ABSTRACT

Title of Dissertation:	LITERACY INSTRUCTION AND INTERVENTION FOR MIDDLE SCHOOL STUDENTS WITH MILD INTELLECTUAL DISABILITY
	Alexandra Elizabeth Shelton, Doctor of Philosophy, 2020
Dissertation directed by:	Dr. Jade Wexler, Counseling, Higher Education, and Special Education

Research reveals that many individuals with mild intellectual disability (ID) face significant challenges in foundational literacy skills that hinder their ability to comprehend texts. Thus, individuals with mild ID need access to instruction and intervention that target reading comprehension effectively. However, the extent to which interventions can improve reading comprehension among individuals with mild ID has been unclear. Therefore, the current dissertation was conducted to explore literacy instruction and intervention for individuals with mild ID.

Chapter 2 of the dissertation is a synthesis of interventions targeting reading comprehension among individuals with mild ID. The purpose of the synthesis was to identify common features as well as determine the effectiveness of these interventions for individuals with mild ID.

Chapter 3 presents findings from a mixed-method study, designed based on findings from the synthesis presented in Chapter 2. The study included an intervention intended to improve the main idea identification skills of one middle school student with mild ID. The student received sentence-level comprehension instruction, and a subsequent interview of the student's special education teacher helped interpret the findings of the intervention in the context of the entire class. This mixed-method study as well as the Chapter 2 synthesis informed the practitioner manuscript presented in Chapter 4. The practitioner manuscript explains how teachers can provide middle school students with ID explicit instruction on using a main idea identification strategy, supplemented with instructional scaffolds, other forms of instruction, and peer-mediated practice to support students' comprehension of grade-level texts.

The current dissertation yields several important findings. First, the synthesis revealed that explicit instruction and peer-mediated practice improve reading comprehension among individuals with mild ID. Second, the findings of the mixed-method study suggest that middle school students with mild ID require main idea instruction—supplemented with background information and vocabulary instruction—as well as phonics instruction to support reading comprehension. These features were incorporated into the instructional approach outlined in the practitioner manuscript. Areas for future research are discussed throughout the dissertation.

LITERACY INSTRUCTION AND INTERVENTION FOR MIDDLE SCHOOL STUDENTS WITH MILD INTELLECTUAL DISABILITY

by

Alexandra Elizabeth Shelton

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Advisory Committee:
Associate Professor Jade Wexler, Chair
Professor Susan De La Paz
Associate Professor Christopher J. Lemons
Associate Professor Jennifer Turner
Assistant Professor Gulnoza Yakubova

Dedication

To my grandmothers Cecille and Geraldine,

who paved the way for education in our family,

and to Nadia and Hunter,

who inspire me along my own path.

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Chapter 1: Introduction

During the 2018-2019 school year, an estimated 6% of students receiving special education services in the United States had a primary disability of intellectual disability (ID; Hussar et al., 2020). Intellectual disability is a neurodevelopmental disorder characterized by deficits in intellectual functioning (e.g., academic learning) that result in deficits in at least one domain of adaptive functioning—conceptual (or academic), social, or practical (American Psychiatric Association [APA], 2013). These deficits appear in the developmental period and are evident in various settings, such as in school (APA, 2013). The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) recognizes four categories of ID, which vary in the degree of severity: mild, moderate, severe, and profound (APA, 2013). Mild ID is the most common category of ID (APA, 2013). In the past, the DSM considered mild ID for individuals with IQs ranging from 50-55 to approximately 70 (APA, 2000). Today, the DSM-V reserves the category of mild ID for persons who can live independently with minimal support.

Individuals with mild ID face difficulties learning functional academic skills—academic skills students need to live independently (APA, 2013). The academic challenges individuals with mild ID face are particularly evident in the area of reading comprehension. On the National Longitudinal Transition Study 2, 99% of secondary students with ID—regardless of category—scored at or below the 25th percentile on the Woodcock-Johnson III passage comprehension subtest (Woodcock et al., 2001). Secondary students with mild ID, in particular, scored significantly lower than their peers with learning disabilities (Bouck et al., 2015). Challenges in

areas such as phonological awareness, word recognition, listening comprehension, and nonverbal reasoning (which can serve as a proxy for general intelligence) contribute to reading comprehension difficulties among students with mild ID (Van Wingerden et al., 2018).

It is important to understand and address reading comprehension needs of persons with mild ID because reading allows all individuals—that is, individuals with and without disabilities—to access information. For example, older students are expected to read and comprehend to acquire content knowledge in school, which contributes to their academic success (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). Furthermore, reading is necessary to apply for jobs and maintain employment, thus promoting independent living and financial security (e.g., Ju et al., 2012).

Teachers must provide secondary students with mild ID evidence-based reading comprehension instruction to improve their long-term outcomes. However, much is unknown about how to target the reading comprehension needs of individuals with mild ID. Therefore, the purpose of the current dissertation was to gain a better understanding of instructional practices that support the literacy skills of individuals with mild ID. To achieve this goal, I first conducted a synthesis of interventions aiming to improve reading comprehension among individuals with mild ID (Chapter 2). Only six studies in my corpus targeted the reading comprehension skills of middle school students specifically. This gap is meaningful because texts are increasingly demanding and complex at the secondary level, thus requiring older students to have sufficient reading comprehension skills to meet rigorous academic demands. Yet, we

have limited information on how to provide middle school students with mild ID the instructional support necessary to make such progress. To address this gap in the literature, I developed and piloted an intervention with one middle school student with mild ID (Chapter 3). Based on the findings of this study, I wrote a practitioner manuscript providing guidance on how teachers can facilitate main idea identification among middle school students with ID (Chapter 4). Thus, the current dissertation makes important contributions by informing the field about literacy instruction and intervention for middle school students with mild ID and areas for future research.

Outline of the Dissertation

This dissertation is organized into five chapters: Introduction, Research Synthesis, Mixed-Method Study, Practitioner Manuscript, and Conclusion. The current chapter (Chapter 1) introduces the problem this dissertation aims to address. Chapter 2 is a synthesis of interventions that target the reading comprehension skills of individuals with mild ID in grades 4-12 and postsecondary settings. The research questions are:

1. What are the features of interventions that aim to improve the reading comprehension of individuals with mild ID?
2. To what extent are interventions (i.e., single-component and multicomponent interventions) that aim to improve the reading comprehension of individuals with mild ID effective?

Chapter 3 is a mixed-method study that extends the findings of the Chapter 2 synthesis for individuals with mild ID. The study included an intervention that aimed to improve the ability of one middle school student with mild ID to identify main

ideas within expository passages. Specifically, I provided the student with explicit sentence-level comprehension instruction by teaching him how to use a strategy known as sentence-level Get the Gist. I evaluated the effects of the intervention within the framework of a formative experiment, which helped me to identify any factors that positively or negatively impacted the effectiveness of the intervention (Reinking & Watkins, 2000). I piloted the intervention with the student using two A-B single-case designs. After the intervention was complete, I interviewed the student's teacher regarding the literacy needs of her students, the literacy instruction she provides to address their needs, and any barriers she faces when addressing their needs. The interview helped contextualize the findings of the formative experiment and inform future research related to reading interventions for middle school students with mild ID. The results of this study extend our collective knowledge about the reading comprehension needs of individuals with mild ID as well as the interventions to address those needs.

Chapter 4 provides guidance on how teachers can facilitate text comprehension among middle school students with ID by providing explicit main idea identification strategy instruction and additional instructional support, including opportunities for peer-mediated practice. This chapter focuses on both listening comprehension and reading comprehension because the mixed-method study revealed that teachers need strategies to support the comprehension needs of students with mild ID who have varying levels of decoding and fluency skills. Thus, the practitioner manuscript provides teachers with step-by-step instructions and examples they can follow to support the comprehension needs of a variety of students with ID.

Chapter 5 summarizes the findings of the research synthesis and mixed-method study. The chapter also summarizes the guidance provided in the practitioner manuscript, which the practical implications of both the synthesis and study support. The chapter then concludes with a discussion on research questions that can be addressed in future studies built on the current dissertation.

Definition of Key Terms

A-B design: Type of single-case design used to establish the participant's baseline before implementing one intervention phase (Kennedy, 2005)

Fidelity of implementation: The extent to which an instructional practice, strategy, or intervention is implemented as intended or designed

Formative experiment: A research approach that involves examining factors that facilitate or hinder the effectiveness of an instructional intervention to modify the intervention and achieve a pedagogical goal (Reinking & Watkins, 2000)

Gist: The main idea of a text (Stevens et al., 2018)

Intellectual disability: A neurodevelopmental disorder characterized by deficits in intellectual functioning (e.g., academic learning) that result in deficits in the conceptual (or academic), social, and/or practical domain

Interobserver agreement: The extent to which two or more observers independently measure dependent and independent variables consistently (Kennedy, 2005)

Intervention: A program or set of practices teachers provide for students to improve skills in an area where students are not meeting grade-level expectations or are experiencing deficits

Main idea statement: A statement that identifies the subject of a text (i.e., who or what the text is mostly about) and the most important information about the subject (Klingner et al., 1998)

Mild intellectual disability: The most common category of ID; categorized by a person's need for minimal support to live independently (APA, 2013)

Peer-mediated practice: Practice that allows students to collaborate in pairs or small groups to complete academic tasks (Wexler et al., 2015)

Percentage of non-overlapping data: Percentage of intervention data points higher than the highest baseline data point (when an intervention is intended to increase performance; Scruggs et al., 1986)

Reading comprehension: The process of gathering and making meaning from text (Snow, 2002)

Chapter 2: A Synthesis of Reading Comprehension Interventions for Persons with Mild Intellectual Disability

Note. Chapter 2 includes the accepted manuscript. Citation as follows: Shelton, A., Wexler, J., Silverman, R. D., & Stapleton, L. M. (2019). A synthesis of reading comprehension interventions for persons with mild intellectual disability. *Review of Educational Research, 89, 612-651*. https://doi.org/10.3102/0034654319857041

Intellectual disability (ID) is commonly described as significantly limited intellectual functioning with accompanying deficits in adaptive behaviors that impair one's ability to function independently. Recently, the inclusion of individuals with ID in typical school and community settings has dramatically increased in the United States. For example, over the past decade, postsecondary education in the United States has become increasingly popular for newly graduated students with ID. There are now more than 260 college programs in the United States for individuals with ID (Think College, 2018), which indicates "a more than 10-fold increase since 2004" (Papay et al., 2018, p. 458). The Higher Education Opportunity Act (HEOA) of 2008, which is a reauthorization of the Higher Education Act of 1965, has contributed to the growing number of individuals with ID pursuing postsecondary education. The HEOA made two critical additions that benefit students with ID. First, students with ID now have access to federal financial aid through Comprehensive Transition and Postsecondary (CTP) programs. Second, a model demonstration program, known as the Transition and Postsecondary Programs for Students with Intellectual Disabilities (TPSID), was designed to support colleges and universities in creating model CTP programs for students with ID. Because of the HEOA, more students with ID in the United States can access postsecondary education.

Individuals with ID increasingly participate in typical academic and postsecondary settings. As such, it is especially important that educators capitalize on the strengths of individuals with ID by providing individualized supports and adapting environments to foster participation in typical settings (Thompson, 2013; Thompson et al., 2017). One way to provide individualized supports to individuals with ID is to equip individuals with adequate reading comprehension skills that support students' academic and postsecondary success.

Reading comprehension requires complex skills and processes that promote both academic and life-long learning (National Reading Panel, 2000). For example, various systematic reviews have demonstrated that reading comprehension interventions using academic content (e.g., science) may improve both reading comprehension and content knowledge outcomes (e.g., Kaldenberg et al., 2015; Swanson et al., 2014). However, these reviews primarily targeted reading and academic outcomes for students with learning disabilities (LD) only. Thus, there is a need to examine the research that targets the reading comprehension and overall academic needs of individuals with ID, including mild ID.

The Academic Needs of Students with Mild ID

The nature of ID can be categorized in four ways: mild, moderate, severe, and profound. Most individuals with ID (i.e., approximately 85%) have mild ID (American Psychiatric Association [APA], 2000). In the past, mild ID was characterized by IQ scores between 50-55 and approximately 70 (APA, 2000). Perhaps due to the controversy over the validity of IQ testing (e.g., Hessl et al., 2009), the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (APA,

2013) now determines one's category placement within ID based on a person's adaptive skills. For example, individuals with mild ID may display adequate skills of personal care but may need support to improve more complex daily living skills (e.g., grocery shopping) and academic skills (APA, 2013). Because most individuals with ID have mild ID and because academic achievement is critical for future success, it is essential to determine ways to address the specific academic needs of individuals with mild ID to improve their long-term outcomes and increase their role in society.

Federal legislation mandates that students with disabilities have access to the general education curriculum in general education settings (Individuals with Disabilities Education Improvement Act [IDEA], 2004) and that all children, including those with mild ID, receive evidence-based instruction to meet challenging academic standards (No Child Left Behind, 2002). However, the percentage of students across all categories of ID served under IDEA who spent 80% or more of their instructional time in the general education setting only increased from 13.2% during the 2000-2001 school year to 16.3% in fall 2015 (U.S. Department of Education [USDOE], National Center for Education Statistics [NCES], 2004, 2017c). This small increase suggests that the legislation has had minimal impact on the educational experience of students with mild ID. Yet, research indicates that the postsecondary participation of individuals with ID in inclusive classes is possible and can have a positive impact on their outcomes (Qian et al., 2018). Because education at the K-12 level prepares students for postsecondary education, K-12 educators must embrace ambitious but reasonable academic goals (Prince et al., 2018) to help

students with ID “make progress appropriate in light of [their] circumstances” (Endrew v. Douglas County School District, 2017, p. 3).

To meet high academic expectations, students with mild ID need to demonstrate several critical academic skills, particularly the ability to read and understand text. Therefore, we must consider the role of reading comprehension among individuals with mild ID. In the next section, we explain why reading comprehension is essential for children with mild ID and the skills needed to comprehend text effectively. We also explain why reading comprehension is important for adults with mild ID as it relates to postsecondary success. To put the limited research base on reading comprehension interventions for individuals with mild ID in context, we also review the more robust evidence about reading comprehension instruction for a similar population: older students with reading difficulties. We then present the evidence we have thus far on meeting the literacy needs of persons with mild ID. Together, these sections provide a rationale for the current review, a review of the literature on reading comprehension interventions for older students and adults with mild ID.

The Role of Reading Comprehension among Students with Mild ID

Being able to read and comprehend narrative and expository text is essential for all individuals, including individuals with mild ID. Children are primarily exposed to narrative text as they begin to develop their literacy skills (Lynch et al., 2008). In order to comprehend narrative text, children must process plot structure, explicit references to characters’ varying mental states, and implicit information about the text that must be inferred (van den Broek et al., 2015). However, research has shown that

some elementary students struggle with these skills (Mullis et al., 2012). Furthermore, some adolescents continue to struggle with the skills necessary to comprehend narrative text (e.g., perspective-taking; Pavias et al., 2016). Students facing these difficulties may benefit from explicit instruction to develop their narrative comprehension skills, thus improving their overall understanding of a story (e.g., Hodges et al., 2018).

Students also need to be able to comprehend expository text. Expository text is an essential source of information in content-area classes and beyond the classroom (e.g., on news websites). Yet, expository text is often complex and conceptually dense with unpredictable text structure and unfamiliar content-specific vocabulary (Gajria et al., 2007). Researchers have demonstrated that content-area literacy instruction can improve students' comprehension of expository text and their content knowledge (e.g., Connor et al., 2017; Taboada et al., 2012; Vaughn, Swanson et al., 2013). Thus, by improving reading comprehension of expository text among students with mild ID, their content knowledge can also improve, which maximizes their learning and overall success in the general education classroom.

In order to understand both narrative and expository text, students need effective reading comprehension skills; however, students with mild ID typically struggle with reading comprehension (Katims, 2001). Reading comprehension is a complex process that is influenced directly and indirectly by various factors. The simple view of reading (SVR) theorizes that decoding and linguistic comprehension influence one's reading comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990). Children must develop adequate word recognition and language

comprehension abilities in order to develop their skills in reading comprehension. SVR provides insight into the reading comprehension difficulties of students, including those with mild ID, who struggle to read. Individuals who struggle with decoding, linguistic comprehension, or both will likely also struggle in reading comprehension.

The use of specific strategies that assist proficient readers in deriving meaning from text is also necessary (e.g., Biancarosa & Snow, 2004). Pressley and Afflerbach (1995) identified strategies that proficient readers consciously use to construct meaning from text, including activating prior knowledge and previewing text before reading, using text structure and context clues, and paraphrasing sections of text intermittently. Thus, in addition to developing decoding and language comprehension skills, individuals with mild ID should become proficient in using intentional strategies to increase their ability to comprehend text. However, our understanding of these exact strategies for individuals with mild ID is limited.

