8-21-2023 9:00 AM

Single-Subject Writing Strategy Instruction: A Meta-Analysis

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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Education
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Casola, Madelyn A., "Single-Subject Writing Strategy Instruction: A Meta-Analysis" (2023). *Electronic Thesis and Dissertation Repository*. 9568.
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Abstract

This meta-analysis reports on single-subject design (SSD) writing strategy instruction research conducted in the 15 years since Rogers and Graham's (2008) meta-analysis on SSD writing instruction. The analysis reviewed 36 studies and aimed to answer four questions: 1) Are writing strategy interventions tested using single-subject methodology effective with students in Grades 1 to 8? (2) Is writing strategy instruction more effective for some grades than others? (3) Is writing strategy instruction more beneficial for specific samples of students? (4) Do studies deemed higher quality based on What Works Clearinghouse (2022) (WWC) indicators have more or less overlap than those deemed lower quality? Results showed that students benefited from writing strategy instruction, making significant gains in holistic text quality, number of genre elements and word count. When comparing the effectiveness across grade levels, writing strategy instruction was highly effective in improving holistic text quality of students in grades 5-8 and moderately effective for students in grades 1-4. When exploring the effectiveness with various student samples, writing strategy instruction was highly effective in improving holistic text quality for emotional behavioural disorders/suspected emotional behavioural disorders and autism spectrum disorder groups but moderately effective for the learning disabilities/struggling writers' group. Visual analysis results revealed low to moderate study validity. Although study quality was poor to acceptable and should be improved, the effectiveness of writing strategy instruction did not differ significantly between low and higher quality studies.

Keywords

Summary for Lay Audience

Writing strategy instruction has been shown to be effective when taught in a class-wide setting; however, some struggling students require one-on-one assistance. Writing strategy instruction teaches students to use self-regulation skills combined with writing knowledge to improve their writing. This includes teaching students specific strategies on how to plan, draft and revise writing, with most strategies designed to address a specific genre or type of writing. Self-regulation skills are complex mental processes that allow individuals to deal with the relationship between personal, behavioral, and environmental factors. Writing knowledge refers to an individual's knowledge of the writing process, including knowledge of sentence formation, vocabulary and different writing genres.

The purpose of this review was to examine the research conducted in the last 15 years and determine if writing strategy instruction is also beneficial when taught on an individual basis. This study reviewed 36 studies to determine the effectiveness of writing strategy instruction tested across students in Grades 1-8 using single-subject design, meaning the instruction was taught to individuals and not on a class-wide basis. The study determined that writing strategy instruction administered one-on-one is highly effective for all students including those with various exceptionalities in Grades 1-8. This is important for educators who can use writing strategy instruction on a class-wide basis, or as a one-on-one intervention with students with exceptionalities or who may need additional support. While study quality was an issue with studies generally, the positive effects of writing strategy instructions for individuals did not differ by study design quality.

Acknowledgments

First, I would like to express my sincerest thanks to my supervisor Dr. Perry Klein for his unwavering support and guidance throughout this process. I would also like to thank Dr. Nicole Neil for providing me with valuable insights and guidance on single-subject design research. Furthermore, thank you to the writing research group for providing valuable feedback throughout. Finally, I would like to sincerely thank my family and friends for their unconditional support.

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Chapter 1

1   Introduction

Writing, including planning, researching, organizing, and editing, helps children think, learn, express their thoughts, and be understood by others (Graham et al., 2005). Therefore, teaching children to write effectively is critical to promoting their future academic and personal success (Miller & McCardle, 2010). This thesis will report on a meta-analysis of single-subject design studies of writing strategy instruction, a specific type of writing intervention. While writing strategy instruction is often conducted in a class-wide setting, there are cases in which students work one-on-one with educators during writing interventions. These cases may include students with learning challenges or disabilities, as well as students who have been placed in tier 3 within a response to intervention model and require additional support (Denton et al., 2013; Werts et al., 2014). However, the effectiveness of writing strategy instruction administered one-on-one may differ, making it important to investigate the effectiveness of delivering these interventions on a one-on-one basis. Such interventions are commonly investigated using SSD research. This work will report on research conducted in the 15 years since the meta-analysis of Rogers and Graham (2008), providing an up-to-date review of single-subject design writing strategy instruction including whether such instruction is beneficial for students with exceptionalities.

1.1   Writing Development

Research on writing development demonstrates the skills required to write effectively, making it important to incorporate such skills into writing interventions. Kim's (2020) interactive dynamic literacy (IDL) model provides a comprehensive overview of the skills that

contribute to writing processes and outcomes. The IDL model expands on developmental models such as Berninger and Winn's (2006) not-so-simple view of writing and Kim and colleague's (2017) direct and indirect effects model of developmental writing, by summarizing research on the foundational skills needed by students to be strong readers and writers. The IDL model integrates the results of previous research on writing development. It conceptualizes reading and writing as relying on an overlapping set of discourse, sentence, lexical and sublexical level literacy skills, such as reading and writing comprehension, phonemic awareness, and transcription skills. Additionally, reading and writing skills also rely on similar executive functioning skills such as working memory and self-regulation (Kim, 2020). The development of students' reading and writing skills is bidirectional, with each influencing the other. Furthermore, the IDL model also explains why students with reading difficulties often experience writing challenges and vice versa, as having challenges with any of these sets of skills will directly influence a student's development in the other subject, and they rely on many of the same underlying cognitive and oral language skills.

1.2   Role of Discourse Knowledge in Writing

An individual's discourse knowledge plays a vital role in their development as a writer (Kim, 2020). Discourse knowledge refers to an individual's linguistic knowledge, vocabulary, knowledge of sentence formation, and knowledge of different writing genres (Olinghouse & Graham, 2009; Kim, 2020). For example, a study by Saddler and Graham (2007) examined the relationship between discourse knowledge and writing development in both strong and struggling Grade 4 writers. Researchers reported two main findings: (1) Students classified as strong writers had more general writing knowledge; and (2) Students with more discourse knowledge produced longer and stronger writing pieces.

Discourse knowledge also positively impacts beginning writers' development. To illustrate, Wen and Coker (2020) examined the influence of discourse knowledge on beginning writers' development. In this study, 380 Grade 1 students participated in an interview at the beginning and end of the school year designed to assess their discourse knowledge. Students also completed narrative and descriptive writing samples at the beginning and end of the school year. The researchers found that results from the discourse knowledge interview at the beginning of the school year had no relationship with writing development. However, students' results from the end of the year discourse knowledge survey were related to students' writing achievement in both genres. This suggests that discourse knowledge begins to develop early, contributes to writing development, and should be an area of focus in writing interventions.

1.3   Role of Self-Regulation in Writing

Self-regulation also plays a vital role in an individual's writing development. According to Bandura (1991), self-regulation is defined as a dynamic and complex cognitive process that allows individuals to deal with the interplay between personal, behavioural, and environmental factors. Self-regulatory processes such as monitoring and controlling the planning of texts, editing throughout the writing process, and self-evaluating the text all influence writing quality. In 1997, Zimmerman and Risemberg created the self-regulation model of writing. In this model, self-regulation is divided into three components: (1) environmental; (2) behavioural; and (3) personal/covert. The authors suggest that these three components interact through what is described as a cyclic feedback loop, meaning that writers can actively monitor their writing and apply feedback from others in a timely manner.

Research on self-regulation's influence on writing has shown positive results. For example, a meta-analysis conducted by Graham and colleagues (2012) examined 115 studies that conducted research on writing interventions with elementary students in Grades 1-5. Results showed that writing strategy instruction was the most effective of all the types of writing interventions analyzed, with an effect size of 1.02. Specifically, interventions that utilized self-regulated strategy development were found to have significantly improved students' overall text quality (effect size 1.17). Furthermore, when studies added self-regulation training to their writing interventions, they were more effective. These findings suggest that for writing interventions to be effective, they should target the essential skills needed for writing: discourse knowledge and self-regulation (Santangelo & Graham., 2015).

1.4   **Writing Strategy Instruction**

Writing strategy instruction teaches discourse knowledge and self-regulation skills including specific strategies on how to plan, draft and revise writing, with most strategies being designed to address a specific genre of writing (e.g., persuasive writing, story writing; Graham et al., 2005; Kim, 2020; Olinghouse & Graham, 2009). Research has shown that writing strategy instruction is effective at improving students' writing. To illustrate, Graham and Harris (2017) conducted a review of meta-analyses exploring the effectiveness of writing practices for students in Grades 1-12. Results showed that studies of writing strategy instruction, in comparison to other methods such as process writing instruction, reported the largest effect sizes for improvement in writing quality (Graham & Harris, 2017).

1.5   **Self-Regulated Strategy Development (SRSD) Instruction**

The most extensively researched form of writing strategy instruction in the literature and in the present meta-analysis is self-regulated strategy development (SRSD; Graham et al., 2005). Thus, this section will explain SRSD in more detail. SRSD teaches students to use self-regulatory processes appropriate to different genres and phases of the writing process. SRSD consists of methods to effectively plan writing and edit a writing piece, intertwined with other self-regulation processes. This includes using a strategy, a plan that students follow to help generate ideas and language for a particular type of text, to plan their writing and to engage in self-instruction throughout the writing process.

There are four main categories of self-regulation strategies taught in SRSD: self-evaluation, goal setting, positive self-talk, and self-reinforcement. The first category, self-evaluation, requires students to evaluate their writing throughout the writing process. The second category of the self-regulation process taught is goal setting, in which the writer sets personal goals to improve their writing; for example, the writer incorporating a certain number of story elements into their stories. A vital component of SRSD is teaching students how to cope with the challenges they may face during writing. One way this is taught is by teaching students to engage in positive self-talk. Positive self-talk is when writers say positive phrases of encouragement, such as "you can do it", to get through the writing process (Harris & Graham, 2016). Finally, students learn to engage in self-reinforcement using verbal or tangible reinforcers for completing writing activities to a criterion.

SRSD instruction consists of six steps: (1) develop background knowledge; (2) discuss it; (3) model it; (4) memorize it; (5) support the student with the strategy; and (6) independent practice (Graham et al., 2000). In the first step of SRSD, develop background knowledge,

students are taught the prerequisite skills and knowledge that are needed for the strategy. This teaching may include specific elements of a genre, such as, a story has a beginning, middle and end. In the second step, discuss it, the teacher first introduces the strategy to students, discussing why the strategy is being used and when it is appropriate to use it. In some cases, teachers create mnemonics to help consolidate student learning. In the third step, model it, the teacher demonstrates to the students how the strategy is used. This includes modelling how to identify goals for their writing piece, organize and plan out their writing before starting, implement strategies for when they get stuck, evaluate their own work, exhibit self-control in relation to writing, and provide positive self-reinforcement. An important aspect of this step is the teacher thinking aloud, so that students can see the thinking, including discourse knowledge and self-regulatory thinking, "behind" the writing. The teacher may work with the students to create a simplified list that highlights each step of the strategy so that students can refer to it throughout.

In the fourth step of SRSD instruction, memorize it, students commit the steps of the strategy to memory, as well as put what they have learned into action, by participating in lessons taught by the teacher that incorporate all steps of SRSD. In the fifth step, support it, students actually create a written text, using the steps of the strategy and self-regulatory processes. The teacher provides students with any support they need to ensure that they are applying the SRSD strategy to composing. Forms of support may include writing with prompting from the teacher, writing with a peer, or writing with support from a template. Finally, in the sixth step, independent work, students work independently on writing pieces by using an SRSD strategy.

1.6   Single-Subject Designs

Single-subject design (SSD) is a group of experimental designs in which the participant acts as their own control (Kratochwill & Levin, 2010). Behavior is measured

repeatedly, and an intervention is introduced for specific time periods, and the data from these different phases are then compared to determine the effectiveness of the intervention. Multiple baseline design (MBD) and multiple probe design (MPD) are two types of SSDs that are often utilized in writing research. Since the studies reviewed in this analysis used one of these two types of SSD, each of these designs will be explained in further detail (Kratochwill & Levin, 2010).

