A paragraph text-writing intervention for secondary students with intellectual and developmental disabilities: a single case design study

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A PARAGRAPH TEXT-WRITING INTERVENTION FOR SECONDARY STUDENTS WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES: A SINGLE-CASE DESIGN STUDY

by

Derek B. Rodgers

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Teaching and Learning in the Graduate College of The University of Iowa

May 2019

Thesis Supervisor: Assistant Professor Shawn M. Datchuk
For Naomi, who – above all things – is the most kind and loving person.
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When I was a child, my parents often told me that an education was the surest path to a better life; my ticket out of Dodge. It is my hope that this project – and the overall experience it represents – convinces them that I listened to their advice, albeit to an extreme. I extend to them my most profound thanks for their support and love, as it was they who first believed in me.

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ABSTRACT

Written expression can be a critical skill for academic, vocational, and social pursuits. Unfortunately, research suggests that students with intellectual and developmental disabilities (IDD) struggle to develop writing skills. Paragraph text-writing is a component of written expression and refers to constructing multiple sentences about a singular topic with appropriate capitalization, punctuation, and grammar. The present study investigated the effects of a multicomponent intervention of explicit instruction and timed practice on the paragraph text-writing skills of four secondary student with IDD. The study included four dependent measures (paragraph text-writing rubric, total words written, and correct and incorrect writing sequences) and used a multiple-probe across participants design. Visual analysis and effect sizes revealed modest results. Three participants showed improvement on at least one of the dependent measures; one participant showed no improvement at all. The practical implications of this study are discussed within the context of existing writing literature, and the limitations are presented.

Keywords: intellectual disability, autism spectrum disorder, text writing, writing fluency, explicit instruction
PUBLIC ABSTRACT

Having adequate writing skills can be an important part of success in school. Students complete writing assignments where they share their thinking about a class topic, and teachers can use such products to evaluate how well a student understands important concepts. Writing can also be important for finding employment and staying in touch with friends and family on popular social media websites. Unfortunately, many students in the United States struggle to develop adequate writing skills. Specifically, students with intellectual and developmental disabilities (IDD) experience numerous challenges, including difficulties with mastering grammar skills, evaluating their writing, and producing as much writing as their peers without disabilities. Students with IDD also have challenges with working memory that can impact the pace at which they learn academic skills.

There are a number of writing interventions for learners with IDD. Many of these interventions help students develop writing strategies, but they do not explicitly help students develop improved important paragraph text-writing skills such as composing multiple sentences about a single topic that have appropriate capitalization, punctuation, and grammar. Four high school students with IDD participated in this study. They completed a series of instructional lessons and timed writing practice lessons to improve such paragraph text-writing skills. This study provides evidence that a combination of explicit instruction and timed writing practice can help some students with IDD improve on several writing measures.
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CHAPTER 1: INTRODUCTION

Chapter Overview

This chapter describes the importance of developing writing skills and the challenges students with intellectual and developmental disabilities (IDD) face when learning to write. Specifically, students with IDD often experience difficulties with both the technical (e.g., rules of grammar/usage) and the cognitive aspects of writing (e.g., organizing thoughts and self-regulating their writing). These challenges may be due in part to deficits in working memory. This chapter also identifies the dearth of research regarding interventions aimed at improving the text writing fluency of students with IDD and describes instructional procedures from other areas of the writing intervention literature that may prove useful. The chapter ends by describing the purpose of this study along with the underlying theory of change.

The Importance of Writing

Writing is the act of translating one’s thoughts into written language – what Berninger (2000) called “language by hand” (p. 66) – and requires a broad set of inter-dependent skills. The amalgamation of these skills is called written expression. Written expression is an important academic skill, particularly for adolescents who use their writing to share their thinking, demonstrate mastery of important concepts, and make connections across academic curricula (Graham, 2006). Similarly, teachers use student writing to evaluate their learning (Bangert-Drowsns, Hurley, & Wilkinson, 2004; Graham & Harris, 2005; Graham & Hebert, 2011). Writing skills also have implications beyond academics, as they play a role in both vocational and social endeavors. In a 2004 survey, over half of employers indicated that they consider an applicant’s writing abilities when making hiring decisions (National Commission on Writing, 2004). The use
of increasingly important social media platforms and text messaging also require students to express their thoughts through writing (Penner-Williams, Smith, & Gartin, 2009). One important aspect of written expression is text-writing, which is the composition of multiple words that follow the rules of spelling, syntax, semantics (Kim, Gatlin, Al Otaiba, & Wanzek, 2017). Text-writing skills are important at the sentence-level independently and within the context of larger compositions, such as paragraphs.

Unfortunately, the evidence suggests that many students with disabilities struggle to develop adequate writing skills. According to the National Assessment of Educational Progress (NAEP), a national assessment of academic skills including writing, 60% of eighth graders and 63% of twelfth graders with disabilities scored at the Below Basic level on the NAEP writing assessment (National Center for Educational Statistics, 2011). Comparatively, only 15% of eighth graders and 17% of twelfth graders without disabilities scored at the Below Basic level on the same assessment. Those who scored in the Below Basic category demonstrated challenges associated with presenting a logical argument with supporting details and appropriate grammar, usage, mechanics, and semantics.

**Students with IDD and Writing Skills**

Broadly, research shows that students with IDD have working memory deficits compared to their traditional peers, which can impact their ability to master academic skills (Poloczek, Buttner, & Hasselhorn, 2012; Richards et al., 2015). These challenges often mean that students with IDD also have difficulty transferring skills from one context to another (Gargiulo & Bouck, 2018). The research regarding specifically the writing characteristics of individuals with IDD is scant, but existing literature provides evidence that these learners can struggle with a wide-ranging set of writing skills (Joseph & Konrad, 2008; Lee, Hawley, Browder, Flowers, &
Wakeman, 2016). In general, individuals with IDD experience challenges in both the technical and cognitive aspects of writing. For example, Bird and colleagues (2008) observed that students with IDD sometimes have fine motor skill challenges, which may limit the amount of text these writers produce. Earlier research suggests that students with IDD also have difficulty mastering rules of grammar (Menyuk & Quill, 1985). Pennington and colleagues (2014) observed that writers with IDD write sentences that are often shorter and less complex than their peers without disabilities. Cognitively, students with IDD may struggle with a range of skills, including organizational skills, working memory, and self-regulation (Gabig, 2008; Moore, 2002; Asaro-Saddler & Saddler, 2010).

These challenges pose potential problems for students with IDD and meeting expectations for writing skill development. The Common Core State Standards (CCSS) suggest that students should be able to write multiple, related sentences about a topic by the end of fourth grade (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). However, research suggests that some schools allocate less than 30 minutes per day to writing instruction (Coker et al., 2016). Students with disabilities receive less instructional time devoted to critical writing skills, such as grammar (Monroe & Troia, 2006). This limited amount of instructional time devoted to text-writing within sentences and paragraphs is problematic to overall writing development.

**The Simple View of Writing: A Developmental Framework**

Researchers have illustrated the theoretical processes associated with writing development using several theoretical writing models, one of the most common being the simple view of writing (Berninger & Amtmann, 2003). Although the simple view of writing has primarily been used to describe the emergence of writing skills of elementary-aged writers,
recent research has successfully applied the model to adolescent students (Limpo, Alves, & Connelly, 2017; Poch & Lembke, 2017). Broadly, the simple view of writing posits that written expression emerges from a network of transcription, text generation, and executive functioning skills, all of which interact with and draw upon the writer’s working memory (Berninger & Amtmann, 2003).

The simple view of writing is commonly depicted as a triangle (see Figure 1 for an illustration). Text generation serves as the apex of the triangle, and transcription and executive functioning serve as the left and right base corners, respectively. Working and long-term memory are situated within the triangle. Transcription refers to handwriting, spelling, and typing skills. Text generation is when a writer uses transcription skills to form multiple words into sentences and paragraphs that make semantic and syntactic sense. Finally, executive functioning skills refer to the writer’s ability to plan, revise, and regulate the overall process (Berninger, 2000).

The simple view of writing posits that developing writers have a finite reserve of working memory to draw upon when learning new skills. Once developed to fluency, these skills move to long-term memory, freeing up more working memory for the development of new writing tasks. For example, fluent transcription skills have been shown to increase the total quantity and improve the quality of a writer’s text generation skills (Datchuk & Kubina, 2013; Garcia, Crespo, & Bermudez, 2017), which are important for later writing skill development. One important aspect of text generation is text-writing, which can occur at the sentence- and discourse levels. At the sentence level, text-writing involves the sequencing of multiple words making semantic and syntactic sense (Kim, Gatlin, Al Otaiba, & Wanzek, 2017), and fluent text-writing at the sentence level has been shown to improve the acquisition of paragraph text-writing.
skills (Datchuk, 2016). At the discourse-level (i.e., paragraph-length or greater), text-writing refers to the composition of multiple sentences with the same semantic and syntactic requirements for individual sentences. However, paragraph and essay-level writing requires writers to use self-regulatory skills like planning, editing, and sometimes goal-setting and monitoring (Feretti, MacArthur, & Dowdy, 2000; Graham, MacArthur, Schwartz, & Page, 1981; Schunk, 2003).

**Behavioral Fluency: An Intervention Framework**

The theory of behavioral fluency helps illustrate the importance of developing fluency within the components of written expression. According to the theory, instruction first helps students develop targeted skills to a specified level of accuracy, a process sometimes called acquisition (Daly, Lentz, & Boyer, 1996). Once they perform a skill accurately, students learn to develop the skill to fluency, through deliberate practice procedures such as repeated and timed practice (Daly et al., 1996). A learner achieves fluency when she or he can perform a behavior or skill at a pre-specified level of accuracy and speed (Johnson & Street, 2013; Kubina & Yurich, 2012). In addition, behavioral fluency positions skills – and therefore learning – along a continuum that spans from component to composite skills (Johnson & Layng, 1992). To develop fluency in a composite skill, such as paragraph text-writing, prior instruction must build important component skills (e.g., sentence-writing, capitalization, punctuation) to fluency.

Behavioral fluency is related to several measurable benefits for students. First, the student should show immediate improvement in both accuracy and speed in performing the fluent skill. Second, the learner should maintain the improved level of performance after instruction. Third, developing fluency in a skill should ease the development of closely related skills. For example, in written expression, an intervention that targets fluent paragraph text writing skills should
result in the learner demonstrating (a) an immediate improvement in skills related to sentence construction, syntax, semantics, punctuation, and capitalization, and (b) improved skills that maintain after the intervention has concluded.

**Previous Fluency Studies**

At present, few studies describe interventions that target text writing accuracy and fluency for students with IDD (see Chapter 2). The majority of writing interventions for students with IDD focus on writing strategy development (e.g., the self-regulated strategy development) and include more global dependent measures that do not measure text-writing skills, such as holistic and quality rubrics (e.g., Asaro-Saddler, 2014; Asaro-Saddler & Bak, 2012). While other studies (e.g., Kenney, 2013; McLaughlin, Williams, & Bording, 1984) do measure elements of text writing skills, they do not focus on developing those skills to fluency. Fortunately, the broader writing intervention literature for students with disabilities and writing challenges suggests that a combination of explicit instruction and timed practice may help students improve the accuracy and fluency of text writing skills.

Several studies have investigated the effects of explicit instruction and picture-word prompts on the text writing accuracy of students with writing difficulties, learning disabilities, and emotional-behavioral disorders (Anderson & Keel, 2002; Datchuk, 2016; Viel-Ruma, Houchins, Jolivette, Fredrick, & Gama, 2010; Walker, Shippen, Alberto, Houchins, & Cihak, 2005). Explicit instruction is a direct and systematic method of teaching that uses a model-lead-test framework to provide students with initial scaffolding that is gradually removed as students master the targeted skills (Archer & Hughes, 2011). For example, two single-case design studies (Viel-Ruma et al., 2010; Walker et al., 2005) examined the effects of the Expressive Writing program (Engelmann & Silbert, 1983) on three students with learning disabilities. *Expressive*
*Writing* is an intensive, direct instruction writing program that provides students with modeling, examples with which to practice, and immediate feedback aimed at improving their writing accuracy. In addition to explicit instruction, these studies also used picture-word prompts to help facilitate student writing. Picture-word prompts typically present a character or animal engaged in an action with several descriptive words that help describe the picture. (See Figure 2 for an example of a picture-word prompt.) Picture-word prompts have the potential to assist ideation and alleviate some strain on working memory because it provides writers with a specific visual context within which to write and accompanying word prompts to help them begin writing.

Viel-Ruma et al. (2010) and Walker et al. (2005) were both intensive interventions. In Walker et al. (2005), each participant completed the entire *Expressive Writing* program (50 50-minute sessions). Viel-Ruma et al. (2010) investigated whether an abbreviated version of *Expressive Writing* program would yield similar results; participants therefore completed 26 of the 50-minute lessons. The results were positive and comparable across studies, as participants showed improved text writing skills as measured by several traditional and modified measures (Ritchey et al., 2016): total words written (TWW), correct writing sequences (CWS), and incorrect writing sequences (IWS). (See Chapter 3 for definitions and examples of these measures.) For example, participants in both Viel-Ruma et al. (2010) and Walker et al. (2005) made modest gains with respect to CWS (i.e., 10-20 more CWS) by the end of intervention.

Other studies have examined the effects of a supplemental writing intervention that paired explicit instruction with timed writing procedures, referred to as sentence instruction (SI) and frequency building to a performance criterion (FBPC) respectively, for improving participants’ text writing fluency within simple sentences (Datchuk, 2017; Datchuk & Kubina, 2013; Datchuk, Kubina, & Mason, 2015; Datchuk & Rodgers, 2019). The SI component of the
intervention involved a series of lessons aimed at improving participants’ use of appropriate capitalization, punctuation, and grammar. In these lessons, participants identified the two parts of a simple sentence (i.e., the part that names and the part that tells more), corrected sentences for capitalization and punctuation, and completed activities related to verb tense.

In the FBPC component, participants completed a series of 1-minute timed practice trials. In each trial, a participant received a picture-word prompt with 10 unique images and words, and they had 1 minute to write as many simple sentences as they could. After each timing, the instructor reviewed the participants’ work and provided participants with error correction and performance feedback. In addition, the instructor provided participants with the number of modified CWS (i.e., identical to a traditional CWS except that spelling is not assessed) they earned in the timing. After receiving feedback, the participants received an identical picture-word prompt and participated in another 1-minute timing to try improving their CWS score. After their timing, the instructor provided additional error correct and performance feedback. This process repeated once more for three total repeated timings in a single session. During the next session, the instructor provided students with a novel picture-word prompt but used identical procedures. The FBPC component concluded in one of two ways: either participants completed 10 to 15 FBPC lessons, or they met a pre-determined performance criterion set from a small sample of high-performing writers (i.e., at least 30 CWS per 1-minute timing). The results of these studies indicated that participants improved their level of text writing accuracy and fluency, as they increased the number of CWS produced within simple sentences.

**Pilot Study**

One pilot study adapted the procedures of the SI and FBPC studies to examine the effects of supplemental intervention that paired explicit instruction and timed practice with picture-word
prompts on the paragraph text-writing skills of three secondary-aged participants with IDD (Rodgers & Datchuk, in review). Influenced by both the simple view of writing and the theory of behavioral fluency, the intervention relied upon a theory of change that a combination of paragraph instruction and timed practice could improve the accuracy and fluency of students’ paragraph text-writing skills. As per the simple view of writing, these improvements should shift the text-writing skills to long-term memory, resulting in greater self-regulation skills. (See Figure 3 for an illustration of the theory of change model for the pilot study.) A paragraph text-writing rubric closely aligned with the instructional materials (see below) was developed to measure changes in participants’ paragraph text-writing skills.

The paragraph instruction (PI) component involved three lessons designed to improve participants’ text-writing accuracy within paragraphs. These lessons included activities on identifying the parts of a simple sentence, writing multiple sentences about a singular topic, editing paragraphs for capitalization and punctuation, and verb tense. Like previous writing text-writing interventions, the lessons followed explicit instruction procedures: Participants initially received modeling and guidance from the instructor but worked gradually toward completing tasks independently. The FBPC component of intervention had participants complete a series of 3-minute timed practice trials aimed at improving their text-writing fluency skills. At the start of each session, participants received a picture-word prompt and had 3 minutes to write a paragraph. At the end of the timing, the instructor provided error correction and performance feedback using a paragraph text writing rubric. The participant then received another copy of the same picture-word prompt and had another 3 minutes to write a paragraph. These sessions continued until either the participants completed 10 FBPC sessions or they earned a score of 46
on the paragraph text-writing rubric on their best paragraph for two consecutive sessions, whichever came first.

The investigators developed a paragraph text-writing rubric to measure participants’ paragraph text-writing on the daily paragraph probes. The paragraph-text writing rubric was designed to address some potential limitations associated with common writing intervention metrics, such as TWW, CWS, and IWS. Specifically, scoring for CWS and IWS traditionally consider only adjacent writing units (i.e., two side-by-side words); how the writing units fit into the larger composition are not often considered (Parker, Tindal, & Hasbrouck, 1991). For example, a participant might begin an intervention writing short sentences with poor grammar. During intervention, the participant may write lengthy run-on sentences that are still not, overall, accurate (e.g., the sentences continue to have grammatical issues, or they may not be about a singular topic). This hypothetical situation may still result in a greater number of CWS despite the issues associated with elements of their writing because of how CWS and IWS are scored. Measurement challenges exist even when CWS and IWS evaluate adjacent writing units within the context of a sentence (Videen, Deno, & Marston, 1982). Although effective for short sentences (e.g., the writing sequence “Chris is” within the sentence “Laura and Chris is at the store” would receive an IWS because of the subject-verb agreement error), lengthy run-on sentences make it difficult to determine the context of a sentence. Finally, CWS is not sensitive to certain elements of paragraph writing (e.g., the need for five sentences about a singular topic). The paragraph-text writing rubric was designed to address these limitations.

The paragraph rubric was a trait-based rubric, which identified a series of text-writing elements closely aligned with the intervention (i.e., grammar, capitalization, and punctuation) that were scored on a 0-3 scale in addition to a dichotomous element that indicated whether the
The results of the pilot study were mixed. The second and third participants demonstrated a marked improvement from baseline to intervention: They wrote more sentences during intervention than baseline, and they used more consistently appropriate capitalization, punctuation, and grammar. In addition, the participants maintained their improved performance two weeks after intervention. However, the first participant showed mixed results. Although she demonstrated some initial improvement at the start of the intervention (i.e., wrote additional sentences with some improvements in grammar), her performance later returned to baseline level. Her maintenance data followed an identical pattern. Interestingly, the participant performed different during instruction. The paragraphs she wrote during the PI and FBPC components of the intervention showed considerable improvements compared to her baseline performance. However, she was unable to transfer this performance to the daily paragraph probes.

**Purpose of the Present Study**

The purpose of the present study was to extend the literature regarding paragraph text-writing skills for students with IDD and continue the development of the supplemental paragraph text-writing intervention. This study improved upon the pilot study in several key ways and, as such, relied upon a modified theory of change (see Figure 4). Broadly, the modifications to the intervention were designed to address limitations identified in the pilot study by making modest adjustments to the treatment intensity of the intervention. Treatment intensity is an important element of intervention modification, though many definitions of intensity exist (see Coddington and Lane, 2015 for a discussion). The modifications described herein were made through a
A taxonomy of intervention intensity framework described by Fuchs, Fuchs, and Malone (2017). The taxonomy provides researchers and educators with a blueprint for increasing the intensity of an intervention through a series of approaches, including adjusting the dosage, comprehensiveness, and strength of the intervention. Dosage refers broadly to the frequency of opportunities participants have to develop a skill and received feedback from the teacher. Intervention comprehensiveness refers to the extent to which a curriculum includes explicit instruction principles, such as initial scaffolding that gradually fades, providing more opportunities for practice, and incorporating activities that review the targeted skills. Theoretically, an increase in intervention intensity through greater dosage and comprehensiveness provides further opportunity for participants to practice skills, adopt them into their long-term memory, and free up additional working memory for future writing development. If successful, these changes could result in improved intervention strength.

Students with IDD exhibit challenges with working memory (Poloczek, Buttner, & Hasselhorn, 2012; Richards et al., 2015), and may require additional time to master academic skills (Gargiulo & Bouck, 2018). Therefore, the changes to the intervention were implemented to adjust treatment intensity through modest changes to dosage and the comprehensiveness of the instructional materials. In addition, changes to the dependent measures were made to ensure that a more dynamic set of possible results would be captured. All modifications are further described below.

First, the PI lessons were modified to increase the intervention dosage. Specifically, the length of the PI lessons were extended by increasing opportunities for practice and to include new instructional activities. For example, in the present study, students were given sample paragraphs that they had to evaluate for the four critical aspects of a paragraph (i.e., begins with
an indentation, includes five sentences, all sentences are about a single topic, and sentences are all complete). These instructional activities were not part of the original pilot study and were added to better align instruction with the paragraph text-writing rubric. In addition, more opportunities were added for students to write paragraphs with instructor feedback (e.g., the fourth lesson was dedicated solely to this activity). These two changes also reflect an increased intervention comprehensiveness, as they provide more opportunities for scaffolding and gradual independence for the participants. The activities are also cumulative in nature, as success on the tasks require students to evaluate pre-written paragraphs for skills targeted in intervention and to produce their own paragraphs that include the necessary skills, respectively.

Second, an additional PI lesson was added to the intervention (i.e., the PI component went from three to four lessons) to further increase intervention dosage. One participant in the pilot study may have benefited from additional instructional time and more independent practice with instructor feedback for two reasons. First, she needed to complete the check-out activity more than once before moving on to the FBPC component. Second, she struggled to transfer her instructional performance to the paragraph probes. Further instructional time may have ameliorated the challenges she demonstrated during intervention. Therefore, an additional lesson was added to increase instructional time on core intervention concepts. The fourth lesson, as described above, was added to increase the amount of time students spent writing paragraphs with instructor feedback prior to the frequency-building phase of the intervention. Studies that have compared intervention dosage (Haegele & Burns, 2015; Neil & Jones, 2015; Ross & Begeny, 2015) found that, broadly, interventions with longer durations lead to improved mastery of content. For example, Ross and Begeny (2015) compared an intervention treatments differing
in instructional time. The results suggested that the longer intervention led to greater levels of performance.

Third, the performance criterion used to conclude the FBPC portion of the intervention was modified to be more stringent. In the pilot study, participants had to meet their writing goal for only two out of three consecutive lessons to conclude the FBPC component (and the intervention as a whole). As a result, all three participants completed the FBPC portion in only two sessions (i.e., they met their writing goal on the first two FBPC lessons). For the present study, the FBPC performance criterion was modified such that students needed to meet their writing goal on three consecutive days to end intervention. This change was made for two reasons. First, prior research shows that more a higher performance criterion can lead to better outcomes. Kubina, Amato, Schilik, and Therrien (2008) compared the effects of two treatment conditions: one with a higher performance and one with a lower performance standard. The results showed that a higher performance criterion led to improved participant retention effects with minimal decrements in performance. Comparatively, the lower performance criterion condition resulted in lower retention and steeper declines in performance over time (Kubina et al., 2008). Second, this change ensured that participants in the present study completed more FBPC sessions and thus receive more independent practice with instructor feedback. This, again, increases the dosage of intervention by increasing the number of minimal lessons that would be completed prior to exiting intervention.

Fourth, the pilot study included only the paragraph text-writing rubric as a dependent measure. This made interpreting the results within the context of common writing intervention metrics (i.e., TWW, CWS, and IWS) difficult. Although the rubric was designed to closely align with the instructional aims of the intervention, these additional measures have some documented
psychometric properties (e.g., Espin, Seierka, & Halverson, 1999; Ritchey & Coker, 2013) and may help provide a more dynamic presentation of the results. For example, the paragraph text-writing rubric is sensitive to improved text generation skills only within the context of writing additional sentences with appropriate punctuation. The TWW measure has the possibility of revealing growth not captured by the rubric. Therefore, the present study included TWW and modified CWS and IWS as dependent measures in addition to the paragraph text-writing rubric.

