in relation to the number of words written was 16% for the pretest and 10% for the posttest, indicating an overall decrease in rate of errors per word written.

To more closely examine what types of errors students made, the total number of errors made on the pre- and posttest, broken down by the five error categories, were calculated (see Table 5). The number of errors made in each category was divided by the total number of errors, and then the amount multiplied by 100. For this analysis, pretest and posttest scores were combined to obtain the total number of errors. For example, in Table 5, one can see that in the Correction Only condition, of all the errors made on both pre- and posttest, 40% of them occurred in the area of capitalization, with 25% of these occurring on the pretest and 15% on the posttest.

Table 5

Percentage of Error Rates on Pretest and Posttest by Conditions

Category	Condition 1		Condition 2		Condition 3	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Capitalization	0.25	0.15	0.24	0.14	0.29	0.20
Punctuation	0.16	0.11	0.15	0.10	0.20	0.08
Word Formation	0.03	0.03	0.05	0.04	0.04	0.05
Word Usage	0.08	0.06	0.08	0.06	0.06	0.06
Tense	0.12	0.03	0.03	0.06	0.02	0.03
Total	0.62	0.38	0.55	0.45	0.62	0.38

Note. Condition 1 = Correction Only condition; Condition 2 = Correction + Write Again condition; Condition 3 = Correction + Explanation + Write Again condition.

Across conditions, the largest percentage of errors was made in capitalization and punctuation, with between 63% and 77% of errors being made in these two categories. Perhaps not surprising, then, these were also the categories where the greatest improvements were seen with percent errors decreasing approximately 10% in capitalization and approximately 7% in punctuation. Students in the Correction Only condition also showed a decrease in tense errors of 9%.

In sum, the results revealed that student writing improved from pre- to posttest across all conditions. Students in all three conditions wrote more CIWS, a greater percentage of CWS, and decreased errors, especially in capitalization and punctuation. One half to two thirds of the students had posttest writing samples that were rated more highly than the pretests. Statistical analysis of the data revealed no significant effects related to intervention. However, effects sizes were larger for CIWS and %CWS for the Correction + Explanation + Write Again condition. Students in this condition also had a higher percentage of the posttest writing samples assigned higher quality ratings than in other conditions and a significantly higher percentage of better quality on the posttest than the pretest.

CHAPTER V

Discussion

This study was designed to examine methods for improving the basic writing skills of students with writing difficulties. Specifically, the study compared the effects of three approaches to providing correctional feedback on the writing performance of students with writing difficulties in grades 4-8. The three intervention approaches used in the study were Correction Only, Correction + Write Again, and Correction + Explanation + Write Again. The 28 participants, who were randomly assigned to one of the three correctional feedback conditions, had Individualized Education Program (IEP) goals in writing. Writing quality was indexed in three ways: correct minus incorrect word sequences (CIWS), percentage of correct word sequences (%CWS), and quality ratings. The first two measures took into account basic skill components such as grammar, punctuation, capitalization, spelling, word usage, and so on. The quality ratings were global ratings of overall improvement in writing. A secondary analysis examined what types of errors students made and what types of errors were affected by the interventions.

What Are the Effects of Three Approaches to Providing Correctional Feedback on the Writing Performance of Students with Writing Difficulties in Grades 4-8?

Results revealed that students in all three groups made significant gains from pre- to posttest on both CIWS and %CWS, but that these gains were statistically equivalent across conditions. These findings suggest that all three approaches contributed to improvements in students' writing performance although such a conclusion should be tempered by the fact that there was no control group in which students received no

interventional instruction. Thus, it is possible that students may have made such gains without any of the intervention.