MBD, the first of the two types of SSDs used by studies in this meta-analysis, was first introduced by Baer and associates (1968) to investigate research questions in applied behavior analysis. MBDs typically have four phases. First, a baseline is established for each participant, meaning that during a specified period, multiple data points are collected from each participant to ensure that the assessment is capturing the participant's consistent behaviour or response prior to instruction (Ledford & Gast, 2018). Validity is considered highest in concurrent designs, in which all participants begin the baseline phase at the same time, to control for possible history effects. Once the researchers establish a baseline for a given participant, instruction is introduced in the intervention phase for one participant at a time. It is important to note that in MBD studies, participants begin the intervention phase of the study at different times and not simultaneously so that each student can act not only as a participant for themselves but also as a control for the participant that entered the intervention before them (Baer et al., 1968). This rules out alternative explanations for results, such as maturation. When the intervention is completed, the student is re-evaluated in the post-intervention phase (Baer et al., 1968; Mason et al., 2010). Finally, the researchers wait for a designated period post-intervention and then establish a reliable measure of performance in the maintenance phase for the student (Baer et al., 1968; Mason et al., 2010).

MPDs follow the same principles as MBD designs, with the difference being the use of intermittent measurement to determine the change between phases. MPD and MBD studies have high internal validity due to the repeated measurement involved in both designs and the staggering of when participants will receive the intervention. Collecting data points across multiple distinctive time periods and participants helps to ensure that the change observed was due to the intervention and not random error, novelty of the intervention, or maturation (Kratochwill & Levin, 2010).

1.7   **Percentage of Non-Overlapping Data Points (PND)**

In SSDs, a variety of statistics have been used by different researchers and disciplines to compare phases of an intervention, with debate on what is deemed to be the best measure (Kratochwill & Levin, 2010). In recent decades, the most commonly used statistic in SSD research and in particular writing research has been PND (Scruggs & Mastropieri, 2013). PND was also the statistic used in the Rogers and Graham (2008) meta-analysis, which is the starting point for this review. Therefore, the researcher chose PND as the statistic for the current meta-analysis as it was the most appropriate option and would allow for comparison of effects across studies in the current analysis and with the Rogers & Graham meta-analysis (2008).

PND is comprised of the percentage of participants' post-intervention phase data points that do not overlap with the data points collected during baseline (Rogers & Graham, 2008). Post-intervention data points that exceed the participant's highest baseline point (or lowest if it is a behaviour decrease study) are counted and turned into a ratio, dividing the number of non-overlapping data points by the total number of data points in the post-intervention phase, and then multiplied by 100 to calculate a percentage representing the intervention's effectiveness

(Mason et al., 2010). Advantages of PND include ease of calculation from graphical rather than raw data, a high degree of inter-rater reliability, applicability to any SSD design type and ease of interpretation (Scruggs & Mastropieri, 2013). Although some criticism argues that PND is not considered a true effect size measure because of difficulty assessing the magnitude of change (Kratochwill & Levin, 2010), Scruggs and Mastropieri (1998) interpret the effectiveness of an intervention as follows: PND values from 0 to 49 percent are considered to represent an ineffective intervention, values from 50 to 69 percent are considered to represent a somewhat effective intervention, values from 70 to 89 percent are considered to represent an effective intervention, and values from 90 to 100 percent are considered to represent a highly effective intervention.

1.8   **Explanation of Visual Analysis**

Researchers utilize visual analysis to determine the outcome of an intervention by examining data patterns both within and between phases (Kratochwill & Levin, 2010). PND does not account for possible trends within the data. This is important to note, as the presence of a trend in the data may suggest that positive outcomes are due to factors outside of the intervention, and descending trends in the post-intervention phase may suggest that the intervention may not be effective even if it appears to be initially. When conducting a visual analysis in this review, researchers followed visual analysis standards outlined by Ledford and Gast (2018). Four standards must be followed to ensure reliability: (1) Ensure a consistent baseline pattern with minimal variability is documented before moving on to the next phase; (2) Data collected during the intervention phase will be examined to determine if a trend has formed, with no significant upward trend; (3) Data collected during all the study phases will all be compared with respect to level to establish if the change across phases occurs concurrently in the

desired direction enough and; and (4) across participants, the effect occurs at least three times (Kratochwill & Levin, 2010).

1.9   **Summary of Rogers and Graham (2008) Research**

The last meta-analysis on SSD writing strategy instruction and interventions was conducted in 2008 by Rogers and Graham and consisted of students in Grades 1-12. The researchers calculated the PND values for nine different types of writing interventions: (1) strategy instruction for planning/drafting; (2) teaching grammar and usage; (3) goal setting for productivity; (4) strategy instruction for editing; (5) writing with a word processor; (6) reinforcing specific writing outcomes; (7) use of prewriting activities; (8) teaching sentence construction skills; and (9) strategy instruction for paragraph writing. While results showed that all nine interventions were effective, the three writing strategy instruction interventions were the most effective. Specifically, the strategy instruction for planning/drafting interventions had a mean text quality PND value of 99 percent, a mean genre elements PND value of 96 percent, and a mean productivity PND value of 91 percent. The strategy instruction for editing interventions had a mean correcting errors PND value of 84 percent. Finally, the strategy instruction for paragraph writing interventions had a mean genre elements PND value of 97 percent.

Rogers and Graham (2008) analyzed the quality of the studies included in their meta-analysis, using a set of study quality indicators for SSDs developed by Horner (2005) that represented the standard at the time. However, those quality indicators differ from the more recent WWC (2022) quality indicators used for this analysis, as study quality standards have risen since the publication in 2008 of Rogers and Graham's analysis. Rogers and Graham's quality analysis indicated that many of the studies reviewed failed to fully describe the study's selection criteria, and where the study took place. Many studies also failed to fully describe their

participants, including whether students were suspected to have or identified with various exceptionalities. Furthermore, very few of the studies provided information to confirm treatment fidelity. Finally, it was shown that experimental control was established in only about 40 percent of the studies analyzed. This leads to concerns about how effective the interventions were, as it was logically not possible to determine if the interventions were the sole reason for participants' improvement or if results were influenced by outside variables. These concerns regarding study quality, combined with increased study quality standards, suggest the need for continued analysis of study design quality in SSD writing intervention research (Rogers and Graham, 2008; WWC, 2022).

In addition to study design quality, it is important to note further limitations regarding the Rogers and Graham (2008) meta-analysis and the studies analyzed within the analysis. First, Rogers and Graham reviewed very few studies about writing strategy instruction with students in lower elementary grades, indicating the need to explore subsequent research with this group. Second, Rogers and Graham's analysis only included the effects of writing instruction for students in general and did not provide information on the effectiveness of writing instruction for students with various exceptionalities. Finally, the meta-analysis was conducted in 2008, now 15 years ago, suggesting the need for a review on up-to-date literature, which this meta-analysis provides.

1.10   Rationale for Meta-Analysis

This meta-analysis aims to update the literature by exploring four questions: (1) Are writing strategy interventions tested using SSD methodology effective with students in Grades 1 to 8? (2) Does the effect of writing strategy instruction differ between early elementary grades and late elementary grades? (3) Is writing strategy instruction more beneficial for specific

samples? (4) Do studies deemed higher quality based on What Works Clearinghouse (2022) (WWC) indicators have more or less overlap than those deemed lower quality?

Chapter 2

2   Methods

2.1   Location and Selection of Studies

Nine criteria were used to select studies for this meta-analysis. First, studies included in this review must have focused on writing strategy instruction. Second, studies must have had a sample of students in Grades 1 to 8. Third, only studies that used SSD methodology (e.g., MBD or MPD) were included in this review. Fourth, only studies that provided the appropriate data for calculating PND values between baseline and treatment phases by presenting legible graphical data or numerical data, were included. The fifth criterion was that only studies published between January 2008 and November 2022 that were peer-reviewed journal articles were included. Seventh, studies must have had a minimum of three participants to be included in this review, to provide more data and strengthen the finding of the analysis. Eighth, studies must have included one, two, or three of the following dependent variables: holistic text quality, genre elements and word count. Finally, all studies must have been published in English as the researcher did not have the resources to consider studies conducted in languages other than English.

The following databases and journals were used to conduct a systematic search for studies to include in this review: (1) *ERIC*; (2) *Reading and Writing Quarterly*; (3) *Routledge*; (4) *Omni*; (5) *JSTOR*; and (6) *PsychInfo*. These databases and journals were chosen as they are the most comprehensive in psychology and education, making them ideal places to search for studies to include in this analysis. More specifically, *ERIC* (Education Resource Information Centre) database is sponsored by the Institute of Educational Sciences of the United States Department of Education and focuses on education research (*ERIC - Education Resources*

Information Center, 2019). *Reading and Writing Quarterly* is the leading journal specifically focused on instruction and intervention in reading and writing (*Reading and Writing Quarterly*, n.d.). *Routledge* publishes research across multiple disciplines including psychology and education (*Routledge*, 2019*). JSTOR* is a general database with access to over 12 million articles across 75 different disciplines including psychology (*JSTOR*, 2000). The *PsychInfo* database, created by the American Psychological Association, describes itself as the largest resource for peer-reviewed literature in psychology and behavioural science (American Psychological Association, 2023). Finally, *Omni* is an academic search tool that provides users with access to the libraries of participating Ontario universities and other high-quality resources (*Omni Academic Search Tool*, n.d.).

To identify studies that met the nine study inclusion criteria listed above, the primary researcher performed the following steps. First, by selecting and combining key terms based on the Rogers and Graham (2008) meta-analysis, the following syntax was created and used to search for articles: (Single Subject OR Multiple Baseline OR Multiple Probe) AND (Writing Strategy OR SRSD OR Self-Regulated Strategy Development OR Strategy in Writing). Further search filters were applied relating to study inclusion criteria, such as publication dates only from January 2008 onwards, participant grade levels ranging from Grades 1-8, participants described as elementary or middle school students and relevant subject area, resulting in 1,384 articles. The researcher then scanned those article titles for publication date and other inclusion criteria, and more specifically, to ensure studies related to the correct subject area and had the correct study populations. This led to 187 studies selected for abstract screening and placed into Covidence. Covidence is an online screening tool used for meta-analyses and systematic reviews. Specifically, it helped the primary researcher to organize their studies, and to detect any

duplicate studies and studies that failed to meet the study inclusion criteria (Covidence, 2023).

After Covidence screening was completed, 64 of the 187 studies were found to be duplicates and

were removed. Abstract screening was conducted on the remaining 123 studies, after which 64

studies were removed for failing to meet study inclusion criteria. The remaining 59 studies were

then subjected to a full-text review, resulting in a further 23 studies being excluded for various

reasons, including not being focused on elementary-age students or writing strategy instruction.

Throughout the search process, studies were excluded if they failed to meet any of the current

meta-analysis inclusion criteria listed above. This search process, as shown below in Figure 1,

resulted in a total of 36 studies being included in the current meta-analysis. The data generated

from the above search was entered into an Excel spreadsheet and organized into individual

sheets, based on the specific analysis being conducted.