Finally, the paragraph-text writing rubric was modified in several key ways. First, two paragraph-level elements were added: singular topic and consistent verb tense. These elements measured whether a student’s sentences were about one topic and used a consistent verb tense, respectively. These elements were added to address specific concerns from special educators at the participating high school. In addition, the sentence-level capitalization was modified to be a dichotomous measure (0 = inappropriate use; 1 = appropriate use). This change was made to prevent writers who used more instances of capitalization (e.g., more than one subject, the inclusion of specific places) from being disproportionally penalized compared to a writer who needed only to capitalize the first word in a sentence.

The present study was guided by four research questions:

1. What are the effects of the intervention on participants’ paragraph text-writing rubric scores?
2. What are the effects of the intervention on participants’ total words written?
3. What are the effects of the intervention on participants’ modified correct writing sequences?
4. What are the effects of the intervention on participants’ modified incorrect writing sequences?
Chapter Summary

This chapter described how writing skills can impact students’ overall academic experiences. Paragraph text-writing, in particular, can be an important skill for students in academic, social, and vocational pursuits. Unfortunately, students with intellectual and developmental disabilities (IDD) may struggle with the technical and cognitive aspects of written expression, in addition to broader issues with working memory and academic skill development. To date, very few studies have described interventions that target the paragraph text-writing skills of individuals with IDD. (Chapter 2 provides more detail on the topography of writing interventions for students with IDD.) Procedures for similar intervention borrowed from the broader writing intervention literature were presented in the chapter. A previous pilot study was discussed, and the purpose of the present study was put forward. The chapter concluded with the presentation of the specific research questions that guided this study.
CHAPTER 2: A META-ANALYSIS OF WRITING INTERVENTIONS FOR STUDENTS WITH IDD

Chapter Overview

To date, there has been no meta-analysis conducted to examine the aggregated effects of writing interventions for students with IDD. This chapter presents such a meta-analysis. The chapter begins with a description of the search procedures, as well as the inclusion and exclusion criteria. Thirty-eight (38) studies were included in the analyses, 35 of which were single-case design (SCD) studies and three of which were group design studies. A Tau-U was calculated for each outcome reported in the single-case design studies, and a Hedges’ g was calculated for all outcomes reported in the group design studies. The results suggest that, as a whole, writing interventions are effective for students with IDD. The SCD studies yielded a summary Tau-U of 0.79 (SE = 0.05, p < 0.001). The single group study with a control group yielded a Hedges’ g of 0.41 (SE = 0.17, p = 0.02), and the two group studies without a control group resulted in a summary Hedges’ g summary effect of 1.43 (SE = 0.94, p = 0.37). The chapter ends with a discussion of the results and limitations associated with the analysis.

Rationale for the Meta-Analysis

Few published studies describe the writing skills of and writing interventions for individuals with intellectual and developmental disabilities (IDD). This is in stark contrast to the body of literature exploring writing interventions for students with other disabilities, such as learning disabilities (e.g., Gillespie & Graham, 2014). Nevertheless, such intervention studies do exist and the research literature may benefit from a systematic analysis of this work. One rigorous method for synthesizing such related studies is through meta-analysis (Glass, 1976;
Meta-analyses can be conducted for several purposes, such as determining whether a set of related interventions are effective at improving outcomes for a specific population (Cleophas & Zwinderman, 2013). A meta-analysis of writing interventions for students with IDD has the potential to demystify the topography of the literature, providing researchers with an understanding of what interventions have been studied and to what extent those interventions have been effective.

Therefore, the purpose of this chapter is to perform the first meta-analysis of writing interventions for students with IDD. Because no such synthesis yet exists, the aim was to identify and include as much of the writing intervention literature for this population as possible, regardless of publication date, source of publication, study design, or other related elements. The meta-analysis was guided by several research questions:

1) What are, in general, the effects of writing interventions for students with IDD?

2) How do effects compare across intervention type?

3) How do effects compare across composition type?

4) How do effects compare across disability categories?

**Search Procedures**

**Inclusion Criteria**

To be included in meta-analysis, studies needed to meet several criteria. Studies must have: a) included participants diagnosed with an intellectual and/or developmental disability, b) used an pre/post design with or without a control group, a quasi-experimental design, or a single-case design (SCD) with sufficient data to calculate effect sizes, c) included dependent variables that measure participants’ written expression skills, and d) been published in English. The author placed no limitations on the age or grade level of the participants to be included in the analysis in order to provide the most comprehensive analysis of this literature as possible. In addition, SCD
studies that included participants with diagnoses of IDD as well as participants with other labels were included provided the data for the IDD participants could be isolated (i.e., results for participants with IDD were not aggregated with participants who had other disability labels). For group studies, all participants needed to be diagnosed with IDD in order to be included in this synthesis. Several studies (e.g., Woods-Groves et al., 2013; Woods-Groves et al., 2015) were excluded because a few participants had disability labels other than ID, DD, or ASD. The data from these studies would have been informative, but they did not meet the inclusion criteria. Similarly, SCD studies needed to provide more than one data point per phase to be included in the analysis. Regarding the third criterion, studies that reported on an intervention that included writing but did not report a dependent measure related to those skills were excluded. To ensure further the comprehensiveness of the analysis, the author included studies from peer reviewed journals, dissertations, and unpublished manuscripts.

**Electronic Search**

The literature search was conducted in three phases. The first phase was an electronic search of two databases: ERIC (Pro-Quest Version) and PsycInfo.

The following search terms were used for the ERIC database: intellectual disability OR moderate intellectual disability OR severe intellectual disability OR mental retardation OR developmental disability OR autism OR pervasive developmental disorders AND writing ability AND writing skills AND writing research AND writing instruction AND writing strategies. When accounting for duplications, this search resulted in 115 articles. The author read the abstracts for all articles and retrieved 33 for further review. Of the 33 articles retrieved, 20 articles (18 SCD studies, 2 group studies) were included in the analysis. Excluded studies were removed from the analysis because they did not report upon a writing intervention (s = 9), did
not include participants with IDD (s = 1), or provided insufficient data for the calculation of an effect size (s = 3).

The following index terms were used for the PsycInfo database: cognitive impairment OR developmental disabilities OR intellectual development disorder OR autism spectrum disorders AND written language OR writing skills OR written communication OR grammar OR sentence structure. When accounting for duplications, this search yielded 375 articles. The author read the abstracts for all articles and retrieved 53 of the articles for further review. Of the 53 articles retrieved, 12 articles (11 SCD studies, 1 group study) were included in the analysis. The remaining 41 studies were removed from the analysis because they did not report upon a writing intervention (s = 23), did not include participants with IDD (s = 7), provided insufficient data for the calculation of effect sizes (s = 4), were not available in English (s = 1), or did not include a dependent measure related to writing (s = 5).

During the electronic search, two published reviews of writing interventions for students with disabilities other than learning disabilities were identified (Joseph & Konrad, 2009; Taft & Mason, 2011). The author reviewed the studies that were included in these reviews and identified one additional single-subject study to include in this analysis.

Hand Search

The second phase of the literature search was a hand search of the following journals:

Ancestral Search

The third and final phase of the literature search was an ancestral search. The author reviewed the reference list of each included study to identify other studies that may have been missed from the first two phases. This search resulted in two additional studies.

Unpublished Manuscripts

Finally, two of the author’s unpublished studies were included in this analysis. Therefore, a total of 38 studies (35 SCD studies and 3 group studies) were included in the analysis.

Coding Procedures

Included studies were coded for the following elements: the source of publication, year of publication, participant characteristics (sex, diagnosis, IQ), intervention setting, study design, the type of writing intervention, dependent measure, whether spelling was a measured component, writing method, factors related to intervention intensity (i.e., number of sessions, length of sessions), and study quality elements (fidelity and interobserver agreement measures, maintenance phases, generalization measures, social validity data). See Appendix A for a copy of the coding form.

An additional coder was recruited to evaluate the reliability of the author’s coding. The second coder reviewed 12 studies (34% of included studies) randomly drawn from the list of included studies. Agreement was determined using the following formula:

\[ \frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \]

Agreement between coders was 97%.

Quality Indicators

In addition to the coding procedures described above, the studies included in this meta-analysis were evaluated for overall quality. The author adapted the Evaluative Method of evaluating study quality for both SCD and group design studies set out by Reichow, Volkmar, &
Ciocchetti (2008). Each set of standards is divided into primary and secondary standards. (See Appendix B for a copy of the SCD and group design Evaluative Method quality indicators.) For SCD studies, Reichow et al. (2017) identified six primary and five secondary quality indicators. For group design studies, the Evaluative Method provides six primary and eight secondary quality indicators. The majority of quality indicators overlap between the two sets. However, SCD includes indicators for baseline conditions, visual analysis, and experimental control that do not appear in the group design indicators. Similarly, the group design set includes indicators regarding comparison conditions, research questions and data analysis, statistical tests, random assignment, attrition, and effect sizes that do not appear in the SCD set.

The author selected Evaluative Methods over other methods of evaluating study quality (e.g., What Works Clearinghouse Single Case Design Standards) for two key reasons. First, Wendt and Miller (2017) compared several study quality rubrics and found the Evaluative Method to be the most appropriate for comprehensive reviews of intervention literature. Their determination is due, in part, to the documented reliability of the Evaluative Method’s standards. Kappa values for SCD primary and secondary standards were 0.69 and 0.93, respectively, and kappa values for group design primary and secondary ratings were 0.77 and 0.69, respectively (Reichow et al., 2008). Second, the Evaluative Methods provide a broader set of criteria than do other quality standards. For example, the Evaluative Methods provides criteria for assessing the extent to which the extent to which participant and interventionist characteristics are reported in the paper, as well as the precision with which the dependent variables are described. These standards also include an evaluation of the social validity of the intervention. The What Works Clearinghouse standards do not include these components, as these standards more aimed at evaluating the internal validity of a study.
Data Analysis

All data analysis was conducted using R 3.5.2 (R Core Team, 2018) and the metafor package (Viechtbauer, 2010). The author used a random-effects model to calculate the summary effects. The random-effects model assumes that the primary study effect sizes are estimating multiple “true” values; that is, the observed heterogeneity stems from both within-study and between-study variance. The inverse of these measures of variance are used when weighting primary studies for the summary effect.

The author included both group design and SCD studies in this investigation but did not combine the studies during the analysis; SCD and group design studies were analyzed separately with different effect sizes (see below). One effect size was calculated for each measure within each study. Over half of the included studies, 21 of 38, included studies that reported more than one dependent measure related to writing. Therefore, robust standard errors were calculated to account for the dependency of the data (Hedges, Tipton, & Johnson, 2010).

Calculation of Effect Sizes

Single Case-Design Studies

A Tau-U was used as the effect size for dependent measure reported in the SCD studies. Tau-U is a combination of the Mann-Whitney U test and a Kendall’s Rank Correlation and is interpreted as the proportion of data points that improve from baseline to treatment conditions (Parker, Vannest, Davis, & Sauber, 2011). Parker and colleagues (2011) suggest that Tau-U is preferable to traditional non-overlap indices (e.g., percentage of non-overlapping data, percentage of all non-overlapping data) because the researcher can adjust for undesired baseline trends, it is robust to issues of autocorrelation, and it is more appropriate for smaller datasets. Tau-U values range from -1.0 to 1.0, and can be interpreted as such: < .20 are considered small
effects, 0.20 to 0.60 are considered moderate effects, > 0.60 to 0.80 are considered large, and > 0.80 are considered very large (Vannest & Ninci, 2015).

All Tau-U values were calculated with the online Tau-U Calculator (Vannest, Parker, Gonen, & Adiguzel, 2016). Unlike traditional non-overlap indices, the calculation of Tau-U requires the specific values of each data point included in the analysis. For some studies, the y-axis intervals made it impossible to extract the specific values each data point using traditional methods (e.g., transparent straight-edge). Therefore, the data for all 35 SCD studies were extracted using WebPlotDigitizer (Rohatgi, 2014), a software that digitizes and scans graphs to provide X and Y coordinates for each data point used in previous SCD meta-analyses (see Maggin, Pustejovsky, & Johnson, 2017). In addition, Moeyart and colleagues (2017) found that WebPlotDigitizer yielded the highest reliability and was the most user-friendly when compared against other data extraction software programs.

**Group Design Studies**

A Hedges’ g (Hedges, 1981) was used as the effect size for dependent measures reported in the group studies. Hedges’ g is a standardized mean difference, similar to Cohen’s d. However, with small samples, Cohen’s d can include a bias that overestimates δ; Hedges’ g is a correction that can be applied to a Cohen’s d to remove the small sample bias. No group studies reported effect sizes; all Cohen’s d and Hedges’ g estimates were calculated from data provided in the studies.

One of the group studies (Haviland, 1982) included a control group, whereas two studies (e.g., Asaro-Saddler et al., 2015; Wang et al., 2016) only assessed the pre and posttest scores for the treatment group. The initial standardized mean difference for these two types of studies were calculated differently.
For Haviland (1982), the Cohen’s $d$ was calculated in this way:

$$d = t \sqrt{\frac{n_1 + n_2}{n_1n_2}}$$

Where $t$ is the $t$-statistic value of the group differences, and $n_1$ and $n_2$ are the sample sizes for the treatment and control groups.

For Asaro-Saddler and colleagues (2015) and Wang et al. (2016), the Cohen’s $d$ was calculated in this way:

$$d = t \sqrt{\frac{2(1-r)}{n}}$$

Where $t$ is the $t$-statistic value of the group differences, $n$ is the sample size for the treatment groups, and $r$ is the correlation between pre and posttest scores. Neither study reported the value of $r$. However, researchers have suggested that using a value of 0.5 when the true value is unknown is appropriate for calculating mean-difference effect sizes (e.g., Becker, 1988). Therefore, $r = 0.5$ was used to calculate the Cohen’s $d$ for the two studies.

Once the Cohen’s $d$ estimates were calculated for each dependent measure, the estimates were corrected for small sample bias with Hedges’ $g$ as described in Borenstein, Hedges, Higgins, and Rothstein (2009):

$$d * J$$

where:

$$J = 1 - \frac{3}{4df - 1}$$

Given the small number of group design studies ($s = 3$), and because these studies could not be combined (i.e., one study used a control group, two studies did not), the three group studies were not included in the sub-group analyses pertinent to the last three research questions.
Results of the Meta-Analysis

Characteristics of Included Studies

In total, 38 studies (35 SCD studies and 3 group studies) with 74 total dependent variables published between 1982 and 2017 were included in the analysis. Table 1 and Table 2 provide an overview of the study characteristics for the SCD and group design studies, respectively.

Participants. A total of 147 individuals with IDD (109 males, 38 females) participated in the 38 studies. Of the 147 participants, students had the following diagnoses: 62 with ASD, 15 with ASD and ID, 61 with ID, and 9 with DD. Only 18 studies supplied specific participant IQ scores. Of these studies, the mean IQ was $66.46 (SD = 17.76)$. Studies most often included participants enrolled in elementary school ($s = 16$), middle school ($s = 10$), and high school ($s = 8$). Two studies included participants enrolled in a postsecondary program, and one study included a participant in middle school and two participants in high school. Finally, one study included preschool-aged participants.

Study characteristics. The most common research designs were multiple baseline across participants ($s = 11$), multiple probe across participants ($s = 8$), and multiple baseline across measures ($s = 5$). The remaining designs included: multiple probe across measures ($s = 4$), ABAB reversal ($s = 2$), AB ($s = 1$), pretest/posttest without control group ($s = 2$), and pretest/posttest with control group ($s = 1$).

With regard to the type of intervention, four studies were spelling interventions, two were handwriting interventions, two were grammar interventions, six were sentence-writing interventions, two were sentence-combining interventions, seven were paragraph-writing interventions, and 15 were essay or story-writing interventions. Of the 22 studies that described a
paragraph, essay, or story-writing intervention, six studies focused on narrative compositions, eight studies included persuasive compositions, five studies focused on descriptive writing, three studies included expository writing, and one study was a mixture. In 26 of the studies, participants wrote with paper and pencil, whereas in 10 studies participants used a computer to write. Nine studies did not report how students composed their writing samples. In eight studies, spelling was either a direct or indirect outcome (i.e., a targeted dependent measure or part of another dependent measure, such as traditional correct writing sequences). For the remaining studies, spelling was either not measured (s = 21), or whether spelling was a measured component of the intervention could not be inferred (s = 9).

All SCD studies reported indices of treatment fidelity, whereas no group study included this information. The majority of studies (s = 25) included a maintenance phase, and 13 included at least one generalization measure. Eighteen studies reported social validity data from either participants or interventionists.

**Quality Indicators**

The studies included in this meta-analysis varied with respect to quality (see Table 3 and Table 4 for an overview of individual study quality). No studies met all of the quality indicators, and no individual quality standards were met by all studies. The most commonly met standards were those related to inter-observer agreement (s = 32), description of the dependent variable (s = 31), description of the independent variable (s = 30), and fidelity (s = 30). That is, the majority of studies reported adequate levels of inter-observer agreement on dependent measures (i.e., 80% or greater) as well as treatment fidelity (i.e., 80% or greater). In addition, most studies provided a detailed description of the dependent measures. The standards least often met were those related to social validity (s = 17), the use of blind raters (s = 16), and visual analysis (s = 13). With
respect to social validity, some studies (e.g., Asaro-Saddler, 2014; Delano, 2007a, 2007b; Pennington et al., 2016) did not collect social validity data, whereas others (e.g., Carlson et al., 2016; Pennington et al., 2011; Pennington et al., 2016) were not inexpensive. For example, Carlson et al. (2016) required the use of a software program that may not be readily available in most environments. With respect to blind reviewers for inter-observer agreement, several studies used a member of the research team as a second rater (e.g., Pennington et al., 2014), whereas in other instances (e.g., Lee et al., 2016) it was impossible to infer whether the reporter was blind to treatment conditions. With respect to visual analysis, a number of studies did not provide graphs of all the relevant data collected in the study (e.g., De La Paz & Graham, 1998; Liberty & Fitzpatrick, 1994). Other studies (e.g., Asaro-Saddler & Bak, 2012; Moore et al., 2013) included participants whose baselines did not stabilize during the baseline phase.

The results for the three group studies were similar, with some key differences. Although no study included all quality indicators, three indicators were included in all three studies. All three studies provided adequate detail about the participants and interventionist(s), and no study had high levels of attrition. However, there were several indicators that were not addressed by any study. With respect to random assignment, only Haviland et al. (1984) included a control group, and participants were not randomly assigned. No study reported fidelity, and no study indicated that raters were blind to treatment conditions. No study included generalization or maintenance data, social validity information, or effect sizes.

**Research Question 1: The Effectiveness of Writing Interventions**

**Single-Case Design Studies**

Figure 5 presents a forest plot of effect sizes with 95% confidence intervals for all 35 SCD studies. The meta-analysis yielded an overall statistically significant Tau-U summary effect
of 0.79 ($SE = 0.05$, $p < 0.001$). Stated differently, the summary effect suggests that 79% of the data points included in the meta-analysis demonstrate an improvement from baseline phase, which Vannest and Ninci (2015) consider a large effect. The result of the test of heterogeneity was not statistically significant ($Q = 13.74$, df = 63, $p = 1.0$) and the $I^2$ value suggested that 0% of the variance between studies was due to true heterogeneity. Because these results appear to suggest that there is no heterogeneity beyond within-study error, a moderator analysis was not conducted. (See the Limitations section for a discussion of the Tau-U variance estimates and their role in this analysis.)

**Group Design Studies**

Figure 6 presents a forest plot of Hedges’ $g$ effects with 95% confidence intervals for the three group design studies. (Note: There is no summary effect for this plot because these studies are methodologically different; summary effects were calculated separately.) The Hedges’ $g$ for the single pretest/posttest design with a control group was 0.41 ($SE = 0.17$, $p = 0.02$). The results were statistically significant and suggest that the treatment and control groups differed by less than one half of a standard deviation. The summary effect for the two pretest/posttest without control group designs was 1.43 ($SE = 0.94$) but was not statistically significant ($p = 0.37$). The heterogeneity test for the two group studies without control groups was statistically significant ($Q = 311.52$, df = 7, $p < 0.0001$), and the $I^2$ statistic suggested that 99.76% of the observed variance was due to true heterogeneity.

**Research Question 2: Differences in Effects by Intervention Type**

All studies were coded as one of seven possible types of writing interventions, and Table 5 presents summary effects for each intervention category. The Tau-U summary effect for the intervention types ranged from moderate to very large effects (i.e., 0.52 to 0.85), and all
categories sentence-combining resulted in statistically significant effect sizes. The heterogeneity test was not statistically significant ($Q = 11.05, df = 57, p = 1.00$) and the $I^2$ statistic indicated that 0% of the observed variance was due to true heterogeneity. The paragraph-writing interventions resulted in the highest effect size (0.85, $SE = 0.10$), and the grammar studies yielded the lowest effect sizes (0.52, $SE = 0.21$). All sub-group effects were statistically significant except for the effects of the single sentence-combining study.

**Research Question 3: Differences in Effects by Composition Type**

Table 6 presents the results of the composition type sub-group analysis for studies that focused on paragraph or story/essay-writing. The Tau-U summary effects for the five groups range from 0.80 to 0.92, all of which are considered very large effects. However, the heterogeneity test was not significant ($Q = 4.12, df = 38, p = 1.00$), and the $I^2$ statistic indicates that 0% of the observed variance was due to true heterogeneity. The narrative compositions (0.80, $SE = 0.14$) yielding the lowest value. The studies that included descriptive compositions yielded the largest effect (0.91, $SE = 0.47$), but this effect was the only result to not reach statistical significance.

**Research Question 4: Differences in Effects by Disability Category**

Table 7 presents the results of the disability category sub-group analysis. Regarding disability category, all sub-groups yielded similar Tau-U values of either large or very large effects (Range = 0.74 to 0.86). Again, the heterogeneity test was not statistically significant ($Q = 13.36, df = 60, p = 1.00$), and the $I^2$ statistic indicated that 0% of the observed variance was due to true heterogeneity. The studies including participants with DD resulted in the largest Tau-U value (0.84, $SE = 0.26$), whereas the studies that had participants of various disability categories resulted in the lowest Tau-U value (0.74, $SE = 0.09$). All summary effects were significant.
Publication Bias

The presence of publication bias may affect the summary estimates if the missing studies are systematically different than the studies included in the meta-analysis (Borenstein et al., 2009). To detect the presence of publication bias, the author conducted an Egger’s regression test for funnel plot asymmetry (Egger, Smith, Schneider, & Minder, 1997). The SCD and group studies were tested separately.

Figure 7 and Figure 8 provide the funnel plots for the SCD and group studies, respectively. Neither the SCD studies ($z = 1.42, p = 0.1561$) nor the group studies ($z = 1.84, p = 0.07$) yielded statistically significant results from the Egger’s test for funnel plot asymmetry. The symmetry of the funnel plots suggests that publication bias is unlikely.

Discussion

The purpose of this chapter was to present the first meta-analysis aimed at synthesizing writing interventions for students with IDD. In total, 38 studies (35 SCD studies and 3 group design studies), data from 147 participants, and 74 outcome measures were included in the analysis. A random effects model was used to calculate the estimates, as the author hypothesized that the true effects for each study would not be equal, especially given the diversity of participants, intervention types, and outcome measures included in the analysis. A moderator analysis was not conducted because of the test of heterogeneity for the SCD studies was not statistically significant.

The overall summary effects for the included studies suggest that the writing interventions did lead to improved writing performance and provide evidence that students with IDD benefit from writing interventions. The single-subject design studies resulted in an overall Tau-U value of 0.79 ($SE = 0.05$), which indicates that 79% of the data points show improvement.
from baseline to intervention phases. This result was statistically significant ($p < 0.001$). The Hedges’ $g$ summary effects for the pretest/posttest groups with (0.41, $SE = 0.17$) and without control groups (1.43, $SE = 0.94$) provide further evidence that the participants with IDD improved in their writing performance after intervention. The summary effect for Haviland (1982) suggests that the treatment group outperformed the control group by less than half of a standard deviation. This result was statistically significant ($p = 0.02$). The summary effect for the studies without control groups suggest that students outperformed their pretest scores by 1.43 standard deviations. However, this result was not statistically significant ($p = 0.37$).