The Role of Reading Comprehension among Adults with Mild ID

According to federal legislation, transition planning to prepare students with disabilities, including students with mild ID, to meet postsecondary goals must begin before the age of 16. Reading comprehension should be an essential part of students' transition plans as reading comprehension promotes postsecondary success. In fact, many have argued for a stronger instructional focus on literacy in postsecondary education as reading comprehension is essential for all professions (e.g., Schneider & Foot, 2013). Postsecondary education among individuals with ID is related to employment, financial security, and satisfaction with social life (Papay et al., 2017;

Sannicandro et al., 2018). Additionally, young adults with ID or developmental disabilities who attend and complete postsecondary education programs earn higher wages than their peers who do not (Migliore et al., 2009).

Despite positive outcomes linked to postsecondary education, individuals with mild ID, in particular, are less likely to pursue postsecondary education than individuals with disabilities in general. A secondary analysis of the National Longitudinal Transition Study-2 (NLTS2) database revealed that within two years of exiting high school, 17.1% of individuals with mild ID attended 2-year postsecondary schools (Bouck, 2014). Up to 4 years after exiting high school, 3% attended 4-year postsecondary schools (Bouck, 2014). Although the rate of individuals with disabilities in general who attended 2-year postsecondary schools within two years of exiting high school was similar (19.7%) to the proportion of individuals with mild ID, the percentage of individuals with disabilities in general who attended 4-year postsecondary schools within 4 years of leaving high school was significantly higher (45%; Bouck, 2014). Because postsecondary education is vital for positive adult outcomes, improving the reading comprehension skills of individuals with mild ID while still in K-12 settings in order to promote their participation and success in postsecondary education is important.

Reading comprehension also plays a key role in employment success. In a survey administered to 168 employers across a wide variety of fields, basic academic skills were the most essential set of skills required for entry-level employees with and without disabilities (Ju et al., 2012). Within basic academic skills, reading with understanding was the most critical skill for all employees. Thus, improving the

reading comprehension skills of individuals with mild ID may help to increase their employment rate. According to Bouck's (2014) secondary analysis of the NLTS2, 48.3% of individuals with mild ID were employed at the time of being interviewed, although the percentage of individuals with disabilities in general who were employed was 56.8%. These findings indicate that individualized and environmental supports are needed to prepare individuals with mild ID for employment and to increase their opportunities for financial security.

Meeting the Literacy Needs of Individuals with Mild ID

Students with mild ID tend to exhibit greater reading comprehension needs than their peers without disabilities or with other disabilities, such as LD (Bouck & Satsangi, 2015). Although SVR informs us that decoding and linguistic comprehension facilitate reading comprehension, Van Wingerden et al. (2018) extended SVR to explain how additional components contribute to the reading comprehension levels of children with mild ID. Van Wingerden et al.'s model demonstrates that in addition to decoding and listening comprehension, foundational literacy skills (i.e., rhyme, blending, deletion, and sound-to-letter knowledge) and nonverbal reasoning directly affect reading comprehension for children with ID as well. Van Wingerden et al.'s model suggests that multicomponent interventions (i.e., interventions that target more than one component of reading) that adhere to SVR but also address early literacy skills could be effective in improving the reading comprehension of children with mild ID.

As students with mild ID get older, they may face disadvantages when trying to keep up with typical reading demands. In addition to facing challenges with

decoding text, older students with mild ID may be less equipped to use strategies that effectively facilitate their understanding while reading, similarly to other students with reading difficulties (i.e., students with low scores on reading tests or students who have been identified as having a reading disability; Pressley & Afflerbach, 1995) and students with LD (Wigent, 2013). Thus, to improve the abilities of students with mild ID so that they can comprehend complex text as they get older, it is necessary to provide explicit evidence-based reading interventions that lead to their growth in reading comprehension.

Few previously published reviews have examined, in part, the effects of reading interventions on the reading comprehension of participants with mild ID. Alnahdi (2015) conducted a review of instructional strategies intended to improve the reading skills of persons with ID of any age. Alnahdi included studies that targeted any reading skills (e.g., decoding) and sub-reading skills (e.g., sight word recognition) and included participants of any category of ID (e.g., mild and moderate ID). Based on 15 studies and one literature review published between 2003 and 2011, Alnahdi reported that explicit or direct instruction involving "a systematic order of practices" (p. 85) over a long period helps improve the reading skills of individuals with ID. However, Alnahdi's review has gaps that we fill with the current synthesis. Specifically, Alnahdi did not report effect sizes for any studies in his synthesis, and the inclusion of reading comprehension measures and individuals with mild ID as participants were not required for studies to be included in Alnahdi's corpus. Therefore, we continue to have a limited understanding of the effects of interventions on the reading comprehension of individuals with mild ID.

Recently, Afacan and colleagues (2018) analyzed the characteristics and effects of seven multicomponent reading interventions designed to improve the reading performance of students across any category of ID in grades K-12. All but one study targeted reading comprehension. However, only two of these studies resulted in significant improvements in students' reading comprehension skills. The overall effects of the studies presented in Afacan et al.'s review suggest that although Edmonds et al. (2009) determined that multicomponent interventions are effective in improving the reading comprehension of struggling readers in general, the effectiveness of multicomponent interventions among students with ID has not yet been established. Afacan et al.'s synthesis excluded all single-component intervention studies and multicomponent intervention studies conducted among postsecondary adults. Additionally, Afacan et al. only analyzed two studies that included participants with mild ID. Therefore, our knowledge of the effects of both single-component and multicomponent reading interventions among individuals with mild ID, including adults with mild ID, is limited.

Meeting the Literacy Needs of Older Students with Reading Difficulties

As noted above, limited research has been conducted regarding effective ways to improve reading achievement for individuals with mild ID. Therefore, in this section, we discuss the literature on reading comprehension interventions for students with reading difficulties as a starting point. Again, this allows us to review the literature on reading comprehension interventions for individuals with mild ID within a broader context.

Authors of multiple reviews have analyzed the effects of various interventions on the reading comprehension skills of upper elementary and secondary students with reading difficulties. Edmonds et al. (2009) calculated a positive effect of reading interventions that targeted the reading comprehension of secondary students with reading difficulties (Cohen's $d = 0.89$) and reported that secondary students with reading difficulties benefit from explicit instruction in reading comprehension. Edmonds et al. also reported that multicomponent interventions could improve reading comprehension among older students with reading difficulties. Swanson et al.'s (2017) meta-analysis supports Edmonds et al.'s finding, as the authors reported that multicomponent interventions that target reading comprehension and vocabulary among students with reading difficulties in Grades 4 through 8 may effectively improve reading comprehension, as measured by standardized assessments (Hedges' $g = 0.00$-0.36). In contrast, however, Scammacca and colleagues (2015) reported that single-component interventions that only targeted the reading comprehension of students with reading difficulties in both upper elementary school and secondary school (i.e., Grades 4 through 12) yielded better comprehension outcomes ($g = 0.45$) than multicomponent interventions.

Edmonds et al. (2009) and Scammacca et al. (2015) provided direction on how to support students with reading difficulties in Grades 4 and above: Explicit reading comprehension instruction is necessary to make adequate growth. Examples of effective practices that teachers provide explicit reading comprehension instruction in include summarizing text (Alfassi, 1998), identifying story elements (Vallecorsa & deBettencourt, 1997), and self-monitoring (Jitendra et al., 2000). Although proficient

readers may be able to use these practices without instruction, students with reading difficulties typically need explicit instruction in such strategies to be successful. These syntheses provide critical information about effective reading comprehension practices for students with reading difficulties. However, we still do not know if these are effective specifically for students with mild ID.

Researchers and educators have paid considerable attention to investigating and implementing interventions that may be effective for individuals with reading difficulties and focused considerably less on the reading skills of students with mild ID. For instance, students with mild ID receive less instruction in language arts and spend less time in the general education setting than their peers with LD (Bouck & Satsangi, 2015). This finding is consistent with Sabornie et al.'s (2006) research, which revealed that students with mild ID receive less academic instruction overall and more free-time activities in school than students with LD. Instead of less instruction, educators need to provide individuals with mild ID more access to evidence-based interventions to promote their growth in reading comprehension, which could support their content knowledge acquisition and, ultimately, their postsecondary success.

Rationale and Research Questions

Many of the instructional experiences of individuals with mild ID are different from those of their peers with other disabilities (Bouck & Satsangi, 2015), which may help to explain why their reading needs tend to be greater. Identifying interventions that target their reading needs could encourage educators to spend time providing instruction that would be likely to improve the reading achievement and promote the

academic and postsecondary outcomes of individuals within the largest category of ID. Yet, few syntheses of intervention studies designed to improve the reading achievement of students with reading difficulties and disabilities explicitly include individuals with mild ID. Therefore, we lack clarity about what specific literacy practices (e.g., identifying story features) can improve the reading comprehension outcomes of individuals with mild ID. Therefore, a synthesis of interventions designed to improve the reading comprehension skills of individuals with mild ID, in particular, is warranted. The purpose of conducting the present synthesis was to determine the effectiveness of interventions that target the reading comprehension of individuals with mild ID. Specifically, we addressed the following research questions:

1. What are the features of interventions that aim to improve the reading comprehension of individuals with mild ID?
2. To what extent are interventions (i.e., single-component and multicomponent interventions) that aim to improve the reading comprehension of individuals with mild ID effective?

Method

We identified studies for this synthesis using a multistep process. First, we conducted an online search of peer-reviewed articles using the ERIC, PsycINFO, and Academic Search Premier databases. We used the term *reading comprehension* plus one of the following search terms to conduct our search: *intellectual disability*, *mental retardation*, *cognitive disability*, or *developmental disability*. Until the 2010 U.S. federal statute Rosa's Law, *mental retardation* was used in place of *intellectual disability*. Therefore, we used this term in our search. Additionally, because ID falls

under the umbrella terms *cognitive disability* and *developmental disability*, these terms were used in the search as well. Our search resulted in 774 articles. We then conducted a first-level screening by reviewing the titles and abstracts to determine which articles met the following criteria:

1. Studies were published between January 2001 and December 2018 in peer-reviewed journals. These years of publication were chosen to capture studies published during and beyond the timeframe of the studies in Alnahdi's (2015) review, the first synthesis on reading interventions for individuals across all categories of ID.
2. Studies were published in English.
3. Authors indicated that participants included individuals within any category of ID or individuals with low intellectual abilities (i.e., IQ scores that range in the lowest quartile; Grünke et al., 2013).
4. Participants included persons in Grades 4–12 or in postsecondary programs.
5. Studies targeted reading strategies, approaches, or instruction.
    a. Although we also allowed studies targeting text manipulation (i.e., the adaptation of text, such as through the inclusion of embedded images, to increase understanding), none of these studies qualified in the first-level screening.
    b. Studies were excluded from inclusion in our synthesis if the interventions were not clearly described in a manner that allows for replication (e.g., Adediran & Eni-Olorunda, 2013) or if the studies were program evaluations (e.g., Moni et al., 2018).

We then conducted a second-level screening by reviewing the bodies of the studies that met the first-level criteria for information that is not typically available in the titles and abstracts of studies. Screening the bodies was necessary to identify which remaining articles met the following criteria:

1. Authors explicitly stated that participants included individuals with mild ID.
    a. If the category of ID was not specified, the authors were required to state that participants had IQs of 50 or higher. We emailed the corresponding author of one study that did not report ID categories or IQ scores for additional information. The author was able to confirm that participants included students with mild ID. Therefore, the study was included in the present synthesis.
    b. Other participants without mild ID could be included in the sample.
2. The research design was an experimental, quasi-experimental, or single-case design (SCD).
3. Outcomes included any assessments that measured narrative or expository reading comprehension at the sentence level, passage level, or both. SCD studies were excluded if these outcomes were not measured within the specific design employed (e.g., multiple baseline design) and were instead measured as pretest/posttest outcomes for participants (e.g., Head et al., 2018).
4. Participants were required to read assessment texts independently (versus using a reader) in order to ensure the intervention targeted reading comprehension rather than listening comprehension.

5. Authors of studies provided means and standard deviations to calculate Hedges' *g* effect sizes for experimental and quasi-experimental studies and sufficient information to calculate the percentage of non-overlapping data (PND; Scruggs et al., 1987) for SCD studies. We emailed corresponding authors whose studies did not report this information. If the studies did not require new analyses and the authors responded within one month of the request, their studies continued to be considered. One of two corresponding authors responded with the necessary information, allowing for the inclusion of their study in the present review.

Based on the aforementioned criteria, 14 studies were eligible for inclusion in the synthesis.

Upon completion of the search of online databases, we conducted a manual search of nine journals from 2016 to December 2018 to identify any studies that met our criteria but may not have been included in our search. We manually searched *Exceptional Children*, *Remedial and Special Education*, *Journal of Special Education*, *Reading and Writing*, *Scientific Studies of Reading*, *Reading Research Quarterly*, and *Journal of Intellectual Disability Research*. According to the 2017 Journal Citation Reports Social Sciences Edition's (Clarivate Analytics, 2018) Aggregate Citing Category Data, these are the top journals relevant to the field of special education and that publish studies related to disabilities in general, ID specifically, and/or reading outcomes. Our manual search did not yield any additional studies.

Finally, we conducted ancestral searches of the previously discussed syntheses (i.e., Afacan et al., 2018; Alnahdi, 2015; Edmonds et al., 2009; Scammacca et al., 2015) to identify any eligible articles that were not included in our online database and manual searches. A first-level screening of the titles and abstracts of the studies in the corpus of each synthesis revealed that no additional studies met the first-level criteria to be considered for a second-level screening.

Coding Procedures

Once our corpus was established, we created a code sheet to identify important characteristics of the studies. Information about the following components of each study was recorded on the coded sheet: (a) participants, (b) settings, (c) methodology, (d) conditions, and (e) results. The first author initially recorded the information for each study using the code sheet. A second rater was trained on the codes. To establish interrater reliability, the second rater coded each article independently. To calculate the percentage of agreement, we determined the total number of agreements and then divided that total by the number of agreements plus disagreements (i.e., the total number of items on the code sheet) for each category. An interrater agreement of 90% or more for each category was achieved. Once the goal of interrater agreement was achieved, some disagreements were resolved through discussions between the first author and the second rater, and other disagreements were resolved in consultation with the second author.

Based on the study information recorded in the code sheet, we categorized interventions as single-component or multicomponent. We identified studies as employing single-component or multicomponent interventions to explore whether the

effects of these two intervention types among individuals with mild ID are similar to those among older students with reading difficulties and LD. In addition, we labeled study interventions by instruction type (e.g., reciprocal teaching, explicit strategy instruction) to determine the ranging effects of each intervention type among individuals with mild ID. The decision to characterize the interventions in these ways was not determined before coding. Instead, our categorizations were based on classifications used in other syntheses and similar descriptions of interventions across studies.

We created a second code sheet that included Gersten et al.'s (2005) and the What Works Clearinghouse's (WWC; 2017) quality indicators for group-design studies and SCD studies. Quality indicators are used to evaluate the extent to which studies were conducted using high-quality designs. Thus, our intention for adding the application of Gersten et al.'s and the WWC group-design and SCD quality indicators was to add credibility to the findings. Quality indicators place a strong emphasis on assessments used to determine intervention outcomes. For group-design studies, these quality indicators include the use of multiple comprehension measures and the use of standardized comprehension outcome measures. In addition, high-quality SCD studies measure a dependent variable repeatedly over time. Although we address these quality indicators in their own section, we decided to describe assessment characteristics, in further detail, in a separate section to demonstrate the wide variety of assessments that were used to measure reading comprehension growth among individuals with mild ID.

Effect Sizes

The reading comprehension effect sizes of each group-design study (Hedges' *g*) were calculated by dividing the difference in posttest means by the pooled and weighted standard deviation with a correction for studies with sample sizes less than 50 (Hedges & Olkin, 1985). The 95% confidence interval for each effect size was also calculated (Centre for Evaluation & Monitoring, n.d.) and reported because the width of intervals can provide insight into the precision of effect size estimations (APA, 2010). The effect sizes of SCD studies were measured by calculating PND. PND is the percentage of data points during intervention sessions that are higher than the highest baseline data point (when the intervention is intended to raise data points). PND scores that are higher than 90% are highly effective, between 71% and 90% are moderately effective, between 50% and 70% are minimally effective, and less than 50% are ineffective (Scruggs et al., 1986).

Results

As noted, a total of 14 studies representing a range of participants, study designs, intervention setting and length, and types of reading intervention met the criteria for inclusion in the present synthesis. The largest number of studies was published in 2013 (n = 3). A total of 287 participants were included across all studies. The disabilities of 228 participants (79.4%) across the 14 studies were identified, and 178 of them (78.1%) had IQs between 50 and 70 and/or were identified as having mild ID. We first present synthesized information on the design, quality, sample, intervention characteristics, and assessment characteristics to highlight the similarities and differences across the corpus of studies. We then present effects on reading

comprehension outcomes organized by intervention type (i.e., single-component or multicomponent) across all studies.