It is interesting to note that the raw gains on CIWS for the Correction + Explanation + Write Again condition were more than two times that of the other two conditions, with an effect size of .78 ($n = 9$) and 0.7 when the outlier was deleted ($n = 8$). On %CWS, the raw gains for the Correction + Explanation + Write Again condition and the Correction Only condition were identical ($ES = .63$), and were more than two times that of the Correction + Write Again condition ($ES = .25$). When the two outliers were deleted from the Correction Only and the Correction + Explanation + Write Again conditions, the effect sizes of %CWS for the Correction Only ($n = 8$, $ES = .5$) and the Correction + Explanation + Write Again condition ($n = 8$, $ES = .69$) changed slightly. These different gains were not reliable findings. Although the results may have been affected by lack of power due to small sample sizes as well as a high degree of variability in grade levels and student performance levels, the results do not reveal reliable group differences. However, the pattern of change implies the need to examine further the effects of these intervention approaches in future research on a larger sample. This is especially so, given that quality ratings also favored the Correction + Explanation + Write Again condition, with a greater percentage of posttest writing samples receiving higher quality ratings than for the other two conditions.

Closer examination of the types of errors students made and the changes in those errors revealed that students made the greatest number of errors in capitalization and punctuation, and changes in error rates were particularly evident in these same categories. Reduction in error rates were greatest for the Correction Only and Correction +

Explanation + Write Again conditions, with reductions of 24% in these two categories compared to 10% in Correction + Write Again. It is surprising that positive pretest-to-posttest changes on CIWS were different for the Correction Only and the Correction + Explanation + Write Again groups while similar on %CWS for these two groups. This is most likely due to the fact that students in the Correction Only group decreased the number of words in their writing samples from pretest ($WW = 116.83$) to posttest ($WW = 105.5$), and they made a similar number of errors per word from pre- to posttest (pretest $CWS = 86.06$; posttest $CWS = 85.56$). Consequently, the percentage of CIWS over WW for the Correction Only condition increased from 39% to 57% from pre- to posttest. In the Correction + Explanation + Write Again condition, however, students increased in the number of words in their writing samples from pretest ($WW = 122.56$) to posttest ($WW = 143.22$), but decreased in the number of errors per word. Consequently, the percentage of CIWS over WW for the Correction + Explanation + Write Again condition increased from 42% to 62% from pre- to posttest.

Findings regarding changes in the types of errors suggest that skills in the correct use of capitalization and punctuation are difficult to acquire, and students need help in acquiring these skills. This implication coincides with the outcome of Lyman's study (1931), in which 1,039 students in general education received error-correction intervention. Lyman found that the participants, although benefitting from the intervention, made more errors in capitalization and punctuation than in other areas including sentence structure and grammar on both the pre- and posttest.

In sum, evidence suggests that some types of correctional feedback may be helpful for improving writing performance of students with writing difficulties. The types

of feedback were not found to produce differential effects in this study although consistently results favored the Correction + Explanation + Write Again group, and to a lesser extent, the Correction Only group. Correction + Write Again condition led to consistently lower change scores, perhaps due in part to the lack of motivation to write again on the same story without knowing exactly why they were doing it. For example, on several intervention days, students in the two write-again conditions asked the researcher, “Do I have to write the same story?” They expressed they would like to write on a new story prompt.

Previous studies that examined the effects of teaching mechanics and grammar through writing practice suggested that an intervention of mechanics and grammar, when integrated with writing tasks, could improve writing quality (Fearn & Farnan, 2007; Maize, 1954; Suggs, 1961; Vernon et al., 2005). The current study has yielded a similar result in the performance by the participants with writing difficulties. These students received correctional feedback focusing on mechanics and grammar and practiced correction of the errors they made in mechanics and grammar through writing tasks.