The sub-group analyses offer further insight regarding the effects of writing interventions for students with IDD. There were minimal differences between the effects for students within different disability categories; all effects for the sub-groups were either large or very large (i.e., Tau-U = 0.60 to 0.80 or > 0.80, respectively). These findings suggest that students with more moderate needs (e.g., ID) may benefit from writing interventions in a comparable way to students with stronger cognitive skills (e.g., high-functioning ASD).

Similarly, there were minimal differences amongst the summary effects for the type of writing intervention. All summary effects, except for those in the grammar and handwriting sub-groups, were either large or very large. The summary effect for the grammar (Tau-U = 0.52, $SE = 0.21$) study was the smallest of the sub-groups; only 50% of data points in these studies improved from baseline levels. Grammar studies were also the intervention type with the second-fewest number of studies ($s = 2$). Handwriting studies yielded a similar result: a summary effect of 0.57 ($SE = 0.25$).

Twenty studies focused on compositions of paragraph or essay-length. These compositions included narratives, persuasive pieces, descriptive essays, expository essays, and
one study included a combination of composition types. The summary effects for the composition sub-groups were all very large: The Tau-U estimates ranged from 0.80 to 0.92. These results suggest that students with IDD make similar gains regardless of the type of composition they are writing, which provides evidence that students with IDD can learn to develop various writing skills.

However, the majority of studies that focused on paragraph or essay-length writing interventions did not explicitly measure text-writing skills. Rather, many studies used holistic rubrics or counted the number of essay or story elements included in student compositions. Very few of the included studies described interventions aimed at improving the grammar-related skills of students with IDD at any composition length. More research is needed regarding the effectiveness of interventions that target the text writing skills (grammar, punctuation, capitalization) of students with IDD. The study described in this document (introduced in Chapter 1 and further described in Chapter 3) aimed to address several gaps in the research. First, the intervention described in Chapter 3 will provide explicit instruction regarding text-writing skills to students with IDD. At present, there are only two studies that explicitly target grammar-related skills for students with IDD. This proposed study would add to that body of literature. Second, the primary dependent measure in this proposed study is a novel rubric designed to measure text writing skills in larger compositions (i.e., paragraphs) bolstered by traditional curriculum-based writing metrics (i.e., total words written, correct writing sequence, incorrect writing sequence).

**Limitations**

There are several important limitations that influenced the results of this meta-analysis. Most critically, the Tau-U effect size resulted in large variance estimates (Range = 0.09 – 0.36)
for each outcome in the single-subject design studies. Because the variances were so large, the results of the heterogeneity tests were insignificant (i.e., all $Q$-values were statistically insignificant, and $p = 1.0$ for all tests). Similarly, all $I^2$ statistics were zero. A strict interpretation of these data would suggest that there is no true heterogeneity between studies. Said another way: these studies all appear to be estimating the same true effect. This is unlikely, especially given the diversity of the ages of the participants, the types of interventions, and the myriad of outcomes included in this analysis. In addition, while a significant $p$-value for the $Q$-statistic does suggest that the true effects vary, failure to reject the null hypothesis is not definitive evidence of the alternative (Borenstein, Hedges, Higgins, & Rothstein, 2009). Substantial within-study variance, as was the case here, may result in a failure to reject the null hypothesis. These variances blocked any attempt at a moderator analysis. In sum, the author was not able to adequately examine the way specific variables may have influenced the effects across studies.

The analysis of group studies had another set of limitations. First, there were very few studies to include – the author identified only three group studies that met the inclusion criteria for this analysis. Second, the three studies were not methodologically similar; one study was a pretest/posttest with control group design whereas the remaining two studies were pretest/posttest without a control group. Therefore, the summary effects could not be combined. Like the single-case studies, the group study data were not appropriate for a moderator analysis.

There were several other limitations regarding this synthesis. Many of the studies did not adequately report data related to intervention dosage (e.g., number of sessions, length of sessions). Just under 50% of studies ($s = 18$) did not provide enough information to determine the number of instructional sessions, and 23 studies did not report enough information to determine the length of instructional sessions. Therefore, intervention duration could not be
analyzed. This information may have provided insights regarding the relationship between length of intervention and the magnitude effects.

**Chapter Summary**

This chapter described a meta-analysis aimed at aggregating writing intervention literature for students with IDD. The primary research question was whether writing interventions, in general, are effective for this population of learners. In total, 38 studies were included in the analysis (35 SCD studies and three group studies). The majority of studies did not target the text-writing skills of students with IDD. In addition, these studies used dependent measures that do not explicitly measure text-writing development, such as holistic and quality rubrics. The summary effects for the single-subject studies (Tau-U of 0.79, $SE = 0.05$, $p < 0.001$) and group studies without control groups (Hedges’ $g = 1.43$, $SE = 0.94$, $p = 0.37$) and with a control group (Hedges’ $g = 0.41$, $SE = 0.17$, $p = 0.02$) suggest that the included studies demonstrate, on average, positive effects on writing outcomes. Sub-group analyses showed that there were minimal differences in intervention type, type of composition, or participant diagnosis. The chapter concluded with a discussion of the results and several limitations, most notably the variances associated with the Tau-U variance estimates.
CHAPTER 3: METHODS

Chapter Overview

This chapter describes the methodology for the present study. The independent variable was a series of paragraph instruction (PI) lessons and frequency building to a performance criterion (FBPC) lessons. The first four lessons comprised the PI component, which covered the parts of a simple sentence; evaluating paragraphs for indentation, capitalization, punctuation, and grammatical errors; and writing paragraphs using picture-word prompts. The next ten lessons comprised up the FBPC component of the intervention, during which participants completed 3-minute timed writing sessions and receive immediate, corrective feedback.

The primary dependent measure was a paragraph text-writing rubric that measured whether the paragraph began with an indentation and used consistent verb tense, and it assessed the following elements in each sentence within the students’ paragraphs: grammar, capitalization, and punctuation. Total words written (TWW), correct writing sequence (CWS), and incorrect writing sequence (IWS) were also collected. The study used a multiple-probe across participants design with secondary students with intellectual and developmental disabilities (IDD). This chapter also describes the procedures used to evaluate treatment fidelity, inter-observer agreement on the dependent measure, and social validity.

- Students and Setting

Four secondary-aged individuals with IDD (Boomer, Chuck, Cat, Kayla) from a suburban Midwestern high school participated in this study. See Table 8 for a summary of participant characteristics. At the time of the study, all participants were receiving instruction in writing, and each had writing goals on their individualized education plans (IEPs). Boomer, Cat, and Kayla
had IEP goals specific to CWS, whereas Chuck had an IEP goal specific to paragraph writing. Each student received approximately 10 to 15 minutes per day of writing instruction in a special education setting. Teachers reported that no specific writing intervention packages or curricula were used. Teachers reported that all participants were diagnosed with ID (i.e., IQ scores of 75 or below). In addition, teachers reported that Boomer and Kayla both had an additional diagnosis of ASD. Cat’s teacher also reported that she had a behavioral plan. All four participants spent 40% of their day in the general education setting, and all were paired with an individual aide.

The author, Derek Rodgers, served as the interventionist for all sessions and administered and scored all probes. The interventionist held a master’s degree in special education, was currently enrolled in a PhD program for special education and had seven years’ experience teaching students with IDD. All sessions took place during the last period of the school day; this time was allocated for participants to receive supplemental instruction related to their IEP goals. The majority of sessions (90%) took place in an unoccupied office space in the participating school. The space included a small desk, two chairs, and several filing cabinets. During these sessions, the interventionist sat at the desk alongside the participant. However, the office was unavailable for 10 sessions. The interventionist used a classroom for six (6%) of the sessions, and the school library for the remaining four (4%) sessions. The classroom consisted of three circular desk clusters. The interventionist and the participant sat side-by-side at an unoccupied desk cluster furthest from the front of the classroom. The library included a small table close to the entrance, which is where the interventionist and participant sat. The interventionist worked individually with each participant.
Materials

There were 14 unique sets of intervention stimuli. The first four sets of stimuli were for the paragraph instruction (PI) lessons, which included instructional activities related to identifying the parts of a simple sentence (i.e., the part that names and the part that tells more), evaluating paragraphs for the necessary elements (i.e., an indentation and five complete sentences about a singular topic), editing paragraphs for capitalization and punctuation errors, and writing descriptive paragraphs using picture-word prompts. The picture-word prompts in the PI lessons appeared as three rectangular panels at the top of the page. Each panel contained hand-drawn images depicting a person or animal engaged in an activity. The images presented the activity in a linear fashion (i.e., the first, second, and third panels corresponded to the beginning, middle, and end of the action). Three words that help describe the character or animal and the activity appeared below the panels. The remaining 10 intervention stimuli were for the frequency building to a performance criterion (FBPC) lessons.

Each FBPC stimulus included a picture-word prompt at the top of the page and horizontal lines below the images on which the students could write their paragraphs. See Figure 2 for an example of a picture-word prompt. In addition, the FBPC stimuli included a checklist to prompt participants to check their writing for the four paragraph elements targeted by instruction (i.e., an indentation, five sentences, sentences about a singular topic, all sentences are complete simple sentences). The picture-word prompts appeared as three rectangular panels at the top of the page. The first and third panels contained hand-drawn images depicting a person or animal engaged in an activity. The first and third panels corresponded to the beginning and ending, respectively, of the activity. The middle panel was empty. Three words that help describe the character or animal
and the activity appeared below the panels. The FBPC stimuli also had two blank spaces upon which participants could write their own words to describe the action in the pictures.

There were 30 unique sets of 3-minute descriptive paragraph probes used for the measurement of the dependent variables at the end of every even-numbered lesson (e.g., Lesson 2, Lesson 4). These probes were formatted similarly to the FBPC picture-word prompts described above. However, the descriptive paragraph probes did not include the checklist that appeared on the FBPC stimuli, nor did they include spaces for students to write their own descriptive words. In addition, the descriptive paragraph probes used novel images and word combinations that do not overlap with the FBPC materials. The interventionist read the following instructions when administering the descriptive paragraph probe, “Write your name and date at the top of the page. You are going to write a paragraph that describes these pictures. The first picture shows the beginning, the middle is missing, and the last picture shows how it ended. There are some words you can use.” The interventionist read the words aloud. “Do you have any questions about the pictures or the words?” After addressing any questions, the interventionist set a timer for three minutes and said, “Begin.” After three minutes, the interventionist said, “Stop.”

**Definition and Measurement of the Dependent Variable**

The study included four dependent variables, described below.

**Paragraph Text-Writing Rubric**

The paragraph text-writing rubric measured paragraph-level and sentence-level elements of participants’ paragraphs from the descriptive paragraph probe. At the paragraph level, the rubric measured whether the student indented the first line of his or her paragraph, whether all the sentences were about a singular topic, and whether the participant used consistent verb tense across the entirety of the paragraph. The presence of an indentation was measured
dichotomously: a paragraph with no indentation received a 0, whereas a paragraph with an indentation received a 1. Whether all sentences were about a singular topic was also measured dichotomously (i.e., 1 = this was true, 0 = this was not true). Consistent verb tense was evaluated on a 0-3 scale, with 0 being the lowest score and 3 being the highest score. Scores were assigned in the following way: 3 = no errors, 2 = 1 error, 1 = 2 errors, 0 = 3 or more errors. For example, a paragraph that contained two verb tense errors received a score of 1.

The rubric also measured the following sentence-level elements for each sentence within the participants’ paragraphs: grammar, capitalization, and punctuation. Two elements (appropriate punctuation and appropriate capitalization) were scored dichotomously (1 = appropriate use, 0 = inappropriate use). Capitalization referred to instances in which participants needed to use capitalization (i.e., beginning of the sentence, proper nouns), and punctuation referred to placing an appropriate punctuation mark at the end of a sentence. The appropriateness of the participant’s grammar was evaluated on the 0-3 scale described above. Grammar referred to within-sentence errors related to subject-verb agreement, consistent verb tense, or other issues that impacted the meaning of the sentence. For example, a sentence that makes no, one, two, or three grammatical errors received a score of 3, 2, 1, or 0, respectively. Because the probe was timed, it was possible for participants to run out of time while writing a sentence. These sentences could receive a single point for grammar if the writing was devoid of errors and could receive one point for capitalization if all the appropriate words were capitalized.

The overall rubric score was dependent in part upon the number of participants a student’s paragraph contained. Punctuation marks were used to identify the number of sentences. For example, a participant who wrote a single long, run-on sentence and placed a single punctuation mark at the end of the sentence was assessed as having written only a single
sentence. Similarly, a participant who used two instances of punctuation was assessed as having written two sentences, and so on.

The paragraph-level elements were worth five total points, and the sentence-level elements were worth five points per sentence. Therefore, the ideal paragraph (i.e., begins with an indentation, includes five sentences about a singular topic, makes no change in verb tense, and all sentences include appropriate grammar, punctuation, and capitalization) is worth a total of 30 points. See Figure 9 for a copy of the paragraph text-writing rubric. For examples of how the paragraph text-writing rubric was used, see Figure 10 and Figure 11.

The paragraph rubric is researcher-designed and does not have documented psychometric properties, including reliability and validity. The rubric was closely aligned with the content of instruction, and it is a trait-based rubric. The scoring of the rubric was designed to limit subjectivity of the scorer.

**Total Words Written**

Total words written (TWW) refers to the total number of words in a piece of writing, regardless of spelling, grammar, or semantics (Hosp, Hosp, & Howell, 2016). For example, the sentence “timmy were at the stor t.” includes six TWW.

**Correct and Incorrect Writing Sequences**

Correct writing sequence (CWS) refers to instances in which a sentence begins with a capital letter, a sentence ends with appropriate punctuation, the use of appropriate capitalization within sentences, and when any two adjacent writing units use appropriate grammar and semantics. Traditional CWS also account for spelling errors; however, this study did not address spelling as part of the intervention. Therefore, a modified CWS that ignored spelling errors was used provided the target words were phonetically similar to the intended word (e.g., kofe for
coffee; Ritchey et al., 2016). Modified CWS has been used in several other studies (e.g., Rodgers & Datchuk, in review; Datchuk, 2016).

An incorrect writing sequence (IWS) was assigned whenever the aforementioned CWS criteria is not met. For example, the sentence “timmy_were_at_the_stor_t.” contains a total of seven writing sequence, indicated by the underlined spaces. In this example, the sentence would be scored as such: “^Xtimmy^Xwere^Xat^Xthe^Xstor^Xt.^X,” with two CWS (as indicated by the carrot symbol) and five IWS (as indicated by the X symbols).

**Inter-observer Agreement**

The investigator scored all probes. An individual unrelated to the intervention was recruited and trained to serve as a second rater and provide inter-observer agreement. The interventionist trained the individual on scoring the four dependent variables until reaching at least a 95% agreement for each measure on sample probes. Several sources of standards for single-subject design (e.g., Kratochwill et al., 2010; Reichow et al., 2008) recommend that at least 20% of probes across phases be re-scored by a second rater. However, other writing studies (e.g., Bishop et al., 2015; Konrad, Clark, and Test, 2017) have reported inter-observer agreement on at least 30% of probes. In keeping with this more stringent procedure, the second rater scored a randomly selected 33% of all probes across phases and students (i.e., 33% of Boomer’s probes across baseline, intervention, and maintenance phases). Inter-observer agreement was calculated using Cohen’s weighted kappa (Cohen, 1968). Weighted kappa differs from a Pearson’s correlation in that it accounts for chance agreement. The weighted kappa values range from 1- to 1, with higher numbers corresponding to a greater level of agreement. Cohen described agreement values greater than 0.80 as ideal and values of 0.60 to 0.80 as acceptable. The
weighted kappa values for each of the dependent variables were as follows: 0.82 for the paragraph text-writing rubric, 0.99 for TWW, 0.99 for CWS, and 0.97 for IWS.

**Independent Variable**

The independent variable was a multi-component intervention of paragraph instruction and frequency building to a performance criterion (PI and FBPC). There were four PI lessons, each of which lasted approximately 25 minutes. These lessons followed the model-lead-test hierarchy of explicit instruction (Archer & Hughes, 2011). The interventionist began by modeling all skills, after which he guided the participants through practice. After participants practiced the skills, the interventionist tested their independent performance. The PI phase of the intervention concluded when participants achieved at least 90% on an independent section of the final lesson. The 90% criterion was chosen in accordance with recommendations that instructors select high performance criteria as described by Archer and Hughes (2011).

The FBPC component included a maximum of 10 sessions (i.e., Lessons 5 to 14), which lasted approximately 15 minutes each. In the FBPC sessions, participants completed two 3-minute timed writings of paragraph writing, goal setting, performance feedback, and error correction. The FBPC lessons concluded either when a participant met her or his performance goal (i.e., 27 points on the paragraph text-writing rubric) for three consecutive days or completed all 10 FBPC lessons, whichever occurred first. A criterion of 27 points was selected as it corresponded to earning 90% of the possible points, thus mirroring the criterion from the check-out activity.
Procedures

Screening

Table 9 presents scores on the screening measures. To be eligible for participation in this study, participants needed first to be nominated by a teacher at the participating school. Appropriate nominees had a diagnosis IDD and demonstrated difficulty with paragraph composition. Once nominated, participants completed three screeners: a reading probe, a spelling probe, and a descriptive paragraph screener identical to the dependent measure, each of which are described below. The reading and spelling probes were used to ensure potential participants could access the intervention materials. That is, the interventionist wanted to take efforts to ensure that a participant who did not show growth on the dependent measures did not do so because of challenges associated with the instructional material. The descriptive paragraph screener was used to determine participants’ pre-intervention paragraph text-writing ability. Only the descriptive paragraph screener was timed.

The reading probe (see Appendix E) asked participants to read aloud sentences from the instructional lessons. To create the reading probe, each sentence from the instructional lessons was entered into an excel file. Three sentences from the beginning, middle, and end of each lesson were randomly sampled for a total of 36 sentences and 212 words. The order of these sentences were again randomized for the probe. Participants received a copy of the probe on which the 36 sentences were listed. The interventionist said, “When I tell you, you’re going to read the sentences on the page. You’ll start reading the first sentence, and then you’ll go down to the next one. You’ll read every sentence. Do you have any questions?” After addressing any questions, the interventionist said, “Begin.” The interventionist marked errors as the participant read. Reading errors were determined using common oral reading fluency procedures (see Hosp,
A participant’s final score was the ratio of words read correctly divided by 212. Participants had to earn at least 95% accuracy on the reading probe to qualify for the study.

The spelling probe (see Appendix D) was one Dolch’s 20 most common sight words (Dolch, 1936). The interventionist handed participants a sheet of paper with 20 blank spaces and said, “Do not pick up your pen until I tell you to. We’re going to do a quick spelling activity. I will say word and use it in a sentence. Then you write it down. Let’s get started.” The interventionist read each word aloud, used the word in a sentence, and repeated the word. A participant’s final score was the ratio of words spelled correctly divided by 20. Participants had to earn at least 95% accuracy on the spelling probe to qualify for the study.

The descriptive paragraph screener was identical to the probes used to measure the dependent variable, and the administration directions were identical to that of the baseline phase. To qualify for the study, participants had to write at least one sentence and earn at least five points on the rubric (i.e., no less than 50% of the total possible rubric points) but no more than four complete sentences with a score greater than 23 points on the rubric (i.e., no more than 90% of the total possible rubric points). Participants who scored less than five points were deemed ineligible because they lacked the appropriate sentence-writing skills necessary for paragraph writing. Participants who scored above 23 on the rubric were deemed ineligible because they already possessed strong text-writing skills.

Four individuals qualified for the study based upon the screening procedures described above. In addition to these screening measures, these four participants also completed the Kaufman Brief Intelligence Test 2nd Edition (Kaufman & Kaufman, 2004) because the school did not have IQ data. This assessment was administered individually in an unoccupied room of the
school and took approximately 25 minutes to complete per individual. This data is included in Table 6.

**Baseline**

During the baseline phase, all participants completed descriptive paragraph probes. The participants received no feedback on their work, nor did they participate in any PI or FBPC lessons during this time. This study took place during the last period of the participants’ academic day. During this time, participants worked on individual assignments either independently or with the help of a teacher or aide. Participants who had no additional work often went to the media center in the library to access the internet.

**Lessons 1 to 4: Paragraph Instruction**

In the first lesson, participants began a review of sentence construction by identifying the two parts of a simple sentence: the part that names and the part that tells more. Participants learned that all simple sentences begin with a capital letter, includes capital letters for all names and titles, and end with punctuation. Participants then practiced writing simple sentences. Next, participants learned that paragraphs are a collection of five or more complete simple sentences that follow the same grammatical rules as individual sentences, begin with an indentation, and are about the same topic. Participants then read several paragraphs and determine whether the example paragraphs adhered to these criteria. The lesson concluded with an opportunity for participants to write a paragraph with guidance from the instructor.

The second lesson began with a review activity in which participants identified the part that names for each sentence within a paragraph. Next, participants were given several paragraphs that they had to edit for appropriate capitalization and punctuation. Participants then completed two activities in which they practiced conjugating verbs in the past tense. Past tense
verbs were emphasized in the instructional procedures because early research suggested that it is the most efficient way to improve writing because it follows fewer rules. Specifically, it controls the task difficulty associated with learning paragraph composition (Kame‘enui & Simmons, 1990). For example, past tense verbs are often consistent regardless of the number of subjects. For instance, the word “ran” works for both “Dave ran the race” and “Dave and Denise ran the race.” This would not be true for present-tense verbs: “Dave runs the race” and “Dave and Denise run the race.” For this reason, previous studies on text-writing skills (e.g., Anderson & Keel, 2002; Datchuk, 2016; Datchuk & Rodgers, 2019; Viel-Ruma, Houchins, Jolivette, Fredrick, & Gama, 2010; Walker, Shippen, Alberto, Houchins, & Cihak, 2005) have focused on past-tense verb usage. The participants then received more practice evaluating paragraphs for the criteria described in the first lesson (i.e., indentation, five complete simple sentences, about a singular topic). This lesson concluded with more opportunities for participants to write paragraphs, both with guidance from the instructor and on their own.

The third lesson started with additional opportunities for participants to read paragraphs and a) identify the parts of each sentence that name something, b) edit the paragraph for capitalization and punctuation errors, and c) evaluate paragraphs for the criteria described in the first lesson. Participants also engaged in further practice conjugating verbs into the past tense. Participants were asked to complete these tasks with greater independence compared to previous lessons. Then participants practiced writing their own paragraphs.

The fourth lesson focused solely on participants writing their own paragraphs. After the lesson, participants completed a check-out activity containing activities and items sampled from the four lessons. They needed to earn at least 90% correct on this check-out activity before
moving on to the FBPC component of the intervention. (See Appendix F and Appendix G for the instructional materials and scripts, respectively.)

Three participants (Boomer, Chuck, Kayla) required at least one repeated lesson to successfully meet the 90% criterion on the check-out activity. Boomer and Chuck required two additional lessons, and Kayla required one additional lesson. All three participants required additional instruction on the identification of sentence parts and correcting capitalization and punctuation errors from pre-written paragraphs. Boomer’s scores on the checkout activity were 88%, 82%, and 94%. Chuck’s scores on the checkout activity were 86%, 76%, and 94%. Kayla’s check-out scores were 84% and 96%. Cat completed the PI and met the check-out criterion on her first attempt (94%).

**Lessons 5-14: Frequency Building to a Performance Criterion**

Participants began the FBPC component of the intervention once they successfully completed the four PI lessons and the check-out activity. At the beginning of each FBPC lesson, the interventionist explicitly stated the participant’s performance goal (e.g., 27 on the paragraph text-writing rubric). For all sessions after the first FBPC session, the interventionist reviewed the participant’s most recent performance. Next, the interventionist provided the participant with a picture-word prompt, and they vocally described the images. Next, the participant came up with and wrote two additional descriptive words in the allotted blank spaces underneath the images. After these procedures, the participant started the first 3-minute timed writing. After 3 minutes, the interventionist asked the participant to stop writing. The interventionist then reviewed the participant’s work and provided feedback by scoring the participant response using the paragraph text-writing rubric. When the interventionist identified student errors, he stated aloud the correct response and asked the participant to make the correction. The interventionist praised appropriate
elements of the participant’s paragraph (e.g., grammar, capitalization, punctuation, writing at least five total sentences).