Figure 1

Overview of the Meta-Analysis Search Process

```
┌─────────────────────┐                      ┌──────────────────────────────────┐
│   Studies from      │                      │ Studies excluded (n = 1197)      │
│  databases/journals │ ───────────────────▶ │  Reasons for exclusion:          │
│    (n = 1,384)      │                      │  • Study did not focus on        │
└─────────────────────┘                      │    the correct subject area      │
           │                                 │  • Grade level                   │
           ▼                                 │  • Publication date              │
┌─────────────────────┐                      └──────────────────────────────────┘
│  Studies selected for│
│   title screening    │                     ┌──────────────────────────────────┐
│     (n = 187)        │ ───────────────────▶│  Duplicate studies removed        │
└─────────────────────┘                      │         (n = 64)                  │
           │                                 └──────────────────────────────────┘
           ▼
┌─────────────────────┐                      ┌──────────────────────────────────┐
│ Study abstracts      │                     │ Studies excluded (n = 64)        │
│ screened             │ ───────────────────▶│  Reasons for exclusion:          │
│   (n = 123)          │                      │  • Study did not use an SSD      │
└─────────────────────┘                      │  • Fewer than three              │
           │                                 │    participants                  │
           ▼                                 └──────────────────────────────────┘
┌─────────────────────┐                      ┌──────────────────────────────────┐
│ Studies assessed for │                     │ Studies excluded (n = 23)        │
│ full text review     │ ───────────────────▶│  Reasons for exclusion:          │
│  (n = 59)            │                      │  • Grade level                   │
└─────────────────────┘                      │  • Not focusing on strategy      │
           │                                 │    instruction                   │
           ▼                                 └──────────────────────────────────┘
┌─────────────────────┐
│ Studies included in  │
│ review (n = 36)      │
└─────────────────────┘
```

2.2   Dependent Variables

Three dependent variables, namely holistic text quality, genre elements, and word count, were used in this meta-analysis to answer the research questions. Holistic text quality is a measurement used by writing researchers that considers the ideas, organization, vocabulary, sentence structure and tone of participants' writing, with no weighting of these features, to provide a holistic overall score. Holistic text quality has been shown to validly measure the development of students' writing (Kim et al., 2014; Graham & Perin, 2007). Regarding the genre

elements dependent variable, research has indicated that a count of the type of genre elements or features in student writing is also a valid measure of writing development (Olinghouse & Graham, 2009). Measuring genre elements involves assessing how many key genre elements a student includes in their writing samples; for example, in a narrative, whether the student includes characters, setting, dialogue, problem and solution (Salas et al., 2020). Finally, word count, the third dependent variable, has also been shown to be a valid measurement of young writers' development (Graham et al., 2005; Wagner et al., 2011). Word count is calculated by determining the sum of words that students include in their writing sample (Coker et al., 2018).

2.3   **What Works Clearinghouse Quality Indicators**

The quality of each study in this analysis was assessed using WWC (2022) quality indicators for SSD research. To be eligible for review, studies must be publicly available, complete with all relevant data, published within the last 20 years, and written in English. The study must use an eligible design, one of which is SSD. The study sample must have an eligible population (e.g., elementary school students), and a majority of the sample must be participants from the U.S., U.S. overseas military bases, or an Organization for Economic Cooperation and Development member country where English is the main language (Canada, United Kingdom, New Zealand, Austria and Ireland). The study intervention must be eligible (e.g., school-based or educationally relevant) and must have at least one outcome from an area relevant to the education community (e.g., educational attainment or progress).

Once the initial screening is completed, six principal quality indicators apply to all types of SSD research: (1) outcome measures; (2) data availability; (3) independent variable; (4) residual treatment effects (if applicable); (5) design assessment; and (6) limited risk of bias. Outlined below in Table 1 is a summary of the six principal indicators and their subcomponents

(see Appendix A for a full explanation). If the study does not meet any of these eligibility

requirements, the review stops, and the study does not receive a quality rating.

Table 1

Summary of Principal WWC Quality Indicators

Indicator	Explanation
Outcome measures	Evidence of validity is shown throughout the study, with reliable outcome measures and no evidence of confounding factors being present. Additionally, data collection procedures must be the same across all phases of the study. Failure to meet results in a rating of does not meet standards and review stops.
Data availability	All raw data relating to participants' findings must be shown in graphical or tabular format, and summary data is not acceptable. Failure to meet results in does not meet standards.
Independent variable	The researcher must methodically manipulate the independent variable. Additionally, there must be clear standards for when participants change phases in the study. Failure to meet results in the finding being rated does not meet standards.
Residual treatment effects	Study must be designed in a way that minimizes the likelihood of spillover from one intervention phase into the observation phase before a separate intervention. If a study finding is found to have this, the finding will be rated does not meet standards.
Design assessment	Refers to number of phase changes present in study. Three phase changes must occur between two conditions at three different points in time (meaning a total of six phase changes must occur throughout entire study). Studies with findings that meet these criteria will meet standards with reservations OR without reservations, depending on data points per phase requirements set out below.

In addition to meeting these principal quality indicators, studies must also meet additional quality indicators depending on the type of SSD conducted. Since the studies in this meta-analysis utilized multiple baseline or multiple probe designs, a summary of the applicable additional criteria is provided below in Table 2 (see Appendix B for a full explanation of these additional indicators).

Table 2

Summary of Additional WWC MBD and MPD Quality Indicators

Indicator	Explanation
Phases	MBD and MPD - designs must have a minimum of six phases split into two conditions at three different times. Studies that meet this requirement will be rated meets standards with reservations or meets standards without reservations, depending on the number of data points per phase set out below.
Data points per phase	MBD and MPD - Phases must have a minimum of three points per phase for study to be rated meets with reservations. However, studies with six points in baseline and five points in subsequent phases will be rated meets standards without reservations. (The exception to this rule: a study having zero variability can receive the higher rating with only three data points per phase.)

Concurrence	MBD and MPD - Data must be arranged in a way that allows for vertical comparison between graphs for participants. Baseline data for all participants must be collected before first participant enters intervention phase. Further, individuals waiting to receive the intervention must have data recorded at the time or immediately after another individual enters the intervention phase. Study findings from MBDs/MPDs that do not meet this concurrence requirement will be rated Does not meet standards.
Presence of training phase (if applicable)	MBD and MPD - Ensuring a training phase is present in the study if appropriate.
Initial preintervention data collection sessions must overlap	MPD only - There must be a minimum of three data points collected in the first three sessions, to meet standards without reservations. To meet standards with reservations, in at least one of the first three sessions the probe points must overlap vertically for all phases of the design.
Probe points must be available just prior to introducing the independent variable	MPD only – Within the first three sessions just before the intervention phase, the study must have three consecutive probe points for each participant to meets standards without reservations, and a minimum of one probe point for each participant immediately before the start of the intervention to meet standards with reservations. Each participant not receiving the intervention, must have a probe point in a session where another participant either first receives the intervention or reaches a prespecified intervention criterion described by the researchers.

Note: MPD studies must meet all criteria of MBD studies, in addition to the MPD only criteria

outlined above in Table 2.

The primary researcher completed an additional scan of each study in the meta-analysis and assessed whether studies met the above WWC quality indicators. A second reviewer also assessed one-third of the studies included in the meta-analysis to determine if they met WWC quality indicators. The researchers followed WWC (2022) scoring procedures:

1. If at least one main finding in a study is reviewed and rated *meets WWC standards without reservations*, the study will receive a research rating of *meets WWC standards without reservations*. A main study finding will be rated meets WWC standards without reservations if it meets all Table 1 indicators, has the requisite number of phase changes and data points (six in the baseline phase and five in subsequent phases), and meets concurrence requirements. MPDs must also meet their additional above requirements.

2. If at least one main or supplemental finding in a study is reviewed and rated *meets WWC standards with reservations*, the study will receive a research rating of *meets WWC standards with reservations*. A main or supplement study finding will be rated meets WWC standards with reservations if that finding meets all Table 1 indicators, meets the concurrence requirements, but only has a minimum of three data points in the baseline phase. MPDs must also meet their additional above requirements.

3. However, if at least one supplemental study finding is reviewed and rated *meets WWC standards without reservations* or *meets WWC standards with reservations*, BUT all the main findings in the same study are rated *does not meet WWC standards,* or the study does not have main findings, the study as a whole will receive a research rating of *meets WWC standards with reservations*.

4. If all main and supplemental study findings are rated *does not meet WWC standards*, the study will be rated *does not meet WWC* standards. This will occur when all main and supplemental study findings do not meet Table 1 and 2 indicators.

It is important to note that if studies fail to meet concurrence standards, they automatically receive a *does not meet WWC standards* rating. Studies with less than six data points in the baseline phase and five points in the subsequent phases will at best be rated *meets WWC standards with reservations*. The findings for each study using the Table 1 and Table 2 indicators were analyzed independently and then looked at holistically, with a final rating assigned for the whole study.

2.4   Calculation of PND Values

The primary researcher reviewed the 36 studies in this meta-analysis to determine a mean PND value, where possible, for the three dependent variables (holistic text quality, genre elements and word count) for each study. This allowed the researcher to summarize the results and compare studies. PND values for each study were calculated in one of two ways. First, if a study reported individual participant PND values, the primary researcher added the values together and averaged them to create a mean PND value for the study as a whole. This procedure was followed for each dependent variable for which the study provided individual PND values. If individual participant PND values were not reported, but the data was available, the researcher calculated each individual participant's PND value for each dependent variable, by analyzing each participant's graph for the number of post-intervention phase data points that do not overlap with the highest data point collected during the baseline phase (Scruggs & Mastropieri, 2013). Post-intervention data points that exceeded the participant's highest baseline point were counted for each participant and turned into a ratio, specifically of points that exceeded the highest

baseline data point to all data collected during post intervention. This ratio was then multiplied

by 100 to calculate a percentage representing the intervention's effectiveness. The researcher

calculated and recorded each participant's PND value for each dependent variable in the study.

The researcher then combined and averaged all the participants' PND values, for each dependent

variable, to create a mean PND value for each dependent variable for the study as a whole.

(Scruggs & Mastropieri, 2013).

2.5   **Conducting Visual Analysis**

To further assess study outcomes, visual analysis was conducted on the 17 studies that

received a study design quality rating of *meets WWC standards with reservations*. When a study

presented more than one result visually, the researcher chose to report on holistic text quality, as

it is one of the more common measures used in writing strategy research. If holistic text quality

was not present, genre elements was chosen, as this measure is also common in writing strategy

research. The primary researcher analyzed one of each study's outcome measures and data using

the following six data patterns: (1) level; (2) trend variability; (3) the immediacy of effect; (4)

overlap of data points; (5) variability; and (6) consistency in results across phases within the

same conditions (Ledford & Gast, 2018). The level refers to the mean score of the data for each

phase of the study. Trend variability deals with the slope of the line of best fit of the data during

a distinct phase. Trend variability was assessed using the split-middle technique. The first step in

this technique was to locate the mid-date and mid-rate of the data for each participant. If there

was an even number of data points on a participant's graph, the mid-date was located by drawing

a vertical line to split the data points into two halves (Ledford & Gast, 2018). If there was an odd

number of data points, a line was placed vertically through the middle data point to ensure the

data points were split half on the left and half on the right of the vertical line. Next, the mid-rate

was located by observing each of the two halves created by the vertical line, and determining the median point for each half of the graph. A vertical line was then drawn to indicate the mid-rate for each half of the data. Finally, the researcher drew a diagonal line connecting the mid-date and mid-rate. After the line was placed, it was moved so an equal number of data points were above and below the line. Finally, the line was viewed to determine if a trend was present and the variability of the trend. If an upward line formed, there was an ascending trend in the data, and if a downward line formed there was a descending trend in the data (Ledford & Gast, 2018).

The immediacy of effect was determined by analyzing the extent to which data immediately changed after a phase change (increasing if behavior is desired and decreasing for undesirable behavior). Variability concerns the value similarity of data points in the same phase. Overlap of data points was calculated when the mean PND values were determined. Finally, consistency of data pattern involved looking at the data from all participants in the same phase, for example all data for participants in the baseline phase, to determine how consistent the data patterns were across the study. It is important to note that the researcher observed these six data patterns simultaneously for each phase.

The researcher then followed the criteria established by Busacca and colleagues (2015) in accordance with WWC standards, to determine study validity. This resulted in the generation of one of the following ratings: strong evidence, moderate evidence or weak evidence of each intervention's effectiveness. The ratings criteria to determine existence of a functional relationship created by Busacca et al. (2015) are outlined below:

1. Six or more data points in the baseline phase and three or more data points in the subsequent phases with no non-effects, receive a rating of strong evidence.

2. Six or more data points in the baseline phase and three or more data points in the subsequent phases with one non-effect, receive a rating of moderate evidence.

3. Six or more data points in the baseline phase and three or more data points in the subsequent phases with two or more non-effects or the absence of three data points in intervention, post-intervention, and maintenance phases (if applicable), receive a rating of weak/no evidence.

4. If a study did not have a minimum of six points in the baseline phase, but still had three or more data points in the subsequent phases with zero non-effects, it will receive a rating of moderate evidence.

Examples of non-effects include the presence of an ascending trend in the baseline phase, a descending trend in post-intervention phases and high variability within the data.