Findings of the study have two tentative implications. First, correcting errors in mechanics and grammar in an appropriate manner through writing tasks may help students correctly use mechanics and grammar for better writing. Students in all three groups demonstrated improvements as measured by CIWS and %CWS. Of course, without a nontreatment control group, it is impossible to conclude that the interventions were the cause for the improvements. Thus, in future research, a nontreatment control group should be included to further examine the effects of basic-skill interventions vs. typical in-class writing instruction. Being able to define and identify rules of mechanics

and grammar is different from being able to apply these rules to writing (Weaver, McNally, & Moerman, 2001). Students need opportunities to practice new knowledge for bridging the gap between knowing and applying. Second, one-to-one feedback on specific writing errors allows the teacher to tailor the feedback to meet the needs of students with writing difficulties. Students may persist in their writing errors when they receive inadequate feedback (Fallahi et al., 2006). The feedback provided to students with various writing difficulties targets problem solving. One-to-one feedback can generate meaningful communication between instructor and student, which increases student involvement in the learning process (Edwards & Pula, 2008) and helps students progress from the level of potential development to the level of problem solving using the principle of Zone of Proximal Development (Vygotsky, 1978). The effectiveness of one-to-one feedback with a focus on specific errors is supported by some participants' comments that one-to-one communication provided them the opportunity to have their errors pointed out.

These tentative conclusions and implications must be tempered by the limitations of the study. As stated earlier, the study had a small sample size and low power to reveal statistically significant differences. Thus, although examination of the overall pattern of results may contribute to the design of future research, it is impossible to draw specific conclusions about the effects of the interventions. Furthermore, the study was of short duration. A longer study might yield more valuable data of interventions. However, despite these limitations, the results do support further research into the effects of interventions designed to address students' lower-level writing skills, with special

attention to the potential effects of a Correction Only condition and a Correction + Explanation + Write Again condition.

Summary

This study examined the effects of three approaches to providing correctional feedback on writing performance of students with writing difficulties. All three approaches focused on providing correctional feedback on errors in mechanics and grammar that students made in their writing samples. Through eight sessions of correctional feedback, students in all three conditions (Correction Only, Correction + Write Again, Correction + Explanation + Write Again) displayed significant improvement in writing performance from pre- to posttest. Although there was no significant difference in the outcomes of the three conditions, findings of students' improvement on CIWS, %CWS, quality ratings, and the decreases in students' errors, particularly in capitalization and punctuation, suggest that one-to-one correctional feedback with a focus on specific errors may help students improve their overall writing performance in that one-to-one correctional feedback is likely to meet individual needs of students with writing difficulties. The study also indicates that lower-level writing skills, when taught specifically, may contribute to better writing. Students can become better writers when they learn lower-level writing skills through writing tasks.

Strengths and Limitations

This study displays three strengths. First, the study targeted students in special education. All participants had IEP goals in writing. Participants' grade levels from 4 to 8 revealed a fairly large age range. The difficulties they exhibited and the improvement

they made in mechanics and grammar might indicate that students across grades with writing difficulties needed help in applying lower-level writing skills to writing.

Second, the teaching of skills in mechanics and grammar was reinforced through completing writing tasks. The integration of teaching lower-level writing skills with writing tasks dynamically engaged students in a learning process for better writing. This learning process not only enabled students to improve lower-level writing skills but also provided opportunities for students to generalize the learned skills to learning tasks.

Third, individualized feedback was able to meet students' specific needs. Students displayed various writing difficulties. Their problems with mechanics and grammar led to different errors in their written expressions. For example, one student's problem with punctuation might be his or her confusion with the use of comma and period, and another student's problem with punctuation could be the incorrect use of quotation marks. As the correctional feedback focused on individual students' specific errors in their writing samples, this feedback appeared to be adequate in helping them identify and solve problems in the process of completing writing tasks.

The study has at least four limitations. First, the participants, recruited only from three suburban public schools, could not represent the entire population. Although a stratified random method was used to assign the participants to one of the three conditions, participants displayed only those characteristics that were specific to their school communities. As a result, there existed a threat to the internal validity of this study.

Second, the small sample size ($n = 28$) made it impossible to set up a control group for the study. Although the participants were randomly assigned to the three

treatment conditions, the special education service that they were receiving when they participated in the study might have had an effect on their writing performance.