The interventionist then removed the participant’s paragraph from view and provided the her or him with an identical picture-word prompt. Identical picture-word prompts were used for individual sessions, but different picture-word prompts were used across lessons (i.e., Set A will be used for Lesson 6, Set B will be used for Lesson 7, etc.). The participant then participated in another 3-minute timed writing. After 3 minutes, the interventionist told her or him to stop writing and again provided the same error correction and feedback described above.

Two participants (Cat and Kayla) concluded their FBPC phases after the first three sessions (i.e., they met their performance criterion for each of their first three FBPC lessons). Cat’s highest scores per session were 28, 30, and 29. Her total instructional time was 134.33 minutes. Kayla’s highest scores per session were 28, 29, and 30. Her total instructional time was 135.52 minutes. Boomer and Chuck completed the FBPC phase after four and five sessions, respectively. Boomer’s highest scores per session were 22, 30, 28, and 30. Chuck’s highest scores per session were 28, 22, 29, 27, and 28. Their total instructional time was 216.23 and 222.35 minutes, respectively.

**Maintenance**

No PI and FBPC lessons were delivered during the maintenance phase. Maintenance data were collected for each participant approximately two weeks after their last FBPC lesson. During the maintenance phase, participants completed 3-minute descriptive paragraph probes in an identical manner to the previous daily probes. The interventionist provided no error correction or feedback during this time, nor did the interventionist review the instructional material prior to administering the probe.


**Fidelity of Implementation**

All sessions were recorded with an audio-video camera. In accordance with other writing studies (e.g., Asaro-Saddler & Bak, 2014; Bishop et al., 2015), the author recruited an individual unaffiliated with the intervention to review at least 30% of the sessions for fidelity of implementation. This individual reviewed 33% of the recorded sessions with a checklist of instructional procedures developed by the interventionist. See Appendix H for a copy of the treatment fidelity checklist. The reviewer reported that intervention procedures were followed with 100% fidelity.

**Social Validity**

Once students completed the final maintenance probe, they completed a brief questionnaire about the intervention. Students responded to three questions: 1) “How do you feel about the instruction and timed practice with picture-word prompts?” 2) “How do you feel about your paragraph writing skills after the instruction and practice?” and 3) Is there anything you would change to the instruction or practice?” Questions 1 and 2 were answered with a Likert-style scale, with responses ranging from 1 to 4. A response of 1 meant “Poor” and a 4 meant “Great.” The third question was an open-response item. (See Appendix I for a copy of the social validity survey.)

**Experimental Design and Data Analysis**

This study used a multiple-probe across participants design to detect a functional relation between the intervention and the dependent measures (Kazdin, 2011). Single-case designs can be used to study low-incidence populations – such as students with IDD – as a participant’s performance during intervention is compared to her or his performance prior to intervention (i.e.,
baseline). In addition, single-case designs allow for the study of treatment effects that are measured repeatedly over time (Horner et al., 2005).

The multiple-probe across participants design is a modification of the multiple-baseline across participants design in which intervention is staggered across all participants. The primary difference is that with multiple-probe across participants design, the dependent variable is observed less frequently. In this study, descriptive paragraph probes were administered every other lesson during the intervention (i.e., Lesson 2, Lesson 4, FBPC 2).

All participants started in the baseline phase described above. The first participant began intervention once his performance across all four dependent variables was either stable or showed a downward trend, while the other participants remained in baseline. The second participant began intervention when two criteria were met: the first participant had completed the PI phase of the intervention and the second participant’s performance across all dependent variables was stable or showed a downward trend. This process repeated until all four participants had completed intervention.

The interventionist used a two-pronged approach to analyze the data. First, the interventionist used a visual analysis of trend, level, and variability to detect functional relations between intervention and the primary dependent measure for each participant. Specifically, the interventionist looked for changes in performance for the participant in the treatment phase while participants who remain in baseline continued to perform at their baseline level. The visual analysis was bolstered with the use of descriptive statistics (i.e., means and standard deviations) for each student across all phases (i.e., baseline, intervention, maintenance).

Second, in order to provide a summary effect of the intervention, the interventionist calculated a Tau-U effect size for each of the four dependent measures. Tau-U is an overlap
index that compares baseline and treatment-phase data. The effect size is a combination of the Kendall’s Rank Correlation and the Mann-Whitney $U$-test and allows the researcher to control for undesirable baseline trends (Parker, Vannest, Davis, & Sauber, 2011). Tau-U values range from -1 to 1, and Vannest and Ninci (2015) suggest the following interpretation guidelines for the Tau-U value: $< 0.20$ is a small effect, $0.20$ to $0.59$ is a moderate effect, $0.60$ to $0.80$ is a large effect, and $> 0.80$ is a very large effect. The interventionist used the Tau-U calculator on the Single Case Research Website (Vannest, Parker, Gonen, & Adiguzel, 2016) to calculate all Tau-U values.

**Chapter Summary**

This chapter provided a description of the participants, setting, and methodology for this study. Four secondary participants with IDD qualified for the intervention after a screening process. Participants first completed four PI lessons, at the end of which they needed to complete a check-out activity with a performance of at least 90% correct. Three participants required additional lessons to conclude the PI component of the intervention. After the PI component, participants completed the timed practice lessons. These lessons concluded when a participant either met the writing goal for three consecutive sessions, or they completed 10 FBPC sessions. All participants completed the FBPC component by meeting their performance goal for three consecutive sessions. The interventionist collected data on four dependent measures: a paragraph text-writing rubric score, total words written, correct writing sequences, and incorrect writing sequences. The study relied upon a multiple-probe design, wherein the intervention was staggered across all participants. Dependent measure data was collected at the end of every other lesson. A second scorer was recruited to provide inter-observer agreement on 30% of paragraph probes. The rater was blind to the purpose of the treatment and the treatment phases of the scored
probes. All inter-observer agreement values were within the acceptable range with respect to Cohen’s (1968) criteria (i.e., greater than 0.80). Another rater was recruited to evaluate treatment fidelity. The rater found that intervention procedures were followed with 100% fidelity.
CHAPTER 4: RESULTS

Chapter Overview

This chapter described the results of the paragraph text-writing intervention on the four dependent measures: the paragraph text-writing rubric, total words written (TWW), and correct and incorrect word sequences (CWS and IWS). Results are organized by student. In addition, Tau-U effect sizes for the four measures are described. Means and standard deviations per phase per student, as well as Tau-U effect sizes, are presented in Table 10. Tau-U values for individual participants are reported for each measure in Table 11. Graphed data for participants’ performance on the paragraph text-writing rubric, total words written, and correct and incorrect writing sequences are presented in Figure 12, Figure 13, and Figure 14, respectively.

Boomer

Paragraph Text-Writing Rubric

During baseline, Boomer wrote only one sentence per probe, and his sentences were often run-on sentences that contained grammatical errors (e.g., subject-verb agreement, missing words). He often capitalized words incorrectly in sentences (e.g., capitalizing words in the middle of sentences) and sometimes did not capitalize proper nouns. His sentences usually omitted punctuation marks at the end, but he often received full points for writing about a single topic and keeping a consistent verb tense. Boomer’s baseline data path showed an initial upward trend followed by a downward trend on the paragraph text-writing rubric. His rubric scores showed little variability during this phase (range: three to seven), with a mean performance of 4.86 (SD = 1.35). Boomer showed an immediate improvement in performance on the rubric at the start of the intervention phase. He began writing multiple sentences with fewer grammatical
errors. Early in the intervention phase, Boomer wrote two or three sentences, but he consistently wrote four sentences that started with an indentation by the end of the phase. He made fewer capitalization errors, and he continued to write about a singular topic and make minimal verb tense consistency errors. His rubric data path reflected these changes: It showed a variable but steep, upward trend as he progressed through the intervention. His rubric scores ranged from seven to 29, and his mean performance increased to 16.20 ($SD = 9.44$). Boomer maintained and improved upon his performance two weeks after the intervention concluded. On one maintenance probe, Boomer wrote five sentences. On another, he wrote six. He continued to use indentations and appropriate capitalization and punctuation, though he did make several grammatical errors (e.g., omitting words, subject-verb agreement). He consistently wrote about a singular topic and made minimal verb tense consistency errors. His rubric data path showed an initial dip in performance during the maintenance phase, but his final two data points met and exceeded his highest level of performance during intervention. His mean performance for this phase was 25.00 ($SD = 9.84$).

**Total Words Written**

After showing initial stability, Boomer demonstrated a downward trend in text production during the baseline phase. He wrote between 13 and 35 words during this phase, with a mean performance of 24.57 words ($SD = 6.83$). Boomer showed a more stable performance during the intervention phase with respect to TWW. He wrote 19 to 44 words, and his downward TWW data path stabilized. However, his mean performance is very similar to his baseline phase performance with greater variability (i.e., $M = 26.40$, $SD = 10.21$). Boomer showed minimal changes during maintenance, continuing a similar level of performance with less variability. He wrote between 25 and 36 words, with a mean of 29.33 ($SD = 5.86$).
Correct and Incorrect Writing Sequences

Boomer’s baseline performance showed an overall decreasing frequency and accuracy with respect to word sequences. His CWS data path showed initial stability with a possible upward trend, but the data path eventually showed a steep, negative slope. The IWS data path remained relatively stable during baseline and nearly converged with the CWS data path at the end of the phase. That is, Boomer earned nearly as many IWS as he did CWS on his final baseline probe. He averaged 19.57 CWS ($SD = 5.77$) and 3.71 IWS ($SD = 3.50$) during this phase. Boomer showed an overall improvement in frequency and accuracy during intervention. His CWS and IWS data paths converged on his first intervention phase probe, but the data paths diverged on subsequent probes. His average CWS increased to 25.00 ($SD = 11.31$), and his average IWS increased slightly to 4.4 ($SD = 3.78$). Boomer maintained his improved performance two weeks after the conclusion of the intervention. His CWS and IWS data paths remained separate, and his performance showed slightly less variability. He averaged 33.00 CWS ($SD = 8.54$) and 1.00 IWS ($SD = 1.00$) during this phase. Boomer made no errors on his final maintenance probe.

Chuck

Paragraph Text-Writing Rubric

During baseline, Chuck usually wrote two or three sentences with numerous grammatical errors (e.g., subject-verb agreement) per probe. His final sentence was often a run-on sentence. He used punctuation appropriately and rarely made capitalization errors, but he did not indent his paragraphs. In addition, Chuck often made verb tense consistency errors within paragraphs (e.g., sentences alternated between past and present tense). Chuck showed considerable variability on his rubric scores during baseline: His data path rose and fell in a consistent pattern. His rubric
scores ranged from two to 17, with a mean of 7.70 \((SD = 4.24)\). Chuck showed a stark improvement on the rubric during the intervention phase. Chuck started writing four sentences per probe, and his paragraphs began with an indentation. Chuck initially continued to make grammatical errors (e.g., run-on sentences, subject-verb agreement), though he made fewer such errors by the end of intervention. He continued to use punctuation and capitalization appropriately, and he improved with respect to verb-tense consistency. His intervention phase data path showed an improved performance. His paragraphs earned rubric scores that ranged from 15 to 28, and his average performance increased to 20.50 with a slight increase in variability \((SD = 5.26)\). Chuck performed at comparable level during the maintenance phase. He continued to write at least four sentences about a singular topic and began his paragraphs with an indentation, but he still consistently made verb tense consistency errors across his paragraphs. His mean performance was similar to the intervention phase performance \((M = 19.57)\) with less variability \((SD = 4.04)\).

**Total Words Written**

Chuck showed consistency with respect to TWW during baseline. He wrote between 38 and 55 words on his probes, with an average of 43.80 \((SD = 5.22)\) words for the phase. During intervention, Chuck maintained a similar level of performance with greater variability. His probes ranged from 32 to 60 words, with a mean of 49.75 \((SD = 12.23)\) for the intervention phase. His maintenance performance was comparable but lower average than both previous phases of the intervention. He wrote between 37 and 48 words, with a mean of 41.33 \((SD = 5.86)\).
Correct and Incorrect Writing Sequences

During baseline, Chuck showed high levels of frequency and inaccuracy. His CWS data path showed variability, and his final data points show a possible downward trend. Chuck’s IWS data path showed an initial upward trend, with his CWS and IWS data paths nearly crossing on one probe. The IWS data path later developed a negative slope, as he started to make fewer errors. He averaged 35.80 CWS ($SD = 7.27$) and 10.00 IWS ($SD = 4.78$) during baseline. Chuck showed an immediate improvement in frequency and accuracy during intervention. His CWS and IWS data paths grew further apart, indicating that he was generating more text with fewer errors. His CWS data path demonstrated performance above his baseline performance, while his IWS data path showed an overall downward trend. During intervention, Chuck’s average CWS increased to 50.25 ($SD = 14.64$) and average IWS decreased to 4.00 ($SD = 2.45$). His maintenance phase data paths showed a pattern consistent with his intervention-phase performance of IWS but not CWS. While his CWS and IWS data paths remained separate, his CWS data path clustered at a somewhat lower level than his intervention phase data. However, the CWS data path showed less variability than both baseline and intervention phases. Chuck’s IWS data path was similar to his intervention phase performance but showed an upward trend on the final probe. His average CWS decreased to 40.00 but had considerably less variability ($SD = 1.00$), whereas his IWS performance remained stable with an average of 5.33 IWS with greater variability than the intervention phase ($SD = 5.86$).

Cat

Paragraph Text-Writing Rubric

Cat’s baseline probes consistently included one run-on sentence per probe. On several occasions, she wrote two sentences, and she wrote three sentences on one probe. She often used
punctuation (with some exceptions), but she frequently made capitalization errors (i.e., did not capitalize proper nouns). In addition, her sentences often contained some grammatical errors (e.g., verb conjugation errors, subject-verb agreement). Her sentences were consistently about a single topic, and she made few errors with respect to verb-tense consistency. Cat showed considerable variability in her rubric scores during baseline. She received scores ranging from four to 17, with an overall mean performance of 11.00 (SD = 5.06). Cat made no improvements to her paragraphs with respect to the rubric during the intervention phases. She wrote only one sentence per probe during intervention, and each sentence contained similar grammatical errors to those from the baseline phase (e.g., run-on sentence, verb-conjugation errors). She did not use an indentation, though her sentences were about a singular topic, rarely contained verb tense consistency errors, and showed fewer capitalization errors. Her rubric data path showed the lack of effect, though it showed less variability in performance. Her paragraphs received rubric scores ranging from nine to 10. Her mean for this phase was 9.67 (SD = 0.58). Her maintenance paragraphs were comparable to her intervention phase writing. She consistently wrote a single run-on sentence about a singular topic with no indentation. She made similar grammatical errors, though she continued to use capitalization appropriately and made very few verb-tense consistency errors. Her maintenance paragraphs earned either eight or nine points, with a mean performance of 8.33 (SD = 0.58).

**Total Words Written**

Cat showed an initial upward trend on with respect to her TWW data path, but her performance later stabilized. She wrote between 11 and 29 words on her baseline probes, with an overall mean of 18.50 TWW (SD = 6.53). During intervention, Cat wrote a similar number of total words on her probes with less variability. She ranged from 15 to 20 TWW, with a mean of
18.00 TWW \( (SD = 3.79) \). Cat demonstrated an increase in overall writing production during the maintenance phase with increased variability. Her mean TWW increased to 29.00 \( (SD = 6.56) \).

**Correct and Incorrect Writing Sequences**

During baseline, Cat produced minimal text with some accuracy. Her baseline CWS data path showed a steep initial slope that later stabilized by the end of the phase, and her IWS data path showed stability throughout baseline. She averaged 16.00 CWS \( (SD = 6.81) \) and 4.33 IWS \( (SD = 2.73) \) during the baseline phase. Cat’s first two intervention phase paragraphs showed potential improvements: Her CWS data path had an initial upward trend and, and her IWS data path remained stable. That is, her data showed an initial increase in frequency and accuracy. However, her final intervention phase paragraph showed a downward trend. She had an average of 18.33 CWS \( (SD = 3.79) \) and 0.67 IWS \( (SD = 1.15) \) during the intervention phase. Cat’s maintenance paragraphs showed an improved performance from her intervention and baseline phase probes. Cat showed improvements in frequency while maintaining her previous level of accuracy: Her CWS data path showed an increase in level and an overall upward trend with a wider separation from her IWS data path. Her average CWS increased to 28.67 \( (SD = 6.81) \) and her average IWS was comparable to the intervention phase at 0.67 \( (SD = 0.58) \).

**Kayla**

**Paragraph Text-Writing Rubric**

Kayla’s baseline paragraphs usually contained two or three sentences. The paragraphs were always about a singular topic, though she did demonstrate some verb tense consistency errors. Her sentences were sometimes run-on sentences, and they typically included grammatical errors (e.g., verb conjugation errors, subject-verb agreement) and no indentation. She sometimes made capitalization errors (e.g., incorrectly capitalized words in the middle of a sentence).
Kayla’s rubric scores reflect this variability: Her data path showed an initial upward trend that stabilized later in the phase. Her scores ranged from 11 to 18, with a mean performance of 14.33 ($SD = 2.15$). During intervention, Kayla made minimal improvement with respect to her rubric scores. She continued to write three sentences consistently, though she occasionally wrote four sentences. Her paragraphs did not contain indentations, and she continued to write run-on sentences with similar grammatical errors throughout the phase. She made fewer capitalization errors, and her sentences were consistently about a single topic. Kayla continued to make verb-tense consistency errors. Her intervention phase data path showed little effect, though her data path showed a possible upward trend by the end of the phase. Her intervention phase rubric scores ranged from 15 to 19. Her mean performance on the rubric showed a slight increase ($M = 17.00$), and she showed less variability ($SD = 1.83$). Kayla’s maintenance phase paragraphs were comparable to those she wrote during intervention: She wrote three to four sentences with some grammatical errors throughout (e.g., subject-verb agreement), and many of her sentences were run-on sentences. She continued to make fewer capitalization errors, and she included an indentation on two of her paragraphs. Her data path showed an overall downward trend, with scores ranging from 14 to 20. Her overall performance yielded a mean of 16.33 ($SD = 3.21$).

**Total Words Written**

After some initial variability during baseline, Kayla’s TWW scores showed greater stability with a possible downward trend at the end of the phase. Her scores ranged from 23 to 57, with a mean performance of 37.42 ($SD = 10.15$). Kayla’s intervention phase data showed a positive slope, suggesting that she wrote more during intervention. Her TWW scores for this phase ranged from 49 to 66, and her mean performance increased to 56.00 TWW ($SD = 8.04$).
Kayla’s maintenance data path showed a return to baseline phase performance, with slightly lesser variability. Her TWW scores ranged from 33 to 46, with a mean of 38.67 ($SD = 6.66$).

**Correct and Incorrect Writing Sequences**

During baseline, Kayla showed varying levels of frequency and accuracy. Her CWS data path showed initial variability that started as an upward trend and concluded as a downward trend by the end of the phase. Conversely, her IWS data path showed an initial downward trend that became an upward trend. By the end of the phase, her CWS and IWS began to converge. These data showed an overall decline in frequency and accuracy during baseline. She averaged 36.08 CWS ($SD = 10.00$) and 4.58 IWS ($SD = 2.97$) during this phase. Kayla showed an improvement in both frequency and accuracy during the intervention phase. The convergence of her CWS and IWS data paths at the end of the baseline phase reversed: Her CWS data path demonstrated an immediate jump in level with a positive slope, whereas her IWS data path showed slight downward trend. Therefore, Kayla wrote more with greater accuracy during intervention. She had an average of 55.75 CWS ($SD = 8.46$) and 3.75 IWS ($SD = 1.26$) during intervention. During the maintenance phase, Kayla’s CWS and IWS data paths showed an overall convergence similar to the end of the baseline phase. Her mean performance on CWS ($M = 39.57$, $SD = 8.33$) and IWS ($M = 2.00$, $SD = 2.00$) was, overall, an improvement from baseline but lower than her intervention phase performance.

**Effect Size**

Tau-U effect sizes were calculated for each of the four dependent measures. All measures yielded moderate effects according to Vannest and Ninci’s (2015) interpretational guidelines. The paragraph text-writing rubric and CWS resulted in similar effects, with a Tau-U of 0.55 ($SD = 0.39$) and a Tau-U of 0.54 ($SD = 0.39$), respectively. The IWS measure resulted in a slightly
lower Tau-U of 0.47 ($SD = 0.39$), and TWW resulted in the smallest effect, with a Tau-U of 0.29 ($SD = 0.39$).

**Social Validity**

All students reported positive perceptions of the instruction and timed practice, scoring their experiences as “Great” (i.e., a 4 on 0-4 scale). Similarly, all students reported positive perceptions of their paragraph writing skills after intervention, scoring their experience again as “Great.” No students wrote any additional comments for the open-ended item.

**Chapter Summary**

This chapter described the results of the intervention on four dependent measures: the paragraph text-writing rubric, total words written (TWW), and correct and incorrect writing sequences (CWS and IWS). The results were dynamic but mixed, with three students demonstrating growth on only some of the dependent measures. Boomer and Chuck showed improvements on the paragraph text-writing rubric, but Chuck also showed improvements on CWS and IWS. Kayla showed improvements on all measures except the paragraph text-writing rubric. One student (Cat) showed no growth on any measure. The Tau-U effect sizes for the four measures were all moderate, ranging from 0.29 to 0.55.
CHAPTER 5: DISCUSSION

Chapter Overview

This chapter begins by describing the importance of written expression skills. The purpose, methodology, and mixed results of this study are summarized and synthesized within the context of previous research. Several important limitations are described, as are possible steps for future research. The chapter ends with a discussion of the study’s implications.

Text-writing skills – a component of written expression – can play an important role in academic, vocational, and social pursuits. Students can use such skills to demonstrate their knowledge of curriculum or share their thoughts with a friend through social media, and they may need adequate writing skills to gain employment. When students have inadequate writing skills, they may experience challenges related to these tasks. Unfortunately, research shows that students with intellectual and developmental disabilities (IDD) struggle to develop important writing skills, such as adequate grammar (Menyuk & Quill, 1985), text production (Bird et al., 2008), and higher-order skills (Gabit, 2008; Moore, 2002; Asaro-Saddler & Saddler, 2010).

The meta-analysis conducted in Chapter 2 revealed that very few studies target the text-writing skills of students with IDD. The majority of writing interventions for this population rely upon strategy instruction and use quality or holistic rubrics as dependent measures (e.g., Asaro-Saddler, 2014; Asaro-Saddler & Bak, 2012). These measures, while important aspects of writing, do not explicitly measure text-writing skills (e.g., capitalization, punctuation, grammar). There is a need for interventions that address the text-writing accuracy and fluency of students with IDD.

The present study described a multicomponent intervention of explicit instruction and timed practice designed to improve the paragraph text-writing skills of adolescents with IDD.
The study operated under the theory that a combination of explicit instruction and timed practice could improve text generation and self-regulation skills, which are theoretical components of the simple view of writing (Berninger & Amtmann, 2003). The simple view of writing suggests that individuals develop their writing skills through an interaction of transcription, text generation, and executive functioning skills. These three skill sets draw upon the writer’s working memory. As one skill is mastered, it moves into long-term memory; this frees up more working memory for learning other, more complicated writing skills. Prior studies with participants from other disability populations (e.g., learning disabilities, emotional-behavioral disorders) have shown that explicit instruction procedures and picture-word prompts can lead to improvements in text-writing accuracy within sentences (Anderson & Keel, 2002; Datchuk, 2016; Viel-Ruma, Houchins, Jolivette, Fredrick, & Gama, 2010; Walker, Shippen, Alberto, Houchins, & Cihak, 2005). Other studies (Datchuk, 2017; Datchuk & Kubina, 2013; Datchuk, Kubina, & Mason, 2015) have demonstrated that a combination of explicit instruction, picture-word prompts, and timed practice can improve text-writing accuracy and fluency.