Study Design and Quality

Group-design studies. Eight studies used group designs (Allor et al., 2010; Cohen et al., 2006; Hua et al., 2014; Lundberg & Reichenberg, 2013; Mastropieri et al., 2001; Miller et al., 2011; Van den Bos et al., 2007 [two studies in one article]). Based on Gersten et al. (2005) and WWC (2017), the studies in the corpus of the present synthesis were reviewed to analyze the types of group design employed, descriptions of interventions and comparison conditions, fidelity of implementation, the number and types of measures used, level of attrition, and baseline equivalence at pretest. A summary of Gersten et al.'s and the WWC's quality indicators in relation to the group-design studies in the corpus of this synthesis is provided in Table 2.1 (Appendix A).

Seven of the eight group-design studies used a randomized controlled trial (RCT; Allor et al., 2010; Hua et al., 2014; Lundberg & Reichenberg, 2013; Mastropieri et al., 2001; Miller et al., 2011; Van den Bos et al., 2007). In Hua et al. (2014), Miller et al., and Van den Bos et al., individual participants were randomly assigned to receive either the treatment or typical or no instruction. In Van den Bos et al., half of the randomly assigned treatment participants received instruction in small groups (Study 1), and the other half received instruction (on the same reading comprehension strategies) individually (Study 2). Mastropieri et al. and Lundberg and Reichenberg randomly assigned subgroups (e.g., two to four students)—not individual participants—to each condition, and Allor et al. was a multisite study in

which participants within each school were randomly assigned to the treatment and comparison groups. None of these three studies (Allor et al., 2010; Lundberg & Reichenberg, 2013; Mastropieri et al., 2001) accounted for the clustering of individuals in analyses. Cohen et al. (2006), the eighth group-design study, employed a quasi-experimental design, as the treatment group only included participants who volunteered for the intervention.

All group-design studies had intervention and comparison conditions that were described clearly. The clarity of the descriptions was determined by whether or not the researchers provided precise definitions of conditions that would allow for replication and support coding in systematic reviews (Gersten et al., 2005). Only three of the eight studies reported fidelity of implementation data (Allor et al., 2010; Hua et al., 2014; Miller et al., 2011). All but three studies used more than one assessment to measure reading comprehension outcomes (Cohen et al., 2006; Lundberg & Reichenberg, 2013; Miller et al., 2011; Van den Bos et al., 2007), but evidence that a norm-referenced measure was used to measure comprehension was only provided in one study (Allor et al., 2010).

Based on WWC quality indicators (WWC, 2017), we analyzed the level of attrition in each of the RCT studies. Only three of these studies, Hua et al. (2014), Lundberg and Reichenberg (2013), and Miller et al. (2011), did not report any withdrawn participants or reported appropriate levels of overall attrition and differential attrition. Allor et al. (2010) reported that 33 students did not complete the study, but they did not specify these participants' condition(s). Mastropieri and colleagues (2001) were unable to assess three participants after the intervention but

did not identify their condition(s). Van den Bos et al. (2007) reported that three participants across the two studies (i.e., the group instruction and individual instruction studies) dropped out, but they failed to report the study in which each person previously participated and the condition to which each person had been assigned. Thus, Allor et al., Mastropieri et al., and Van den Bos et al. failed to provide information on differential attrition.

Per WWC (2017) standards, quasi-experimental studies (e.g., Cohen et al., 2006) do not need to be evaluated for attrition. However, both quasi-experimental studies and RCT studies with issues of attrition should be evaluated for baseline equivalence between treatment and control groups on pre-intervention measures of reading comprehension. Therefore, we planned to evaluate baseline equivalence in Cohen et al., Allor et al. (2010), Van den Bos et al. (2007), and Mastropieri et al. (2001). Baseline equivalence between the treatment and control groups was estimated using Hedges' *g* where values between 0 and 0.05 satisfy baseline equivalence, greater than 0.05 but no greater than 0.25 require "statistical adjustment to satisfy the baseline equivalence" (WWC, 2017, p. E-10), and greater than 0.25 do not satisfy baseline equivalence (WWC, 2017). Allor et al.'s study did not meet baseline equivalence on passage comprehension. Cohen et al. (2006) failed to meet baseline equivalence on the comprehension of long texts, met baseline equivalence for comprehension of short texts, and could only meet baseline equivalence for sentence comprehension with statistical adjustment. Van den Bos et al.'s study providing individual instruction failed to satisfy baseline equivalence on narrative comprehension, expository comprehension, and sentence comprehension measures.

Van den Bos et al.'s group instruction study did not satisfy baseline equivalence on narrative comprehension and could meet baseline equivalence for sentence and expository comprehension with statistical adjustments. Although we intended to evaluate baseline equivalence for Mastropieri et al. (2001), the authors did not report pretest scores, which would have allowed us to calculate baseline equivalence. However, the authors stated that there was "no statistically significant difference between the two conditions" (p. 22) during comprehension pretesting.

Single-case design studies. There were six SCD studies included in the present synthesis (Bilgi & Özmen, 2018; Grünke et al., 2013; Hua et al., 2012, 2018; Hua et al., 2013; Özmen, 2011). The WWC's quality indicators for SCD studies are: (1) the independent variable is systematically manipulated, (2) the dependent variable is systematically measured over time and by more than one assessor, (3) interobserver agreement (IOA) is measured for at least 20% of the data points, (4) there is at least 80% IOA, (5) there are at least three attempts to demonstrate a treatment effect, and (6) there is an appropriate number of phases and data points within each phase. A summary of the quality of SCD studies in the corpus of this synthesis is provided in Table 2.2 (within Appendix A).

Bilgi and Özmen (2018) employed a multiple probe design across three participants (two with mild ID). Grünke et al. (2013) employed a multiple baseline design across six participants with mild ID and met the minimum number of phases for multiple baseline design studies. Hua et al. (2012) employed a multiple baseline design across three participants (two with mild ID). Hua et al. (2013) employed an alternating treatments design with four participants (three with mild ID) wherein

participants received the intervention with a focus on either health care or money management. Hua et al. (2018) employed a response-guided, randomized concurrent multiple baseline design across five participants with mild ID. Özmen (2011) employed an alternating treatments design with five participants with mild ID.

All SCD studies in the present synthesis systematically manipulated independent variables. All but two studies attempted and provided at least three attempts to demonstrate a treatment effect with the minimum number of phases (i.e., six phases for multiple baseline designs and four repetitions for alternating treatment designs) and the minimum number of data points per phase to meet WWC standards without reservations (i.e., five for multiple baseline and alternating treatment designs). Baseline data points for two of Grünke et al.'s and all of Bilgi and Özmen's (2018) participants were fewer than five, which can threaten the validity of the data (Kratochwill et al., 2010). In five studies, more than one assessor measured the dependent variable (Bilgi & Özmen, 2018; Hua et al., 2012, 2013, 2018; Özmen, 2011). Four of these studies met the 80% IOA requirement on at least 20% of data points (Bilgi & Özmen, 2018; Hua et al., 2012, 2013; Özmen, 2011).

Summary. The majority of group-design studies in the present corpus utilized random assignment, provided clear descriptions of the treatment and comparison conditions, and administered more than one reading comprehension measure. However, few studies evaluated and reported fidelity of implementation, administered standardized reading comprehension measures, reported appropriate levels of attrition, and met baseline equivalence. Most SCD studies met the requirement for the minimum number of attempts to demonstrate a treatment effect, the minimum number

of phases, and the minimum number of data points per phase. Additionally, in the majority of SCD studies, more than one assessor measured the dependent variable and met a minimum of 80% IOA for the minimum number of data points. Overall, SCD studies were more likely to meet the SCD criteria than group-design studies were to meet the group-design criteria.

Sample Characteristics

The studies in the present corpus had sample sizes ranging from three to 59 participants. The SCD studies all had fewer than 10 participants (n = 3-6; M = 4.33), and the group-design studies had sample sizes of at least 10 participants (n = 10-59; M = 32.63). Seven studies assessed participants in Grades 4 through 12 (Allor et al., 2010; Bilgi & Özmen, 2018; Grünke et al., 2013; Lundberg & Reichenberg, 2013; Mastropieri et al., 2001; Miller et al., 2011; Özmen, 2011), and seven studies had postsecondary adult participants (Cohen et al., 2006; Hua et al., 2012, 2013, 2014, 2018; Van den Bos et al., 2007). Additionally, five of the studies explicitly stated that participants were required to meet certain reading standards (e.g., oral reading fluency at first-grade level; Bilgi & Özmen, 2018; Miller et al., 2011; Özmen, 2011; Van den Bos et al., 2007). Although all studies had participants with mild ID, six of the studies were open to other individuals, including individuals with LD (Hua et al., 2012, 2013; Mastropieri et al., 2001; Miller et al., 2011) and language disorders (Hua et al., 2013), individuals with moderate ID (Allor et al., 2010), or individuals without disabilities (Bilgi & Özmen, 2018). Sample characteristics are reported in Table 2.3 (single-component intervention studies) and Table 2.4 (multicomponent intervention studies) within Appendix A.

Summary. Half of the studies in the present corpus included participants in Grades 4-12, and the other half included postsecondary adults as participants. Additionally, the majority of studies only included participants with mild ID, and the remaining studies included participants with mild ID and with other disabilities or characteristics.

Intervention Characteristics

The studies in the present corpus varied in the total duration of the intervention as well as the length of each session. The SCD studies ranged between 4 and 21 intervention sessions. The group-design studies were conducted between 3 and 106 weeks. Additionally, 12 of the studies reported information on intervention session lengths, which indicated that lengths ranged from 15 minutes to 1 hour.

Single-component interventions. Eight single-component intervention studies targeted the reading comprehension of individuals with mild ID. All but one single-component intervention study explicitly taught participants a strategy intended to improve their reading comprehension (Bilgi & Özmen, 2018; Grünke et al., 2013; Hua et al., 2014; Lundberg & Reichenberg, 2013; Miller et al., 2011; Van den Bos et al., 2007). Two of these studies utilized reciprocal teaching (Lundberg & Reichenberg, 2013; Van den Bos et al., 2007), a form of peer-mediated reading instruction in which students are taught to use the strategies of predicting, questioning, clarifying, and summarizing texts within conversations in pairs or small groups (Lundberg & Reichenberg, 2013; Van den Bos et al., 2007). The second Van den Bos et al. study taught these same strategies, but treatment participants received the intervention individually.

Bilgi and Özmen's (2018) modified multicomponent cognitive strategy instruction study provided students with explicit instruction, modeling, guided and independent practice, as well as feedback to prepare students to identify the parts and sub-parts of the structure of expository texts to promote their comprehension and summarization of this particular text type. Hua et al.'s (2014) explicit strategy intervention consisted of teaching young adults with mild ID a three-step paraphrasing strategy to improve their reading comprehension of expository texts. Specifically, participants were taught the mnemonic (i.e., a learning device that supports memory) RAP—i.e., (a) Read a paragraph; (b) Ask yourselves, "What was the main idea and two details?"; and then (c) Put the answer into your own words. Miller et al. (2011) taught participants how to use rule statements (e.g., "the main ideas of paragraphs are usually expressed in the first few sentences of the paragraph" [p. 19]) and multistep procedures to identify main ideas within paragraphs. Another single-component intervention study provided explicit strategy instruction as students used story map graphic organizers to record relevant information about the story's setting, characters, events, problem, solutions, and conclusion (Grünke et al., 2013).

Özmen (2011) was the only single-component intervention study that did not provide explicit strategy instruction. In Özmen's study, students alternated between two graphic-organizer treatments to determine which treatment increased students' understanding of text-based similarities and differences. In the first treatment, participants examined an already completed compare/contrast graphic organizer before reading an expository text. In the second treatment, participants read the parts of a text that provided them with information on similarities, restated the similarities

and added them to a blank compare/contrast graphic organizer, and then repeated these steps for information on differences. See Table 2.5 in Appendix A for a summary of the characteristics of single-component interventions.

Multicomponent interventions. Six multicomponent intervention studies were reviewed in the present synthesis. One intervention implemented partner reading and corrective feedback with story retell and paragraph summarization (Mastropieri et al., 2001). Another multicomponent intervention targeted "concepts of print, phonological and phonemic awareness, oral language, letter knowledge, word recognition, vocabulary, fluency, and comprehension" (Allor et al., 2010, p. 449). In this study, comprehension instruction consisted of applying comprehension strategies, such as predicting, making inferences, and summarizing, when reading narrative and expository texts. Cohen et al.'s (2006) intervention provided remediation to target phonological abilities, word identification processes, syntactic rules, and global reading tasks, as needed and on an individual basis. In this study, researchers used cognitive remediation to promote comprehension of prose. Specifically, participants were asked to select keywords and phrases in an instructional text, identify the theme of the text, paraphrase the meaning of the text, and reread the text to increase understanding. However, only Cohen et al.'s participants with sufficient word identification skills progressed to comprehension instruction.

In Hua et al. (2013), constant time delay (CTD; i.e., fading prompting and using reinforcement during instructional activities) was employed to examine the effects of vocabulary instruction on word knowledge and comprehension of expository texts. Students were taught the definitions of target vocabulary words

using flashcards before answering 10 passage-specific questions about the text. Although Hua et al. (2013) did not directly target reading comprehension, one of the purposes of the study was to determine whether the effects of the explicit vocabulary instruction influenced participants' comprehension of expository text.

Two multicomponent intervention studies tested the effects of the Reread-Adapt and Answer-Comprehend (RAAC) intervention (Hua et al., 2012, 2018). Specifically, students read aloud four generic questions related to narrative texts (e.g., "How did the main character feel?" [Hua et al., 2012, p. 74]) and were told to pay attention to the text so that they could answer those same generic questions after reading. The researcher then employed repeated reading and provided corrective feedback. After the third reading, students answered the generic questions and received feedback about their responses from the researcher. Hua et al. (2018) extended the RAAC intervention by giving students the opportunity to set goals related to improving oral reading fluency. See Table 2.6 in Appendix A for a summary of the characteristics of multicomponent interventions.

Summary. Five group-design studies and three SCD studies implemented single-component interventions. The majority of these interventions provided participants with explicit strategy instruction. Reciprocal teaching strategies were the most commonly taught strategies among these interventions. The six multicomponent interventions were split equally between group-design and SCD studies. Half of these interventions targeted reading comprehension and fluency only, two interventions were comprehensive in that they targeted various reading skills, and one study targeted reading comprehension and vocabulary.

Assessment Characteristics

Single-component interventions. A variety of assessments were used to measure reading comprehension in the single-component intervention studies in the present corpus. The majority of these studies assessed students' ability to recall information (after being prompted), summarize text, and/or identify the main idea. Van den Bos et al. (2007) measured reading comprehension through participants' ability to recall information from a narrative text and an expository text. Özmen (2011) also measured reading comprehension based on participants' ability to recall information, particularly the similarities and differences in identified in intervention texts. Miller et al. (2011) determined the effectiveness of their intervention by measuring a participant's ability to retell a story and a participant's ability to identify main ideas of stories on researcher-designed unit tests. Hua et al. (2014) measured reading comprehension by the total number of main ideas and details participants were able to recall after reading a passage. Bilgi and Özmen (2018) assessed passage comprehension by students' ability to summarize texts and identify the main idea.

In addition to Bilgi and Özmen (2018), the remaining single-component intervention studies measured passage comprehension by administering specific comprehension questions. Lundberg and Reichenberg (2013) measured passage comprehension as students answered five sets of three questions about five different passages they read. In Grünke et al.'s (2013) and Bilgi and Özmen's (2018) SCD study, passage comprehension was measured as students answered 10 comprehension questions for each text. Finally, two single-component intervention studies measured sentence comprehension by requiring participants to choose one picture (out of four)

that accurately represented a sentence or set of sentences (Lundberg & Reichenberg, 2013; Van den Bos et al., 2007).

Multicomponent interventions. To measure passage comprehension, four studies required students to answer comprehension questions. Mastropieri et al. (2001) required students to complete comprehension tests, which included both generic and content-specific comprehension questions that students answered with open-ended responses. At the end of each intervention session in Hua et al.'s (2012) RAAC study, students answered eight researcher-developed, content-specific questions about the text, including four factual comprehension questions and four inferential comprehension questions for each session's narrative text. In Hua et al.'s (2013) study, students were required to read an expository text and orally answer 10 researcher-developed passage-specific questions. Vocabulary knowledge was the focus of three questions, and factual knowledge was the focus of the remaining seven questions. Cohen et al. (2006) measured narrative comprehension of short and long texts using multiple-choice questions. Cohen et al. also measured sentence comprehension with the researcher-developed *Test de compréhension de phrase* [Sentence Comprehension Test] (Rivière, 1998), which is a sentence picture-matching task.