Therefore, the study outcome that students in all three conditions made significant improvements in writing performance over time could not conclusively attribute to the intervention.

Third, as mentioned earlier, the small sample size, with only eight to ten students in each condition, decreased power.

Fourth, this study did not examine the writing efficiency in terms of how many minutes students should write for each session. Although participants wrote for 10 minutes and put a slash mark on their compositions after 5 and 7 minutes, the actual time that each participant spent on the writing tasks was not the same. A few students were unable to start writing during the first 3 to 5 minutes. Another few students wrote for less than 7 minutes in each session and refused to write more. To reduce the intervention time cost, it would be ideal to give students adequate preparation time and then let them write for the shortest possible time.

Implications for Research and Practice

More research needs to focus on improving lower-level writing skills for better writing quality. Such research should be conducted on a large student population over a long period of time. Research in integrating the teaching of lower-level writing skills with writing practice may provide information about the instruction content that is adequate for students with writing difficulties. Research in how to provide correctional feedback with a focus on students' writing errors may yield information about whether and which type of feedback procedure produces greater effect on students' writing performance.

Research in time efficiency (in terms of how many minutes students should write for in each session, and how frequently an intervention can be implemented) may be beneficial for monitoring progress in student writing. As students with writing difficulties often experience problems in both lower-level writing skills and higher level writing skills, future research also needs to investigate how the use of lower-level writing skills and the use of higher level writing skills can be combined together to improve writing quality.

More research is needed to investigate how teachers can provide appropriate need-oriented instruction in lower-level writing skills to individual students on a regular basis. On the one hand, teachers need to be competent for identifying students' problems with lower-level writing skills. On the other hand, teachers should be capable of teaching specific lower-level writing skills. Teaching is vital for student learning. Appropriate teaching contributes to successful learning. When teachers have a good understanding of lower-level writing skills and are up-to-date with the most recent research-based teaching methods for integrating lower-level writing skills into writing, they will be competent for helping students improve their writing.

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Appendix A
Sample of Error Correction

If I could talk with animals...

I would know what they like.

I want to become a friend with... animals.