To date, only one study – the pilot study for the present investigation (Rodgers et al., in review) – has examined the effects of such procedures on the paragraph text-writing skills of students with IDD. That study hypothesized that a combination of explicit instruction and timed practice could improve the paragraph text-writing accuracy and fluency of secondary students with IDD. Theoretically, this would result in such skills shifting to participants’ long-term memory and improve self-regulation skills. The results of that study were mixed. Two participants showed an improvement, whereas the third participant showed minimal change. The third participant demonstrated growth during instruction, but she was unable to transfer that performance to the descriptive paragraph probes with which the dependent measure was
observed. The results of that pilot study and a taxonomy of intervention intensity (Fuchs, Fuchs, & Malone, 2017) informed efforts to increase the intensity and strength of the intervention for this project through modest changes to dosage and comprehensiveness. First, new writing activities were added to the lessons to extend the instructional time per lesson. Second, an additional PI lesson was added to add additional opportunities for writing practice with instructor feedback and error correction. Third, the performance criterion for the FBPC component of the intervention was made more stringent to ensure students completed more timed practice lessons. In addition to these changes, the present study included TWW, CWS, and IWS as dependent measures, and the text-writing rubric was changed to include new skills (i.e., consistency of verb tense, consistency of topic). The intervention contained four PI lessons aimed at improving the paragraph-text writing accuracy of the participants and a maximum of 10 FBPC lessons aimed at improving participants’ text-writing fluency.

A combination of visual analysis and the calculation of Tau-U effect sizes revealed dynamic but mixed results. All Tau-U effect sizes were moderate and ranged from 0.29 to 0.55, with the paragraph rubric yielding the largest effect. Visual analysis provided a more complex interpretation of the results. Broadly, the intervention led to inconsistent changes across individuals, as no two students showed parallel performances. Two of four students (Boomer and Chuck) showed clear improvements with respect to the paragraph text-writing rubric. Although Kayla showed a possible upward trend by the end of intervention, she concluded the FBPC component after three lessons. Therefore, this potential pattern was not substantiated. Interestingly, the improvements with respect to the paragraph rubric did not necessarily translate to improvements on the other measures. For example, Boomer did not show any changes to text generation skills (as measured by TWW) or frequency and accuracy (as measured by CWS and
IWS). Conversely, Chuck did earn a greater number of CWS and a lower number of IWS during intervention despite showing no changes to TWW. Although her rubric scores did not improve, Kayla did demonstrate positive changes to her text generation skills, frequency, and accuracy.

These results are better understood through a closer examination of the dependent measures. The paragraph text-writing rubric was designed to measure elements of writing that might escape traditional CBM metrics (i.e., TWW, CWS, and IWS). For example, the rubric evaluates individual sentences in their entirety and includes metrics related to such paragraph-level elements as indentation, verb tense consistency, and the extent to which all sentences are about a singular topic. The CBM metrics can be immune to changes in these aspects of text-writing. For instance, CWS and IWS are usually assigned at adjacent writing units for appropriate grammar, capitalization, and syntax. However, the context of run-on sentences can be difficult to determine. The paragraph rubric allowed for an evaluation of an entire sentence by requiring punctuation between sentences and penalizing students for writing run-on sentences.

Growth on the rubric was contingent upon improvement in at least one of two elements. First, students could write more sentences. With each new sentence (delineated by punctuation), students opened themselves up to another five possible points (i.e., three for grammar, one for capitalization, and one for punctuation). Therefore, a student who wrote two more sentences (like Boomer, but unlike Kayla) could avail themselves of 10 more rubric points. Second, students could include the paragraph-level elements (i.e., indentation, consistent verb tense, sentences about a single topic). However, these two avenues of improvement do not necessitate increased text generation: Neither Boomer nor Chuck showed an overall change in TWW despite their increased rubric scores. Boomer earned more rubric points by dividing his single, run-on sentence typical of his baseline paragraphs into individual sentences. He did not write more
words overall; he just more appropriately demarcated his sentences and made the corresponding capitalization changes. Similarly, Chuck wrote additional sentences in much the same way, though he also showed a greater improvement with respect to his grammar. Kayla was the only student to increase her overall writing output during intervention. She wrote more, and she did so with greater accuracy but without writing more sentences. Her individual sentences became longer, and they had greater accuracy. But they were not more numerous. As a result, the paragraph rubric did not capture the changes in her performance.

Cat showed no improvement on any of the dependent measures. Her stagnant performance is curious, especially given her performance during the PI and FBPC lessons. Broadly stated, Cat demonstrated improved accuracy and fluency on instructional materials. Although she began the intervention by writing paragraphs with single, run-on sentences, she gradually wrote paragraphs with more sentences that had fewer grammatical errors. In fact, she had mastered the content of the intervention such that she was the student in the intervention to achieve 90% on the check-out activity at the end of the fourth lesson on her first attempt. The other participants required at least one additional lesson. Similarly, Cat met her FBPC performance criterion after her third consecutive session; her highest scores for the three timed practice sessions were 28, 30, and 29. She and Kayla were the only students to complete the FBPC portion in their first three consecutive lessons. Therefore, Cat routinely demonstrated her ability to write paragraphs that aligned with the specific criteria identified by the paragraph text-writing rubric and included more words and sentences than her earlier paragraphs. However, she showed no difference on the paragraph probes administered at the end of every other lesson. Therefore, Cat’s performance on the probes appear to be an issue of transfer rather than mastery of the content. This is also true for Kayla, who required only one additional PI lesson and
completed her FBPC component after the first three consecutive sessions. These challenges with skill transfer mirrors those of the third participant in the pilot study.

The feedback component of instruction may partially explain the discrepancy between her performance during instruction and on the paragraph probes. During instruction, Cat received feedback on her performance, including specific praise for independently completing tasks. Research has shown that praise can reinforce positive behaviors which can lead to an increased performance of those behaviors in the future (e.g., Hester, Hendrickson, & Gable, 2009). However, participants received no feedback (including praise) when completing the paragraph probes. Hosp and Ardoin (2008) have argued that students who do not receive appropriate praise for their performance may struggle to adequately complete the task. These issues, in addition to potential challenges with transfer, may explain Cat’s performance on the paragraph probes.

The theory of behavioral fluency posits that fluency of a composite skill, such as paragraph text-writing, is contingent upon the accuracy and fluency of component skills. The present intervention targeted only some component skills related to paragraph text-writing (e.g., simple sentence writing, capitalization, punctuation, grammar). The study did not address handwriting or spelling skills, which can contribute meaningfully to overall writing quality (Graham, Berninger, Abbot, Abbott, & Whitaker, 1997). Though participants were screened for basic spelling skills, undetected spelling challenges may have contributed to the modest results. It should be noted that the screening measures were a random sampling of intervention materials and not a comprehensive battery of reading and writing abilities. In addition, Cat’s performance suggests that the intervention did not provide enough instruction on the transfer of targeted writing skills. Her performance is consistent with research that suggests that students with IDD may have working memory deficits that make it difficult to transfer and
master academic skills (Gargiulo & Bouck, 2018; Poloczek, Buttnér, & Hasselhorn, 2012; Richards et al., 2015).

**Contributions to Writing Literature**

The methods and results of this study contribute to several lines of research. First, and most broadly, the present study contributes to the relatively small body of literature regarding writing interventions for students with IDD. Only 38 studies (35 single-subject studies and three group design studies) were identified for the meta-analysis presented in Chapter 2 despite no restrictions with respect to publication year. There was a broad array of dependent measures, the majority of which were holistic measures (i.e., they evaluated the overall quality writing without assessing text-writing elements). The Tau-U effect sizes ranged from 0.08 to 1.00, with a summary effect of 0.79 ($SE = 0.05$), which is considered a large effect. The results of this study are more modest. The meta-analysis identified two studies that focused on grammar skills (Liberty & Fitzpatrick, 1994; McLaughlin et al., 1984) and six studies that targeted paragraph-writing skills (Allen-Bronaugh, 2013; Kenney, 2013; Konrad, Clark, & Test, 2017; Konrad, Trela, & Test, 2006; Park et al., 2017; Rodgers et al., in review). The combined effect size for the grammar studies was in line with the results of this study (Tau-U = 0.53, $SE = 0.27$), whereas the summary effect for the paragraph studies was larger (Tau-U = 0.88, $SE = 0.11$). The grammar studies targeted punctuation and capitalization skills, which closely resembles the skills targeted in this investigation. Conversely, the paragraph studies primarily used quality and holistic rubrics that largely ignored text-writing elements of participants’ writing, which may partially explain the larger summary effect.

Second, this study extends the teaching of text-writing skills to students with disabilities through the use of explicit instruction and picture-word prompts. Previous studies found that
explicit instruction procedures lead to writing improvements for students with learning
disabilities, emotional-behavioral disabilities, and students with writing challenges (Anderson &
Keel, 2002; Datchuk, 2016; Viel-Ruma, Houchins, Jolivette, Fredrick, & Gama, 2010; Walker,
Shippen, Alberto, Houchins, & Cihak, 2005). For example, in Viel-Ruma et al.’s (2010) single-
case study, the six participants with learning disabilities showed improvements in both CWS and
overall text length. The results were modest and were not immediate. Similarly, the three
participants with learning disabilities in Walker et al.’s (2005) study demonstrated modest
improvements on the number of CWS. The results of this study are somewhat comparable,
especially given the shorter instructional time. However, not all students in this study showed
growth on the CBM metrics. Given the working memory challenges that some students with IDD
face, it is possible that the intensity of the intervention was insufficient in moving the targeted
writing skills to participants’ long-term memory.

Finally, this study also extends a line of emerging research that combines explicit
instruction, picture-word prompts, and timed practice to promote text-writing accuracy and
fluency. Studies that have used similar procedures (e.g., Datchuk, 2017; Datchuk & Kubina,
2015; Datchuk et al., 2015) demonstrated a functional relation between instructional procedures
and the number of CWS and IWS. One prior study (e.g., Rodgers & Datchuk, in review) piloted
these combined procedures for three adolescents with IDD, and the study resulted in a Tau-U
effect size of 0.74 ($SD = 0.44$) for the paragraph rubric. The equivalent effect size from this study
is smaller, and the increase in CWS and decrease in IWS more modest. Again, the results of this
study suggest that the intervention dosage was not adequate for some students.
Limitations and Directions for Future Research

The modest results described in this study should be interpreted within the context of several important limitations. First, the sample was small and homogenous. All participants had similar characteristics and attended the same secondary school. These factors prohibit broad generalization of the results. Future endeavors should attempt to include more students from multiple research sites.

Second, the paragraph text-writing rubric is a researcher-designed tool created to assess the paragraph text-writing elements targeted in this intervention. Although two evaluators reliably scored the paragraph rubric, the measure does not have any demonstrated statistical validity. Future research should attempt to establish such validity by comparing the rubric to already-established, standardized writing assessments.

In addition, the rubric did not measure some writing elements that could be informative in the evaluation of longer compositions. For example, the rubric did not allow for the examination of sentence complexity. A student who wrote, “Tom went to the store” and a student who wrote, “Tom went to the store to buy groceries and saw his friend Bill” would receive an identical score on the rubric (though such differences would be detected by TWW, CWS, and IWS). Similarly, the rubric did not provide a quantitative measure of the uniqueness of sentences. For example, the sentences “Tom went to the store” and “Tom went to the store yesterday” are very similar. Future projects could improve the rubric by including a metric that enabled researchers to evaluate both the complexity and redundancy of sentences.

Third, the present study does not meet the 11 SCD standards laid out by Reichow et al. (2008). For example, the study does not meet the indicator associated with visual analysis because many adjacent phases do not reveal large changes in level. Similarly, the study does not
meet the experimental control quality indicator because there are not three demonstrations of an experimental effect. Several phases meet the minimal number of data points per phase (i.e., three points). This is a function of the design, as students were administered paragraph probes at the end of every other instructional session. Future studies could ensure further data points per phase by either using a multiple-baseline across participants design or by adding additional instructional lessons.

Finally, though individual instruction is a common and valid procedure within single subject designs, this is likely not a practical implementation for educators. That is, educators would likely need to implement the intervention with multiple students at once. This would minimally affect the instructional procedures, but future studies that use a single-subject design should make a greater attempt to utilize groups of two or three to better model instructional setups used in schools.

**Implications for Practice**

The results of this study suggest that a combination of explicit instruction and timed practice have the potential to improve certain paragraph text-writing skills of students with IDD, including the number of sentences with appropriate grammar and syntax, capitalization, and punctuation skills. In a relatively short period of time, two students made clear improvements on their paragraph writing with respect to the paragraph rubric. Two students improved their overall text-writing accuracy, and one student showed improved text-writing frequency. However, further development and modification to instructional procedures is needed. Results were inconsistent across participants, and one participant made no growth on the dependent measures. Additional lessons and more practice transferring skills may be needed for some students.
Conclusion

What little research exists shows that students with IDD may experience numerous challenges in the pursuit of adequate writing skills. The majority of writing interventions for this population have been writing strategy interventions that use quality or holistic rubrics, which typically ignore text-writing skills. This project demonstrated that a combination of explicit instruction and timed practice can improve the text-writing skills of some adolescents with IDD, though future research and further modifications are required to address the mixed results.

Chapter Summary

This chapter summarized and synthesized the results of the present study in the context of previous research. This investigation contributes to the small body of literature regarding writing interventions for students with IDD, specifically to those studies that target text-writing skills. The results were mixed and modest, though some findings were consistent with previous studies. The study included several important limitations, such as sample, absence of measurement validity, issues with the practicality of its implementation.
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The * indicates that the study was included in the meta-analysis.

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https://automeris.io/WebPlotDigitizer


Table 1. *Summary of Single-Case Design Studies*

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Note. D (n) = disability category (number of individuals); GL = grade level; IT = intervention type; CT = composition type; WM = writing method; Sp = whether spelling was a measured component; ID = intellectual disability; ASD = autism spectrum disorder; DD = developmental disability; ASD-ID = autism spectrum disorder with intellectual disability; PreSch = preschool; Elem = elementary school; HS = high school; PS = postsecondary; Int. Type = type of writing intervention; Sp = spelling; HW = handwriting; G = grammar; S = sentence-writing; SC = sentence combining; P = paragraph; S/E = story or essay writing; Comp. Type = type of paragraph/story/essay composition; Per = persuasive; Desc = descriptive; Nar = narrative; Exp = expository; N = spelling is not a measured component; Y = spelling is a measured component; NR = the role of spelling is not reported in the study; TWW = total words written; CWS = correct writing sequence; CLS = correct letter sequence; SD = standard deviation.
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**Note.** D (n) = disability category (number of individuals); GL = grade level; IT = intervention type; CT = composition type; WM = writing method; Sp = whether spelling was a measured component; ID = intellectual disability; ASD = autism spectrum disorder; DD = developmental disability; ASD-ID = autism spectrum disorder with intellectual disability; Elem = elementary school; HS = high school; Int. Type = type of writing intervention; SC = sentence combining; P = paragraph; S/E = story or essay writing; Comp. Type =
type of paragraph/story/essay composition; N = spelling is not a measured component; Y = spelling is a measured component; NR = the role of spelling is not reported in the study; TIW = total intelligible words; TUW = total unique words; SD = standard deviation.
Table 3. *Quality Indicators for Single-Case Design Studies*

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*Note.* QI1 = participant characteristics; QI2 = independent variable; QI3 = dependent variable; QI4 = baseline condition; QI5 = visual analysis; QI6 = experimental control; QI7 = inter-observer agreement; QI8 = fidelity; QI9 = blind raters; QI10 = generalization and/or maintenance; QI11 = social validity.
Table 4. *Quality Indicators for Group Design Studies*

<table>
<thead>
<tr>
<th>Study</th>
<th>Primary Quality Indicators</th>
<th>Secondary Quality Indicators</th>
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<tr>
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<tr>
<td>All Studies</td>
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<td>Haviland et al. (1982)</td>
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<td>Wang et al. (2016)</td>
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</tbody>
</table>

*Note.* QI1 = participant characteristics; QI2 = independent variable; QI3 = comparison condition; QI4 = dependent variable; QI5 = research questions and analysis; QI6 = statistical tests; QI7 = random assignment; QI8 = inter-observer agreement; QI9 = blind raters; QI10 = fidelity; QI11 = attrition; QI12 = generalization and/or maintenance; QI13 = effect size; QI14 = social validity.
Table 5. *Summary Effects for Writing Intervention Type*

<table>
<thead>
<tr>
<th>Type of Intervention</th>
<th>Tau-U (SE)</th>
<th>p-value</th>
<th>CI&lt;sub&gt;95&lt;/sub&gt;</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td>Spelling (s = 4)</td>
<td>0.84 (0.17)</td>
<td>&lt; 0.001</td>
<td>0.50</td>
</tr>
<tr>
<td>Handwriting (s = 2)</td>
<td>0.57 (0.25)</td>
<td>0.0075</td>
<td>0.18</td>
</tr>
<tr>
<td>Grammar (s = 2)</td>
<td>0.52 (0.21)</td>
<td>0.0147</td>
<td>0.10</td>
</tr>
<tr>
<td>Sentence-Writing (s = 6)</td>
<td>0.75 (0.13)</td>
<td>&lt; 0.0001</td>
<td>0.50</td>
</tr>
<tr>
<td>Sentence-Combining (s = 1)</td>
<td>0.62 (0.32)</td>
<td>0.0576</td>
<td>-0.02</td>
</tr>
<tr>
<td>Paragraph (s = 6)</td>
<td>0.85 (0.11)</td>
<td>&lt; 0.0001</td>
<td>0.64</td>
</tr>
<tr>
<td>Essay/Story-Writing (s = 14)</td>
<td>0.82 (0.10)</td>
<td>&lt; 0.0001</td>
<td>0.64</td>
</tr>
</tbody>
</table>

*Note. SE = standard error; CI<sub>95</sub> = 95% confidence interval; LL = Lower Limit; UP = Upper Limit*
Table 6. *Summary Effects for Composition Type*

<table>
<thead>
<tr>
<th>Disability Category</th>
<th>Tau-U (SE)</th>
<th>p-value</th>
<th>CI95</th>
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<tr>
<td></td>
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<td>LL</td>
</tr>
<tr>
<td>Narrative (s = 6)</td>
<td>0.80 (0.14)</td>
<td>&lt; 0.0001</td>
<td>0.53</td>
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<tr>
<td>Persuasive (s = 8)</td>
<td>0.83 (0.10)</td>
<td>&lt; 0.0001</td>
<td>0.63</td>
</tr>
<tr>
<td>Descriptive (s = 2)</td>
<td>0.92 (0.25)</td>
<td>0.0002</td>
<td>0.44</td>
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<tr>
<td>Expository (s = 3)</td>
<td>0.84 (0.16)</td>
<td>&lt; 0.0001</td>
<td>0.53</td>
</tr>
<tr>
<td>Combination (s = 1)</td>
<td>0.91 (0.47)</td>
<td>0.0509</td>
<td>-0.00</td>
</tr>
</tbody>
</table>

*Note.* SE = standard error; CI95 = 95% confidence interval; LL = Lower Limit; UP = Upper Limit
Table 7. Summary Effects for Disability Category

<table>
<thead>
<tr>
<th>Disability Category</th>
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<th>p-value</th>
<th>CI&lt;sub&gt;95&lt;/sub&gt;</th>
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<td></td>
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<td>ASD (s = 17)</td>
<td>0.81 (0.07)</td>
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<tr>
<td>ID (s = 5)</td>
<td>0.81 (0.18)</td>
<td>&lt; 0.0001</td>
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<tr>
<td>DD (s = 1)</td>
<td>0.86 (0.26)</td>
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<tr>
<td>Combination (s = 12)</td>
<td>0.74 (0.09)</td>
<td>&lt; 0.0001</td>
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</table>

*Note. SE = standard error; CI<sub>95</sub> = 95% confidence interval; LL = Lower Limit; UP = Upper Limit*
Table 8. Participant Characteristics

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Race</th>
<th>Age</th>
<th>Year</th>
<th>FSIQ</th>
<th>Disability Information</th>
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<tr>
<td>Boomer</td>
<td>M</td>
<td>African American</td>
<td>17</td>
<td>Junior</td>
<td>43</td>
<td>ID, ASD</td>
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<tr>
<td>Chuck</td>
<td>M</td>
<td>Caucasian</td>
<td>17</td>
<td>Junior</td>
<td>68</td>
<td>ID</td>
</tr>
<tr>
<td>Cat</td>
<td>F</td>
<td>Caucasian</td>
<td>17</td>
<td>Junior</td>
<td>75</td>
<td>ID, Behavioral Plan</td>
</tr>
<tr>
<td>Kayla</td>
<td>F</td>
<td>African American</td>
<td>18</td>
<td>Senior</td>
<td>57</td>
<td>ID, ASD</td>
</tr>
</tbody>
</table>

*Note. M = male; F = female; FSIQ = full scale IQ on the Kaufman Brief Intelligence Test (Kaufman & Kaufman, 2004).*

*Disability labels were provided by participants’ teachers.*
Table 9. *Participant Screening Data*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Spelling Probe</th>
<th>Reading Probe</th>
<th>Paragraph Probe&lt;sup&gt;a&lt;/sup&gt;</th>
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<td>100%</td>
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<td>95%</td>
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<td>Cat</td>
<td>100%</td>
<td>99%</td>
<td>8</td>
</tr>
<tr>
<td>Kayla</td>
<td>95%</td>
<td>99%</td>
<td>14</td>
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</table>

<sup>a</sup> The paragraph probe score is the score each participant received on the paragraph text-writing rubric used during the screening process.
Table 10. Means, Standard Deviations, and Tau-U Values for Dependent Measures

<table>
<thead>
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<th>Measure</th>
<th>Phase</th>
<th>Participant</th>
<th>Boomer</th>
<th>Chuck</th>
<th>Cat</th>
<th>Kayla</th>
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<tbody>
<tr>
<td>Rubric</td>
<td>Baseline</td>
<td>4.86 (1.35)</td>
<td>7.70 (4.24)</td>
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<td>16.20 (9.44)</td>
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<tr>
<td></td>
<td>Maintenance</td>
<td>25.00 (9.84)</td>
<td>19.67 (4.04)</td>
<td>8.33 (0.58)</td>
<td>16.33 (3.21)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tau-U: 0.55 (SD = 0.39; CI (_{95}) = 0.25 – 0.85)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWW</td>
<td>Baseline</td>
<td>24.57 (6.83)</td>
<td>43.80 (5.22)</td>
<td>18.50 (6.53)</td>
<td>37.42 (10.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>26.40 (10.21)</td>
<td>49.75 (12.23)</td>
<td>18.00 (2.65)</td>
<td>56.00 (8.04)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>29.33 (5.86)</td>
<td>41.33 (5.86)</td>
<td>29.00 (6.56)</td>
<td>38.67 (6.66)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tau-U: 0.29 (SD = 0.39; CI (_{95}) = 0.01 – 0.60)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CWS</td>
<td>Baseline</td>
<td>19.57 (5.77)</td>
<td>35.80 (7.27)</td>
<td>16.00 (6.81)</td>
<td>36.08 (10.00)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>25.00 (11.31)</td>
<td>50.25 (14.64)</td>
<td>18.33 (3.79)</td>
<td>55.75 (8.46)</td>
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<tr>
<td></td>
<td>Maintenance</td>
<td>33.00 (8.54)</td>
<td>40.00 (1.00)</td>
<td>28.67 (6.80)</td>
<td>39.67 (8.33)</td>
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</tr>
<tr>
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<td></td>
<td></td>
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<tr>
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<td></td>
<td>Tau-U: 0.54 (SD = 0.39; CI (_{95}) = 0.23 – 0.84)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>IWS</td>
<td>Baseline</td>
<td>3.71 (3.50)</td>
<td>10.00 (4.78)</td>
<td>4.33 (2.73)</td>
<td>4.58 (2.97)</td>
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<tr>
<td></td>
<td>Intervention</td>
<td>4.40 (3.78)</td>
<td>4.00 (2.45)</td>
<td>0.67 (1.15)</td>
<td>3.75 (1.26)</td>
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<tr>
<td></td>
<td>Maintenance</td>
<td>1.00 (1.00)</td>
<td>5.33 (5.86)</td>
<td>0.67 (0.58)</td>
<td>2.00 (2.00)</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Tau-U: 0.47 (SD = 0.39; CI (_{95}) = 0.16 – 0.77)</td>
<td></td>
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*Note. TWW = total words written; CWS = correct writing sequence; IWS = incorrect writing sequence.*
Table 11. *Tau-U Values and Standard Deviations for Individual Participants*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Rubric</th>
<th>TWW</th>
<th>CWS</th>
<th>IWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boomer</td>
<td>0.98 (0.31)</td>
<td>0.05 (0.31)</td>
<td>0.59 (0.31)</td>
<td>0.20 (0.31)</td>
</tr>
<tr>
<td>Chuck</td>
<td>0.94 (0.29)</td>
<td>0.10 (0.29)</td>
<td>0.44 (0.29)</td>
<td>0.66 (0.29)</td>
</tr>
<tr>
<td>Cat</td>
<td>-0.33 (0.35)</td>
<td>0.44 (0.35)</td>
<td>0.50 (0.35)</td>
<td>-0.75 (0.35)</td>
</tr>
<tr>
<td>Kayla</td>
<td>0.48 (0.28)</td>
<td>0.56 (0.28)</td>
<td>0.61 (0.28)</td>
<td>0.30 (0.28)</td>
</tr>
</tbody>
</table>

*Note.* TWW = total words written; CWS = correct writing sequence; IWS = incorrect writing sequence.
Figure 1. An illustration of the simple view of writing.
Figure 2. Example of a picture-word prompt.
Figure 3. Theory of change for the pilot study.
Figure 4. Modified theory of change for the present study.
Figure 5. Forrest plot of single-case design study effects.
Figure 6. Forrest plot of group study effect sizes.