Allor et al. (2010) administered the passage comprehension subtest of the *Woodcock Language Proficiency Battery-Revised* (Woodcock, 1991), which was the only norm-referenced measure standardized across the target ages or grades used in the corpus of studies. Hua et al. (2018) determined the effects of RAAC on the reading comprehension skills of the participants as measured by the Index of

Narrative Complexity (INC). INC is a criterion-referenced tool that scores students' oral retell of key elements in narrative texts.

Summary. Across the 14 studies, 16 different measures were used to assess reading comprehension. Recalling information (n = 7) was most common among single-component intervention studies. Answering comprehension questions (n = 6) was most common among multicomponent intervention studies. Sentence comprehension measures (n = 3) were used in three studies, and only one standardized measure was used.

Generalization and Maintenance

We evaluated our corpus of literature to identify the studies that utilized generalization and maintenance measures of reading comprehension. Generalization measures assess the extent to which the target effects of an intervention extend to other situations. Because the focus of the present synthesis is on reading comprehension, we were interested in generalizability of reading comprehension skills to different situations (e.g., reading comprehension at a higher reading level). Although these measures are commonly found in SCD studies, only one study administered a generalization measure that met this standard. After one session of generalization instruction focused on a different text topic (i.e., geographical locations rather than wild animals) and text structure, Bilgi et al.'s (2018) participants completed two probes using generalization texts.

Four studies administered a maintenance measure (Bilgi et al., 2018; Miller et al., 2011; Van den Bos et al., 2007). Maintenance measures assess the extent to which intervention effects are sustained beyond the intervention period. Bilgi et al. – the

only study to measure both generalization and maintenance – administered three maintenance probes 3 to 12 weeks after the intervention ended and two generalization maintenance probes 2 to 8 weeks afterward. Miller et al. administered a reading comprehension maintenance test to participants two weeks after the completion of the intervention. Exactly half of Van den Bos et al.'s participants in both studies completed maintenance measures of sentence and passage comprehension three months after the end of the intervention.

Summary. Generalization was assessed in one study only, and maintenance was assessed in four studies. These studies were all single-component intervention studies. Thus, all multicomponent studies failed to measure both generalization and maintenance.

Study Findings

Findings are summarized by type of intervention (i.e., single-component or multicomponent interventions). Within each intervention type, we first report effect sizes from the treatment–comparison studies and then the SCD studies. We calculated a total of 21 effect sizes from the treatment–comparison studies and PNDs based on eight measures across all SCD studies. None of the authors of quasi-experimental studies or group-design studies with issues of attrition corrected for baseline inequivalence. Therefore, for these studies, we reported adjusted effect sizes, which were calculated by subtracting the standardized difference in baseline means from the posttest effect size (What Works Clearinghouse, 2017).

Single-component interventions. Five group-design studies tested the effects of single-component interventions. The range of effect sizes of single-component

group-design interventions was -0.01–3.70, and the average was 0.95, indicating that single-component interventions, on average, have positive effects on the reading comprehension skills of persons with mild ID. Although the first unit test's effect size in Miller et al.'s (2011) study was negative, the treatment group scored significantly higher than the comparison group on weekly unit tests overall (average $g = 0.47$) and on qualitative story retell tasks (average $g = 0.56$).

Hua et al. (2014) reported positive effects on main idea identification ($g = 3.70$) and detail identification ($g = 2.46$) in expository texts for students who participated in RAP instruction, compared to students who received life skills instruction. Hua et al.'s (2014) effect sizes may be exceptionally large because the measure used to assess reading comprehension was so closely aligned to the intervention. In order for students' responses to be scored as correct, their responses were required to meet six criteria, which participants in the treatment group were explicitly taught to do. Therefore, the measure favored treatment group participants, potentially leading to a large difference between treatment and comparison condition means.

Lundberg and Reichenberg (2013) did not specify the exact number of participants in each condition. Instead, they stated that their 40 participants were separated "into two almost equally sized groups" (p. 93). To calculate estimated effect sizes for Lundberg and Reichenberg's study, we assumed there were 19 participants in the treatment group and 21 participants in the control group (the condition with the larger standard deviation). Using this assumption, we found effects in favor of the treatment group that received reciprocal teaching on a researcher-

developed sentence comprehension measure (estimated $g = 0.09$) and a researcher-developed passage comprehension measure (estimated $g = 0.61$).

In Van den Bos et al.'s (2007) group instruction study, reciprocal teaching yielded positive effects on researcher-developed sentence comprehension (adjusted $g = 0.57$), expository passage comprehension (adjusted $g = 0.42$) and narrative passage comprehension measures (adjusted $g = 1.47$). Van den Bos et al.'s individual instruction yielded positive effects on the sentence comprehension test (adjusted $g = 1.42$), the expository passage comprehension test (adjusted $g = 0.31$), and the narrative passage comprehension test (adjusted $g = 1.11$).

Three SCD studies tested the effects of single-component interventions. In Bilgi and Özmen's (2018) SCD study, each participant demonstrated improvement in their ability to include the main idea in their summaries and in the quality of their summaries (PND = 100% for all participants). Although there was a minimum of three summarization probes for each participant in both the baseline and treatment phases of Bilgi and Özmen's study, it is important to note that Bilgi and Özmen provided students with a single score for each phase. Additionally, all of Bilgi and Özmen's participants demonstrated 100% PND for the number of correct answers to the comprehension questions.

In Grünke et al.'s (2013) SCD study, each participant's average score on a researcher-developed reading comprehension measure increased from baseline phases (overall average of 3.93 questions answered correctly) to intervention phases (overall average of 8.96 questions answered correctly). Additionally, because all reading comprehension scores during the intervention phases were higher than the scores

during the baseline phases, the study's PND was 100%, suggesting that the story mapping method used in this study is effective for improving reading comprehension of narrative texts among students with low intellectual abilities.

In Özmen's (2011) study, requiring students to complete the graphic organizer upon reading the expository text was more effective than requiring them to use an already completed compare/contrast graphic organizer. The average PND for the identification of similarities and differences after completing one's own graphic organizer was 92% and 100%, respectively. Additionally, the average PND for the identification of similarities and differences when students previewed the graphic organizer was 100% and 90%, respectively. Therefore, previewing compare/contrast graphic organizers and completing these graphic organizers upon reading both result in positive effects on the identification of similarities and differences in texts. For a summary of single-component intervention study effects, see Table 2.5 in Appendix A.

Multicomponent interventions. Three group-design studies examined the effects of multicomponent interventions. Based on a standardized measure of passage comprehension, Allor et al.'s (2010) intervention yielded a negative effect (adjusted g = -0.13) on passage comprehension after 2 or 3 years of each student's participation. The range of group-design effect sizes for multicomponent interventions with researcher-developed measures was -0.05–1.12, and the average was 0.48, indicating that multicomponent interventions had mixed effects on the reading comprehension of persons with mild ID in these studies. Cohen et al. (2006) found positive effects for both sentence comprehension (adjusted g = 0.80) and the comprehension of short

texts (g = 0.03). However, there were negative effects on the comprehension of long texts (adjusted g = -0.05).

Mastropieri et al. (2001) did not assess three students included in their pretest data. Thus, their pretest data was based on 24 students, but their posttest data was based on only 21 students. To be conservative, we decided to assume that these 21 students were distributed with 9 in the treatment group and 12 in the control group (for which the outcome data demonstrated greater variability). Based on our assumption, we determined that Mastropieri et al.'s study had positive effects (estimated g = 1.12) that favored students in the peer-tutoring treatment condition on a researcher-developed reading comprehension measure.

Authors of three SCD studies implemented a multicomponent intervention (Hua et al., 2012, 2018). Based on the results of Hua et al.'s (2012) study that employed CTD to provide vocabulary instruction, the number of factual and inferential comprehension questions each student answered correctly generally increased. However, there was 100% overlap of data between each participant's baseline phase and intervention phase. Therefore, although there was an overall increase from baseline to intervention for all subjects, because each participant's PND was 0%, there is no evidence that the intervention is effective.

In Hua et al.'s (2013) SCD study, three of the four participants answered more reading comprehension questions correctly during the intervention than they did during the baseline. Because reading comprehension skills did not improve for all participants and because most of the data overlapped between baseline and intervention phases (average PND for all participants = 18.25%; average PND for all

participants with mild ID = 11%), positive effects of pre-teaching vocabulary using CTD on reading comprehension were not established.

After Hua et al.'s (2018) RAAC intervention was implemented, there were increases in the INC scores of two participants with mild ID from the baseline to the intervention, decreases in the INC scores of two other participants with mild ID from the baseline to the intervention, and no change in the INC scores of the final participant from the baseline to the intervention. Hua et al.'s (2018) study had an average PND of 8.6%. Therefore, this study provides no evidence that the current RAAC intervention is an effective practice for improving the reading comprehension skills of individuals with mild ID. For a summary of multicomponent intervention study effects, see Table 2.6 in Appendix A.

Summary. The effect sizes of single-component intervention studies with group designs ranged from -0.1 to 3.70 with an average effect size of 0.95. The PND range of SCD studies of single-component interventions was 92%-100%, and the average PND was 97%. Among multicomponent interventions, the one standardized effect size was -0.13. The range of unstandardized effect sizes, however, was -0.05-1.12 with an average effect size of 0.48. Finally, the PNDs of SCD studies implementing multicomponent interventions ranged from 0% to 18.25%, and the average PND was 8.95%. In Bilgi et al. (2018), participants' reading comprehension successfully generalized to a different text topic.

Generalization and Maintenance Findings

In Bilgi et al.'s (2018) study, the quality of all students' generalization summaries, the main ideas identified in their generalization summaries, and their

reading comprehension scores improved from baseline to generalization post-instruction. Bilgi et al. also maintained high scores for all dependent variables, 3 to 12 weeks post-instruction, using non-generalization and generalization texts. Miller et al.'s (2011) treatment group that received explicit instruction maintained a higher average on the maintenance curriculum-based measure two weeks after instruction than the comparison group. In Van den Bos et al.'s (2007) group instruction and individual instruction studies, the average sentence comprehension maintenance score for treatment participants was higher than their sentence comprehension pretest score but not their immediate posttest score. The average narrative passage comprehension maintenance scores for treatment participants in both studies were higher than their pretest and immediate posttest scores. In the group instruction and individual instruction studies, the average expository passage comprehension maintenance scores for treatment participants were higher than their pretest scores. The expository maintenance score was the same as the immediate posttest score in the group instruction study but lower than the immediate posttest score in the individual instruction study.

Summary. There was some level of successful maintenance in all four studies that measured maintenance of reading comprehension skills.

Discussion

Many individuals with mild ID face significant difficulty reading and comprehending text (Bouck & Satsangi, 2015). Reading comprehension is essential for individuals with mild ID as it supports their access to the general education curriculum. Furthermore, reading comprehension prepares students with mild ID who

are transitioning to postsecondary education and employment, which supports their financial well-being. However, limited research on reading comprehension interventions among individuals with mild ID exists. Therefore, the present synthesis was conducted to identify the common features of interventions that target the reading comprehension of individuals with mild ID and to analyze the extent to which these interventions improve their reading comprehension.

Fourteen studies qualified for inclusion in the present review. The studies included 287 participants, a significantly smaller number than that of participants represented in syntheses of reading interventions for students with reading difficulties and students with LD. For example, in Edmonds et al. (2009), 29 studies included 976 older students with reading difficulties. However, given that 6% of U.S. students with disabilities have ID and 34% have LD (USDOE, NCES, 2017a) and the interventions included in those syntheses were not limited to reading comprehension, the smaller sample sizes can be expected.

Seven of the fourteen reviewed studies targeted the reading comprehension of adults with mild ID. These studies suggest that adults with mild ID often benefit from reading comprehension instruction (e.g., reciprocal teaching) when given the opportunity in postsecondary education and employment settings. This finding is especially important when we consider the fact that reading comprehension has been identified as the most critical basic academic skill for all employees, regardless of whether or not employees have disabilities (Ju et al., 2012). Therefore, in order to facilitate the inclusion and success of adults with mild ID in all postsecondary

settings, we must continue providing individuals with mild ID effective reading comprehension instruction beyond high school.

Many of the studies in the corpus of the present review incorporated intervention practices that are generally effective for individuals with all disabilities and individuals with mild ID specifically. For example, interventions provided direct instruction (i.e., teacher-directed instruction with multiple opportunities for student response) and delivered mnemonic strategy instruction. The findings of these studies reveal that interventions can positively impact the reading comprehension skills of persons with mild ID.

Many consider group-design effect sizes between 0.2 and 0.49 to be small, 0.5 and 0.79 medium, and 0.8 or above large. Although Cohen (1988) recommended using these values when a better basis for interpreting effect sizes is absent, he explained that effect sizes are relative to each other and the specific field and that there is some risk to using a conventional framework to interpret the significance of the effect sizes we calculated. Therefore, instead of defining these effect sizes as small, medium, or large, we state the effect size ranges of similar interventions and discuss if the effects of these interventions are consistent with the effect sizes reported in previous syntheses.

Two common features of effective studies in the present corpus are explicit strategy instruction and peer-mediated reading instruction. Seven of eight single-component intervention studies incorporated explicit comprehension strategy instruction. The 16 explicit strategy instruction group-design effect sizes ranged from –0.01 to 3.70. All but two of these effect sizes were positive. The two SCD studies

that provided explicit comprehension strategy instruction resulted in positive effects as well. To situate these findings in a broader context, we recognize that other syntheses have reported that explicit instruction is effective for individuals with reading difficulties and that delivering explicit instruction with modeling is an effective method for improving student outcomes (e.g., Edmonds et al., 2009). Three explicit comprehension strategy studies in the present synthesis tested the effects of the reciprocal teaching intervention or the effects of the reciprocal teaching strategies independently among high school students and adults. All of the effects of these studies were positive (g = 0.09-1.47), which is not consistent with the findings of Edmonds et al., who reported that reciprocal teaching has mixed results for older struggling readers.

Explicit comprehension strategy instruction was not a primary focus in the multicomponent intervention studies of the present corpus. Therefore, explicit strategy instruction in reading comprehension may be more common in single-component intervention studies among participants with mild ID because providing explicit strategy instruction requires much time and effort, leaving less opportunity to target other reading components. Additionally, the presence of explicit strategy instruction in single-component interventions may help to explain why the percentage of single-component intervention studies with positive effects on reading comprehension is larger than the percentage of multicomponent intervention studies.

Another frequent feature among studies that effectively improved the reading comprehension of individuals with mild ID was peer-mediated reading instruction. Peer-mediated instruction requires peers to complete academic work in pairs or small

groups (Wexler et al., 2015). Three studies in our corpus tested peer-mediated reading instruction (Lundberg & Reichenberg, 2013; Mastropieri et al., 2001; Van den Bos et al., 2007), including two that integrated explicit comprehension strategy instruction (Lundberg & Reichenberg, 2013; Van den Bos et al., 2007). All of these studies had favorable outcomes (g = 0.09-1.47) on the reading comprehension skills of participants with mild ID. This finding is consistent with the broader findings of Wexler et al.'s synthesis that reported positive effects for the use of peer-mediated instruction in improving the reading comprehension of secondary struggling learners. This is notable considering the fact that the two studies in Wexler et al.'s synthesis reporting small to no effects included samples in which all students faced significant reading difficulties. Thus, we might have expected similar effects from peer-mediated reading interventions with students with mild ID.

Overall, the findings from our synthesis suggest that targeting reading comprehension through explicit strategy instruction and peer-mediated reading instruction can result in positive outcomes for individuals with mild ID. Therefore, one can infer that more widespread implementation of these evidence-based interventions in schools might support the reading outcomes of students with mild ID and increase their opportunities for general academic and postsecondary success.

Limitations of the Research

Despite what we know about how to support the reading comprehension of individuals with mild ID, the studies reviewed in the present synthesis have limitations that restrict our understanding of effective reading comprehension strategies for individuals with mild ID. These limitations are related to our knowledge

of high school students with mild ID, fidelity of implementation, the type of measures used to assess reading comprehension, and the use of generalization and maintenance measures.

The effects of reading interventions on the reading comprehension of high school students with mild ID are generally unknown. Of the 14 studies in our corpus, six studies included secondary students as participants (Bilgi & Özmen, 2018; Grünke et al., 2013; Lundberg & Reichenberg, 2013; Mastropieri et al., 2001; Miller et al., 2011; Özmen, 2011), and only one of those studies included high school participants (Lundberg & Reichenberg, 2013). Students with Individualized Education Programs (i.e., legal documents designed to outline the special education services of students with disabilities in public schools in the United States) can receive special education services until they graduate from high school or until the age of 21 (or 22 in some states) (IDEA, 2004). Therefore, high school provides students with the last guaranteed opportunity for reading comprehension instruction. Reading comprehension interventions are essential for high school students with mild ID because, as previously discussed, they will need to apply their reading skills to maximize their participation and independence as they pursue postsecondary education and employment and engage with their communities as postsecondary adults. Thus, a greater understanding of effective reading comprehension interventions for high school students with mild ID is warranted.