① Become friends with unique, nice, kind, cool, awesome, amazing and

wonderful animals. But if they talk too much they will be

a bothersome. / There are bad

animals. So sometimes you have to

be careful. / I wish sometimes

I couldn't talk ^{with} animals I think

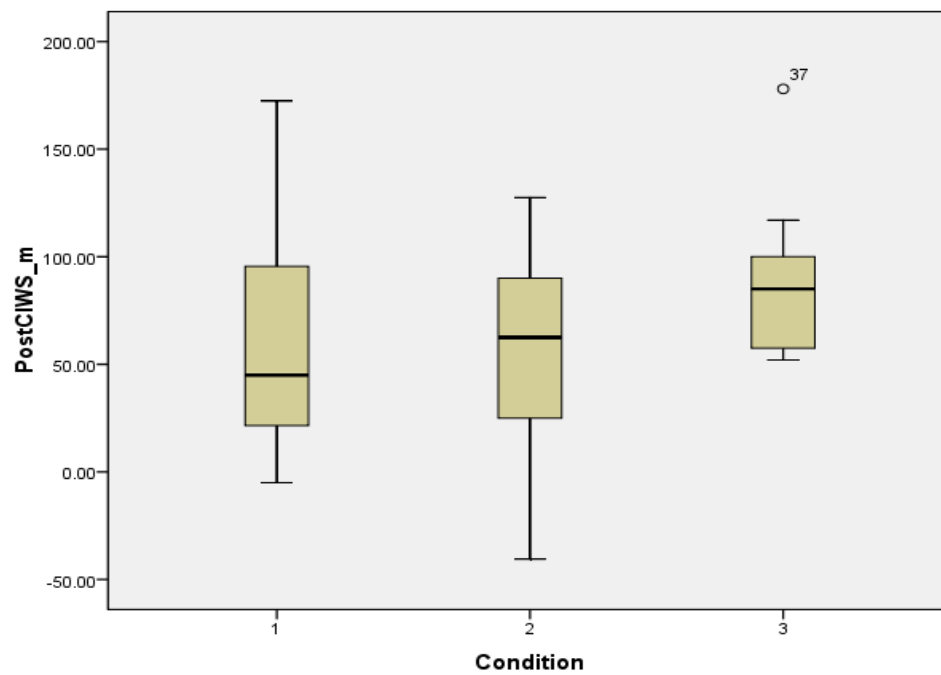
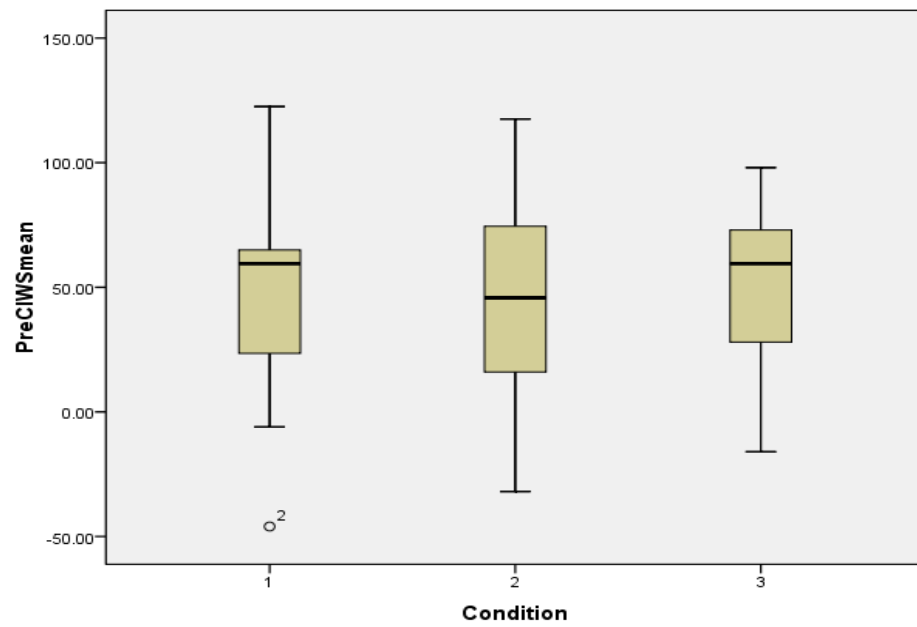
it would be fair. It is neat

to talk to animals.