Note: The gray box indicates that Haviland (1982) is methodologically different than the other two studies as it included a control group.
Figure 7. Publication bias funnel plot for single-case design studies.
Figure 8. Publication bias funnel plot for group studies.
**Paragraph Text Writing Rubric**

**Paragraph-Level**

<table>
<thead>
<tr>
<th>Element</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>Indentation</td>
<td></td>
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<tr>
<td>Adherence to a Single Topic</td>
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<tr>
<td>Consistent Verb Tense</td>
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</table>

**Sentence #1**

<table>
<thead>
<tr>
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<th>0</th>
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<td></td>
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<tr>
<td>Appropriate Capitalization</td>
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<td></td>
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<tr>
<td>Appropriate Punctuation</td>
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**Sentence #2**

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<td>Appropriate Grammar</td>
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<tr>
<td>Appropriate Capitalization</td>
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<td>Appropriate Punctuation</td>
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**Sentence #3**

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<td>Appropriate Capitalization</td>
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**Sentence #4**

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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate Capitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate Punctuation</td>
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</table>

**Sentence #5**

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</thead>
<tbody>
<tr>
<td>Appropriate Grammar</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate Capitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate Punctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL:** ________________

1Where,
0 = The element is not present
1 = The element is present

2Where,
0 = Three or more errors
1 = Two errors
2 = One error
3 = No errors

3Grammar refers to within-sentence error, including: subject-verb agreement, consistent verb tense, or other issues that impact the meaning of the sentence.

*Figure 9.* Paragraph text-writing rubric.
Instructions: Write a paragraph describing the pictures below.

Francis carved a pumpkin he made a face. Summer is warm.

Paragraph-Level

1. Indentation 0 1
2. Adherence to a Single Topic 0 1
3. Consistent Verb Tense 0 1 2 3

Sentence #1

1. Appropriate Grammar 0 1 2 3
2. Appropriate Capitalization 0 1
3. Appropriate Punctuation 0 1

Total: 5 points

Figure 10. Writing sample with rubric score 1.
Instructions: Write a paragraph describing the pictures below.

Francis carved a pumpkin. She used a sharp knife. Francis loved the circus. Francis carved a face on the pumpkin.

Figure 11. Writing sample with rubric score 2.
Figure 12. Participants' performance on the paragraph text-writing rubric.
Figure 13. Participants' performance on total words written.
Figure 14. Participants' performance on correct (open circle) and incorrect (X symbol) writing sequences.
APPENDIX A: META-ANALYSIS CODING FORM

Meta-Analysis Coding Form

Coder:

Study (Full Citation):

Study Code:

Section I – Publication Characteristics

Source of Study:
1. Journal
2. Dissertation
3. Book
4. Conference Presentation
5. Other
   a. Explain:

Section II – Sample & Participant Characteristics

Sampling Method:
0. Not reported
1. Random
2. Purposive
3. Matching
4. Convenience (Inferred)
5. Other
   a. Explain:

Participant Assignment Method:
0. Not reported
1. Random
2. Naturally Occurring Groups
3. Not Applicable (e.g., Single-Subject Design)
4. Other
   a. Explain:

Number of Participants Included in Meta-Analysis:
   a. Males:
   b. Females:
Participant Grade Levels (report all that apply; include number):
0. Not reported
1. Preschool
2. Elementary School (K-6)
3. Middle School (7-8)
4. Secondary/ High School (9-12)
5. Postsecondary
6. Other
   a. Explain:

Participant Diagnosis Category:
1. ASD
2. ID
3. DD
4. Mixture of Disability Labels

Include Number of Diagnoses Below:
1. ID/Mental Retardation
2. ASD
3. Developmental Disability
4. ID-ASD
5. Other (for group studies)

Mean IQ Score: NA
   a. Additional Notes:

Section III – Intervention Characteristics

Community Setting:
0. Not reported
1. Urban
2. Suburban
3. Rural

Intervention Setting:
0. Not reported
1. Preschool
2. K-12 School
3. University
4. Other:
   a. Explain: homes, public places

Number of Interventionists (0 if not reported):
Degrees Held by Interventionists (report all that apply; include number):
   0. Not reported
   1. Bachelor’s Degree
   2. Master’s Degree
   3. PhD

Did Interventionists Develop Intervention:
   0. Not reported; cannot be inferred
   1. Yes
   2. No

**Single Subject Studies**

Study Design:
   0. Not adequately described
   1. Multiple baseline across participants/groups
   2. Multiple baseline across measures/skills
   3. Multiple probe across participants/groups
   4. Multiple probe across measures/skills
   5. Alternating Treatment
   6. Reversal (e.g., ABAB or ABCBC)
   7. Other
      a. Note:

Type of Writing Intervention:
   1. Spelling
   2. Handwriting
   3. Grammar
   4. Sentence-Writing
   5. Sentence-Combining
   6. Paragraph
   7. Essay-Writing
   8. Editing
   9. Other
      a. Explain:

If Paragraph/Essay-Writing, Type of Composition:
   1. Narrative (including fiction)
   2. Persuasive
   3. Descriptive
   4. Expository
   5. Mixture

SRSD Status:
   1. Non-SRSD
   2. SRSD
Dependent Variables (list all related to writing and underline those to be included):

Was Spelling a Measured Component of the Intervention:
  0. Not reported
  1. Yes
  2. No

Method of Writing:
  0. Not reported
  1. Handwriting
  2. Computer

Number of Total Treatment Sessions (0 if not reported):

Session Length (0 if not reported):

Total Intervention Length (0 if not reported):

Average Intervention Length per Participant:

Was Fidelity Assessed:
  1. Yes
  2. No

Was IOA Reported:
  1. Yes
  2. No

Was Social Validity Reported:
  1. Yes
  2. No

Was Maintenance Included:
  1. Yes
  2. No

Was Generalization Included:
  1. Yes
  2. No

Section IV – Effect Sizes

Single Subject Studies
*All effect sizes will be calculated by the coders
### APPENDIX B: SCD QUALITY INDICATORS

Evaluative Method Quality Standards for Single-Case Design Studies

<table>
<thead>
<tr>
<th>Primary Quality Indicators</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Characteristics</td>
<td>• Age/gender provided for all participants</td>
</tr>
<tr>
<td></td>
<td>• Characteristics of interventionist were provided</td>
</tr>
<tr>
<td>Independent Variable</td>
<td>• Treatment was described with replicable precision</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td>• All measures were described with operational precision</td>
</tr>
<tr>
<td></td>
<td>• All measures were linked to purpose of the treatment</td>
</tr>
<tr>
<td></td>
<td>• All measures were collected at appropriate times</td>
</tr>
<tr>
<td>Baseline Condition</td>
<td>• All baseline phases contained at least three data points</td>
</tr>
<tr>
<td></td>
<td>• All baselines were stable</td>
</tr>
<tr>
<td></td>
<td>• Phase was operationally defined</td>
</tr>
<tr>
<td>Visual Analysis</td>
<td>• All relevant data were graphed</td>
</tr>
<tr>
<td></td>
<td>• Data from adjacent conditions showed large changes</td>
</tr>
<tr>
<td></td>
<td>(e.g., less than 25% overlap between data points in adjacent phases)</td>
</tr>
<tr>
<td></td>
<td>• If a delay in change was present, this was common across participants</td>
</tr>
<tr>
<td>Experimental Control</td>
<td>• At least three demonstrations of an experimental effect at three different points in time</td>
</tr>
<tr>
<td></td>
<td>• These changes occurred with the manipulation of the independent variable</td>
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</table>
APPENDIX B Cont.

<table>
<thead>
<tr>
<th>Secondary Quality Indicators</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>Interobserver Agreement</td>
<td>• IOA was collected on at least 20% of sessions</td>
</tr>
<tr>
<td></td>
<td>• IOA was adequate (e.g., above 0.80 or 0.60 with Kappa)</td>
</tr>
<tr>
<td>Fidelity</td>
<td>• Fidelity was assessed across participants/conditions</td>
</tr>
<tr>
<td></td>
<td>• Fidelity was 0.80 or greater</td>
</tr>
<tr>
<td>Blind Raters</td>
<td>• Raters were blind to treatment conditions for participants</td>
</tr>
<tr>
<td>Generalization and/or Maintenance</td>
<td>• Generalization or maintenance measures were collected</td>
</tr>
<tr>
<td>Social Validity (at least four of the criteria)</td>
<td>• DVs were socially important</td>
</tr>
<tr>
<td></td>
<td>• Intervention was inexpensive and not time intensive</td>
</tr>
<tr>
<td></td>
<td>• Study included comparisons between students with and without disabilities</td>
</tr>
<tr>
<td></td>
<td>• Changes in DV were practically valuable</td>
</tr>
<tr>
<td></td>
<td>• Participants and/or educators were satisfied with treatment</td>
</tr>
<tr>
<td></td>
<td>• The interventionist was someone who would typically implement the intervention</td>
</tr>
<tr>
<td></td>
<td>• Study occurred in a natural context</td>
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### APPENDIX C: GROUP DESIGN QUALITY INDICATORS

Evaluative Method Quality Standards for Group Design Studies

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<th>Primary Quality Indicators</th>
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<tbody>
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<td>Participant Characteristics</td>
<td>• Age/gender provided for all participants</td>
</tr>
<tr>
<td></td>
<td>• Characteristics of interventionist were provided</td>
</tr>
<tr>
<td>Independent Variable</td>
<td>• Treatment was described with replicable precision</td>
</tr>
<tr>
<td>Comparison Condition</td>
<td>• The control group and their condition was adequately described</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td>• All measures were described with operational precision</td>
</tr>
<tr>
<td></td>
<td>• All measures were linked to purpose of the treatment</td>
</tr>
<tr>
<td></td>
<td>• All measures were collected at appropriate times</td>
</tr>
<tr>
<td>Research Questions and Analysis</td>
<td>• Research questions informed data analysis</td>
</tr>
<tr>
<td>Analysis</td>
<td>• Analysis used appropriate units of measure</td>
</tr>
<tr>
<td>Statistical Tests</td>
<td>• Proper statistical tests were used with adequate power</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Quality Indicators</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random Assignment</td>
<td>• Participants were randomly assigned</td>
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<tr>
<td>Interobserver Agreement</td>
<td>• IOA was collected on at least 20% of sessions</td>
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<tr>
<td></td>
<td>• IOA was adequate (e.g., above 0.80 or 0.60 with Kappa)</td>
</tr>
<tr>
<td>Fidelity</td>
<td>• Fidelity was assessed across participants/conditions</td>
</tr>
<tr>
<td></td>
<td>• Fidelity was 0.80 or greater</td>
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</table>
### Attrition
- Attrition was equal between groups and less than 30%

### Blind Raters
- Raters were blind to treatment conditions for participants

### Generalization and/or Maintenance
- Generalization or maintenance measures were collected

### Effect Size
- Effect sizes were reported; greater than 0.40

### Social Validity (at least four of the criteria)
- DVs were socially important
- Intervention was inexpensive and not time intensive
- Study included comparisons between students with and without disabilities
- Changes in DV were practically valuable
- Participants and/or educators were satisfied with treatment
- The interventionist was someone who would typically implement the intervention
- Study occurred in a natural context
APPENDIX D: SPELLING SCREENER

Spelling Screener

Student writes his/her name at the top of the page.

Teacher says: *Do not pick up your pen until I tell you to. We’re going to do a quick spelling activity. I’ll say word and use it in a sentence. Then you write it down. Let’s get started.*

1. “the.” The dog barked. “the.”
2. “to.” I walked to the store. “to.”
3. “and.” Mary and her sister had lunch. “and.”
4. “he” He is my friend. “he”
5. “a” She ate a piece of cake. “a”
7. “You” You are a student. “You.”
8. “it” I gave Tom some candy, but he didn’t like it. “it”
9. “of” Sally did not want to get out of bed this morning. “of”
10. “in” He was standing in the rain. “in”
11. “was” She was wearing a yellow hat. “was”
12. “said” I asked my friend to hang out and she said yes. “said”
13. “his” Henry sits at his desk during class. “his”
14. “that” Bill did not like that movie. “that”
15. “she” She liked to run outside. “she”
16. “for” Alex opened the door for Stan. “for”
17. “on” He put his coat on. “on”
18. “they” They are enjoying the concert. “they”
19. “but” I wanted to go to the party, but I had to work. “but”
20. “**had**” Susie stayed home because she **had** a cold. “**had**”
Spelling Pre-Assessment

1. ______________
2. ______________
3. ______________
4. ______________
5. ______________
6. ______________
7. ______________
8. ______________
9. ______________
10. ______________
11. ______________
12. ______________
13. ______________
14. ______________
15. ______________
16. ______________
17. ______________
18. ______________
19. ______________
20. ______________
APPENDIX E: READING SCREENER

Reading Accuracy Screener

Teacher hands student a copy of the sentences.

Teacher says: When I tell you, you’re going to read the sentences on the page. You’ll start reading the first sentence, and then you’ll go down to the next one. You’ll read every sentence. Any questions?

[Teacher answers questions]

Teacher says: Begin.
The cat goes to catch it.

It rolled down the hill.

Dr. Green was happy about their work.

The bear was standing in the river.

It hid in some bushes.

The ball was tossed into the air.

She planted carrots and lettuce.

She hung the painting in her house.

The monkeys ate bananas.

The astronaut loved being in space.

Terry worked in a factory.

It is a large circle.

The small grey cat played with a ball of yarn.

The music was very loud.

It ate more fish until it was full.

He stayed up late to write it.

The guests arrived at 7 for dinner.

Polar bears love the snow.

Robert wrote on a notepad.

He felt a little sick.

It wanted to go home.

Lucy planted a garden in her yard.
The carrots grew large.
They liked to play football.
The swimmer dove in the pool.
Another panda walked by.
The red team had the ball first.
The cooks were working in the kitchen.
The factory made ice cream.
The camels ate plants.
The artist wanted to paint a picture.
A ball broke the window.
Dr. Green gave out the test.
The cat was scared and cried.
The dog had mud on its paws.
She stands up on her legs.
The cat goes to catch it.

It rolled down the hill.

Dr. Green was happy about their work.

The bear was standing in the river.

It hid in some bushes.

The ball was tossed into the air.

She planted carrots and lettuce.

She hung the painting in her house.

The monkeys ate bananas.

The astronaut loved being in space.

Terry worked in a factory.

It is a large circle.

The small grey cat played with a ball of yarn.

The music was very loud.

It ate more fish until it was full.

He stayed up late to write it.

The guests arrived at 7 for dinner.

Polar bears love the snow.

Robert wrote on a notepad.

He felt a little sick.

It wanted to go home.
Lucy planted a garden in her yard.
The carrots grew large.
They liked to play football.
The swimmer dove in the pool.
Another panda walked by.
The red team had the ball first.
The cooks were working in the kitchen.
The factory made ice cream.
The camels ate plants.
The artist wanted to paint a picture.
A ball broke the window.
Dr. Green gave out the test.
The cat was scared and cried.
The dog had mud on its paws.
She stands up on her legs.

Words Read Correctly: ____/212 = ____ % accuracy
Participant Instructional Materials

**PARAGRAPHS**

**LESSON 1**

**A**

**Instructions:** Underline the part of each sentence that names something.

1. Kim jumped high into the air.
2. The old man read the newspaper.
3. The small dog chased the cars.
4. It rolled down the hill.
5. A ball broke the window.
6. Tim wore a jacket.
7. Mr. Smith caught a large fish.
8. Robert wrote on a notepad.
9. The bicycle looked brand new.

**B**

**Instructions:** Circle each simple sentence.

1. the dog.
2. Sat in the tree.
3. The boy sat in the tree.
4. The old man.
5. We swung in the trees.
7. My shirt smelled funny.
8. Played basketball.
9. The girls sat in chairs.
10. Looked at the T.V.

----------------------------------------------------------------------------------------------------------------

11. Our computer.
12. We ran home.
13. Grabbed the candle.
14. Hot day.
15. The swimmer dove in the pool.

**Instructions:** Write a complete simple sentence for each picture with the words given.
Tom was hungry. Tom went to the pantry to look for food because he wanted a snack. A box of crackers. Tom ate the crackers.
2. The small gray cat played with a ball of yarn. The cat pushed the ball of yarn under the couch. The cat got tired. The cat went to sleep. Mondays are my favorite day.

3. The artist wanted to paint a picture. She wanted to paint a sunset. The artist got her paints from the closet. The artist painted a beautiful sunset. She hung the painting in her house.

4. The farmer woke up early. He went to the barn to milk the cows. Polar bears love the snow. The farmer fed the chickens. Then he went to the fields to plant.

5. Matt wanted to bake a cake. He put flour, eggs, and butter into a bowl. He mixed them together. Matt put the cake into the oven. Matt ate the cake.

6. The astronaut was in space. She floated inside the space station. Studied the sun. The astronaut loved being in space.
Instructions: Write a paragraph describing the pictures below.

1.

Let’s use our rubric on the next page!
## Paragraph Text Writing Rubric

### Paragraph-Level

| Feature                                | 0 | 1 | 2 | 3 |
|----------------------------------------|---|--|--|--|--|
| Indentation                            |   |   |   |   |
| Adherence to a Singular Topic          |   |   |   |   |
| Consistent Verb Tense                  |   |   | 2 | 3 |

### Sentence #1

| Feature                                | 0 | 1 | 2 | 3 |
|----------------------------------------|---|--|--|--|--|
| Appropriate Grammar                    |   |   | 2 | 3 |
| Appropriate Capitalization             |   |   |   |   |
| Appropriate Punctuation                |   |   |   |   |

### Sentence #2

| Feature                                | 0 | 1 | 2 | 3 |
|----------------------------------------|---|--|--|--|--|
| Appropriate Grammar                    |   |   | 2 | 3 |
| Appropriate Capitalization             |   |   |   |   |
| Appropriate Punctuation                |   |   |   |   |

### Sentence #3

| Feature                                | 0 | 1 | 2 | 3 |
|----------------------------------------|---|--|--|--|--|
| Appropriate Grammar                    |   |   | 2 | 3 |
| Appropriate Capitalization             |   |   |   |   |
| Appropriate Punctuation                |   |   |   |   |

### Sentence #4

| Feature                                | 0 | 1 | 2 | 3 |
|----------------------------------------|---|--|--|--|--|
| Appropriate Grammar                    |   |   | 2 | 3 |
| Appropriate Capitalization             |   |   |   |   |
| Appropriate Punctuation                |   |   |   |   |

### Sentence #5

| Feature                                | 0 | 1 | 2 | 3 |
|----------------------------------------|---|--|--|--|--|
| Appropriate Grammar                    |   |   | 2 | 3 |
| Appropriate Capitalization             |   |   |   |   |
| Appropriate Punctuation                |   |   |   |   |

**TOTAL: ________________**
Instructions: Write a paragraph describing the pictures below.

2.

______________
____________________
____________________
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____________________

___ Indentation     ___ 5 Sentences     ___ About 1 Topic     ____ Complete Sentences

Let’s use our rubric on the next page!
### Paragraph Text Writing Rubric

**Paragraph-Level**

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**TOTAL:** ________________
**Paragraph Lesson 2**

**A**

**Instructions:** Underline the part that names for each sentence. Then fix up the paragraph by adding in capital letters and punctuation marks.

1. The cooks were working in the kitchen, Ms. Peters chopped vegetables, Dan roasted pig in a fire. The guests arrived at 7 for dinner. Everyone ate their meal.

2. A paperboy rode his bike. He delivered newspapers in the morning. He threw a paper into a yard. His bike was fast. He loved his job as a paperboy.

3. It was feeding time at the zoo. The monkeys ate bananas. The elephants did tricks for peanuts. Fuzzy pandas ate bamboo in a tree. The camels ate plants.

**B**

**Directions:** Fill in the blank with the correct past tense verb.

<table>
<thead>
<tr>
<th>(happened) past</th>
<th>(happening) now</th>
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<tbody>
<tr>
<td>1. ____________</td>
<td>←----- have</td>
</tr>
<tr>
<td>2. ____________</td>
<td>←----- go</td>
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<tr>
<td>3. ____________</td>
<td>←----- is</td>
</tr>
<tr>
<td>4. ____________</td>
<td>←----- dance</td>
</tr>
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<td>5. ____________</td>
<td>←----- jump</td>
</tr>
<tr>
<td>6. ____________</td>
<td>←----- grab</td>
</tr>
<tr>
<td>7. ____________</td>
<td>←----- are</td>
</tr>
<tr>
<td>8. ____________</td>
<td>←----- hold</td>
</tr>
</tbody>
</table>
Instructions: Read the sentences. Make sure all are written in the past tense by changing one of the sentences.

1. Tom had $3.00. He goes to the store to buy chips. He was very happy.
   A  B  C

2. The boys dance at the party. The music was very loud. Everyone had fun.
   A  B  C

3. The player jumped to grab the ball. The ball is very high. She grabbed it.
   A  B  C
4. The brothers are on the football team. They liked to play football. They played all day.
   A                                B                                C

5. Tom and Tina ran after school. They ran for 5 miles. They are very fast.
   A                                B                                C

6. Roger had to write a paper. The paper is about dinosaurs. He stayed up late to write it.
   A                                B                                C

Instructions: Check each paragraph to make sure they have all four parts:
• It begins with an indentation
• It contains five sentences
• The sentences are about the same topic
• The sentences are all complete

1. An airplane was flying in the sky. Margot was on the airplane. The airplane bounced up and down because of a storm. Margot was nervous on the plane.
   ___ Indentation   ___ 5 Sentences   ___ About 1 Topic   ___ Complete Sentences

2. Terry worked in a factory. The factory made ice cream. Terry fixed the ice cream machines when they broke. Ate ice cream.
   ___ Indentation   ___ 5 Sentences   ___ About 1 Topic   ___ Complete Sentences

3. Naomi was a student. She liked reading books about science. The goldfish swam in the bowl. Naomi wrote a lot of papers.
   ___ Indentation   ___ 5 Sentences   ___ About 1 Topic   ___ Complete Sentences
Instructions: Write a paragraph describing the pictures below.

1.

---

Indentation  5 Sentences  About 1 Topic  Complete Sentences

Let’s use our rubric on the next page!
## Paragraph Text Writing Rubric

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### Sentence #1

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TOTAL: __________________
2. **Instructions:** Write a paragraph describing the pictures below.