Due to group-design study limitations, the quality of group-design studies in our corpus was variable. Meeting quality standards is an indicator that a study contains the best evidence of the effectiveness of the intervention tested. Hence,

without meeting appropriate standards, a study's effectiveness is questionable. Per Gersten et al.'s (2005) guidelines, two quality indicators were infrequently met: fidelity of implementation and the use of standardized reading comprehension measures.

Fidelity of implementation was reported in few studies. Evaluating implementation fidelity helps to ensure that the procedures of an intervention led to the outcomes observed. Knowledge of implementation fidelity informs both researchers and practitioners of the components of effective interventions that are necessary for future implementation (Swanson et al., 2013). Thus, knowing that the interventions in the present corpus not only have positive effects on reading comprehension but were also implemented with high fidelity would provide support for scaling up the interventions (i.e., expanding and sustaining interventions) in order to benefit more individuals with mild ID.

The only study to include a standardized comprehension outcome measure was a multicomponent intervention study. Using standardized measures typically leads to "better controlled studies" (Gersten et al., 2005, p. 163) but smaller effect sizes than those of proximal measures. Nonetheless, even smaller effects on standardized measures indicate general improvement in reading comprehension and an ability to generalize to reading comprehension tasks that are not closely aligned to the intervention. Yet, the standardized effects of all single-component interventions in the present synthesis, most of which included explicit strategy instruction, are mostly unknown. It is important to note, however, that there may not be evidence that standardized measures of passage comprehension have been validated for persons

with mild ID. In fact, Allor et al. (2010) reported that the manual of the standardized measure they used to assess passage comprehension does not provide validity information for persons with ID specifically. In situations like these, criterion-referenced measures may be better equipped to assess the performance of individuals with mild ID.

A critical aspect of learning is the ability to generalize new knowledge and skills to unfamiliar contexts (e.g., different content areas) and maintain the knowledge and skills upon completion of the learning process. However, the studies in the corpus of the present synthesis provide little information on the generalization and maintenance effects of interventions targeting the reading comprehension of individuals with mild ID, specifically multicomponent interventions. Only one single-component intervention study and no multicomponent intervention studies measured generalization effects. Additionally, only four studies reported maintenance results, none of which were multicomponent intervention studies. Knowledge of the generalization and maintenance effects of these interventions would help us understand how individuals with mild ID apply newly learned reading comprehension skills in different situations.

Limitations of the Current Synthesis

Several limitations of our synthesis exist. First, there is a dearth of empirical research on interventions addressing the reading comprehension skills of individuals with mild ID available since 2001. Fourteen studies qualified for the corpus of our synthesis, and only eight of these studies included participants with mild ID alone. Furthermore, many of these studies did not meet all quality indicators and standards.

Therefore, the limited number of high-quality studies for individuals with mild ID specifically makes it difficult to generalize findings. However, we hope that this synthesis encourages future research in this area. A second limitation is that we only considered studies for inclusion in our synthesis if participants were identified with mild ID or participants with ID were identified with IQs of at least 50. Therefore, although adaptive skills are now the basis of defining ID, we did not consider them when identifying studies with participants with mild ID. Additionally, it is possible that studies that included participants with mild ID were not included in our corpus because they did not explicitly state that participating individuals met our established criteria. For example, studies may include participants with IQs in the mild ID range but who have another disability as their primary disability (e.g., autism spectrum disorder). Thus, we may have missed additional research that provides evidence for effective interventions on the reading comprehension of individuals with mild ID.

Future Directions

The findings of the present synthesis reveal that explicit strategy instruction and peer-mediated instruction are effective methods for improving the reading comprehension skills of persons with mild ID. However, our understanding is primarily informed by middle school and postsecondary interventions as well as interventions that do not solely focus on individuals with mild ID. Our understanding is also primarily informed by studies that do not include information on fidelity of implementation or assess reading comprehension using standardized measures.

Based on the gaps in knowledge that remain, we recommend four directions for future research. First, studies should be conducted that target reading

comprehension among high school students with mild ID. Applied research in this area is necessary so that teachers can better support the reading comprehension skills of individuals before leaving high school and entering postsecondary education and employment.

Second, although there is a general lack of research using both SCD and group designs, group-design studies should be conducted that aim to improve the reading comprehension performance of individuals with mild ID specifically. Future group-design studies should utilize random assignment to the different conditions, which will increase the likelihood that the studies meet baseline equivalence, in the event there was high overall or differential attrition, in order to meet WWC (2017) standards. Third, group-design studies should include participants with mild ID only or disaggregate the data in such a way that allows us to attend to the specific effects for persons with mild ID. Although we recognize that performing separate analyses for persons with mild ID could result in smaller sample sizes for studies with group designs, disaggregating data by disability or ID category or only recruiting participants with mild ID in high-quality studies would allow us to have a better understanding of the differential effects of reading comprehension interventions among individuals with mild ID. The results of these studies would inform us about the extent to which reading comprehension intervention effects from high-quality studies successfully replicate for individuals with mild ID, which is necessary information for practitioners and researchers alike.

Fourth, in future studies, researchers should also evaluate and report fidelity of implementation, which will improve the quality of interventions. Doing so will

ensure that outcomes are due to the proper implementation of the intervention and will allow the intervention to be replicated and scaled up for the benefit of more students with mild ID. Finally, more studies should utilize standardized reading comprehension measures that are valid for persons with mild ID in order to determine whether the reading comprehension effects of interventions among individuals with mild ID are generalizable. Incorporating standardized assessments in future reading comprehension intervention studies for individuals with mild ID will be a significant contribution to the field.

Conclusions

There is emerging research on interventions that target the reading comprehension of individuals with mild ID. The findings of the present synthesis indicate that many of these interventions can improve the reading comprehension skills of individuals with mild ID. Specifically, interventions with explicit instruction and peer-mediated reading instruction can increase their ability to comprehend text. However, due to the limited number of studies and various study limitations, we need to conduct additional studies to investigate ways to support persons with mild ID in reading comprehension. Future studies could substantially extend the knowledge that researchers and practitioners have on potential approaches to improving the reading comprehension of persons with mild ID. The findings from these studies would increase the access that students with mild ID have to the general education curriculum and support them in making appropriate academic progress (Endrew v. Douglas County School District, 2017). Effective interventions and instructional approaches would also prepare high school students with mild ID for inclusion in

postsecondary education and employment as well as in their communities. Thus, it is critical that high-quality research continues to inform reading comprehension instruction for individuals with mild ID to promote their success in adulthood.

Chapter 3: A Mixed-Method Investigation of Main Idea Identification for Students with Mild Intellectual Disability

Literacy can be broadly defined as the ability to access information and express oneself (Ruppar et al., 2015). Adequate literacy skills are necessary because they increase opportunities for academic success, successful employment, and independent living. Thus, literacy allows individuals to participate and engage more actively in society. Conversations around literacy typically focus on reading and writing. For example, in academic settings, students are expected to read and comprehend in order to learn and acquire content knowledge (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). Additionally, employers have identified reading comprehension as the most important basic academic skill for employees with and without disabilities (Ju et al., 2012). Therefore, reading comprehension is an essential skill for all individuals to develop as they enter secondary and postsecondary environments.

Despite its importance, many secondary students with disabilities (SWDs) struggle with reading comprehension, resulting in difficulties accessing information. Only 9% of eighth-grade SWDs in the United States comprehend at or above a proficient level—compared to 34% of all eighth graders (U.S. Department of Education, 2019). Students with mild intellectual disability (ID)—that is, individuals with ID who can live independently with minimal support (American Psychiatric Association, 2013)—may have significant reading comprehension needs. For example, secondary students with mild ID typically score lower than their peers with

learning disabilities (LD) and other high-incidence disabilities on standardized measures of reading comprehension (Bouck & Satsangi, 2015). Because reading comprehension is an important component of literacy, improving the reading comprehension skills of students with mild ID is necessary at the secondary level.

Educators have a moral and legal obligation to help students with mild ID improve their reading and overall comprehension skills. In 2017, the Supreme Court ruled that schools should enable students to make functional and academic progress that is appropriately ambitious given their circumstances (Endrew F v. Douglas County School District, 2017). As such, schools should be held responsible for ensuring that all students attain an education that allows them to develop literacy. Teachers must have access to effective reading comprehension instructional practices to fulfill this responsibility and ensure that all students have opportunities to develop their literacy skills. Thus, research must explore the factors that influence the reading comprehension needs of students with mild ID.

Theoretical Framework

To understand the significant reading needs of secondary students with mild ID, it is helpful to understand multiple theories or models of reading comprehension. The Simple View of Reading posits that word recognition and linguistic comprehension contribute to reading comprehension (Gough & Tunmer, 1986). Van Wingerden et al. (2018) conducted a longitudinal study of older students with mild ID (i.e., students with mild ID in upper elementary and middle grades) to extend the Simple View of Reading. Researchers measured linguistic and nonlinguistic precursors (e.g., nonverbal reasoning) at Wave 1 and reading comprehension,

decoding, and listening comprehension (which is often used to measure linguistic comprehension) at Waves 1-3 (each wave one year apart). Van Wingerden and colleagues reported that, in addition to decoding and listening comprehension, foundational literacy skills (e.g., phonological awareness) directly affect longitudinal reading comprehension among children with mild ID. Nonverbal reasoning, which represents general cognitive ability, makes a direct contribution to reading comprehension as well. Thus, both linguistic and cognitive constraints may hinder reading comprehension among individuals with mild ID.

Although the Simple View of Reading—extended by Van Wingerden et al. (2018)—identifies the components necessary for successful reading comprehension, Kintsch's (1988) model for text comprehension, known as the Construction-Integration model, illustrates the *process* of reading comprehension. This model may provide valuable insight into the challenges readers with mild ID face. According to the model, the ability to construct a coherent mental representation of a text depends on a reader's ability to comprehend the text's macrostructure, which is the global, or overall, meaning of the text. To comprehend the macrostructure, readers must first understand the microstructure of the text. The microstructure includes the individual propositions (e.g., items of information) that compose the text and are often found in each sentence.

To understand the microstructure of a text, readers must process and store important information from the propositions in their working memory. They must also make inferences to establish connections between different propositions in the text. For example, when reading informational texts, readers typically make

inferences of logical relations within the text (van den Broek et al., 2015). Because of constraints in working memory (Van Wingerden et al., 2018), individuals with mild ID may struggle to process and store important information, limiting their comprehension of the microstructure and, ultimately, the macrostructure as well. These challenges may make it difficult for individuals with mild ID to identify main ideas and answer literal text-specific comprehension questions. Therefore, individuals with mild ID are likely to require support in the form of interventions that improve their comprehension of the microstructure of a text in order to understand the text's macrostructure (Rapp et al., 2007).

Reading Comprehension Interventions for Secondary Students with Mild Intellectual Disability

Shelton and colleagues (2019; see Chapter 2 of the current dissertation) conducted a synthesis to investigate the effects of various interventions on the reading comprehension skills of individuals with mild ID. Three of the 14 studies they analyzed successfully targeted the reading comprehension of individuals with mild ID by providing explicit instruction on main idea identification (ES = -0.01-3.70; PND = 100%). Main idea identification is important because it contributes to the ability to summarize a text, reflecting comprehension of the text's macrostructure. In Hua et al. (2014), young adults with mild ID received instruction on a paraphrasing strategy that required them to use self-questioning to identify the main idea and details present in expository paragraphs. Additionally, Miller et al. (2011) presented rule-based statements on identifying main ideas within narrative texts to upper elementary and middle school students with mild ID and LD. For example, teachers taught students to

pay close attention to the first and last sentences of a paragraph to determine the paragraph's main idea. Finally, Özmen and Bilgi (2018) modeled to upper elementary and middle school students with mild ID how to annotate information related to the main ideas of expository paragraphs. These studies reveal that explicit instruction can help improve main idea identification among individuals with mild ID.

One commonly used strategy to identify main ideas is Get the Gist (Klingner et al., 1998). Get the Gist is a key component in Collaborative Strategic Reading, a multicomponent reading intervention that has evidence of improving middle school students' reading comprehension (Vaughn et al., 2011). The Get the Gist strategy requires readers to restate the most important idea of a section in their own words. To generate a main idea statement, or to 'get the gist' of a section of text, students are taught to answer two questions: "What is the most important who or what in the section?" and "What is the most important idea about the who or what?" Students use their responses to these questions to formulate a brief paraphrased sentence that identifies the main idea.

Get the Gist requires students to synthesize propositions by making inferences to build causal or logical relations among the propositions in order to identify main ideas (i.e., the text's macrostructure). However, secondary students with mild ID may face difficulty using this strategy due to working memory constraints and cognitive overload. Therefore, students with mild ID may benefit from explicit instruction on how to process important information from a section of text one sentence at a time (given that each sentence contains at least one proposition) in order to identify the main idea of the section. This type of strategy instruction might help secondary

students with mild ID compensate for difficulties in working memory and support reading comprehension at the macrostructure level. Although some studies in Shelton et al.'s (2019) corpus measured sentence comprehension, none of the studies provided students with sentence-level comprehension instruction.

Purpose of the Study

The purpose of the current study was to iteratively develop and pilot an intervention to improve main idea identification among middle school students with mild ID. Main idea identification is an essential skill because it indicates that the reader has a coherent mental representation of the text (i.e., the reader can comprehend the text). The goal of improving main idea identification also aligns with English language arts (ELA) and other content-area standards for middle school students. For example, middle school Common Core State Standards refers to determining central ideas of text across ELA, science and technical subjects, and history/social studies. Achieving these standards could increase access to the general education curriculum and grade-level content among middle school students with mild ID.

I provided explicit sentence-level comprehension instruction to one middle school student with mild ID to improve his main idea identification skills. I conducted a mixed-method study to evaluate the effects of the intervention and to consider the intervention results in the context of a classroom for middle school students with ID. Specifically, I employed mixed-method research methodology by using a formative experiment approach to evaluate the intervention quantitatively (explained in Parts 1 and 2 of the current study) and by conducting a teacher interview to understand

qualitatively the ways the intervention aligned (or did not align) with the needs of middle school students with mild ID (explained in Part 3 of the current study).

The formative experiment approach allowed me to identify factors that enhanced or inhibited the effectiveness of the intervention and adapt the intervention in response to those factors (Reinking & Watkins, 2000). Thus, I considered the current study in the context of the formative experiment methodological framework (Reinking & Watkins, 2000). I address each question of the framework throughout the current chapter. These questions include:

1. What is the pedagogical goal of the formative experiment, and what pedagogical theory supports this goal?
2. What instructional intervention has the potential to accomplish the pedagogical goal?
3. During implementation, what factors enhance or inhibit the effectiveness of the intervention in accomplishing the pedagogical goal?
4. How can the intervention be modified to increase its effectiveness in accomplishing the pedagogical goal?
5. In what ways has the intervention changed the instructional environment?
6. What are the unanticipated positive or negative effects of the intervention?

Part 1 Method

Intervention Development

An instructional intervention that may improve main idea identification among middle school students with mild ID is sentence-level Get the Gist instruction. In Wexler et al.'s (2019) pilot study of the CALI (Content Area Literacy Instruction)

instructional framework, general education and special education co-teachers taught sentence-level Get the Gist to students who struggled to identify main ideas using the original Get the Gist routine. Sentence-level Get the Gist requires students to extract microstructural information, including pronoun referents, from individual sentences to identify the main idea of a section of text—the macrostructure. Specifically, students received explicit instruction on how to identify the main idea of a section of text using sentence-level information. Teachers provided students a sentence-level gist log to record who or what each sentence was mostly about as well as two important words in each sentence. Students then synthesized the information in the log to identify who or what the paragraph was mostly about and the most important information about who or what was identified. Finally, students generated a main idea statement in 8-13 words. The pedagogical goal was for students to generate an accurate main idea statement for the section.

Wexler et al.'s (2019) study revealed that students who received instruction on the Get the Gist strategies, including SWDs, were able to identify the most important information in passages better than students who did not receive this instruction (ES = 0.277). These findings suggest that explicit instruction on the Get the Gist strategy (with and without sentence-level instruction) may help students identify main ideas. However, it is important to note that the effects of the sentence-level Get the Gist instruction—separate from the original Get the Gist instruction—are unknown. Additionally, although sentence-level Get the Gist was intended for students with intensive reading needs in the general education setting, none of the students had mild ID. Nevertheless, the intervention had the potential for effectiveness because it

incorporated explicit main idea strategy instruction that was intensified to focus on sentence-level information.