Chapter 3

3   Results

3.1   **Selected Studies and Participants**

This meta-analysis reviewed 36 studies, with a total of 217 participants. A brief overview of the studies included in the meta-analysis is shown below in Table 3. All studies included one, two, or three of the following dependent variables: holistic text quality, genre elements and word count. It is important to note that two studies reported two PND values for the same variable (one for each group of participants in their study).

Table 3

Overview of Studies Included in Meta-Analysis, By Type of Writing Strategy Instruction and Grade Level

Researcher & Year	Design	n	Grade	Exceptionality	Type of Writing Strategy Instruction	Quality Rating	PND Holistic Text Quality	PND Genre Elements	PND Word Count	Visual Analysis Results
Zumbrunn & Bruning, 2013	MBD	6	1	Not specified/ struggling writers	SRSD instruction	Meets WWC standards with reservations	59.7	59.7	58.3	Weak evidence
Asaro-Saddler, 2014	MPD	3	2	ASD	SRSD instruction	Does not meet WWC standards	100	100	88.6	
Lane et al., 2010	MPD	13	2	EBD	SRSD instruction	Meets WWC standards with reservations	Internal behaviours: 96.4 External behaviours: 81.0	Internal behaviours: 79.7 External behaviours: 100	Internal behaviours 69.0 External behaviours 87.6	Moderate evidence
Lane et al., 2008	MBD	6	2	At risk for EBD	SRSD instruction	Meets WWC standards with reservations	N/A	100	N/A	Moderate evidence

Study	Design	N	Grade	Population	Intervention	WWC Rating				Evidence
Little et al., 2010	MPD	13	2	EBD and LD	SRSD instruction, schoolwide positive behavioural support	Meets WWC standards with reservations	58.3	100	83.3	Weak evidence
Adkins & Gavins, 2012	MBD	3	2 & 3	EBD	SRSD instruction	Does not meet WWC standards	100	100	100	
Asaro-Saddler & Saddler, 2010	MBD	3	2 & 4	ASD	SRSD instruction	Does not meet WWC standards	91.7	100	91.7	
Asaro-Saddler & Bak, 2012	MBD	3	3 & 4	ASD	SRSD instruction	Does not meet WWC standards	100	100	55.5	
Rogers & Graham, 2020	MPD	6	3 & 4	Struggling writers	SRSD instruction	Does not meet WWC standards	33.3	93.3	33.3	
Grünke et al., 2019	MBD	4	4	LD	SRSD instruction	Ineligible	N/A	100	100	
Ciullo et al., 2021	MBD	8	4 & 5	LD	SRSD instruction	Meets WWC standards with reservations	N/A	98.2	N/A	Moderate evidence
Harris et al., 2019	MBD	8	4 & 5	LD, struggling writers	SRSD instruction	Does not meet WWC standards	95.8	100	56.3	

Lushen et al., 2012	MBD	3	4 & 5	LD, struggling writers	SRSD instruction	Does not meet WWC standards	88.9	100	44.5	
FitzPatrick & McKeown, 2021	MPD	8	5	LD, struggling writers	SRSD instruction	Does not meet WWC standards	37.5	100	N/A	
Mason & Shriner, 2008	MPD	6	2,3,4,5	EBD	SRSD instruction	Does not meet WWC standards	N/A	100	N/A	
Mourgkasi & Mavropoulou, 2018	MBD	3	3,4,5,6	ASD	SRSD instruction	Ineligible	55.6	66.7	11.1	
Cuenca-Carlino & Mustian, 2013	MPD	9	4,5,6	EBD	SRSD instruction	Meets WWC standards with reservations	96.3	96.8	N/A	Weak evidence
Shen & Troia, 2018	MPD	3	4,5,6	LD	SRSD instruction	Does not meet WWC standards	N/A	100	N/A	
Saddler et al., 2017	MBD	6	5 & 6	EBD	SRSD instruction	Does not meet WWC standards	100	N/A	N/A	
Saddler et al., 2019	MBD	3	5 & 6	LD	SRSD instruction	Meets WWC standards with reservations	100	N/A	N/A	Weak evidence

YazarSoyad|, 2021	MPD	3	5,6,7	LD	SRSD instruction	Meets WWC standards with reservations	100	N/A	N/A	Moderate evidence
Kroesch et al, 2022	MPD	6	6	LD	SRSD instruction	Meets WWC standards with reservations	100	100	N/A	Weak evidence
Mason et al., 2011	MBD	16	7	LD	SRSD instruction	Does not meet WWC standards	Study 1: 56.0 Study 2: 62.0	Study 1: 94.0 Study 2: 77.0	N/A	
FitzPatrick & McKeown, 2020	MPD	6	6,7,8	LD	SRSD instruction	Does not meet WWC standards	100	91.7	91.7	
Mason et al., 2010	MPD	5	7 & 8	EBD	SRSD instruction	Does not meet WWC standards	84.0	N/A	N/A	
Cramer & Mason, 2014	MPD	8	7&8	EBD	SRSD instruction	Does not meet WWC standards	95.8	58.3	54.1	
Mastropieri et al., 2014	MPD	12	7 & 8	EBD	SRSD instruction	Meets WWC standards with reservations	100	100	N/A	Weak evidence

Hauth et al., 2013	MBD	8	8	LD, struggling writers	SRSD instruction	Does not meet WWC standards	100	100	100	
Mastropieri et al., 2009	MBD	12	8	EBD	SRSD instruction	Does not meet WWC standards	100	100	N/A	
Miller & Little, 2018	MPD	3	3	LD	SRSD instruction, video self-monitoring	Meets WWC standards with reservations	75.7	84.7	62.5	Weak evidence
Curcic & Platt, 2019	MBD	3	3	LD	POWER instruction	Meets WWC standards with reservations	N/A	N/A	100	Moderate evidence
Pennington et al., 2011	MBD	3	2,3,4,5	ASD	Simultaneous prompting and computer-assisted instruction	Meets WWC standards with reservations	N/A	100	N/A	Moderate evidence
Launder et al., 2022	MPD	4	4 & 5	ASD	Virtual procedural facilitator training	Meets WWC standards with reservations	N/A	100	N/A	Moderate evidence

Nobel et al., 2021	MBD	3	5 & 6	ASD	Response prompting procedure	Meets WWC standards with reservations	97.0	N/A	N/A	Moderate evidence
Bishop et al., 2015	MBD	3	7 & 8	ASD	Graphic organizer training package	Meets WWC standards with reservations	100	N/A	60.1	Weak evidence
Unzueta & Barbetta, 2012	MBD	4	7 & 8	LD	Computer graphic organizer	Meets WWC standards with reservations	N/A	N/A	76.4	Moderate evidence

Of the 36 studies in this meta-analysis, 27 reported PND values or data required to calculate PND values for holistic text quality ranging from 33.3 to 100.0 percent. The average holistic text quality PND value of the 27 studies was 85.0 percent. Of the 27 studies, 20 had a PND value between 80.0 and 100.0 percent, five had a PND value between 50.0 and 79.0 percent, and two had a PND value between 0.0 and 49.0 percent (See Appendix C for the mean PND holistic text quality values for each study).

Of the 36 studies in this meta-analysis, 28 reported PND values or the data required to calculate PND value for genre elements ranging from 58.3 percent to 100.0 percent. The average genre elements PND value of the 28 studies was 93.3 percent. Of the 28 studies, 25 had a PND value between 80.1 and 100.0 percent, five had a PND value between 50.0 and 80.0 percent and no studies had a PND value between 0.0 and 49.0 percent (see Appendix D for the mean PND genre elements values for each study).

Of the 36 studies in this meta-analysis, 19 reported PND values or the data required to calculate PND values for word count, with values ranging between 11.1 percent to 100.0 precent. The average word count PND value for the 19 studies was 71.2 percent. Of the 19 studies, nine had a PND value between 80.0 and 100.0 percent, eight had a PND value between 50.0 and 79.0 percent and three had a PND value between 0.0 and 49.0 percent. Refer to Appendix E for the mean PND word count values for each study.

3.1.1 *What Works Clearinghouse Quality Indicators*

Although most studies in this meta-analysis reported high PND values, many studies scored low in WWC quality ratings. Of the studies included in this meta-analysis, none

met *WWC standards without reservations*; 17 studies received a rating of *does not meet WWC standards* and 17 studies received a rating of *meets WWC standards with reservations*. One main reason studies received low ratings in this quality assessment was that they failed to meet the three concurrence standards for multiple baseline and multiple probe designs, so they automatically received a rating of *does not meet WWC standards*, as outlined below:

1. Tiers must be organized to allow for vertical comparison, meaning that all data points at time one for every tier must be collected before all the data points at time two for every tier, and so on. One should assume this standard is met, unless authors provide evidence of nonconcurrence, such as describing the design as a nonconcurrent multiple baseline or graphing data in a way that suggests nonconcurrence (WWC, 2022). This standard was the main reason for studies in this meta-analysis failing to meet concurrence requirements.

2. All tiers must have data collected in the baseline phase prior to moving into the intervention phase for any participant (WWC, 2022).

3. Participants that have not yet received the intervention must have data at or after the time another participant enters the intervention (WWC, 2022).

Additionally, most studies did not meet the requirements for the number of data points per phase (six in the baseline and five in the subsequent phases), instead often having only three points per phase, resulting in studies automatically at best being rated *meets WWC standards with reservations*. As previously mentioned, a second reviewer rated the study quality of one-third of studies included in this quality analysis. Inter-rater reliability on study quality ratings was $\kappa = .47$, $p=.02.$

3.2   **Results of Visual Analysis**

All 17 studies rated *meets WWC standards with reservations* presented the data of at least one of the dependent variables in a visual format. The primary researcher holistically evaluated the studies for each of the six visual analysis data patterns previously mentioned and followed Busacca and colleagues (2015) visual analysis rating criteria. The visual analysis results are presented in Table 3 and revealed that studies received a rating of moderate or weak evidence of study validity despite high PND values and increase in level between baseline and post-intervention phases. Strong evidence was not reported for two main reasons: (1) having one or more non-effects present (mainly having more than two upward trending data points in the baseline, or more than two descending trending data points in the post-intervention phase); and (2) having insufficient datapoints in the baseline phase (less than six datapoints).

3.3   **Do Studies Deemed Higher Quality Based on What Works Clearinghouse Indicators Have More or Less Overlap Than Those Deemed Lower Quality?**

Each study was assessed for study quality using the WWC (2022) quality indicators, during the data extraction process. A between groups t-test was completed to compare the holistic text quality, genre elements and word count mean PND values, of the *meets WWC standards with reservations* group and *does not meet WWC standards* groups. Below, Figure 2 shows the mean PND holistic text quality values of the two groups. Studies that *did not meet WWC standards* had a mean holistic text quality PND value of 84.1 percent (*SD=23.32*), while studies that *meet WWC standards with reservations* had a mean value of 88.7 percent (*SD=16.00*). These

Figure 2

*The Relationship Between Study Quality and Mean PND Holistic Text Quality Values*
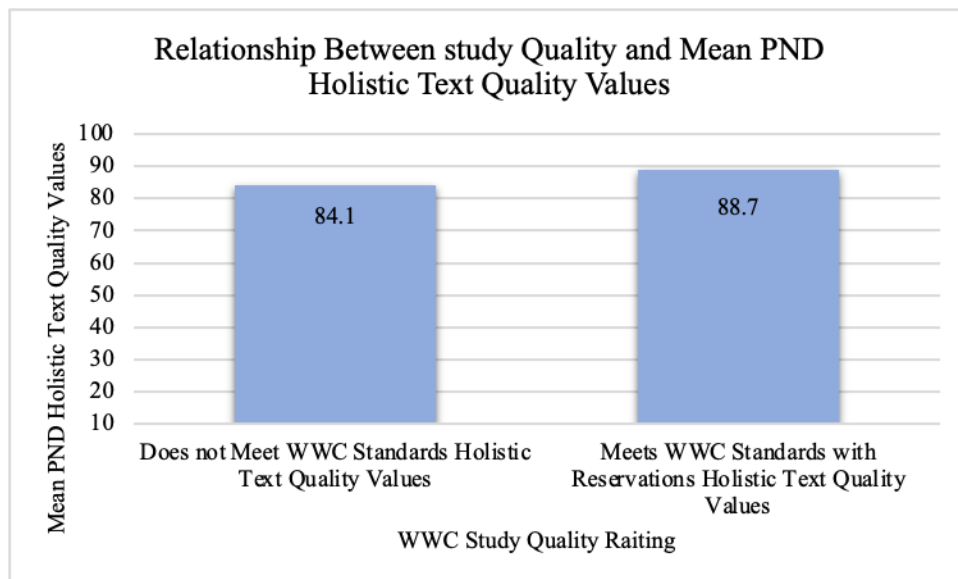
findings show that PND values did not differ significantly by study quality $t(26) =$ .59, $p = .56$, Cohen's $d = .23$.