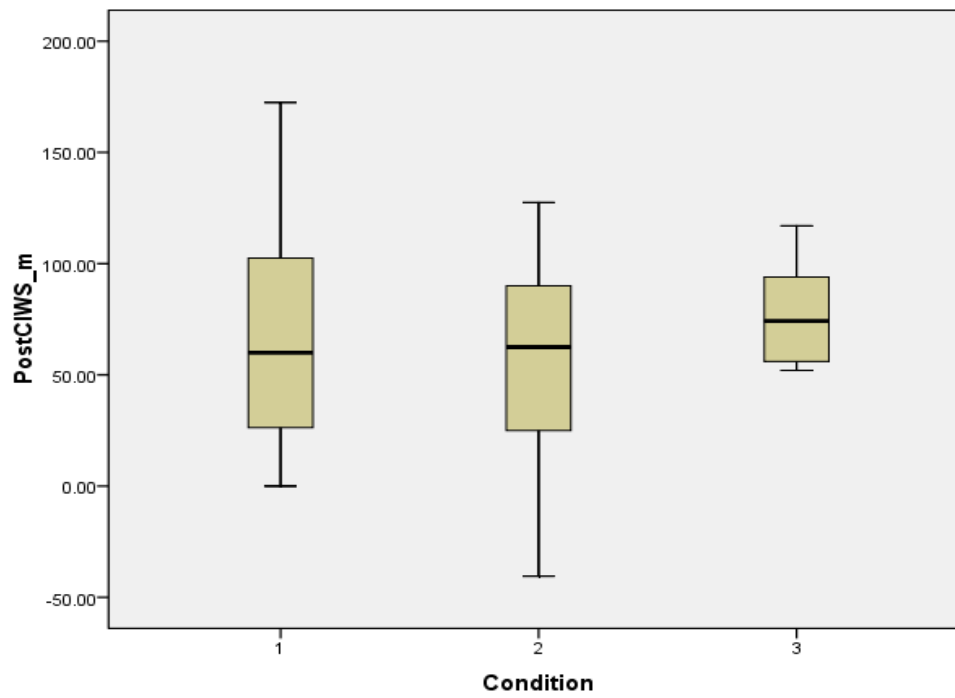
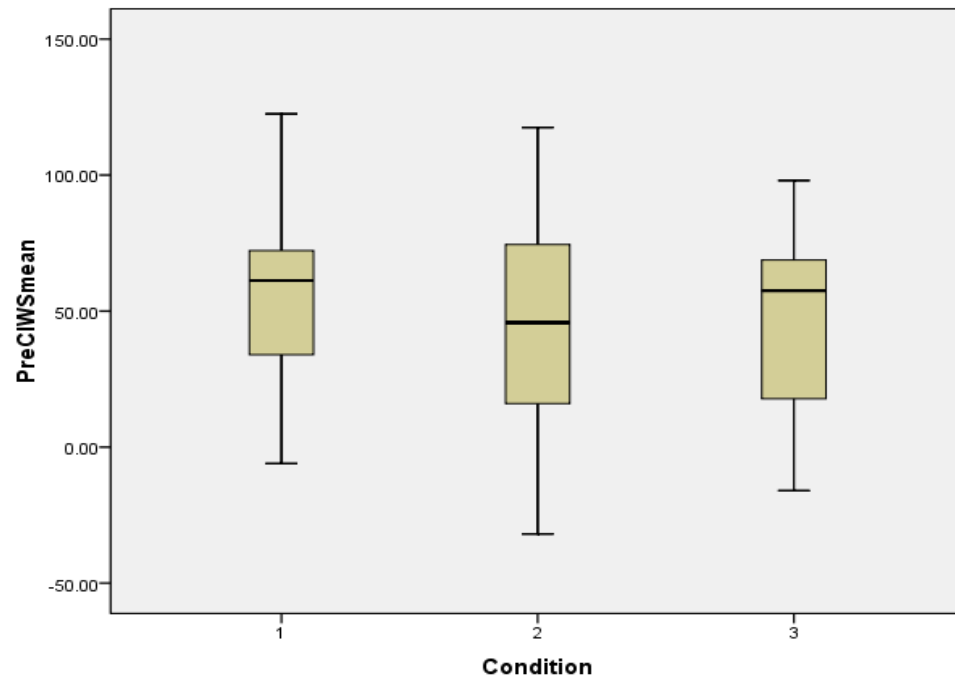
Appendix B

Distribution of CIWS within group with and without outliers

Pretest and Posttest with Outliers



Pretest and Posttest Without Outliers



Appendix C

Results of RM-ANOVA on CIWS and %CWS

Results of RM-ANOVA on CIWS and %CWS

	All participants (<i>n</i> = 28)			Participants without outliers (<i>n</i> = 26)	
	<i>df</i>	<i>F</i>	<i>ρ</i>	<i>F</i>	<i>ρ</i>
<i>CIWS</i>					
Time	1	10.44	<.01	7.27	<.01
Condition	2	.57	.57	.34	.71
Time X Condition	2	1.6	.22	.95	.4
<i>%CWS</i>					
Time	1	22.5	<.01	18.81	<.01
Condition	2	.34	.71	.5	.61
Time X Condition	2	1.2	.32	.98	.39