Sentence-level Get the Gist instruction was the basis of the current study. To prepare the intervention for the current study, I consulted with the Project CALI research team, including the principal investigator of the project and research team members who provided participating teachers with professional development on how to teach sentence-level Get the Gist to students with intensive reading needs.

Instructional materials. Expository passages from ReadWorks were used during each instructional and assessment session of the experiment. Each passage was approximately 100 words and two paragraphs in length. Each passage was adapted to be within the Lexile range that aligned with eligible students' average instructional level—as measured by students' easyCBM passage reading fluency curriculum-based measure (CBM; Alonzo & Tindal, 2010)—to ensure that eligible students' fluency skills did not hinder their ability to comprehend the passages. This Lexile range was determined using the Lexile Analyzer (MetaMetrics, 2019). See Appendix B-1 for a sample passage.

The study also included a cue card and self-monitoring checklist to be used during the intervention. The cue card listed the steps of sentence-level Get the Gist, and the checklist included a set of questions to answer in order to ensure that a main idea statement is complete. The participating student only had access to the cue card and the self-monitoring checklist during instruction. See Appendix B-2 for the cue card and self-monitoring checklist.

A critical distinction between sentence-level Get the Gist in the CALI instructional framework and the strategy used in Part 1 of the current study is that the strategy in Part 1 of the current study did not initially incorporate the sentence-level gist log. Instead, the initial strategy involved annotating sentence-level information in the text. In this version of sentence-level Get the Gist, readers are expected to circle who or what each sentence is about and underline two important words in the sentence. In theory, readers would be able to apply this strategy in various settings because it is not dependent on having specific instructional materials.

Setting and Participants

Research site. The current study was conducted at Robertson Middle School (a pseudonym, subsequently referred to as Robertson). Robertson is in an urban school district in the Mid-Atlantic United States that serves more than 48,000 students. Robertson enrolls approximately 400 students. Fifty-one percent of the school's population is Black or African American, 20% is White, and 18% is Hispanic or Latinx. Forty-one percent of students are considered economically disadvantaged (e.g., receive free or reduced-price lunch), and 14% of students receive special education services.

Robertson was recruited because it has an Independence and Learning Support program that serves students with cognitive or intellectual disability. The purpose of the program is to prepare students for future employment and independent living by providing literacy and life skills instruction. In May 2019, I met with the principal and received approval to conduct the study at Robertson as long as the Independence and Learning Support special education teacher was interested.

Teacher. In June 2019, I spoke with Ms. Calvin (a pseudonym)—the only teacher in the mixed-grade-level Independence and Learning Support class at Robertson—to discuss the goal of the intervention and determine if the intervention might align with the needs of her students. During the meeting, Ms. Calvin shared that she frequently asks her students to identify main ideas, yet they face difficulty doing so. Therefore, Ms. Calvin expressed interest in the intervention during the following school year. In August 2019 (i.e., the start of the new school year), I confirmed that Ms. Calvin was still interested in the study. In October, Ms. Calvin communicated with students' families (to ensure parents were aware of the study and the consent process).

The 2019-2020 school year was Ms. Calvin's eleventh year teaching at Robertson. Before joining Robertson, she was a long-term substitute teacher for one year and a teaching assistant the year before that. Ms. Calvin has her teacher certification in K-12 non-categorical special education. She also has a Master's in curriculum development with a concentration in reading.

Students. Ms. Calvin had eight students in her Independence and Learning Support class.

All students had mild ID, had at least one reading comprehension goal on their Individualized Education Programs (IEPs), and used speech to communicate. All students received reading and all content-area instruction (e.g., ELA), in addition to reading and life skills instruction, in the Independence and Learning Support program in the special education setting, and took Physical Education and Art (on alternating days) in the general education setting.

Because the study was exploratory in nature and formative experiments do not require comparisons between participants, the study included only one student (Reinking & Watkins, 2000). In October 2019, I administered several assessments to identify a student to participate in the study. To be eligible, students were required to meet the following criteria: (a) earned a grade-based scaled score greater than 55 on the Test of Word Reading Efficiency—Second Edition (TOWRE-2; Torgesen et al., 2012) Sight Word Efficiency subtest, (b) earned at least 90% accuracy and above the 50th percentile on a second- or third-grade level easyCBM passage reading fluency CBM, (c) scored below the 25th percentile on the Gates-MacGinitie Reading Comprehension subtest (MacGinitie et al., 2006), and (d) scored a 0 or 1 on at least one initial main idea statement on the main idea measure. See the Data Collection section below.

I used a multiple-gate screening procedure whereby students were required to meet one criterion (e.g., Criterion A) before I determined if they met the subsequent criterion (e.g., criterion B). Meeting the first two criteria indicated that students could read instructional and assessment passages with high rates of fluency, and meeting the remaining criteria indicated that students had significant reading comprehension difficulties. Three students were eligible to participate, and Gerald (a pseudonym) was randomly selected to be the participating student.

Gerald is a 13-year-old African American male seventh-grade student in Ms. Calvin's Independence and Learning Support class. His IEP states that he has multiple disabilities—specifically intellectual disability and other health impairment (due to congenital anomalies present at birth). Gerald receives speech, occupational

therapy, behavioral support, hearing support, and adaptive physical education services. He also has a dedicated instructional aide who supports him through the school day. Per his IEP, Gerald participates in alternate assessments in ELA. Based on an example provided on the district website, ELA alternate assessments may require students to answer multiple-choice questions to assess their reading comprehension. On Gerald's 2017 psychological evaluation, he received a full-scale IQ score of 57, as measured by the Wechsler Intelligence Scale for Children, Fifth Edition (Wechsler, 2014). During screening, Gerald received a scaled score of 67 on the TOWRE-2 (grade equivalency: 2.2), scored 100% accuracy and above the 50th percentile on the easyCBM second-grade passage reading fluency CBM, received a grade equivalency of 3.7 on the Gates-MacGinitie Reading Comprehension subtest, and received scores of 0 for both of his initial main idea statements.

Interventionist. In the current formative experiment, I served as both the researcher and the interventionist. As the researcher, I developed the intervention procedures, analyzed student data, and made adjustments to the intervention based on student data. As the interventionist, I implemented the intervention with Gerald and administered assessments after each intervention session.

Before pursuing my PhD in special education, I was a high school special education teacher, certified in special education, ELA, and science. I taught in both the general education setting (as a special education co-teacher) and special education setting (in self-contained classes and via pull-out services). Approximately 50% of the students in my self-contained classes had mild ID. Other students' disability categories included specific learning disability, autism, and emotional disability.

Data Collection

TOWRE-2. The TOWRE-2 was the first assessment students completed during screening procedures. The TOWRE-2 measures students' ability to read words using two subtests: Sight Word Efficiency (i.e., the ability to recognize common words) and Phonemic Decoding Efficiency (i.e., the ability to sound out nonsense words). Students were only administered the Sight Word Efficiency subtest. The average alternate form reliability coefficients for both subtests exceed 0.90.

easyCBM passage reading fluency CBM. I administered the easyCBM passage reading fluency CBM to students who met the TOWRE-2 criterion to determine who was eligible for participation in the study and to adapt texts for eligible students. For eighth-grade students, alternate form reliability is 0.87-0.95, and test-retest reliability is 0.91 (Alonzo & Tindal, 2009).

Gates-MacGinitie Reading Comprehension subtest. Students who met the easyCBM criterion completed the Gates-MacGinitie Reading Comprehension subtest during screening. The Gates-MacGinitie Reading Comprehension subtest is a group-administered, standardized reading comprehension assessment that measures reading comprehension by requiring students to answer multiple-choice questions based on expository and narrative passages. Internal consistency reliability exceeds 0.90, and alternate form reliability ranges from 0.80 to 0.87.

Main idea measure. The main idea measure was administered to screen three potential participants before the study began as well as to evaluate Gerald's ability to identify main ideas during the study. The assessment required students to write two main idea statements (one statement per paragraph of the assessment passage). At the

beginning of the session, I provided students a randomly selected passage and directed them to "write the main idea of each paragraph on the lines next to the paragraph." Students were given 15 minutes to write their main idea statements without any assistance (e.g., instructional support). However, none of the students needed the entire 15 minutes.

Each main idea statement was scored based on the following five criteria:

1. The main idea statement is paraphrased.
2. The main idea statement identifies who or what the paragraph was about.
3. The main idea statement only identifies the most important information about who or what was identified.
4. The main idea statement is between 8 and 13 words.
5. The main idea statement is provided in one complete sentence.

Students were required to meet Criterion 1 to be eligible to receive points for the remaining criteria. Therefore, students could not earn any points for a copied main idea statement. A main idea statement was considered copied if it included three or more words written in the same order as in the text. All three eligible students copied phrases or entire sentences as their main idea statements for both paragraphs during screening, resulting in scores of zero. Each criterion was worth one point, making each main idea statement worth five points. Because the assessment required students to write two main idea statements, students could receive between zero and ten points on the main idea statements for a single assessment.

Comprehension questions. In addition to generating main idea statements during Gerald's baseline and treatment phases, I asked Gerald five text-specific

comprehension questions, which he answered orally. The comprehension questions did not align with the pedagogical goal of the intervention. However, including the questions in the assessments provided me the opportunity to determine if sentence-level Get the Gist instruction had an indirect effect on Gerald's ability to answer literal text-based comprehension questions. Four comprehension questions on each assessment were literal recall questions (e.g., wh- questions) that could be answered using evidence from the passage. The remaining question on each assessment required Gerald to identify a pronoun referent present in the passage (see Appendix B-1). Each question was worth one point. Thus, the comprehension questions on each assessment were worth five points total.

Procedures

I used an A-B single-case design to establish Gerald's baseline main idea identification skills (i.e., A condition) before implementing the intervention (i.e., B condition). Gerald entered the treatment phase after completing five baseline sessions. In an initial training session, I introduced the intervention to Gerald. This session was approximately 45 minutes so that I could provide the rationale for the intervention as well as introduce and model sentence-level Get the Gist. I explained (a) why reading comprehension is important, (b) what a main idea is, and (c) why main idea identification is important for reading comprehension. Once the rationale was established, I presented the cue card and introduced the steps of sentence-level Get the Gist.

Next, I introduced the instructional passage that we would use during the session. I then read the first paragraph of the passage and modeled sentence-level Get

the Gist. After implementing the strategy, I conducted a think-aloud to assess the accuracy of my main idea statement using the self-monitoring checklist. Gerald followed along using his copy of the instructional passage, cue card, and self-monitoring checklist. Gerald did not complete a treatment probe at the end of this session because he had not yet practiced generating a main idea statement (and instead had only received explicit instruction with modeling).

At the beginning of the second intervention session, I reviewed (a) what reading comprehension is, (b) why it is important, (c) what a main idea is, and (d) the steps of sentence-level Get the Gist. I then guided Gerald in using the strategy with the second paragraph of the instructional passage from the initial training session. As Gerald read the paragraph, I used an error correction procedure to provide him with corrective feedback on any decoding errors. Error correction served as a safeguard against the potential effects of any decoding challenges on Gerald's reading comprehension during instruction. After Gerald read each sentence, I prompted him to annotate important information (i.e., who or what a sentence was about and two important words in the sentence). After Gerald read the entire paragraph, I prompted him to use his annotations to write a main idea statement and revise the statement using the self-monitoring checklist as well as my feedback. At the end of this session, Gerald completed his first treatment probe. The first paragraph of this assessment passage was later used in the next intervention session, which allowed me to conduct a think-aloud and provide Gerald with corrective feedback. The next intervention session followed procedures similar to those used in the second intervention session.

Data Analysis

I analyzed Gerald's main idea statements qualitatively to identify any patterns in his responses. Additionally, I evaluated his graphed data for consistency of level, trend, and variability. I also used visual analysis to determine whether or not functional relations between the intervention and Gerald's ability to identify main ideas as well as between the intervention and his ability to answer comprehension questions correctly exist. In addition to evaluating Gerald's graphed data for consistency of level, trend, and variability, I analyzed the data for immediacy of the effect and overlap between phases.

Part 1 Results

Main Idea Statements

As evidenced by Figure 3.1, Gerald's combined scores for the two main idea statements of a single passage were low but with some variability (range:1-3). He received an average score of 1.6 on a 10-point scale, indicating that the average main idea statement score across the 10 paragraphs was 0.8 (range: 0-2). Gerald copied verbatim from the text for three main idea statements, resulting in scores of 0. For six of the main idea statements, the only point Gerald received was for paraphrasing. The only main idea statement for which he received more than one point was, "The main idea is about plants." Gerald received one point for paraphrasing and an additional point for correctly identifying what the paragraph was about.

Gerald entered the treatment phase after five baseline sessions. Despite receiving explicit instruction with modeling and guided practice, Gerald struggled to synthesize important information across sentences in the paragraph to generate a main idea statement during the second intervention session. On his first treatment probe,

Gerald received a passage score of 2.0 (out of 10). For each paragraph of the passage, Gerald only earned one point for paraphrasing the information in his main idea statement.

During the third intervention session, Gerald demonstrated more familiarity with sentence-level Get the Gist. For example, he was able to identify some of the steps of the strategy without referring back to the cue card. Despite instructional support, Gerald continued to struggle synthesizing information from the paragraph to produce a main idea statement. Together, we wrote a new main idea statement that met the main idea statement criteria, which Gerald was unable to do independently.

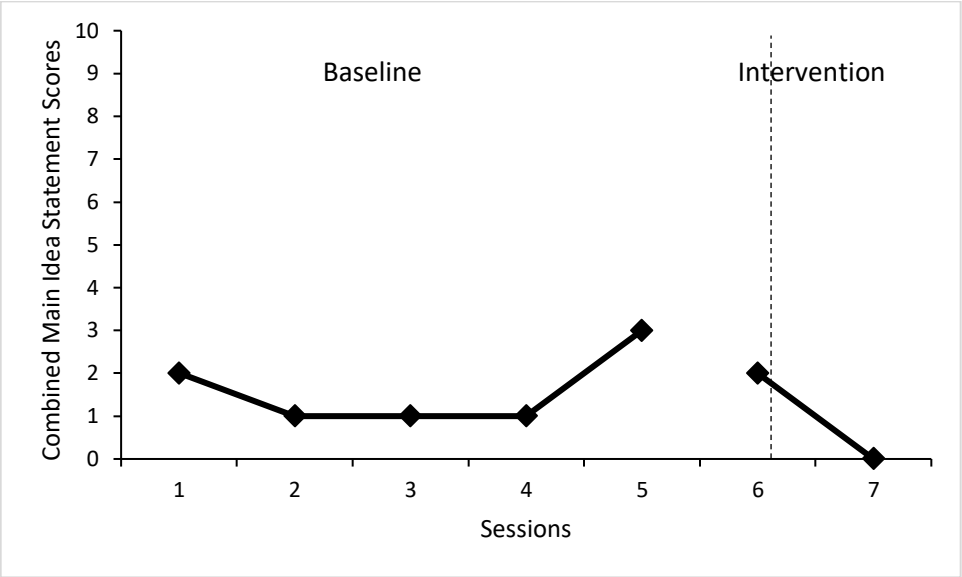
During the assessment following this intervention session, I observed Gerald counting the number of words he wrote and adding a capital letter at the beginning of the sentence and a period at the end. One possible explanation is that Gerald was recalling and attempting to adhere to items included in the main idea statement self-monitoring checklist. However, scoring the assessment probe revealed that Gerald copied verbatim the first sentence of both paragraphs as his two main idea statements, resulting in a passage score of 0. This assessment revealed that Gerald was able to pay close attention to writing mechanics but did not synthesize information from each paragraph to explain the main idea in his own words, thus inhibiting the effectiveness of the intervention.

Between Gerald's first two assessments during the treatment phase, Gerald's average passage score was 1.0 (average main idea statement score: 0.5), and there was 100% overlap between the assessments in the baseline phase and those in the

treatment phase (see Figure 3.1). Therefore, Gerald's ability to generate main idea statements did not improve, which was the pedagogical goal of the experiment.