The relationship between study quality and mean PND genre elements values for the two groups, is shown below in Figure 3. As seen in Figure 3, studies in the *does not meet WWC standards* group had a mean genre elements PND value of 94.6 percent ($SD=11.43$), while the *meets standards with reservation* group had a mean PND value of 93.3 percent ($SD=12.57$). This suggests that overlap did not significantly differ between low and medium quality studies $t(26) = -.30$, $p = .76$, Cohen's $d = .11$.

Figure 3

The Relationship Between Study Quality and Mean PND Genre Elements Values
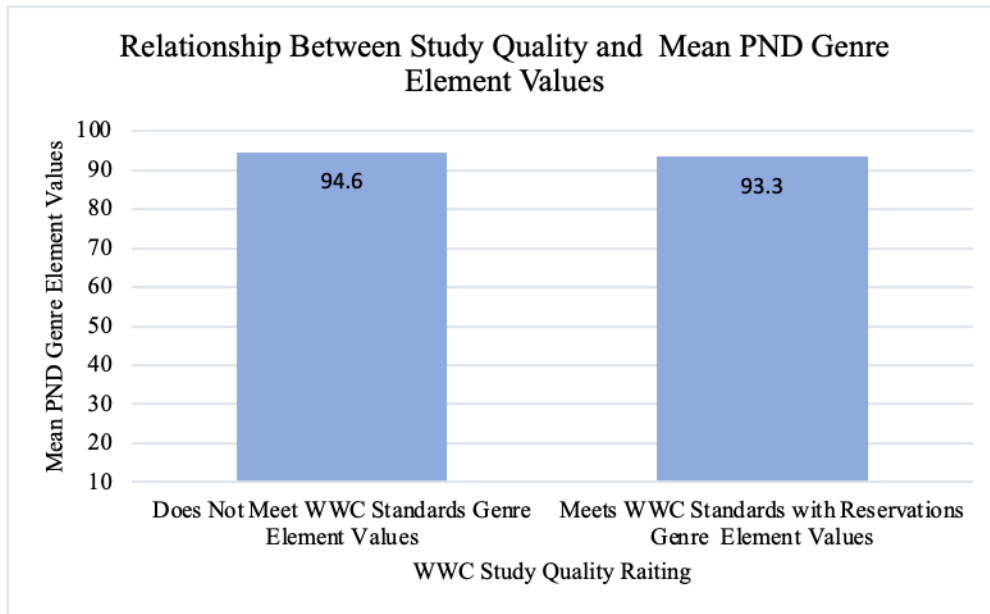
With respect to word count, Figure 4 below shows the comparison between the two groups' mean PND word count values. Figure 4 illustrates that studies in the *does not meet WWC standards group* had a mean PND word count value of 71.6 percent (*SD=25.19)*. The *meets standards with reservations* group had a mean PND value of 74.7. percent (*SD=14.87*), suggesting that the overlap did not differ significantly by study quality, $t(16) = .31$, $p = .76$, Cohen's $d = 0.15$.

Figure 4

*The Relationship Between Study Quality Scores and Mean PND Word Count Values*
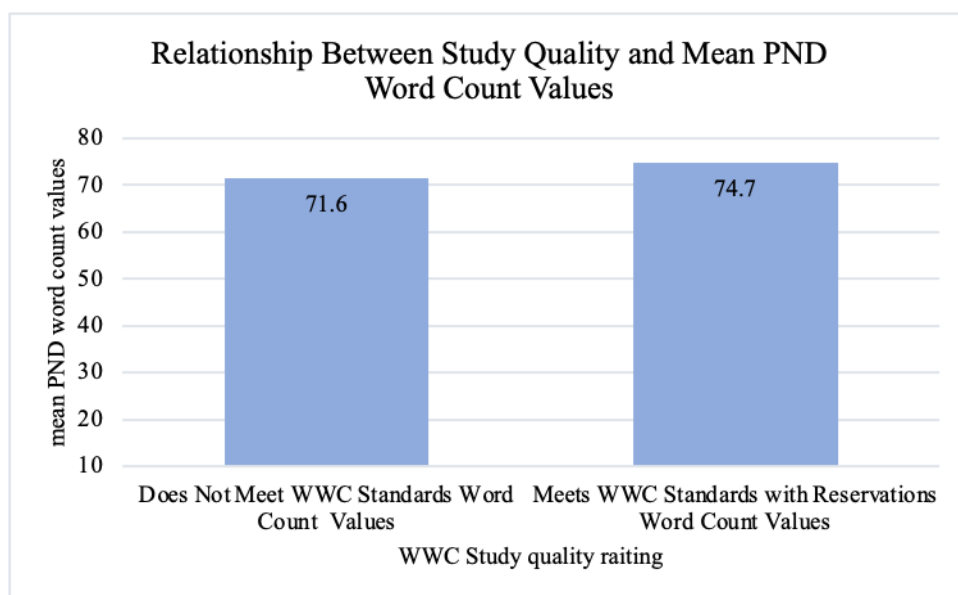
3.4 Is Writing Strategy Instruction More Effective in Some Grade Levels Than Others?

When analyzing the data, the grade of study participants was considered, and studies were divided into two groups: (1) studies with participants in Grades 1 to 4; and (2) studies with participants in Grades 5 to 8. There were cases in which study participants overlapped between these two categories; the researcher excluded these studies from the analysis. In total, 27 out of the 36 studies in this meta-analysis were included in the consideration of writing instruction effectiveness based on grade level. Of the 27 studies included, 23 reported PND values or data for PND value calculations for holistic text quality. Below, Figure 5 below shows the comparison between the mean PND holistic text quality values for the two grade groups in this analysis.

Figure 5

Comparison Between Mean PND Holistic Text Quality Values for Students in Gr.1-4 and 5-8

Mean PND Holistic Text Quality Values of Students in Grades 1-4 and 5-8
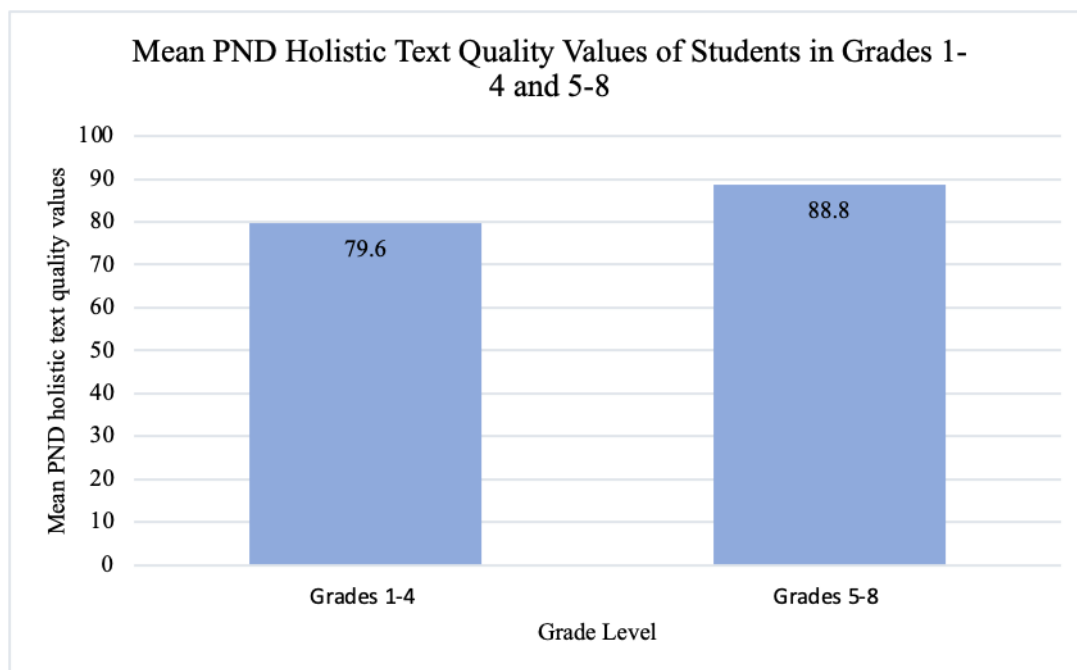
As seen above, students in the Grade 1-4 group had a mean holistic text quality PND value of 79.6 percent (*SD= 22.82*), indicating that writing strategy instruction was moderately effective for this group. However, the Grade 5-8 group had a mean PND value of 88.8 percent (*SD= 20.17*), indicating that writing strategy instruction was very effective in improving participants' holistic text quality. However, holistic text quality did not differ significantly between grade levels $t(23) = -1.06$, $p = .30$, Cohen's $d = 0.43$.

With respect to genre elements, 19 of the 27 studies in this analysis reported PND values or the data to calculate PND values. Figure 6 shows the comparison in

Figure 6

Comparison Between Mean PND Genre Elements Values for Students in Grades1 to 4 and 5 to 8
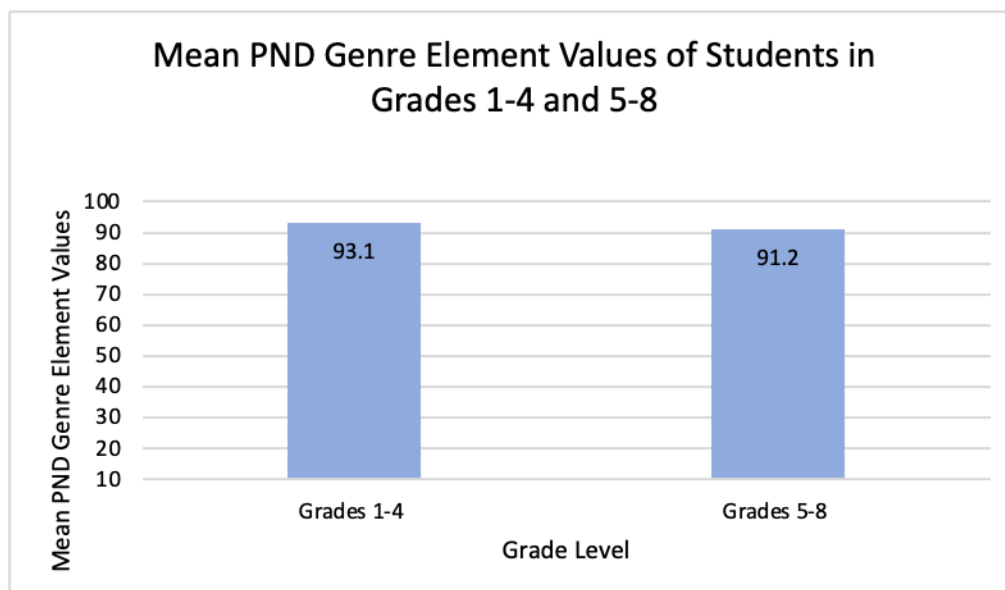

mean PND values for genre elements between participants in Grades 1 to 4 and Grades 5 to 8. As shown in Figure 6, participants in Grades 1 to 4 had a mean PND value of 93.1 percent (*SD= 12.60*) and participants in Grades 5 to 8 had a value of 91.2 percent *(SD=14.90),* which did not differ significantly $t(19) = .32, p = .75$, Cohen's $d = 0.14$) and which suggests that writing strategy instruction was highly effective for both groups but did not significantly differ between the two.

Regarding word count, 16 of the 27 studies reported PND values or the data required to calculate PND data. Below, Figure 7 shows the comparison between the mean word count PND values for participants in Grades 1 to 4 and participants in Grades 5 to 8.