Let's use our rubric on the next page!
### Paragraph Text Writing Rubric

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**TOTAL: ________________**
PARAGRAPH LESSON 3

A  Instructions: Underline the part that names for each sentence. Then fix up the paragraph by adding in capital letters and punctuation marks.

1. sam washed the car he sprayed the dirty car with a hose the car was very dirty sam had to use a lot of water the car was finally clean

2. the bear was standing in the river fish were swimming around the bear grabbed a fish to eat the bear was still hungry it ate more fish until it was full

3. mr. smith walked into his house his dog jumped all over him the dog had mud on its paws the mud got onto mr smith’s pants mr smith was mad

B  Instructions: Check each paragraph to make sure they have all four parts:
• It begins with an indentation
• It contains five sentences
• The sentences are about the same topic
• The sentences are all complete

1. The small grey boat was in the water. The boat had a large hole. Bert was on the boat. He tried to stop water coming in the hole. The old boat was in a lot of trouble.
   ___ Indentation  ___ 5 Sentences  ___ About 1 Topic  ___ Complete Sentences

2. The tall girl played basketball in the gym every day. Bernice. She was the best player on her team. Bernice shot the ball well and dribbled around everyone.
   ___ Indentation  ___ 5 Sentences  ___ About 1 Topic  ___ Complete Sentences
3. Kim had a small dog. Liked to sleep on the couch. It slept on the couch under some blankets during the afternoon. The small dog loved to stay warm under blankets or by the fireplace.

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4. The tiny angry cat hissed at the dog. The tiny cat ran down the street. It hid in some bushes. The cat was scared and cried. It wanted to go home.

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Instructions: Fill in the blank with the correct past tense verb.

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<th>(happening) now</th>
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<td>3. ______________</td>
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<td>9. ______________</td>
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<tr>
<td>10. ______________</td>
<td>see</td>
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</table>

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11. _______________  ← pull
12. _______________  ← draw
13. _______________  ← like
14. _______________  ← get
15. _______________  ← stand
16. _______________  ← need
17. _______________  ← see
18. _______________  ← is
19. _______________  ← play
20. _______________  ← talk

21. _______________  ← see
22. _______________  ← play
23. _______________  ← is
24. _______________  ← draw
25. _______________  ← talk
26. _______________  ← like
27. _______________  ← stand
28. _______________  ← need
29. _______________  ← get
30. _______________  ← pull
Instructions: Read the sentences. Make sure all are written in the past tense by changing one of the sentences.

1. Ms. Jenkins and Ms. Tomlin see the flat tire. They went to the store. The store was closed.
   A  
   B  
   C  

2. The teacher drew a picture on the board. It is a large circle. The teacher talked about the size.
   A  
   B  
   C  

3. The tiny dog was jumping up. The dog liked to see other dogs. She stands up on her legs.
   A  
   B  
   C  

4. Harold and Niesha needed new shoes. Harold goes to his mom. She was not going to buy it.
   A  
   B  
   C  

5. The cat played with the string. His owner pulled the string away. The cat goes to catch it.
   A  
   B  
   C  

6. The red bird was flying in the sky. A worm is on the ground. The bird got the worm.
   A  
   B  
   C  

THE LESSON CONTINUES ON THE NEXT PAGE!
Instructions: Write a paragraph describing the pictures below.

1. dr. musial put tent forest poles

Let’s use our rubric on the next page!
### Paragraph Text Writing Rubric

#### Paragraph-Level

<table>
<thead>
<tr>
<th>Feature</th>
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## Paragraph Text Writing Rubric

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**TOTAL:** _______________
Instructions: Write a paragraph describing the pictures below.

1. ________________________________________________________________________________

Let’s use our rubric on the next page!
### Paragraph Text Writing Rubric

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**TOTAL: ________________**
daniel  cow  horse  threw  rope

Let’s use our rubric on the next page!
## Paragraph Text Writing Rubric

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**TOTAL:** ________________
3.

bear caught fish jumped lake

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___ Indentation ___ 5 Sentences ___ About 1 Topic ___ Complete Sentences

Let’s use our rubric on the next page!

167
## Paragraph Text Writing Rubric

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**TOTAL: ________________**
Paragraph Lesson 4: Check-Out Activity

Instructions: Write a paragraph describing the pictures below.

1.

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howie paula washed hose wiped

___ Indentation ___ 5 Sentences ___ About 1 Topic ___ Complete Sentences

Let’s use our rubric on the next page!
## Paragraph Text Writing Rubric

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**TOTAL:** ________________
Instructions: Underline the part that names for each sentence. Then fix up the paragraph by adding in capital letters and punctuation marks.

Example: the child walked to the door. he rang the bell. the dog started barking.

2. peter stood by the chair he felt a little sick the doctor ran over and helped him the doctor gave him medicine peter felt better

3. dr. smith gave out the test the students looked happy the test was pretty easy the students passed the test dr. smith was happy about their performance

Instructions: Read the sentences. Make sure all are written in the past tense by changing one of the sentences.

Example: The baby was on the floor. He cried very loud. His father picked him up.

A was B was C

4. The players are ready. The ball was tossed into the air. The red team had the ball first.

A are B was C had

5. The zoo animals were outside. A panda bear is looking at a tree. Another panda walked by.

A were B is C walked

6. Whitney danced at the party. She is having fun. The radio was very loud.

A danced B is C was

THE ACTIVITY CONTINUES ON THE NEXT PAGE!
Instructions: Check each paragraph to make sure they have all four parts:

- It begins with an indentation
- It contains five sentences
- The sentences are about the same topic
- The sentences are all complete

Example: Mark fixed elevators. He loved to use his tools. The elevators. Marked fixed elevators in hotels, offices, and hospitals.

X Indentation ___ 5 Sentences X About 1 Topic ___ Complete Sentences

7. Lucy planted a garden in her yard. She planted carrots and lettuce. She watered her garden every day. The carrots grew large. She shared the lettuce with her friends.

___ Indentation ___ 5 Sentences ___ About 1 Topic ___ Complete Sentences

8. Joe liked traveled to Washington on a train. He loved traveling on trains more than airplanes. Weather. Joe brought books with him to read on the train.

___ Indentation ___ 5 Sentences ___ About 1 Topic ___ Complete Sentences

THE ACTIVITY CONTINUES ON THE NEXT PAGE!
Instructions: Fill in the blank with the correct past tense verb

Example: drew ←→ draw

9. _______________ ←→ see
10. _______________ ←→ play
11. _______________ ←→ is
12. _______________ ←→ go
13. _______________ ←→ talk
14. _______________ ←→ like
15. _______________ ←→ dance
PARAGRAPH LESSON 1

INTRODUCTION

Today we are going to begin a series of lessons about writing paragraphs. Paragraphs are five complete simple sentences about the same topic that begin with an indentation. Before we start talking about paragraphs, let’s do a quick activity about writing simple sentences.

PRACTICE WITH SIMPLE SENTENCES

Simple sentences have two parts: a part that names and a part that tells more. When you write a simple sentence, first you name something, then you tell more. What do you do first? “Name something.” Then what do you do? “Tell more.”

Let’s practice with some examples.

Model (Numbers 1 – 3, ONLY teacher writes. Students provide answers vocally and watches).

1. Put your pen/pencil down. Find Part A on your worksheet. The instructions say underline the part of each sentence that names something. Read sentence 1 for me. “Kim jumped high into the air.”

2. The part that names something: Kim. I’ll underline the part that names.

3. Tell me more about Kim. “Jumped high into the air.”

4. Read sentence 2 for me. “The old man read the newspaper.”

5. The part that names something: The old man. I’ll underline the part that names.

6. Tell me more about the old man. “Read the newspaper.”

7. Read sentence 3 for me. “The small dog chased the cars.”

8. The part that names something: The small dog. I’ll underline the part that names.

9. Tell me more about the small dog. “Chased the cars.”

High Prompt (for numbers 4 – 6, student and teacher BOTH write. Student provides vocal answers)
10. Pick up your pen/pencil. Now you’ll write with me.

11. Read sentence 4 for me. “It rolled down the hill.”

12. What part names something? “It.” We’ll underline the part that names.

13. Tell me more about It. “Rolled down the hill.”

[This process repeats for items 5 and 6]

Medium Prompt (For numbers 7 – 9, ONLY student writes. Student provides vocal answers.)

14. Read sentence 7 to yourself. (Think Time)

15. What part names something? “Mr. Smith.” Underline it.

[This process repeats for items 8 and 9]

Model (Numbers 1 – 5, ONLY teacher writes. Student provides answers vocally and watches.)

1. Put your pen/pencil down. find Part B on your worksheet. The instructions say circle each simple sentence. Remember that a simple sentence has a part that names and a part that tells more.

2. Read number 1 for me. “The dog.”

3. This is not a simple sentence, so I won’t circle it.

4. There are two parts to a simple sentence: a part that names, and a part that tells more. “The dog” is the part that names.

5. Read number 2 for me. “Sat in the tree.”

6. This is not a simple sentence, so I won’t circle it.

7. There are two parts to a simple sentence: a part that names, and a part that tells more. “Sat in the tree” is the part that tells more.

8. Read number 3 for me. “The boy sat in the tree.”

9. This IS a simple sentence, so I WILL circle it.

[This process repeats for items 4 and 5]

High Prompt (for numbers 6 – 10, student and teacher BOTH write. Student provides vocal answers)
10. Pick up your pen/pencil. We’ll circle complete sentences together. I’ll need your help.

11. Read number 6 for me. “My shirt.”

12. Is that a simple sentence, yes or no? “No.”

13. Good. We won’t circle it. It is not a simple sentence. What part is there? The part that names or the part that tells more? “The part that names something.”

14. Read number 7 for me. “My shirt smelled funny.”

15. Is that a simple sentence, yes or no? “Yes.”

16. Yes it is, so we will circle it.

[This process repeats for items 8 – 10]

Medium Prompt (for numbers 11 – 15, ONLY student writes. Student provides vocal answers.)

17. Read number 11 to yourself. (Think Time)

18. Is that a simple sentence, yes or no? “No.”

19. What part is there? The part that names or the part that tells more? “The part that names.”

20. Read number 12 to yourself. (Think Time)

21. Is that a simple sentence, yes or no? “Yes.”


[This process repeats for items 13 – 15]

High Prompt (for numbers 1 and 2, student and teacher BOTH write. Student provides answers vocally and watches)

1. Find Part C on your worksheet. The instructions say write a complete sentence for each picture using all the words.

2. Remember, a simple sentence has two parts: part that names and a part that tells more. What are the two parts? First you write a part that names, then you write a part that tells more. What do you write first? “A part that names.” What do you write next? “A part that tells more.”
3. We can’t forget to use our capital letters and end marks.

4. Look at number 1. Each picture, like number 1, has two or more words. The first word is the part that names. The second word helps you tell more. You need to finish the rest of the sentence.

5. Let’s use this word as the part that names (points to the first word). Now I need to tell more using this word (points to the second word).

   [Teacher asks student for suggestions. Teacher writes a sentence using both words, reading the sentence aloud. Student copies the sentence.]

6. Notice that I used my capitals and end mark.

   [This process repeats for item 2]

Medium Prompt (for numbers 3 - 5, ONLY student writes. Student provides vocal answers.)

7. For numbers 3 through 5, you’ll take the lead. First you’ll tell me the sentence you want to write, then you’ll write it in the space next to the picture.

   [Students write a sentence using both words, but student and teacher discuss the sentence BEFORE the student writes it.]

**Practice with Paragraphs**

Now that we’ve practiced writing simple sentences, it’s time to work on paragraphs. Paragraphs have four key things. Paragraphs: 1) Begin with an indentation, 2) Have five sentences, 3) Every sentence is about the same topic, and 4) The sentences are all complete simple sentences.

The first part of the rule is that they begin with an indentation. What is the first part of the rule? “**They begin with an indentation.**” An indentation is just a space at the beginning of the paragraph.

The second part of the rule is that there are at least five sentences. How many sentences does a paragraph need? “**Five.**”

The third part of the rule is that every sentence is about the same topic. Do all five sentences need to be about the same topic? “**Yes.**”

The last part of the rule is that all five sentences must be complete sentences. They must have a part that names and a part that tells more. And they must use capitals and end marks. What are the two parts of a simple sentence? “**A part that names something and a part that tells more.**”
We are going to do two activities about paragraphs. First, we will read paragraphs and decide if they have all of the necessary parts. Second, we will write our own paragraphs. Let’s get started.

Model (for numbers 1–3, ONLY teacher writes. Student answers vocally and writes.)

1. Put your pen/pencil down. Find Part D on your worksheet. The instructions say to check each paragraph to make sure they have all four parts: 1) Begins with an indentation, 2) Contains five sentences, 3) Sentences are all about the same topic, and 4) Sentences are all complete.

2. Read number 1 for me. **Student reads paragraph.**

3. The first thing I have to do is decide if it begins with an indentation. Does this paragraph begin with an indentation? **“Yes.”**

4. Yes, it does. So I will put a check in the space below.

5. The second thing I have to do is decide if the paragraph has 5 sentences. Count the sentences. (Wait Time) Does the paragraph have 5 sentences? **“No.”**

6. No, it does not. It only has four. So I won’t put a check mark in the space.

7. The third thing I have to do is decide if all the sentences are about the same topic. Who is the first sentence about? **“Tom.”** Good. Are all the sentences about Tom and what he was doing? **“Yes.”**

8. Yes, they are. So I will put a check in the space below.

9. Finally, I have to decide if all of the sentences are complete. Does every sentence have a part that names and a part that tells more? **“No.”**

10. No. So I will not put a check in the box below.

11. Which sentence is incomplete? **“A box of crackers.”** Is that the part that names or the part that tells more? **“The part that tells more.”**

   [This process is repeated for items 2 and 3]

High Prompt (for numbers 4–6, student and teacher BOTH write. Student provides vocal answers)

12. Pick up your pen/pencil. We will do these next three together.
13. Read number 4 to me. **Student reads paragraph.**

14. Does this paragraph start with an indentation? **“No.”**

15. We will not put a check in the space.

16. Does this paragraph have 5 sentences? **“Yes.”**

17. We will put a check in the space.

18. Are all the sentences about the same topic? **“No.”**

19. We will not put a check in the space.

20. Are all of the sentences complete? **“Yes.”**

21. We will put a check in the space.

   [This process repeats for items 5 and 6]

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Model (for number 1, ONLY teacher writes. Student provides answers vocally and watches.)

1. Put your pen/pencil down. Find part E. The directions say write a paragraph describing the pictures below.

2. Look at the pictures. What are the pictures showing? **Student provides answers generally describing the pictures.**

3. There are some words below the pictures. We can use these words to help write the paragraph: francis, pumpkin, knife, face, carved.

4. There are also the usual checkboxes below. We can use these to make sure that we remember all the parts of a paragraph.

5. On the next page, there is a rubric we can use to score our paragraphs. **Teacher flips to the rubric on the next page.** This rubric will give us points for making sure that we complete all the checks for the important parts of the paragraph. The rubric will also help us know if we used appropriate capitalization, punctuation, and grammar for all our sentences. If we don’t write enough sentences, we will get a 0 on certain parts of the rubric.

6. Let’s quickly review the four parts of a paragraph. All paragraphs: 1) Begin with an indentation. What do they begin with? **“Indentation.”** 2) Have five sentences. How many sentences do paragraphs have? **“Five.”** 3) Every sentence is about the same topic. Are all sentences about the same topic? **“Yes.”** and 4) The sentences are all complete
simple sentences. What are the two parts of a simple sentence? “A part that names something and a part that tells more.”

7. I’m going to write a paragraph describing these 4 pictures. And I’m going to keep track of all the paragraph parts on the checklist.

   [Teacher writes a paragraph and reads the sentences aloud – the teacher can get some ideas from the student, but the teacher decides what to write]

8. Let me make sure that I included all the necessary paragraph parts. Teacher completes the checkboxes below the paragraph.

9. Now I need to score the paragraph with the rubric on the next page. First, is the first sentence indented? Teacher scores it 0 or 1.

10. Next, I need to make sure all of the sentences are about the same topic. I’ll score it 0, 1, 2, or 3. Teacher reads the paragraph aloud and scores it for adherence to a singular topic.

11. Now I need to read the whole paragraph again and see if I used the same verb tense for every sentence. I’ll score this 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, or Always. Teacher reads the paragraph aloud and scores it for verb tense.

12. Now I’ll look at each sentence individually and decide if it has appropriate grammar, capitalization, and punctuation. For grammar, I’ll use the 0-3 scores. For punctuation and capitalization, I’ll use 0 or 1. If you don’t write enough sentences, you’ll get a 0 in some categories. Teacher scores the individual sentences for each element.

13. OK, let’s look at the final score.

   High Prompt (for number 2, student and teacher BOTH write. Student provides vocal answers.)

14. Pick up your pen/pencil. We will both write this part.

15. Look at the pictures. What are the pictures showing? (Students provide answers generally describing the pictures).

16. There are some words below the pictures we can use to help write the paragraph: patricia, axe, wood, fire, chopped.

17. There are also some checkboxes below. We can use these to make sure that we remember all the parts of a paragraph.

18. I’m going to write a paragraph describing these 4 pictures. And I’m going to keep track of all the paragraph parts on the checklist.
[Teacher writes a paragraph and reads their sentences aloud – the teacher can get some ideas from the student, but the teacher decides on what sentence to write]

19. Let me make sure that I included all the necessary paragraph parts. **Teacher completes the checkboxes below the paragraph.**

20. Now I need to score the paragraph with the rubric on the next page. First, is the first sentence indented? **Teacher scores it 0 or 1.**

21. Next, I need to make sure all of the sentences are about the same topic. I’ll score it 0, 1, 2, or 3. **Teacher reads the paragraph aloud and scores it for adherence to a singular topic.**

22. Now I need to read the whole paragraph and see if I used the same verb tense for every sentence. I’ll score this 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, or Always. **Teacher reads the paragraph aloud and scores it for verb tense.**

23. Now I’ll look at each sentence individually and decide if it has appropriate grammar, capitalization, and punctuation. For grammar, I’ll use the 0-3 scores. For punctuation and capitalization, I’ll use 0 or 1. If you don’t write enough sentences, you’ll get a 0 in some categories. **Teacher scores the individual sentences for each element.**

24. OK, let’s look at the final score.
PARAGRAPH LESSON 2

High Prompt (for numbers 1 to 3, student and teacher BOTH write. Student provides vocal answers.)

1. Find part A on your sheet. The instructions say underline the part that names for each sentence, then fix up each incorrect paragraph by adding capital letters and end marks.

2. Look at number 1. I’ll read each sentence. We’ll both find the part that names and change the capital letters and periods.

3. First sentence: The cooks were working in the kitchen. What is the part that names? “The cooks.”

4. We’ll underline it. Change it to Capital T The cooks were working in the kitchen period.

5. Next sentence: Ms. Peters chopped vegetables. What is the part that names? “Ms. Peters.”

6. We’ll underline it. Change it to Capital M and Capital P Ms. Peters chopped vegetables period.

7. Next sentence: Dan roasted pig in a fire. What is the part that names? “Dan.”

8. We’ll underline it. Change it to Capital D Dan roasted pig in a fire period.


10. We’ll underline it. Change it to Capital T. The guests arrived at 7 for dinner period.

11. Last sentence: everyone ate their meal. What is the part that names? “Everyone.” We’ll underline it. Change it to Capital E. Everyone ate their meal period.

12. Check over the paragraph. Make sure each sentence begins with a capital letter and ends with a period.

13. Look at number 2. First sentence: a paperboy rode his bike. What is the part that names? “A paperboy.”

14. We’ll underline it. Change it to Capital A A paperboy rode his bike period.

15. Next sentence: he delivered newspapers in the morning. What is the part that names? “He.”
16. We’ll underline it. Change it to Capital H He delivered newspapers in the morning period.

17. Next sentence: he threw a paper into a yard. What is the part that names? “He.”

18. We’ll underline it. Change it to Capital H He threw a paper into a yard period.

19. Next sentence: his bike was fast. What is the part that names? “His.”

20. We’ll underline it. Change it to Capital H His bike was fast period.

21. Last sentence: he loved his job as a paperboy. What is the part that names? “He.”

22. We’ll underline it. Change it to Capital H He loved his job as a paperboy period.

23. Check over paragraph. Make sure each sentence begins with a capital letter and ends with a period.

24. Look at number 3. First sentence: it was feeding time at the zoo. What is the part that names? “It.”

25. We’ll underline it. Change it to capital I It was feeding time at the zoo period.

26. Next sentence: the monkeys ate bananas. What is the part that names? “The monkeys.”

27. We’ll underline it. Change it to Capital T The monkeys ate bananas period.


29. We’ll underline it. Change it to Capital T The elephants did tricks for peanuts period.

30. Next sentence: fuzzy pandas ate bamboo in a tree. What is the part that names? “Fuzzy pandas.”

31. We’ll underline it. Change it to Capital F Fuzzy pandas ate bamboo in a tree period.

32. Last sentence: the camels ate plants. What is the part that names? “The camels.”

33. We’ll underline it. Change it to capital T The camels ate plants period.

34. Check over the paragraph. Make sure each sentence begins with a capital letter and ends with a period.
Model (Numbers 1 to 8, only the teacher writes. Student provides answers vocally and watches).

1. Put your pen or pencil down. Find part B on your worksheet. The directions say fill in the blank with the correct past tense verb.

2. The column on the right tells what is happening right now. We use a different form of the word to tell what happened in the past.

3. Look at number 1. The word have tells what is happening now. To tell what happened in the past, it would be had. I’ll write had.

4. Number 2. The word go tells what is happening now. To tell what happened in the past, it would be went. I’ll write went.

5. Number 3. The word is tells what is happening now. To tell what happened in the past, it would be was. I’ll write was.

6. Number 4. The word dance tells what is happening now. To tell what happened in the past, it would be danced. I’ll write danced.

7. Number 5. The word jump tells what is happening now. To tell what happened in the past, it would be jumped. I’ll write jumped.

8. Number 6. The word grab tells what is happening now. To tell what happened in the past, it would be grabbed. I’ll write grabbed.

9. Number 7. The word are tells what is happening now. To tell what happened in the past, it would be were. I’ll write were.

10. Number 8. The word hold tells what is happening now. To tell what happened in the past, it would be held. I’ll write held.

High Prompt (for numbers 9 to 16, student and teacher BOTH write. Student provides vocal answers)

11. Pick up your pen or pencil.


13. Number 10. Is tells what is happening now. What word tells what happened in the past? “Was.” Let’s both write was.


19. Number 16. Are tells what is happening now. What word tells what happened in the past? “Were.” Let’s both write were.

Medium Prompt (For numbers 17 to 24, ONLY student writes)


Model (for numbers 1 to 2, only the teacher writes. Student provides answers vocally and watches)

1. Put your pen or pencil down. Find Part C.

2. The instructions say read the sentences and make sure it is written in the past tense by changing one of the sentences.

3. Each sentence has the verb underlined with a letter below: A, B, or C.
4. Number one says. Tom had $3.00. He goes to the store to buy chips. He was very happy.

5. One of these sentence is NOT written in the past tense. We are telling something that already happened, so we need to make sure all the sentences are in the past tense.

6. A is written in the past tense: had. B is not written in the past tense: goes. I will change that by writing the past tense of goes. What past tense word should I write? “Went.” I’ll write went.

7. Number two says: The boys dance at the party. The music was very loud. Everyone had fun.

8. One of these sentence is NOT written in the past tense. We are telling something that already happened, so we need to make sure all the sentences are in the past tense.

9. A is not written in the past tense: dance. I will change that by writing the past tense of dance. What past tense word should I write? “danced.” I’ll write danced.