Figure 3.1

Gerald's Main Idea Statement Accuracy – Part 1



Comprehension Questions

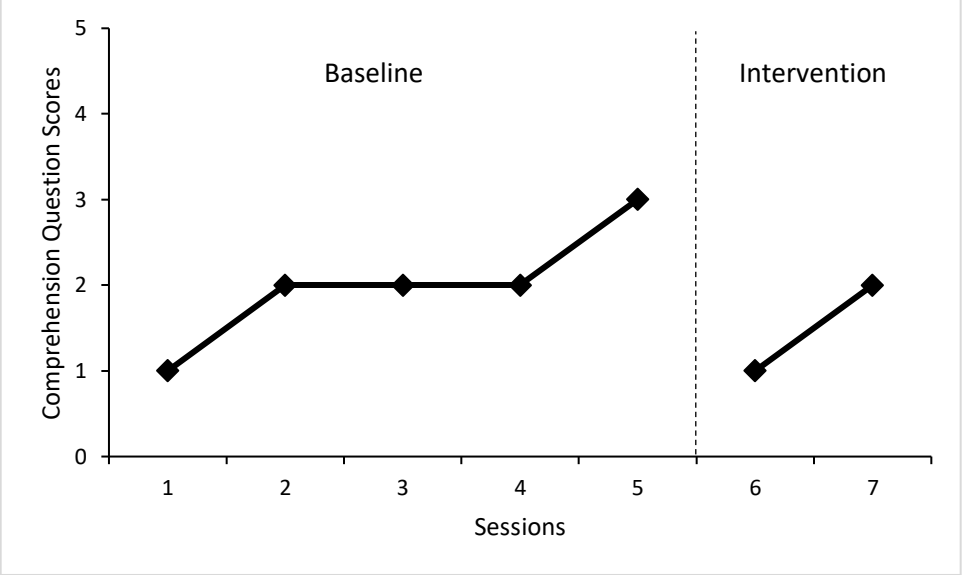
Gerald's baseline comprehension question scores during the baseline phase were low and stable (see Figure 3.2). His scores ranged from 1.0 to 3.0 (out of 5) with an average score of 2.0. He did not correctly identify the pronoun referent for any of the baseline probes.

During the first two treatment phase assessments, Gerald received scores of 1.0 and 2.0 (out of 5) on the comprehension questions, respectively, indicating 100% overlap between the baseline and treatment phases (see Figure 3.2). Additionally, Gerald did not identify either pronoun referent accurately. Based on Gerald's lack of response to the intervention, as well as the difficulty he faced during intervention sessions despite instructional support, I hypothesized that the intervention was not

intense enough to meet Gerald's significant reading needs. Therefore, during Part 2 of this study, I modified the intervention to increase the likelihood that the pedagogical goal of the intervention would be met.

Figure 3.2

Gerald's Comprehension Question Accuracy – Part 1



Part 2 Method

Intervention Modification

To modify the intervention, I first consulted with the principal investigator of Project CALI as well as an expert in single-case design. Based on our discussions, I decided to modify the intervention in several ways. First, although I initially decided to exclude any graphic organizers from the intervention, in order to intensify the intervention and provide more scaffolds, I created a sentence-level gist log during the modification process. This log would allow Gerald to record sentence-level information from a paragraph. In the log, Gerald could list who or what each sentence is about and two important words from each sentence (see Appendix B-3).

Second, I revised the assessment and instructional passages to align with the sentence-level gist log. The assessment passages were each one paragraph with five sentences. They were reduced to one paragraph to provide Gerald with more time to use the sentence-level gist log during assessments. Instructional passages were now two paragraphs, and each paragraph had five sentences. After the first intensified intervention session, instructional passages consisted of the paragraph from the previous assessment and one additional, related paragraph.

Third, I revised the assessment and intervention procedures so that Gerald was no longer required to generate a main idea statement, which required sufficient writing skills. This change made it so that he would not have to pay attention to writing conventions, thus releasing some of his cognitive effort. Due to this revision, Gerald would be able to focus solely on identifying the main idea elements (i.e., who or what the paragraph was mostly about and the most important information about who or what he identified). See the Data Collection and Procedures sections below for more information regarding assessment procedures and intervention procedures, respectively.

Fourth, I modified the cue card. The left side of the cue card included each step of the intensified version of sentence-level Get the Gist, including what information to include in the sentence-level gist log. The right side of the cue card included specific questions Gerald could ask himself to help him identify necessary information. For example, to identify who or what the sentence is about, Gerald could ask himself, “Who or what does the sentence give me the most important information about?” The cue card also includes guidance on how to identify a pronoun referent in

the passage as well as what to do if there are two potential options for who or what the paragraph is about. Appendix B-4 presents the cue card for the intensified intervention.

Fifth, I wrote new scripts to be used during the intensified intervention sessions. The scripts were meant to provide Gerald with rule-based explicit instruction (Miller et al., 2011). Specifically, the script for the first session (i.e., the model script) included the steps to follow to use the strategy, planned think-alouds, and pronoun instruction. During the remaining sessions, I used the guided practice script, which prompted Gerald to identify each step of the procedures and apply each step to the selected passage. The script also incorporated standard ways for me to provide error correction regarding Gerald's use of sentence-level Get the Gist. See Figure 3.3 for examples of the error correction I provided Gerald.

Figure 3.3

Part 2 Intervention Error Correction Procedures

Error	Corrective Feedback
Gerald identifies the wrong who or what in a sentence.	"Does the sentence give us more information about __ or more about something else? The sentence gives us more information about __. That means that __ is who/what the sentence is about."
Gerald does not identify two important words in a sentence.	"Does ___ tell us something we need to know about ___? No, it doesn't. That means ___ is not an important word. Let's read the sentence again to find a word that tells us something we need to know about ___. Is there a word in this sentence that tells us something we need to know about ___? That means that ___ is an important word."

Gerald identifies the wrong who or what in a paragraph.	What did you write down more than ___? That means ___ is who or what the whole paragraph is mostly about.
Gerald does not identify the most important information about the who or what in a paragraph.	Does the paragraph tell you ___ about ___? No, it does not. The paragraph tells you ___. That is the most important information about ___ in the paragraph. OR Does the paragraph tell you something more important than ___ about ___? Yes, the paragraph tells you ___. That is the most important information about ___ in the paragraph.

Experimental Design

I employed a second A-B single-case design for Part 2 of the current study. During Part 2, Gerald completed three baseline sessions using a revised assessment (see the Data Collection section below) before entering the modified treatment phase.

Data Collection

As explained in the Intervention Modification section, Gerald was no longer expected to write main idea statements during assessments. Instead, I assessed his ability to use the sentence-level gist log and identify main idea elements. During the assessment, Gerald had 15 minutes to complete the sentence-level gist log for one paragraph. Gerald was asked to complete the following procedures for each sentence in the paragraph: “Write down who or what the sentence is about in the second column. Then, write down two important words about the who or what in the third column and the fourth column.” Gerald received one point for each who or what he identified correctly and a half-point for each important word he identified correctly.

Therefore, Gerald could earn up to 2 points for each of the five sentences and 10 points for the entire sentence-level gist log.

After Gerald completed the sentence-level gist log, I collected the passage and asked Gerald two initial comprehension questions. I collected the passage to ensure that Gerald could only use his sentence-level gist logs to answer the questions and would not read directly from the passage to answer them. These questions were related to the essential elements of the main idea of the paragraph. Question 1 asked him who or what the paragraph was about, and question 2 asked him for the most important information about who or what he identified. I inserted Gerald's answer to question 1 into question 2. For example, if his answer to question 1 was "Rosa Parks," for question 2, I asked him, "What was the most important information about Rosa Parks?" Upon answering questions 1 and 2, I returned the passage to Gerald and asked him three additional questions. Questions 3 and 4 were text-specific questions, and question 5 asked him to identify a pronoun referent from the passage. Gerald could use both his sentence-level gist log and the passage to answer these questions. Gerald answered all of the comprehension questions orally.

Procedures

During each intensified intervention session, I explained or reviewed how to use sentence-level Get the Gist with the sentence-level gist log. Afterward, I modeled the strategy and the use of the sentence-level gist log with the first paragraph of an instructional passage. Specifically, I modeled how to complete the log, identify pronoun referents, distinguish between important and unimportant words, and synthesize information across the paragraph to identify who or what the paragraph

was about and the most important information about who or what was identified. I then facilitated guided practice as Gerald used the strategy with the second paragraph of the passage. During guided practice, I facilitated text-based discussions to support Gerald's ability to synthesize information from multiple sentences. Intensified intervention sessions occurred for approximately 30 minutes, followed by an assessment adhering to the new data collection procedures.

Data Analysis

Visual analysis remained the primary method for determining whether or not a functional relation between the intervention and student outcomes existed, signaling that the pedagogical goal was met. The two outcomes were Gerald's ability to complete the sentence-level gist log and answer comprehension questions correctly. Once again, I evaluated Gerald's consistency of level, trend, and variability. I also analyzed the immediacy of the effect as well as overlap between his baseline and treatment phases. I also analyzed Gerald's sentence-level gist logs qualitatively to identify any patterns in his approach to completing the logs. Qualitative analysis of Gerald's sentence-level gist logs also allowed me to identify any qualitative changes in how he completed the logs from his baseline phase to his treatment phase.

Part 2 Results

Sentence-Level Gist Logs

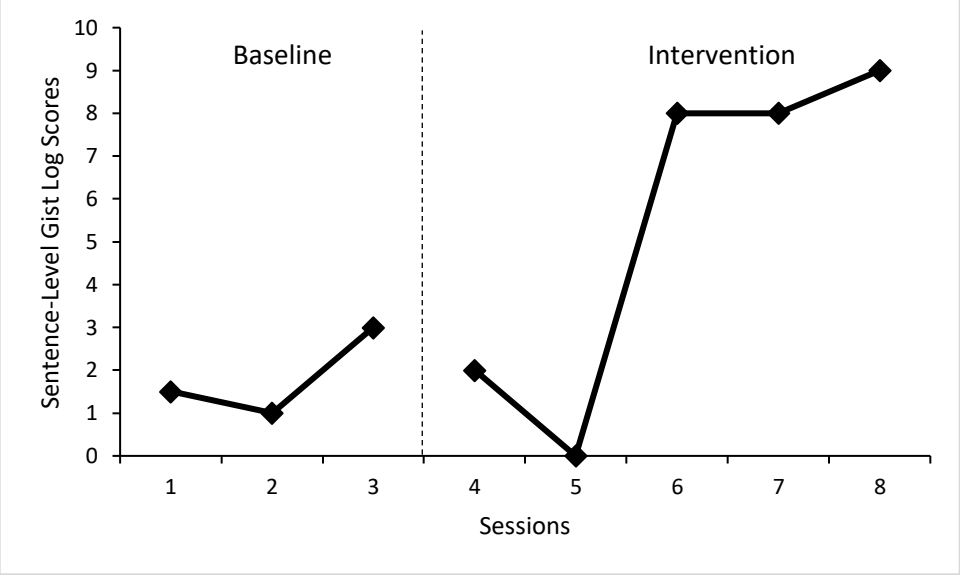
During Gerald's revised baseline phase, he received an average score of 1.83 (out of 10) on completing the sentence-level gist log (range: 1.0-3.0). Analysis of the logs revealed that Gerald placed words in incorrect locations. For example, he wrote a word in the wrong row (i.e., for the wrong sentence) and incorrectly wrote important

words in the column for who or what the sentence was about. These findings suggest that Gerald had difficulty completing graphic organizers independently. See Figure 3.4 for his sentence-level gist log scores during Part 2 of the study.

During the modified treatment phase, Gerald received an average score of 5.4 (out of 10) on his sentence-level gist logs (range: 0.0-9.0; PND = 60%). On the first two logs, Gerald received scores of 2 and 0. His remaining scores were a minimum of 8. Overall, these scores indicate that Gerald's ability to identify important sentence-level information improved, although the change was not immediate (see Figure 3.4). It is also worth mentioning that the subject of the final sentence in the fourth paragraph (i.e., assessment 4) included a pronoun ('they'). Instead of writing the pronoun in his sentence-level gist log, Gerald attempted to record the pronoun referent ('people'), although it was incorrect.

Figure 3.4

Gerald's Sentence-Level Gist Log Accuracy – Part 2



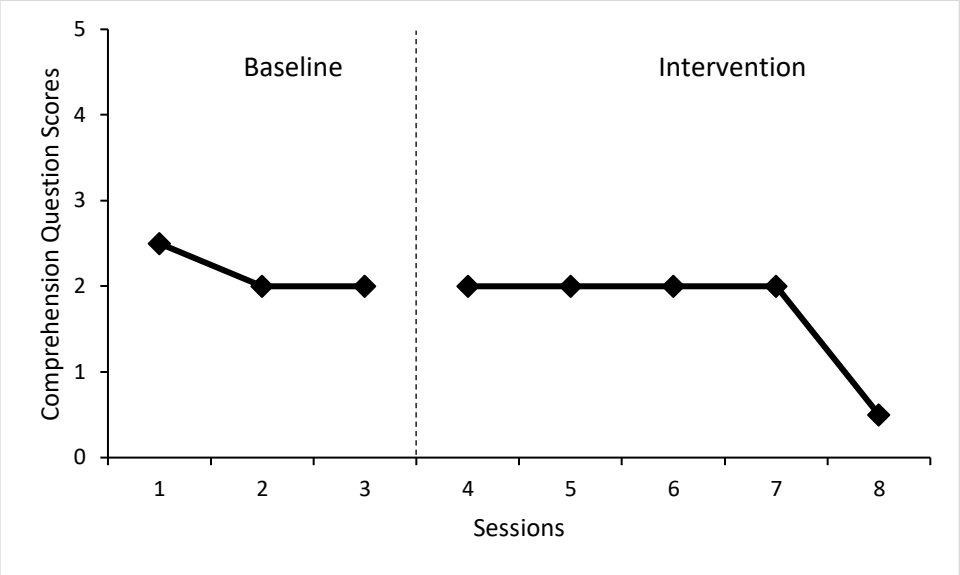
Comprehension Questions

Gerald also received an average score of 2.17 (out of 5) on comprehension questions (range: 2-2.5). He received full credit for his identification of who or what the paragraph was about and his identification of the most important information about who or what the paragraph was about on only one baseline probe. Thus, although the focus on writing was removed in the revised assessment procedures, Gerald continued to struggle with main idea identification. Additionally, Gerald was only able to identify the pronoun referent for one baseline probe. See Figure 3.5 for his comprehension question scores during Part 2 of the study.

Gerald's average score on comprehension questions was 1.7 during the modified treatment phase (range: 0.5-2; PND = 0%). Thus, Gerald's improvement in his ability to identify important sentence-level information did not result in an improvement in his ability to answer comprehension questions correctly, including identifying the elements of main ideas. Additionally, across all five probes, Gerald identified who or what two paragraphs were about but did not identify the most important information in any paragraph. Additionally, he identified the pronoun referents correctly in two paragraphs.

Figure 3.5

Gerald's Comprehension Question Accuracy – Part 2



Procedural Fidelity

A fifth-year literacy education doctoral student at the University of Maryland with secondary literacy intervention experience observed one of Gerald's modified intervention sessions to assess fidelity of intervention implementation and assessment administration. Using a fidelity checklist (see Appendix B-5), the rater indicated whether or not I completed each step of intervention delivery and assessment administration. Procedural fidelity was 100%, revealing that all steps were completed as designed.

Interobserver Agreement

The fidelity rater also served as an assessment scorer. We each scored all assessment probes during the study. Interobserver agreement (IOA) was then calculated by comparing scores, dividing the number of agreements by the total number of agreements and disagreements, and multiplying by 100. IOA was 88.75%, which was higher than the goal of 80% (Hartmann et al., 2004). After IOA was

calculated and confirmed to be higher than 80%, all disagreements were discussed and resolved.

Social Validity

Social validity is related to the value of an intervention's goals, procedures, and effects (Thurlow et al., 1989). According to Horner et al. (2005), single-case design studies are considered socially valid when: (a) "the dependent variable is socially important" (p. 174), (b) "the magnitude of change in the dependent variable is socially important" (p. 174), and (c) intervention implementation "is practical and cost effective" (p. 174). Social validity is important for the adoption and sustainability of intervention practices (Lindo & Elleman, 2010). Therefore, upon completion of Gerald's modified treatment phase, Gerald completed a social validity survey. Using a five-point Likert scale, Gerald indicated the extent to which he agreed with seven social validity statements, which I read aloud to him as he followed along on the survey. For example, one survey item read: "It is easy to use the Sentence Log when I read." Gerald's average rating was 4.43, indicating that he agreed or strongly agreed with most statements, despite the fact that the pedagogical goal of the intervention was not met. See Appendix B-6 for the social validity survey items and Gerald's rating for each item.

Part 3 Method

Upon completing Part 2, I met with Ms. Calvin to share the intervention results with her and answer any questions she had. Ms. Calvin also agreed to be interviewed (and audio-recorded) during this meeting about the instructional practices she typically uses to support her students' reading skills as well as the successes and

challenges she experiences providing this instruction. The decision was made to interview Ms. Calvin after the formative experiment (and not beforehand) in order to interpret and contextualize the findings of the intervention and inform future research building on the current intervention.

Procedures

I interviewed Ms. Calvin via telephone seven weeks after the conclusion of the intervention for approximately 45 minutes. The interview was semi-structured, allowing me to ask unplanned questions to clarify information and investigate new insights further. See Appendix B-7 for the protocol used to guide the interview.

Data Analysis

I analyzed the interview data using a three-step process (Boardman et al., 2005; Miles & Huberman, 1994). First, I audio-recorded the interview and transcribed it within one week. Second, I conducted multiple iterations of coding the transcript on NVivo, a qualitative data analysis software. Third, I discussed any disagreements in coding with two external researchers to establish the trustworthiness of the analysis.