Figure 7

 Comparison Between Mean PND Word Count Values for Students in Grades 1 to 4 and Grades 5 to 8
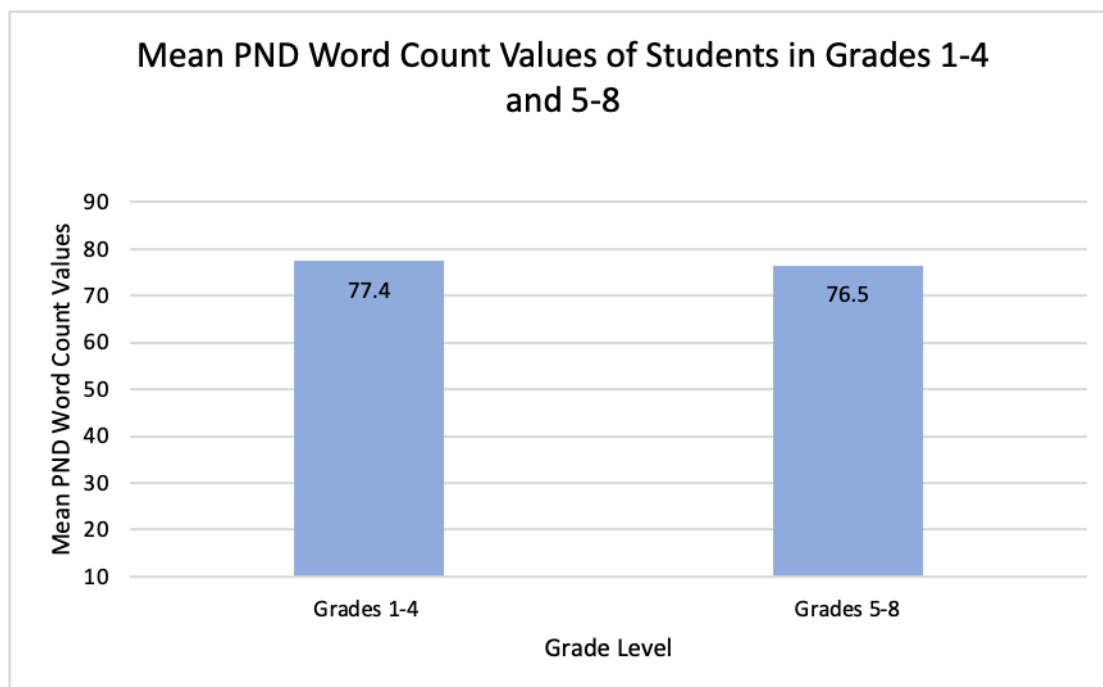
As seen above, participants in Grades 1 to 4 had a mean PND word count value of 77.4 percent (*SD= 21.50*), while participants in the Grades 5 to 8 group had a value of 76.5 percent (*SD= 19.71, t*(15) = .091, *p* =.93 , Cohen's *d* = 0.05.) suggesting that writing strategy instruction was somewhat effective at improving word count for both groups and that there was no significant differences between the two groups.

3.5 Is Writing Strategy Instruction More Beneficial for Certain Types of Exceptionalities

After the initial data collection, studies in this meta-analysis were sorted by study samples, which identified three main samples: (1) students diagnosed with autism spectrum disorder (ASD); (2) students diagnosed or with a suspected diagnosis

of an emotional behavioural disorder (EBD); and (3) students with a learning disability

(LD) and/or struggling writers. Table 4 below provides an overview of the number of

studies conducted with each sample. As shown in Table 4, the sample in eight of the

studies consisted only of participants with ASD. Of these eight studies, six reported

PND values or the data required to calculate PND values for holistic text quality, and

those PND values ranged between 55.6 percent to 100 percent. The average PND

holistic text quality value of the six studies was 90.7 percent. Of the eight studies with

ASD participants, six studies reported PND values or the data required to calculate

PND values for genre elements, and those PND values ranged between 66.7 to 100.0

percent. The average genre elements PND value of the six studies was 94.5 percent.

Finally, of the eight studies with ASD participants, five reported word count PND

values or sufficient data to calculate word count PND values, and those PND values

ranged between 11.1 and 91.7 percent. The average word count PND value in the five

studies was 61.4 percent.

Table 4

Overview of Study Samples Analyzed in Meta-Analysis

Study Sample	Number of Studies
ASD	8
EBD/suspected EBD	11
LD and/or struggling writers	18

Note: One study included students with both EBD/suspected EBD and LD and/or

struggling writers and therefore that study was included in both categories.

As set out in Table 4, the sample in 11 of the studies consisted of participants with

EBD/suspected EBD. Nine of these studies reported PND values or the data required to

calculate PND values for holistic text quality, and those PND values ranged between 58.3 to 100.0 percent. The average holistic text quality PND value in the nine studies was 91.2 percent. Nine studies also reported PND values, or the data required to calculate PND values for genre elements, and those PND values ranged between 58.3 to 100.0 percent. The average genre elements PND value in the nine studies was 93.5 percent. Finally, four of the 11 studies reported the data required to calculate PND values for word count, and those PND values ranged between 54.1 to 100.0 percent. The average word count PND value in the four studies was 78.8 percent.

The sample in 18 of the studies in this analysis consisted of participants with LD and/or struggling writers, as set out in Table 4. Of these 18 studies, 13 reported the data required to calculate PND values for holistic text quality, and those PND values ranged between 33.3 to 100.0 percent. The average holistic text quality PND value in the 13 studies was 76.2 percent, suggesting that intervention was moderately effective in improving the holistic text quality for this population.
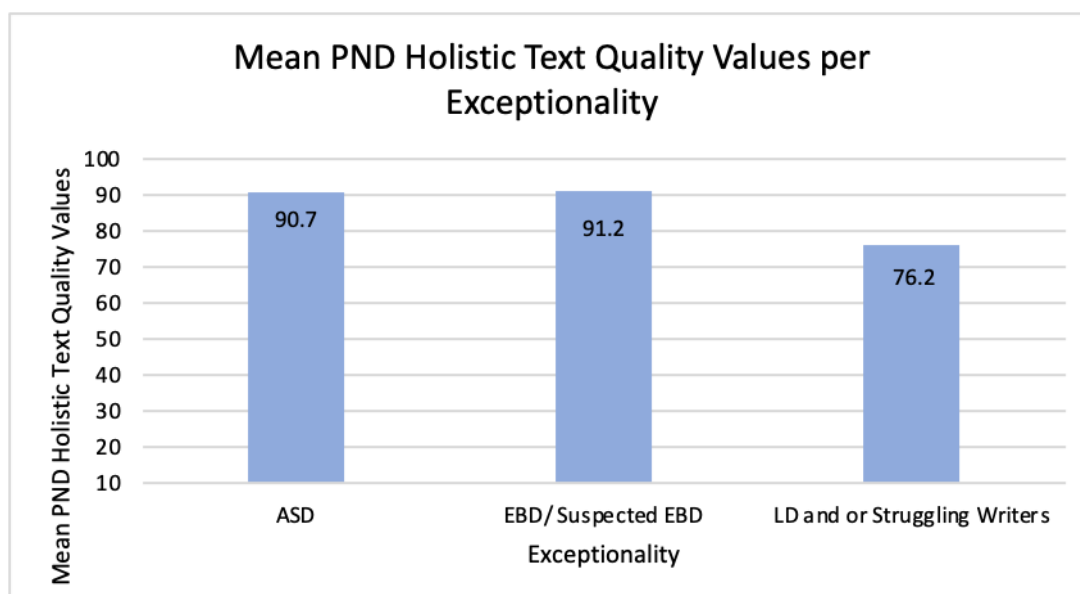
With respect to LD and/or struggling writers and genre elements, 14 of the 18 studies reported PND values or sufficient data to calculate PND values, and those PND values ranged between 59.7 to 100.0 percent. The average genre elements PND value in the 14 studies was 93.2 percent, indicating that writing strategy instruction was highly effective for students with LD and/or struggling writers. Regarding word count, 11 of the 18 studies reported the required data to calculate PND values. Word count PND values in the 11 studies ranged between 33.3 and 100.0 percent. The average word count PND value in the 11 studies was 73.3 percent.

3.5.1   *Comparison Among Study Samples*

Figure 8 shows the mean holistic text quality score for each of the three exceptionalities.

Figure 8

*Mean PND Holistic Text Quality Values for Each Exceptionality*

As shown above, the EBD/suspected EBD sample had a mean PND holistic text quality value of 91.7 (*SD=13.43*) and the ASD study sample had a mean PND value of 90.7 (*SD=18.90*). The LD and/or struggling writers' sample had a mean PND value of 76.2 percent (*SD=24.68)* suggesting that writing strategy instruction was only moderately effective for that sample. These values suggest there is no significant differences between the groups $F(3) = 1.75, n^2 = .12, p=.19$.

The mean PND values for genre elements for the three different study samples are highlighted below in Figure 9. As seen below, all three study samples have very

similar mean PND values, with the ASD group having a mean value of 94.5 *(SD=*

13.59), the EBD/suspected EBD group having a mean value of 95 *(SD=13.89)* and the

LD and/or struggling writers' group having a mean value of 93.5 percent *(SD=11.51).*

Thus, suggesting that there is no significant differences between groups *F(2)=.020,*

n^2= .001, P=.98.

Figure 9

*Mean PND Genre Elements Values for Each Exceptionality*
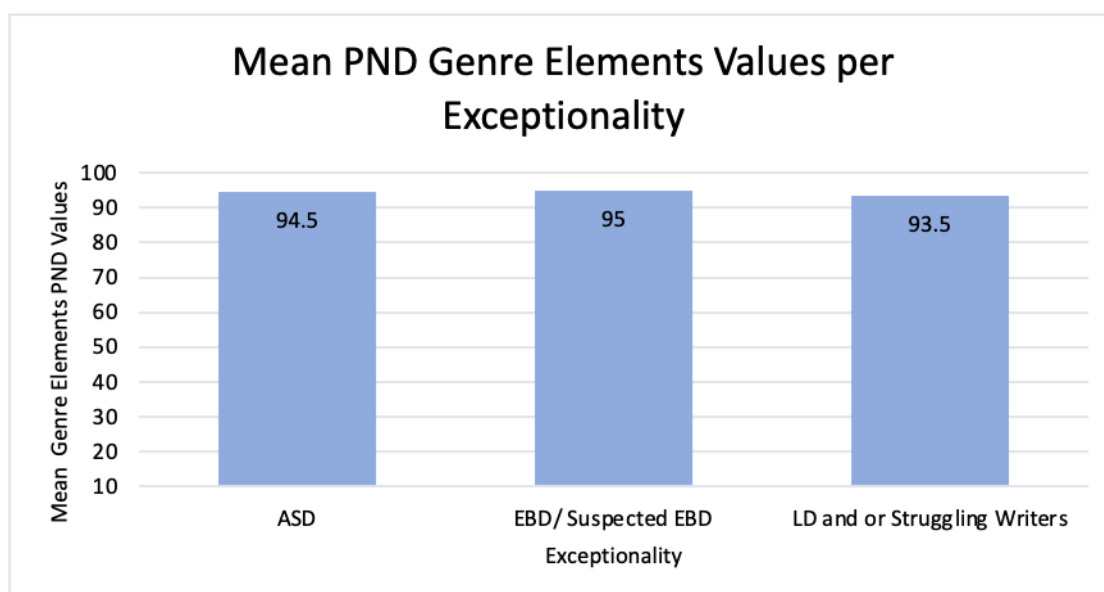
Finally, the mean PND word count values for the three study samples are shown

below in Figure 10. As shown below, the mean PND word count value of 78.8 percent

(*SD= 17.70*) for the EBD/suspected EBD population indicated moderate effectiveness of

writing strategy instruction. The ASD and LD and/or struggling writers study populations

also seemed to have moderately benefited from the instruction, as their mean PND word

count values were 61.4 for the ASD group (*SD=32.50*) and 73.3 for the LD and/or

struggling writers' group (*SD=23.76*). This suggests there are no significant differences

between the groups (*F(2) =.66, n^2=.068, p=.53*).