High Prompt (for numbers 3 and 4, student and teacher BOTH write. Student provides vocal answers)

10. Pick up your pen or pencil. We’ll both write the next two.

11. Number three says: The player jumped to grab the ball. The ball is very high. She grabbed it.

12. Which sentence, A, B, or C is NOT written in the past tense? “B.”

13. Correct, B is not written in the past tense: is. What past tense word should we write? “Was.”

14. Let’s both write was.

15. Number four says: The brothers are on the football team. They liked to play football. They played all day.

16. Which sentence, A, B, or C is NOT written in the past tense? “A.”

17. Correct, A is not written in the past tense: are. What past tense word should we write? “Were.”

18. Let’s both write were.
Medium Prompt (For number 5 and 6, ONLY student writes)

19. Read number 5 to yourself (think time).

20. Get ready to tell me. Which sentence, A, B, or C is NOT written in past tense? “C.”


22. Write were.

23. Read number 6 to yourself (think time).

24. Get ready to tell me. Which sentence, A, B, or C is NOT written in past tense? “B.”

25. Correct, C. What past tense word should you write? “Was.”

26. Write was.

High Prompt (for numbers 1, student and teacher BOTH write. Student provides vocal answers)

1. Pick up your pen/pencil. Find Part D. The instructions say to check each paragraph to make sure they have all four parts. We will do the first one together

2. Read number 1 to me. **Student reads paragraph.**

3. Does this paragraph start with an indentation? “Yes.”

4. We will put a check in the space.

5. Does this paragraph have 5 sentences? “No.”

6. We will not put a check in the space.

7. Are all the sentences about the same topic? “Yes.”

8. We will put a check in the space.

9. Are all of the sentences complete? “Yes.”

10. We will put a check in the space.

Medium Prompt (for number 2, ONLY student writes. Student provides vocal answers.)

11. Read number 2 to yourself (Think Time).
12. Does it begin with an indentation? “No.”

13. Do not put a check.

14. Does it have 5 sentences? “No.”

15. Do not put a check.

16. Are all the sentences about the same topic? “Yes.”

17. Put a check.

18. Are all the sentences complete? “No.”

19. Do not put a check.

Low Prompt (for number 3, ONLY student writes)

20. You’ll do number 3 on your own. Read the paragraph and then check to see if the paragraph has all four parts.

Answer Key:

Naomi was a student. She liked reading books about science. The goldfish swam in the bowl. Naomi wrote a lot of papers.

X Indentation ___ 5 Sentences ___ About 1 Topic X Complete Sentences

High Prompt (Number 1, student and teacher BOTH write. Student provides vocal answers.)

1. Pick up your pen/pencil. Find Part E on your worksheet.

2. Look at the pictures. What are the pictures showing? (Students provide answers generally describing the pictures).

3. There are some words below the pictures we can use to help write the paragraph: Tom, snowman, carrot, snow, rolled.

4. There are also some checkboxes below. We can use these to make sure that we remember all the parts of a paragraph.
5. I’m going to write a paragraph describing these 4 pictures. And I’m going to keep track of all the paragraph parts on the checklist

[Teacher writes a paragraph and reads their sentences aloud – the teacher can get some ideas from the student, but the teacher decides on what sentence to write]

6. Let me make sure that I included all the necessary paragraph parts. **Teacher completes the checkboxes below the paragraph.**

7. Now I need to score the paragraph with the rubric on the next page. First, is the first sentence indented? **Teacher scores it 0 or 1.**

8. Next, I need to make sure all of the sentences are about the same topic. I’ll score it 0, 1, 2, or 3. **Teacher reads the paragraph aloud and scores it for adherence to a singular topic.**

9. Now I need to read the whole paragraph and see if I used the same verb tense for every sentence. I’ll score this 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, or Always. **Teacher reads the paragraph aloud and scores it for verb tense.**

10. Now I’ll look at each sentence individually and decide if it has appropriate grammar, capitalization, and punctuation. For grammar and capitalization, I’ll use the 0-3 scores. For punctuation, I’ll use 0 or 1. If you don’t write enough sentences, you’ll get a 0 in some categories. **Teacher scores the individual sentences for each element.**

11. OK, let’s look at the final score.

**Medium Prompt (Number 2, only the student writes)**

12. Find number 2. What are the pictures showing? (Students provide answers generally describing the pictures).

13. There are some words below the pictures we can use to help write the paragraph: mr. Thompson, dirty, dishes, sink, washed.

14. Your goal is to write a paragraph describing these 4 pictures. Remember that a good paragraph has five simple sentences. We’ll talk about each sentence before you write each. Use the checklist below to make sure you include all the paragraph parts.

[The student first says each sentence out loud, the teacher checks it, and the student writes it, for a total of at least 5 sentences]

15. Let’s do the checks at the bottom of this page. Did you include all four parts? **Student responds.**

16. Now I need to score the paragraph with the rubric on the next page.
17. First, is the first sentence indented? (teacher scores it 0 or 1)

18. Now let’s look at each sentence and decide if it has appropriate grammar, capitalization, and punctuation. Each sentence will get a score of 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, and Always. If you didn’t write enough sentences, you’ll get a 0 in some categories.

[Instructor goes through each sentence written for the paragraph with the student and scores it using the rubric.

19. OK, let’s look at the final score.
Medium Prompt (for number 1, ONLY student writes.)

1. Find Part A. Look at number 1. The directions say underline the part that names for each sentence. Then fix up the paragraph by adding in capital letters and punctuation marks.

2. Look at number 1. Read the first sentence to yourself (Time Time). What is the part that names? “Sam.”

3. Underline it. Change it to Capital S Sam washed the car period.

4. Read the next sentence to yourself (Think Time). What is the part that names? “He.”

5. Underline it. Change it to Capital H He sprayed the dirty car with a hose period.

6. Read the next sentence to yourself (Think Time). What is the part that names? “The car.”

7. Underline it. Change it to a Capital T The car was very dirty period.

8. Read the next sentence to yourself (Think Time). What is the part that names? “Sam.”

9. Underline it. Change it to a Capital S Sam had to use a lot of water period.

10. Read the last sentence to yourself (Think Time). What is the part that names? “The car.”

11. Underline it. Change it to a Capital T The car was finally clean period.

Low Prompt (for numbers 2 and 3, ONLY student writes.)

12. I want you to do the last two by yourself. Underline the part that names for each sentence. Then fix up the paragraph by adding in capital letters and punctuation marks. I’ll check your work when you are done. Do you have any questions?

Answer Key:

2. The bear was standing in the river. Fish were swimming around. The bear grabbed a fish to eat. The bear was still hungry. It ate more fish until it was full.

3. Mr. Smith walked into his house. His dog jumped all over him. The dog had mud on its paws. The mud got on Mr. Smith’s pants. Mr. Smith was mad.
Medium Prompt (for numbers 1 and 2, ONLY student writes. Student provides vocal answers.)

1. Find Part B on your worksheet. The instructions say to check each paragraph to make sure they have all four parts: an indentation, five sentences, all sentences are about the same topic, and the sentences are all complete.

2. Read number 1 to yourself (Think Time).

3. Does it begin with an indentation? “Yes.”

4. Put a check.

5. Does it have 5 sentences? “Yes.”

6. Put a check.

7. Are all the sentences about the same topic? “Yes.”

8. Put a check.

9. Are all the sentences complete? “Yes.”


11. Read number 2 to yourself (Think Time).

12. Does it begin with an indentation? “No.”

13. Do not put a check.

14. Does it have 5 sentences? “No.”

15. Do not put a check.

16. Are all the sentences about the same topic? “Yes.”

17. Put a check.

18. Are all the sentences complete? “No.”

19. Do not put a check.

Low Prompt (for numbers 3 and 4, ONLY student writes)
20. You'll do numbers 3 and 4 on your own. Read the paragraph and then check to see if the paragraph has all four parts. I will check your work when you’re finished. Do you have any questions?

Answer Key

3. Kim had a small dog. Liked to sleep on the couch. It slept on the couch under some blankets during the afternoon. The small dog loved to stay warm under blankets or by the fireplace.

X Indentation ___ 5 Sentences X About 1 Topic ____ Complete Sentences

4. The tiny angry cat hissed at the dog. The tiny cat ran down the street. It hid in some bushes. The cat was scared and cried. It wanted to go home.

X Indentation X 5 Sentences X About 1 Topic X Complete Sentences

C Model (Numbers 1 to 10, only the teacher writes. Student provides answers vocally and watches).

28. Put your pen or pencil down. Find part C on your worksheet. The directions say fill in the blank with the correct past tense verb.

29. The column on the right tells what is happening right now. We use a different form of the word to tell what happened in the past.

30. Look at number 1. The word pull tells what is happening now. To tell what happened in the past, it would be pulled. I’ll write had.

31. Number 2. The word get tells what is happening now. To tell what happened in the past, it would be got. I’ll write went.

32. Number 3. The word need tells what is happening now. To tell what happened in the past, it would be needed. I’ll write was.

33. Number 4. The word stand tells what is happening now. To tell what happened in the past, it would be stood. I’ll write danced.
34. Number 5. The word like tells what is happening now. To tell what happened in the past, it would be liked. I’ll write jumped.

35. Number 6. The word talk tells what is happening now. To tell what happened in the past, it would be talked. I’ll write grabbed.

36. Number 7. The word draw tells what is happening now. To tell what happened in the past, it would be drew. I’ll write were.

37. Number 8. The word is tells what is happening now. To tell what happened in the past, it would be was. I’ll write held.

38. Number 9. The word play tells us what is happening now. To tell what happened in the past, it would be played. I’ll write played.

39. Number 10. The word see tells us what is happening now. To tell what happened in the past, it would be saw. I’ll write saw.

High Prompt (for numbers 11 to 20, student and teacher BOTH write. Student provides vocal answers)

40. Pick up your pen or pencil.


47. Number 17. See tells what is happening now. What word tells what happened in the past? “Saw.” Let’s both write saw.

48. Number 18. Is tells what is happening now. What word tells what happened in the past? “Was.” Let’s both write was.


Medium Prompt (For numbers 21 to 30, ONLY student writes)


High Prompt (for numbers 1 and 2, student and teacher BOTH write. Student provides vocal answers)

1. Find Part D. The instructions say read the sentences. Make sure all are written in the past tense by changing one of the sentences.

2. Number one says: Ms. Jenkins and Ms. Tomlin see the flat tire. They went to the store. The store was closed.

3. Which sentence, A, B, or C is NOT written in the past tense? “A.”

4. Correct, A is not written in the past tense: see. What past tense word should we write? “Saw.”

5. Let’s both write Saw.
6. Number two says: The teacher **drew** a picture on the board. It **is** a large circle. The teacher **talked** about the size.

7. Which sentence, A, B, or C is NOT written in the past tense? “**B.**”

8. Correct, B is not written in the past tense: **is**. What past tense word should we write? “**was.**”

9. Let’s both write **was**.

**Medium Prompt (For numbers 3 and 4, ONLY student writes)**

10. Read number 3 to yourself (think time).

11. Which sentence A, B, C is NOT written in the past tense? “**C.**”

12. Correct, C. What past tense word should you write? “**stood.**”

13. Write it.

14. Read number 4 to yourself (think time).

15. Which sentence A, B, C is NOT written in the past tense? “**B.**”

16. Correct, B. What past tense word should you write? “**went.**”

**Low prompt (For numbers 5 to 6, ONLY student writes).**

17. You’ll do numbers 5 and 6 by yourself. Find the sentence that is NOT written in the past tense and change it. I’ll check your work after you’re done. Let me know if you have any questions.

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**Answer key:**

5. The cat **played** with the string. His owner **pulled** the string away. The cat **goes** to catch it.

6. The red bird **was** flying in the sky. A worm **is** on the ground. The bird **got** the worm.
Medium Prompt (Numbers 1 and 2, only the student writes)

1. Find Part E on your worksheet. Find number 1. What are the pictures showing? (Students provide answers generally describing the pictures).

2. There are some words below the pictures we can use to help write the paragraph: Dr. Musial, put, tent, forest, poles.

3. Your goal is to write a paragraph describing these 4 pictures. Remember that a good paragraph has five simple sentences. We’ll talk about each sentence before you write each. Use the checklist below to make sure you include all the paragraph parts.

[The student first says each sentence out loud, the teacher checks it, and the student writes it, for a total of at least 5 sentences]

4. Let’s do the checks at the bottom of this page. Did you include all four parts? **Student responds.**

5. Now I need to score the paragraph with the rubric on the next page.

6. First, is the first sentence indented? (teacher scores it 0 or 1)

7. Now let’s look at each sentence and decide if it has appropriate grammar, capitalization, and punctuation. Each sentence will get a score of 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, and Always. If you didn’t write enough sentences, you’ll get a 0 in some categories.

[Instructor goes through each sentence written for the paragraph with the student and scores it using the rubric.]

8. OK, let’s look at the final score.

9. Find number 2. What are the pictures showing? (Students provide answers generally describing the pictures).

10. There are some words below the pictures we can use to help write the paragraph: mr. grasko, oven, made, chocolate-chip, tasted.

11. Your goal is to write a paragraph describing these 4 pictures. Remember that a good paragraph has five simple sentences. We’ll talk about each sentence before you write each. Use the checklist below to make sure you include all the paragraph parts.

[The student first says each sentence out loud, the teacher checks it, and the student writes it, for a total of at least 5 sentences]
12. Let’s do the checks at the bottom of this page. Did you include all four parts? Student responds.

13. Now I need to score the paragraph with the rubric on the next page.

14. First, is the first sentence indented? (teacher scores it 0 or 1)

15. Now let’s look at each sentence and decide if it has appropriate grammar, capitalization, and punctuation. Each sentence will get a score of 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, and Always. If you didn’t write enough sentences, you’ll get a 0 in some categories.

[Instructor goes through each sentence written for the paragraph with the student and scores it using the rubric.

16. OK, let’s look at the final score.
PARAGRAPH LESSON 4

Medium Prompt (Number 1, only the student writes).

1. Find Part A, number 1 on your worksheet. What are the pictures showing? (Students provide answers generally describing the pictures).

2. There are some words below the pictures we can use to help write the paragraph: Mischa, climbed, pool, diving board, jumped.

3. Your goal is to write a paragraph describing these 4 pictures. Remember that a good paragraph has five simple sentences. We’ll talk about each sentence before you write each. Use the checklist below to make sure you include all the paragraph parts.

[The student first says each sentence out loud, the teacher checks it, and the student writes it, for a total of at least 5 sentences]

4. Let’s do the checks at the bottom of this page. Did you include all four parts? Student responds.

5. Now I need to score the paragraph with the rubric on the next page.

6. First, is the first sentence indented? (teacher scores it 0 or 1)

7. Now let’s look at each sentence and decide if it has appropriate grammar, capitalization, and punctuation. Each sentence will get a score of 0, 1, 2, or 3 for Never, Sometimes, Most of the Time, and Always. If you didn’t write enough sentences, you’ll get a 0 in some categories.

[Instructor goes through each sentence written for the paragraph with the student and scores it using the rubric.

OK, let’s look at the final score.

Low Prompt (For numbers 2 and 3, ONLY student writes)

1. Number 2. Look at the pictures. What are the pictures showing? (Students provide answers generally describing the pictures).

2. There are some words below the pictures we can use to help write the paragraph: Daniel, cow, horse, threw, rope

3. You’ll write this entire paragraph by yourself. Your goal is to write at least 5 sentences describing the 4 pictures. After you write it, we’ll look at the checks together. Let me know if you have any questions.
The student writes all the sentences by themselves. At the end, the teacher goes through the checkboxes with the student and corrects any errors. If any of the rubric scores are between 0 to 2, the teacher models the correct response and the student writes it.

4. Number 3. Look at the pictures. What are the pictures showing? (Students provide answers generally describing the pictures).

5. There are some words below the pictures we can use to help write the paragraph: bear, caught, fish, jumped, lake

6. You'll write this entire paragraph by yourself. Your goal is to write at least 5 sentences describing the 4 pictures. After you write it, we'll look at the checks together. Let me know if you have any questions.

The student writes all the sentences by themselves. At the end, the teacher goes through the checkboxes with the student and corrects any errors. If any of the rubric scores are between 0 to 2, the teacher models the correct response and the student writes it.

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**CHECKOUT FOR PARAGRAPH LESSON 4**

1. I want to see how well I taught you the material from Lessons 1-4. You will complete this worksheet by yourself.

   1. Directions for 1 say write a paragraph describing the pictures below. There are some words you can use: howie, paula, washed, hose, wiped

   2. Directions for 2 and 3 say underline the part that names for each sentence, then fix up the paragraph by adding in capital letters and punctuation marks. There is an example.

   3. The example says “The child walked to the door. He rang the bell. The dog started barking.” The part that names of each sentence has been underlined, a capital letter has been written above, and periods were inserted.

   4. Directions for 4 - 6 say read the sentences. Make sure all are written in the past tense by changing one of the sentences.

   5. The example says, “The baby is on the floor. He cried very loud. His father picked him up.” The verb “is” for letter A is crossed out and “was” is written above it.

   6. Directions for 7 and 8 say to check each paragraph to make sure they have all four parts.
7. The example says, *Mark fixed elevators. He loved to use his tools. The elevators. Marked fixed elevators in hotels, offices, and hospitals.*

8. The example begins with an indentation, so there is a check. There are only 4 sentences, so there is no check. All the sentences are about the same topic, so there is a check. Not all of the sentences are complete. “The elevators” is missing a part that tells more. So there is no check.

9. Directions for 9 – 15 say fill in the blank with the correct past tense verb.

10. The example shows that draw becomes drew in the past tense.

11. Do you have any questions?

*To proceed to Paragraph Practice 1, the student needs to score at least 90% on the checkout – 47/52.*

*Number 1: Total possible 32 points (total points of the self-check rubric)  
Numbers 2 to 15: Total possible 20 points*
Answer key

1. Use self-check rubric score
2. Peter stood by the chair. He felt a little sick. A doctor ran over and helped him.
3. Dr. Garish gave out the test. The students looked happy. The test was pretty easy.

4. The players are ready. The ball was tossed into the air. The red team had the ball first.

5. The zoo animals were outside. A panda bear is looking at a tree. Another panda walked by.

6. Whitney danced at the party. She is having fun. The radio was very loud.

7. X Indentation X 5 Sentences X About 1 Topic X Complete Sentences
8. X Indentation ___ 5 Sentences X About 1 Topic Complete Sentences
9. saw
10. played
11. was
12. went
13. talked
14. liked
15. danced
APPENDIX H: TREATMENT FIDELITY CHECKLIST

Treatment Fidelity Checklist

All items are scored dichotomously. The sections under each lesson refer to the alphabetized sections on both student materials and teacher scripts.

Baseline/Maintenance

- Teacher states probe directions
- Teacher provides 3-minute timing
- Teacher provides no prompting or feedback

Lesson 1

- Teacher describes simple sentences
- Section 1a: Teacher models underlining
- Section 1a: Teacher and participant provide vocal/handwritten responses for underlining
- Section 1a: Participant only provides vocal/handwritten responses for underlining
- Section 1a: Teacher provides error correction when necessary
- Section 1b: Teacher models identifying simple sentences
- Section 1b: Teacher and participant provide vocal/handwritten responses for finding simple sentences
- Section 1b: Participant only provides vocal/handwritten responses for finding simple sentences
- Section 1b: Teacher provides error correction when necessary
- Section 1c: Teacher reviews simple sentences
- Section 1c: Teacher and participant write simple sentences
- Section 1c: Teacher provides error correction when necessary
- Section 1d: Teacher reviews how paragraphs are a collection of simple sentences and reviews the important parts of a paragraph
- Section 1d: Teacher models how to evaluate paragraphs for the 4 elements (indentation, number of sentences, about one topic, all complete sentences)
- Section 1d: Teacher and student provide vocal/handwritten responses for evaluating paragraphs
- Section 1d: Teacher provides error correction when necessary
- Section 1e: Teacher models how to write a paragraph using picture-word prompt
- Section 1e: Teacher models how to use the paragraph rubric to evaluate the paragraph
- Teacher provides error correction when necessary

Lesson 2
- Section 2a: Teacher and student provide vocal/handwritten responses for identifying parts of a sentence, and correcting capitalization and punctuation errors
- Section 2a: Teacher provides error correction when necessary
- Section 2b: Teacher models writing verbs in past tense
- Section 2b: Teacher and student provide vocal/handwritten responses for writing verbs in past tense
- Section 2b: Teacher provides error correction when necessary
- Section 2c: Teacher models how to identify/change present tense verbs
- Section 2c: Teacher and student provide vocal/handwritten responses for identifying and changing present tense verbs
- Section 2c: Teacher provides error correction when necessary
- Section 2d: Teacher and participant provide vocal/handwritten responses for evaluating paragraphs for the 4 elements
- Section 2d: Participant only provides vocal/handwritten responses for evaluating paragraphs for 4 elements
- Section 2d: Participant independently evaluates paragraphs for the 4 elements
- Section 2d: Teacher provides error correction when necessary
- Section 2e: Teacher models how to write paragraph using picture-word prompt
- Section 2e: Teacher models how to evaluate paragraphs with paragraph rubric
- Section 2e: Teacher and student write a paragraph together using picture-word prompt
- Section 2e: Teacher and student evaluate paragraph using paragraph rubric
- Section 2e: Teacher provides error correction when necessary
- Teacher states probe directions
- Teacher provides 3-minute timing
- Teacher provides no prompting or feedback during timing

Lesson 3
- Section 3a: Student only provides vocal/handwritten responses for identifying parts of a sentence, and correcting capitalization and punctuation errors
- Section 3a: Student independently underlines parts of sentences and fixes capitalization and punctuation errors
- Section 3a: Teacher provides error correction when necessary
- Section 3b: Student only provides vocal/handwritten responses for evaluating paragraphs for the 4 elements
- Section 3b: Student independently evaluates paragraphs for the 4 elements
- Section 3b: Teacher provides error correction when necessary

- Section 2d: Participant only provides vocal/handwritten responses for evaluating paragraphs for 4 elements

- Section 2d: Participant independently evaluates paragraphs for the 4 elements

- Section 3c: Teacher models writing verbs in past tense

- Section 3c: Teacher and student provide vocal/handwritten responses for writing verbs in past tense

- Section 3c: Student only provides vocal/handwritten responses for writing in past tense

- Section 3c: Teacher provides error correction when necessary

- Section 3d: Teacher and student provide vocal/handwritten responses for identifying and changing present tense verbs

- Section 3d: Participant independently identifies/changes present tense verbs

- Section 3d: Teacher provides error correction when necessary

- Section 3e: Teacher and student write a paragraph together using picture-word prompt

- Section 3e: Teacher and student evaluate paragraph using paragraph rubric

- Section 3e: Teacher provides error correction when necessary

Lesson 4

- Section 4a: Teacher and student write a paragraph together using picture-word prompt

- Section 4a: Teacher and student evaluate paragraph using paragraph rubric

- Section 4a: Student independently writes a paragraph with picture-word prompt

- Section 4a: Teacher and student evaluate paragraph using paragraph rubric

- Section 4a: Teacher provides error correction when necessary
- Check-Out Activity: Teacher reviews instructions for each section of the check-out activity
- Check-Out Activity: Teacher provides no instructions or feedback during check-out activity
- Teacher states probe directions
- Teacher provides 3-minute timing
- Teacher provides no prompting or feedback during timing

Frequency-Building Lessons (Lessons 4 – 14)
- Teacher states writing goal
- Teacher reviews student’s previous writing performance (if student has already finished a timed practice lesson)
- Teacher states FBPC directions
- Teacher provides first 3-minute timing
- Teacher provides no prompting or feedback during timing
- Teacher and student review paragraph using the paragraph rubric
- Teacher provides second 3-minute timing
- Teacher provides no prompting or feedback during timing
- Teacher and student review paragraph using the paragraph rubric
- Student identifies highest score
- Student graphs highest score
- Teacher states probe directions (if probe is administered at the end of lesson)
- Teacher provides 3-minute timing (if probe is administered at the end of lesson)
- Teacher provides no prompting or feedback (if probe is administered at the end of lesson)
APPENDIX I: SOCIAL VALIDITY SURVEY

Social Validity Survey

Name: ___________________ Date: ___________________

Student Exit Survey

1. How do you feel about the instruction and timed practice with pictures and words?
   
   1  2  3  4

   I feel: Great Good Not Good Bad

2. How do you feel about your paragraph writing skills after the instruction and practice?
   
   1  2  3  4

   I feel: Great Good Not Good Bad

3. Is there anything that you would change to the instruction or practice?