Figure 10

Mean PND Word Count Value for Each Exceptionality
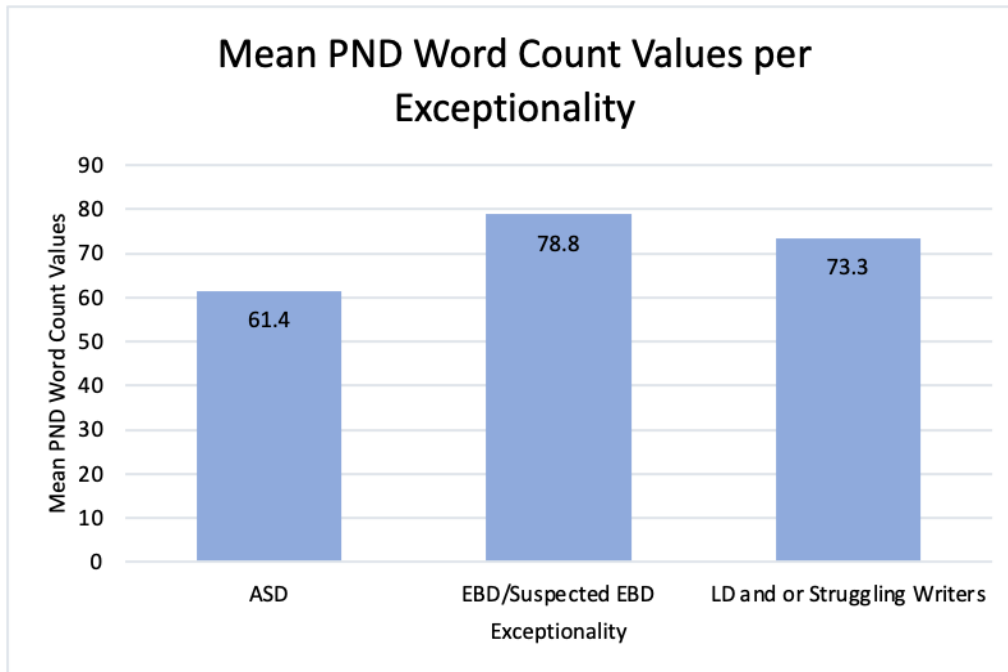
Chapter 4

4 Discussion

Teaching children how to write provides them with critical skills important for school and future success (Miller & McCardle, 2010). This purpose of this meta-analysis was to systematically review the literature conducted in the 15 years since the meta-analysis of Rogers and Graham (2008), on the effectiveness of single-subject design writing strategy instruction for students in Grades 1 to 8. Also, this meta-analysis added to the literature by exploring and providing an up-to-date review on the effectiveness of writing strategy interventions for students with various exceptionalities.

Consistent with Rogers and Graham (2008) meta-analysis, the effectiveness of writing strategy instruction was supported in the present meta-analysis. Specifically, in the 36 studies reviewed in this meta-analysis, the mean PND values for holistic text quality, genre elements and word count indicated that overall, there were low overlap values suggesting positive effects of writing strategy instruction for students in Grades 1 to 8. However, these positive results should be received in the context of low to moderate visual analysis and quality results, and use of appropriate statistics, as addressed later in this discussion.

This meta-analysis was able to review and include a study conducted with Grade 1 students. Whereas Rogers and Graham (2008) found that writing strategy instruction was effective, at that time no studies had been conducted with Grade 1 students. When considering whether writing strategy instruction is more beneficial for some grade levels than others, we found that writing strategy instruction was highly effective for improving the holistic text quality of participants' writing in Grades 5 to 8, with a higher PND value

in holistic text quality, than students in Grades 1 to 4. However, high PND values indicated that writing strategy instruction, for both ranges of grade groups, was highly effective in improving genre elements values, and moderately effective in improving word count values.

One explanation for students having higher holistic text quality PND values in the Grades 5-8 group than the Grades 1-4 group, may be due to the development of transcription skills. The IDL model indicates that one of the main skills determining the quality of writing for early elementary students are their transcription skills, that is, handwriting fluency and spelling accuracy (Kim et al., 2020). Because they are still developing their fine motor skills, students in lower elementary Grades 1-4 have been shown to have weaker transcription skills than students in upper elementary Grades 5-8 (Salas & Silvente, 2019). Thus, students in the lower elementary grades may put more cognitive effort into their transcription efforts, leaving less energy and focus to put toward sentence and idea formation (Limpo et al,, 2017).

This research expanded on the previous Rogers and Graham (2008) analysis by exploring the effectiveness of writing instruction for students with various exceptionalities. Writing strategy instruction was moderately effective in improving holistic text quality for writers with LD and/or struggling writers, and highly effective for writers with ASD and EBD/suspected EBD. Across all three exceptionality groups, PND values indicated writing strategy instruction was highly effective in increasing the number of genre elements included in participants' writing. Furthermore, PND values showed writing strategy instruction was somewhat effective at increasing the word count for all study samples.

One reason for students in the ASD and EBD/suspected EBD groups having larger PND values could be the explicit instruction of self-regulation skills. Research has shown that executive functioning skills influence student writing abilities (Kim, 2020). Students with ASD and EBD/suspected EBD exceptionalities tend to have difficulties with executive functioning (Cumming et al., 2022; Gentil-Gutiérrez et al., 2022). Writing strategy instruction focuses on teaching students these skills, specifically self-regulation (e.g., positive self-talk), providing direct instruction in an area in which they experience a deficit. Furthermore, the absence of statistically significant differences in results across the exceptionality groups could be because there were only a few studies in each sample. If students and not studies were the unit of analysis, the results would most likely be significant, as the sample would be much larger. This is important to note, as larger sample sizes strengthen the statistical power, thus increasing the likelihood of the results being significant.

Finally, an important finding in this meta-analysis concerns study quality, methods, and the outcomes from visual analyses. Generally speaking, design quality of studies in this meta-analysis were found to be poor to acceptable and when evaluated according to WWC standards, were found to *not meet WWC* standards or *meets WWC standards with reservations.* One main reason for poor quality findings was that researchers failed to meet the concurrence requirement; future researchers should take this requirement into consideration when creating their study designs.

Another reason for poor to acceptable quality findings was that studies typically included three to five data points during baseline and subsequent phases, while WWC standards require six data points during baseline phase and at least five data points for

subsequent phases. However, the typical use of three to five data points during baseline and subsequent phases may have occurred because study standards regarding data points have risen since some of the studies in this meta-analysis were conducted. More specifically, WWC quality standards did not exist at the time of Rogers and Graham (2008) meta-analysis. Instead, they relied upon Horner's (2005) study quality indicators, which required studies to have three or more data points in the baseline phase to receive the highest study quality rating. In 2010, when WWC issued their guidelines for rating study quality of single-subject designs, three data points per phase was still the highest standard, the same as Horner's requirement. Therefore, while subsequent researchers may have corrected or improved upon study failings noted by Rogers and Graham (e.g., not adequately describing participants, not describing study selection criteria, not providing information to confirm treatment fidelity, not establishing experimental control), they likely still followed the quality indicator of three data points in the baseline phase, as that was the standard at the time.

However, in 2014, WWC standards were revised to require five data points per phase and revised again in 2020 to require the current six data points in the baseline and five data points in subsequent phases (WWC, 2014; WWC, 2020). Thus, the standards for SSDs have significantly risen over time, causing studies reviewed in Rogers and Graham (2008) analysis and studies published before 2014 in the current meta-analysis to have possibly received a higher quality rating at the time of their publication, but a revised poor to acceptable rating since 2014. These findings are important to consider when interpreting past studies and when structuring future single-subject studies to meet current WWC standards. Specifically, future research should aim to meet WWC (2022)

concurrence standards and data point requirements to ensure consistency in quality and in reviewing studies.

However, it should be noted that studies in this analysis may have been unable to collect adequate data points due to researchers struggling to persuade participants to engage in multiple writing activities. This could be because participants participating in writing strategy instruction research are often not strong writers and may dislike writing (Kim et al., 2014). This raises ethical considerations for researchers that may affect their ability to conduct studies that meet the highest WWC standards. While studies should aim for the required data points, the ethical considerations raised suggest that appropriate methods for single-subject designs in writing instruction may need to be reconsidered, to account for situations relating to participants' inability to complete multiple writing samples.

This analysis also reported on the results of visual analyses conducted on studies rated *meets WWC standards with reservations*, which showed studies had moderate or weak evidence of study validity despite reporting high PND values and increasing levels between baseline and post-intervention phase. The finding of moderate or weak evidence of study validity was mainly due to studies having more than two upward trending data points in the baseline, more than two descending trending data points in the post-intervention phase, or less than six data points in the baseline phase and five data points in each subsequent phase. As previously discussed, students experiencing fatigue or refusing to write may have contributed to less than the required data points per phase, or studies may have been conducted before the new data points standards came into effect. With respect to upwards phase trends in the baseline, three data points may not provide

enough data to accurately demonstrate a stable pattern, which could threaten study validity and which study researchers failed to correct for by using a statistic that accounts for trends in baseline. These issues should be corrected in future studies.

While study quality was clearly an issue in this meta-analysis, study quality did not appear to affect study outcomes. It is important to note that studies were analyzed to determine if their poor to acceptable study design quality affected study outcomes. The results of that analysis showed no apparent relationship between study quality and PND values for holistic text quality, genre elements and word count. This result is important in terms of supporting this review's finding of the positive effects of writing strategy instruction for students in Grades 1 to 8.

Finally, in the past 15 years, there has been an influx of research on early writing intervention, especially quasi-experimental studies (Klein et al., 2021; Mazeh & Safa, 2020; Mason et al., 2017), which support the positive effects of writing strategy instruction and particularly when combined with SRSD on young writers. These positive findings regarding young writers are similar to and confirm the findings of the present meta-analysis, that writing strategy instruction has positive effects for young writers.

Additionally, there have been meta-analyses of other quasi-experimental and experimental studies which have addressed writing strategy instruction and LD exceptionalities. These findings support the positive effects of writing strategy instruction for LD students (Rouse & Graham, 2014) and are similar to the positive findings of this current analysis with respect to writing strategy instruction and LD students. As such, the current SSD meta-analysis and its studies, together with the above meta-analyses, may

provide further support for the positive findings, suggesting they are replicable, regarding writing strategy instruction, young learners and writers with LD exceptionalities.

4.1   **Practical Implications**

Previous quasi-experimental research supports the positive effects of writing strategy instruction conducted in a Tier 1 or class-wide setting, where all students are taught the core curriculum, or even in a Tier 2 setting if the group is large enough (Graham et al., 2012). The findings and studies of the current analysis may also support the use of writing strategy instruction in a Tier 2 setting, where students are placed in very small groups based on a low initial score or low progress so they can receive additional individual support. Additionally, this analysis supports the use of writing strategy instruction in a Tier 3 or one-on-one setting, where students were receiving instruction from a specialist after persistently not progressing in Tier 2. Based on these findings, educators can utilize writing strategy instruction with students in Grades 1 to 8 across the narrative and persuasive writing genres. This may be helpful for teachers who utilize a response to intervention method in schools, as instruction can be used and be beneficial for the entire class in Tier 1, or for smaller groups requiring Tier 2, and then be tailored for students who need additional one-on-one Tier 3 interventions (Graham et al., 2012).

Furthermore, this is currently the only proven intervention for written expression for students with ASD, EBD/suspected EBD and LD and/or struggling writers. This may be useful for teachers and/or learning support teachers, as they can use writing strategy instruction to help students with these exceptionalities who struggle with writing and may need additional one-on-one support outside of the class-wide setting.

4.2   **Limitations and Future Study Directions**

A limitation of this analysis was the use of PND as the only effect size measure. As noted, PND was useful for the researcher as it was the outcome measure used by Rogers and Graham (2008), the starting point for this analysis. The PND effect size index proposed by Scruggs and Mastropieri (2013) was also followed by previous studies included in this analysis as well as the current analysis. As such, PND allowed the researcher to make comparisons across different studies. However, it has been argued that PND is not a true effect size measure because it does not fully document the magnitude of the effect size or the magnitude of change between baseline and intervention phases. For example, two studies with 100% nonoverlap could have phases that differ by either a small magnitude or a large magnitude. Additionally, PND may be impacted by a single extreme or outlier data point in the baseline phase (which may also not be a reliable data point for the reason that it is the most extreme). In that case, the outlier data point could for example be higher than most of the intervention points, and an incorrect effect size may result. Finally, although the researchers did conduct visual analyses to assess whether trends occurred in the data, PND itself does not account for possible trends that can occur in the baseline or intervention phases. This is a concern, as it suggests that student improvements are due to an external factor and not the intervention, or that student performance would increase in the next phase regardless of whether the intervention had any effect. To address this issue, future research could be conducted using other outcome measures such as Tau-U, which accounts for trends in the baseline and allows the researcher to consider treatment effects with both between-phase differences and within-phase trends. Thus, other statistics may be better indicators for determining study effectiveness.

Another limitation of this analysis is that it only considered writing strategy instruction for elementary students. Future research should be conducted on students across all grade levels of primary, secondary, and post-secondary education, to determine if the impact of writing strategy instruction differs across grade levels. Furthermore, studies that included participants in multiple grade levels that span across the two groups, namely Grades 1 to 4 and Grades 5 to 8, were not included in the grade level analysis.

While results from the visual analysis conducted by the primary researcher on studies that were rated *meets WWC standards with reservations* did point out important findings regarding the evidence of study validity, it should be noted that ratings from the visual analyses can differ across raters, making a second rater for visual analyses more desirable (Ledford & Gast, 2018). Alternatively, future research should consider conducting statistical analyses to check visual analyses. For example, standard deviation can be used to check for variation that may occur during baseline phases and Tau-U can be used to detect trends in the baseline.

Future research should also focus on meeting WWC (2022) quality standards as they relate to the three concurrence standards for single-subject designs. The quality assessment of studies in this meta-analysis revealed an important finding, specifically, that many studies failed to meet the three concurrence standards for multiple baseline and multiple probe designs. Thus, future research should consider these standards when establishing study design to ensure that data will be collected and displayed in a way that allows for vertical comparison among the participants.

Finally, as previously mentioned, research suggests that the core skills of reading and writing are related, meaning that students who experience writing challenges are also

likely to experience reading challenges (Kim, 2020). One of the core skills writing and reading share is executive functioning, and specifically self-regulation and working memory. Future research should explore whether self-regulation skills taught during writing strategy instruction could be applied to reading and the challenges experienced during reading instruction (Kim, 2020).

Chapter 5

5   Conclusion

This meta-analysis aimed to critically review the literature on the effectiveness of single-subject design writing strategy interventions for students in Grades 1 to 8, since the last review of this literature by Rogers and Graham (2008). This was achieved by analyzing single-subject design studies on writing strategy research and combining each study's mean PND values for holistic text quality, genre elements and word count. Additionally, the PND values were further compared with respect to the following variables: (1) study samples, (2) quality ratings, and (3) grade level. Overall, mean PND values for holistic text quality and genre elements indicated that writing strategy instruction is very effective in improving these writing components, while the mean PND value for word count indicated that writing strategy instruction is somewhat effective.

Writing strategy instruction was found to be effective in improving holistic text quality for students with ASD and EBD/suspected EBD, and somewhat effective in improving holistic text quality for students with LD and/or struggling writers. Writing strategy instruction was also highly effective in increasing the genre elements in participants' writing across all exceptionality groups, and somewhat effective at increasing the word count for all exceptionality groups. Additionally, there was no significant difference between any of the dependent variables and study quality. Comparing PND values across grade levels suggested a slight difference only in participants' holistic text quality, however this difference was not statistically significant. The PND values for holistic text quality and genre elements suggested that writing strategy instruction was very effective for both grade groups.

Finally, although study quality was generally found to be poor to acceptable, PND values did not differ significantly between higher quality and lower quality studies. While studies in this meta-analysis reported high PND values to support the effectiveness of writing strategy instruction, these PND values should be considered in the context of visual analysis results that indicated weak to moderate study validity, mainly as a result of insufficient data points and the presence of trends in phases. Appropriate statistics should be used in future to account for such trends and to increase study validity.

As noted above, the PND values for students in Grades 1-4 and for the LD and/or struggling writers study population only showed moderate effectiveness. This may be because students in the lower elementary grades and with LD and/or struggling writers are more likely to have weaker transcription skills (Kim et al., 2014). Future research should be done to explore these questions. Finally, when designing writing interventions using a single-subject design methodology, researchers should consider the statistic used, the number of data points collected during each phase, and ensure their study meets concurrence standards to ensure that study design is of high quality.

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Appendices

Appendix A: WWC Primary Quality Indicators

Quality Indicator	Description of Quality Indicator
Outcome measures	- Evidence of face validity must be shown by providing a clear definition of what is being measured and assess it. - Study must present evidence that outcome measures are reliable - Inter-rater reliability is collected during each phase and for a minimum of 20 percent of the judgments - Data collection procedures must be the same across all phases of the study. - Ensuring confounding factors are not present throughout the study.
Data availability	- Data is provided in graphical or tabular format for their findings. Summary data, such as the within-phase mean for each phase, are not sufficient to meet this requirement. - Graphical or tabular data must present the raw data that corresponds to the individual observation sessions.
Independent variable	Independent variable is systematically manipulated and under the control of the experimenter and have clear criteria on when to transition participants between conditions/phases.
Residual treatment effects	When there are two or more interventions in the intervention phase

Quality Indicator	Description of Quality Indicator
	of an alternating treatment design, the reviewer must examine the study to ensure that there is limited risk of residual treatment effects.
Design assessment	• At least three phase changes between the two conditions being compared within a review, which occur at three different points in time must be present. For reversal/withdrawal designs, this will be at least three phase changes within a case. Three phase changes requires that a case has at least four total phases. For a multiple baseline or multiple probe design, this would be at least three tiers with phase changes at three different times.

Appendix B: Additional WWC Indicators for Multiple Baseline and Multiple Probe Single-Subject Research

Quality Indicator	Description of Quality Indicator
Phases	• Multiple baseline designs must have a minimum of six phases across participants and split into two conditions for findings to be rated Meets WWC Standards Without Reservations or Meets WWC Standards with Reservations. • Transitions from the baseline phase to the intervention phase must have at least three unique timings to ensure that there are three opportunities to demonstrate the intervention effect at three different points in time.
Data points per phase	• To be eligible to be rated Meets WWC Standards Without Reservations, the first baseline phase within each tier must have at least six data points. Additionally, all subsequent phases must have five or more data points per phase. • To be eligible to be rated Meets WWC Standards With Reservations, three phases per condition must have three or more data points per phase. Findings from multiple baseline designs that do not meet either set of requirements will be rated Does Not Meet WWC Standards.
Concurrence	• Tiers must be organized to allow for vertical comparison. This means that data points at time 1 for every tier

Quality Indicator	Description of Quality Indicator
	must take place prior to all data points at time 2 for every tier, and all data points at time 2 for every tier must take place prior to all data points at time 3 for every tier, and so on (Slocum et al., 2022). Reviewers should assume this standard is met, unless authors provide evidence of nonconcurrence, such as describing the design as a nonconcurrent multiple baseline or graphing data in a way that suggests nonconcurrence. • All tiers must have data collected in the baseline phase prior to the introduction of intervention to any case. • Cases that have not yet received the intervention must have data at or after the time another case enters the intervention.
Presence of training phase (if applicable)	• If the effect of the intervention is expected to be immediate at the onset of training, then data for the training phases must be present for every tier and can be considered part of the intervention. • If the intervention effect is not expected until after the completion of the training, then tiers still in the baseline phase must continue baseline measurement at or after the time point when a preceding tier has the first intervention probe after completing training.
Initial preintervention data collection sessions must overlap (MPDs only)	• For findings to receive a research rating of Meets WWC Standards Without Reservations, each tier must

Quality Indicator	Description of Quality Indicator
	have three data points in the first three sessions.
	• For findings to receive a research rating of Meets WWC Standards With Reservations, there must be at least one session within the first three sessions where probe points overlap vertically for all tiers in the design.
Probe points must be available just prior to introducing the independent variable (MPDs only)	• Within the three sessions just prior to introducing the independent variable, the design must include three consecutive probe points for each case to be rated Meets WWC Standards Without Reservations and at least one probe point immediately preceding the onset of intervention for each case to be rated Meets WWC Standards With Reservations.
	• Each case not receiving the intervention must have a probe point in a session where another case either first receives the intervention or reaches a prespecified intervention criterion described by the researchers.
	• Findings from MPDs that fail to meet any of these requirements in addition to the general MBD requirements will receive a research rating *of Does Not Meet WWC Standards*.

Appendix C: Mean PND Holistic Text Quality Values

Researcher & Year	PND Holistic Text Quality Mean Values
Rodgers et al., 2020	33.3
FitzPatrick & McKeown, 2021	37.5
Mourgkasi & Mavropoulou, 2018	55.6
Mason et al., 2011 (Study 1)	56
Little et al., 2010	58.3
Zumbrunn & Burning, 2013	59.7
Mason et al., 2011 (Study 2)	62
Miller & Little, 2018	75.7
Lane et al., 2010 (External Behaviours)	81
Mason et al., 2010	84
Lushen et al., 2012	88.9
Asaro-Saddler & Saddler, 2010	91.7
Cramer & Mason, 2014	95.8
Harris et al., 2019	95.8
Lane et al., 2010 (Internal Behaviours)	96.4
Cuena-Carlino & Mustain, 2013	96.3
Nobel et al., 2021	97

Researcher & Year	PND Holistic Text Quality Mean Values
Adkins & Gavins, 2012	100
Asaro-Saddler, 2014	100
Bishop et al., 2015	100
FitzPatrick & McKeown, 2020	100
Hauth, 2013	100
Mastropieri et al., 2009	100
Mastropieri et al., 2014	100
Saddler et al., 2017	100
Saddler et al., 2019	100
YazarSoyad, 2021	100
Asaro-Saddler & Bak, 2012	100
Kroesch et al, 2022	100

Appendix D: Mean PND Genre Elements Values

Researcher & Year	Mean Genre Elements PND Value
Cramer & Mason, 2014	58.3
Zumbrunn & Burning, 2013	59.7
Mourgkasi & Mavropoulou, 2018	66.7
Mason et al., 2011 (Study 2)	77.0
Lane et al., 2010 (Internal Behaviours)	79.7
Miller & Little, 2018	84.7
FitzPatrick & McKeown, 2020	91.7
Rodgers et al., 2020	93.3
Mason et al., 2011 (Study 1)	94.0
Cuena-Carlino & Mustain, 2013	96.8
Ciullo et al., 2021	98.2
Adkins & Gavins, 2012	100
Asaro-Saddler & Bak, 2012	100
Asaro-Saddler, 2014	100
Asaro-Saddler & Saddler, 2010	100
FitzPatrick & McKeown, 2021	100
Grünke et al., 2019	100

Researcher & Year	Mean Genre Elements PND Value
Harris et al., 2019	100
Hauth, 2013	100
Kroesch et al, 2022	100
Lane et al., 2008	100
Lane et al., 2010 (External Behaviours)	100
Launder et al., 2022	100
Little et al., 2010	100
Lushen et al., 2012	100
Mason & Shriner, 2008	100
Mastropieri et al., 2009	100
Mastropieri et al., 2014	100
Pennington et al., 2011	100
Shen & Troia, 2018	100

Appendix E: Mean PND Word Count Values

Researcher and Year	Mean PND Word Count Values
Mourgkasi & Mavropoulou, 2018	11.1
Rodgers et al., 2020	33.3
Lushen et al., 2012	44.5
Cramer & Mason, 2014	54.1
Asaro-Saddler & Bak, 2012	55.5
Harris et al., 2019	56.3
Zumbrunn & Burning, 2013	58.3
Bishop et al., 2015	60.1
Miller & Little, 2018	62.5
Lane et al., 2010 (Internalizing Behaviours)	69
Unzueta, 2012	76.4
Little et al., 2010	83.3
Lane et al., 2010 (Externalizing Behaviours)	87.6
Asaro-Saddler, 2014	88.6

Researcher and Year	Mean PND Word Count Values
Asaro-Saddler & Saddler, 2010	91.7
FitzPatrick & McKeown, 2020	91.7
Adkins & Gavins, 2012	100
Curcic & Platt, 2019	100
Grünke et al., 2019	100
Hauth, 2013	100

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