Coding. I took multiple steps to complete coding of the interview data. First, I read and annotated the transcript by taking notes on my general impressions about the teacher's claims. Next, I reread the transcript and coded it using an initial list of codes based on the interview protocol. For example, because one of the interview questions was about the literacy goals Ms. Calvin had for her students, one of the codes was *literacy goals*. The majority of these codes had two lower-level codes: one sub-code for students who were eligible to participate in the study, including Gerald (i.e., qualifying students), and a second sub-code for students who were not eligible to

participate due to low scores during screening (i.e., non-qualifying students). After this initial coding, I created additional codes to capture any relevant ideas that were not captured using the original codes (e.g., support needed). Next, I created a matrix in which I summarized the main point related to each code and then provided quotes from the interview to support those points. When applicable, I wrote one point for each upper-level code, a second point for each sub-code related to qualifying students, and a final point for the sub-code relating to non-qualifying students. Finally, I analyzed the codes to identify themes present throughout the interview (see Part 3 Results below).

Trustworthiness. To ensure the trustworthiness of the analysis, I used strategies outlined by Brantlinger et al. (2005). First, an external researcher reviewed the interview matrix and findings. We then discussed one disagreement about the themes to come to a consensus. After making necessary revisions to the findings, a second researcher reviewed the findings. Upon completing a second round of revisions, I employed second-level member-checking by sharing a write-up of the interview findings with Ms. Calvin so that she could confirm their accuracy. Ms. Calvin agreed with the findings.

Part 3 Results

Several areas of importance emerged during coding of the interview transcript. These areas are: (a) the literacy needs of Ms. Calvin's students, (b) the literacy instruction Ms. Calvin provides to target students' literacy needs, and (c) the instructional support Ms. Calvin has received and continues to need. These findings support and contextualize the results of the formative experiment.

Literacy Needs

Ms. Calvin identified different literacy needs depending on the students she was discussing—whether she was talking about qualifying students or non-qualifying students. The differences between students were most evident as she described students' reading goals on their IEPs. For example, when discussing qualifying students, Ms. Calvin said, "Usually for the three [qualifying students], it's like main idea, the goal for breaking down multi-syllable words, and then…a comprehension goal like wh- questions or…I think two of the three had a goal about when you have a text-dependent question, like being able to go back in the text and say where you found the answer or to go back and not have the prompting." Thus, most reading goals for qualifying students were related to comprehension. On the other hand, non-qualifying students primarily had goals related to word reading. Ms. Calvin said they "also have a wh- questions goal. They have a lot more decoding goals. We use that Edmark Reading Program, so there's usually a goal around mastering those words, which are usually sight words. And then depending on the student, blends and digraphs might be a goal or CVC [consonant-vowel-consonant] word patterns."

Main idea identification. Given that main idea identification was both an IEP goal for qualifying students and the pedagogical goal of the formative experiment, we discussed students' needs related to main idea identification at length. Ms. Calvin explained that identifying main ideas is an important instructional goal for her qualifying students—who read above a second-grade level—because it helps "them understand what they're reading more." She elaborated by saying that main idea identification is "such a big component [for] the regular education students." When

discussing qualifying students, in particular, Ms. Calvin explained, “Usually their main ideas are very simple. So, if we did the reading about police dogs…and then if I asked them about it, they would just say ‘dogs.’ It’s hard for them to get more of a specific main idea. Or reading about a volcano in Hawaii, they would just say the reading was either about Hawaii or just volcanoes.”

Literacy Instruction

Ms. Calvin uses various instructional approaches throughout the school day to target students’ literacy needs and help them achieve their IEP goals in reading. She has a 50-minute reading period during which she facilitates guided reading to target students’ word reading and reading comprehension. Ms. Calvin also has 50-minute ELA, science, and social studies periods in which she presents grade-level texts to provide students with content-area literacy instruction.

Guided reading. During the reading period, Ms. Calvin facilitates guided reading using Reading A-Z and other resources. Specifically, students rotate stations in pairs or small groups (i.e., 2-3 students) and receive individualized reading instruction or independent reading practice. Ms. Calvin explained, “This year, we were doing Words Their Way [a phonics instructional approach], like word sorts. Then they have a computer program they use for reading. And then they have one-on-one instruction and independent worksheet work, which sometimes is not independent, depending on what it is and where they are.” When Ms. Calvin said “where they are,” she was referring to their reading skills or levels. When discussing the qualifying students, in particular, she explained, “It’s more of that guided reading blend. Reading comprehension and then decoding. I mean it’s kind of the same setup

for the other kids, it's just different levels." Thus, Ms. Calvin uses guided reading to target all students' decoding and reading comprehension needs.

Reading comprehension instruction. During guided reading, qualifying students typically spend much of their time reading and answering comprehension questions. Ms. Calvin shared, "It's usually more like a paragraph or two that they're reading and trying to answer questions." She further explained, "If we're doing a passage in the guided reading, it will be sometimes a worksheet that has them go back in what we read and answer questions. Sometimes we have the same ones I've asked them already, but just to go back and do it on their own." Ms. Calvin incorporates main idea identification practice into guided reading as well. Ms. Calvin did not discuss reading comprehension instruction specifically for non-qualifying students.

Reading comprehension instruction challenges. Qualifying students typically struggle to complete reading comprehension tasks accurately and independently, despite demonstrating understanding during instruction (e.g., individualized instruction with Ms. Calvin). Ms. Calvin explained, "You can see that they're getting it kind of when you're working with them and you can scaffold and prompt them. But then once it is on their own, it's a struggle."

The disconnect between students' reading comprehension performance during instruction and during independent activities may exist for several reasons. Ms. Calvin suspects that students are overly dependent on adult support. She explained, "Then there's also, I think, that [dependence] that they have, I guess, maybe from elementary school and different things where they just want the help with it." She also explained, "I always struggle with trying to get them to be more independent

with it, because they aren't. So, [the students are] still dependent on the adults to help them. And they always also want to get the right answer to try to please you. Yeah, I haven't fully, obviously, figured it out."

Another reason that students may struggle with reading comprehension tasks is that students lack the skills necessary to be able to paraphrase information from a text using their own words. Ms. Calvin posited, "I think one of the biggest issues with the kids is that they're so reliant on the text—whether it's because they have trouble forming their own sentences or using the spelling. To not get them to copy and the idea of putting something into their own words is really, really difficult."

Finally, Ms. Calvin's students may also face significant reading comprehension difficulty (despite literacy instruction) because students spend much of their cognitive resources focused on reading texts accurately, limiting the effort they have to concentrate on comprehending the texts. As Ms. Calvin expressed, "I think they spend a lot of time just focused when they're reading on figuring out the words sometimes, that there's that issue that comes up sometimes where it's like the kids are just reading to show that they can read. They're not always paying attention to what they're reading." Thus, there are several challenges associated with providing reading comprehension instruction during guided reading.

Decoding instruction. Although Ms. Calvin explained that non-qualifying students receive both word reading and reading comprehension instruction, she only elaborated on the word reading instruction they receive. Ms. Calvin explained that independent work during guided reading is "based off of their Edmark words, so it's more word focused—on what they've done with me." She also said, "The Edmark is

kind of a sight word-focused program, and then I try and build off of the words that we're studying—obviously, sound and letter knowledge, which comes back to the phonics." Thus, non-qualifying students primarily receive sight word and decoding instruction and practice opportunities during guided reading.

Furthermore, Ms. Calvin explained that guided reading gives qualifying students the opportunity to receive instruction on decoding multisyllabic words—specifically "how to break down two-syllable words, and then how to break down the three-syllable words into parts that they can recognize." Finally, qualifying students receive instruction on prefixes and suffixes "to identify and break down words…It kind of ends up being more how to say them."

Decoding instruction challenges. One of the main challenges Ms. Calvin faces when aiming to provide decoding instruction is low motivation among some non-qualifying students, which hinders their desire or willingness to read. When discussing students who are "still reading on a kindergarten level," Ms. Calvin noted, "It's really hard to get them to want to read anything just because they're so used to the failure piece of it." Later, Ms. Calvin added, "It's like they're not doing a worksheet because, 'oh,' they 'can't do it.' They just don't want to ask for help again. But that's kind of more their own attitudes. Not all of them. It's only probably two to three that are pretty aware of" their low reading levels. Thus, Ms. Calvin's students who have greater self-awareness may be discouraged to engage fully in decoding instruction.

Content-area literacy instruction. In addition to providing instruction during the reading period, Ms. Calvin provides literacy instruction in the ELA period.

During ELA, Ms. Calvin's focus is on grade-level academic tasks, a priority of the school district for SWDs. Ms. Calvin explained, "There's the push in [the school district] to also have them be doing grade-level academic reading or work." Thus, Ms. Calvin's ELA instruction involves grade-level texts. She explained, "So I have it [grade-level academic reading or work] broken into the language arts class, where we kind of focus more on higher-level text."

Because Ms. Calvin's students struggle with word reading, grade-level texts may be inaccessible for her students without additional support (e.g., accommodations). Therefore, Ms. Calvin typically reads texts aloud to provide students with necessary reading support during ELA instruction. Ms. Calvin stated, "We do end up doing a lot of reading aloud or listening because it kind of takes away that hurdle... When they read grade-level text, I obviously am reading it to them and then I have to scaffold it a lot for them to understand it." In doing so, Ms. Calvin provides students with comprehension instructional support and removes the potential barrier of word reading. Ms. Calvin's instructional focus is no longer on reading comprehension—it is on listening comprehension. This approach is beneficial because all of Ms. Calvin's students' listening comprehension skills are more advanced than their reading comprehension skills. Ms. Calvin explained, "Their listening comprehension's definitely a lot higher. That's for all of the kids in class." In fact, one non-qualifying student's listening comprehension skills are on par with the listening comprehension skills of qualifying students. Regarding this student, Ms. Calvin shared, "His reading's very low, like kindergarten level. His auditory listening skills are a lot higher. His comprehension is usually about on their [qualifying

students'] levels, depending on what you're reading." By listening to texts as they are read aloud, Ms. Calvin's students are more likely to comprehend grade-level texts.

Finally, students also receive literacy instruction during science and social studies similar to the literacy instruction they receive in ELA. Specifically, Ms. Calvin reads science and social studies texts aloud to students as well. Ms. Calvin explained, "I think comprehension's worked into social studies and science as well a lot… Mainly they're reading more with a science or social studies focus. Again, usually the text is harder so it's being read aloud and then answering different comprehension questions from it." Ms. Calvin also incorporates main idea identification practice into science and social studies instruction. Ms. Calvin removes reading barriers during science and social studies instruction so that students can acquire necessary content knowledge. Therefore, their knowledge in these content areas is also primarily dependent upon their listening comprehension skills.

Content-area literacy instruction challenges. Despite the use of the read-aloud accommodation and scaffolding during content-area literacy instruction, Ms. Calvin still faces challenges supporting students' listening comprehension of text. Although students listen to texts as they are read aloud, Ms. Calvin's students are not able to identify main ideas accurately. She explained, "Either they pick the wrong one [main idea], or they just copy it directly." Ms. Calvin later elaborated, "I feel like sometimes a strategy will work, but then a few days later it doesn't work anymore." For example, she shared, "Graphic organizers help sometimes but not always." Ms. Calvin once again admitted, "I have not, obviously, figured out the way to do it

completely." Thus, Ms. Calvin feels generally unsure about the effectiveness of her main idea instruction, which is intended to target students' text comprehension.

Literacy Instructional Support

Support received. Ms. Calvin has received various forms of literacy instructional support over the years. She has attended trainings about different reading programs or curriculums. Ms. Calvin explained, "It depends on what it is and the year or who heads it… Usually there's some type of new program that gets introduced each year or something that we get trained on. In the past, there's been a few other different reading programs I've cycled through. So yeah, there's usually training that goes with any curriculum like that."

Other times, Ms. Calvin has received training on reading in general (i.e., independent of a reading program or curriculum). For example, during the previous school year, Ms. Calvin attended a training that was led by two professors at a nearby university. She explained that the training was "about how to teach kids with intellectual disabilities reading skills—phonics." Although Ms. Calvin found the training "really helpful," she added, "but we never had them back." Thus, the training Ms. Calvin receives may not be ongoing. Ms. Calvin also referred to district-level training. She described the training by saying, "Sometimes it's kind of focused on looking at what the grade-level expectation is and how to scaffold it down to our students."

Finally, when asked if she has ever completed coursework focused on literacy, Ms. Calvin responded that she has taken general literacy classes. In fact, she has her Master's degree in curriculum development with a focus on reading. Although Ms.

Calvin acknowledged that she learned a lot about literacy in her program, she admitted that "it was more general" and "there still wasn't a major focus" on literacy for SWDs. Instead, the focus was on struggling readers in general—whether or not they have disabilities.

Support needed. Because Ms. Calvin has not yet identified instructional approaches that fully meet the literacy needs of her students, it is important to consider what support she continues to need. When asked what additional support she needs, Ms. Calvin spoke about needing a curriculum to provide her students phonics instruction. Ms. Calvin explained:

> Sometimes I feel like I need either a curriculum or like a map on how to incorporate phonics-based instruction. I know it's kind of late [since] they're in middle school. There's people that say you shouldn't do phonics that late. But sight word knowledge is not going to be enough… I know they have it at the elementary level, but we've never really had training or guidance on it. Sometimes it's like, 'Well… I know in third grade they have information about this. Why can't I just use what they have?' But that usually doesn't happen.

One challenge with finding this support is that the phonics resources need to be appropriate for middle school students. Ms. Calvin elaborated, "It kind of circles back to some of the reading issues…but also the books also are sometimes kind of babyish… It's just kind of getting difficult for some of them to be invested in reading, practicing and trying." Thus, age-appropriate phonics resources are particularly important to motivate students who are aware of their literacy needs compared to the needs of their age-level peers with less significant reading needs.

Finally, as mentioned, Ms. Calvin discussed the fact that she does not have a suitable approach for teaching students how to identify main ideas. Sometimes an approach is effective, while other times it is not. Therefore, Ms. Calvin would benefit

from an instructional approach that she can use to teach students how to identify main ideas consistently.

Discussion

Formative Experiment Insights

The pedagogical goal of the present study was to improve Gerald's main idea identification skills, a middle school student with mild ID. Identifying main ideas is one way that individuals can demonstrate comprehension of text. Thus, main idea identification is an essential literacy skill for all students, including students with mild ID. Based on the theoretical framework, I hypothesized that an intervention targeting Gerald's processing of sentence-level information would support his ability to comprehend the microstructure of the text, thus supporting his macrostructure comprehension. Therefore, I conducted an exploratory study within a formative experiment to pilot sentence-level Get the Gist instruction and determine the extent to which it meets the pedagogical goal of the study. I employed a single-case design during which I provided Gerald sentence-level Get the Gist instruction. In Part 1 of the study, the intervention involved annotating text and using the information in the text to write a sentence explaining the main idea of the paragraph. However, Gerald's assessment data revealed that his accuracy in writing main idea statements and answering text-specific comprehension questions was not improving. Therefore, a data-based decision was made to redesign and intensify the intervention by providing more scaffolds in Part 2 of the study. Specifically, I conducted a second A-B single-case design to provide rule-based explicit instruction (Archer & Hughes, 2010; Miller et al., 2011) as well as systematic feedback (e.g., error correction). I also introduced a

sentence-level gist log (to replace annotations), which was also used during assessments.

Assessment data from a second single-case design during Part 2 of the study revealed that the modified intervention led to an increase in Gerald's ability to complete sentence-level gist logs accurately. This improvement indicated that Gerald was able to process sentence-level information. However, this approach did not impact his ability to identify the essential elements of main ideas or answer comprehension questions. Therefore, despite the modifications made to the intervention, the pedagogical goal of the study was not met. These null results suggest that Gerald did not generate the inferences necessary to make connections across the sentences in the text. Yet, this is an essential component of microstructure comprehension, which is necessary for ultimately comprehending the macrostructure of a text.

Unanticipated intervention effects. Although Gerald's ability to identify the elements of main ideas independently did not improve, one unanticipated effect of the intervention is that Gerald was able to access and comprehend more of the text during intervention sessions. Gerald may have been more successful in intervention sessions than on assessments because of the instructional support he received during these sessions (which was not available on assessments). For example, I defined vocabulary for Gerald that he was unfamiliar with and facilitated text-based discussions so that Gerald and I could synthesize information across the sentences in the paragraph. In fact, studies in Shelton et al.'s (2019) synthesis placed a strong emphasis on text-based discussions *and* strategy instruction, which led to significant improvement in

text comprehension (Lundberg & Reichenberg, 2013; Van den Bos et al., 2007). In addition to Gerald's success during intervention sessions, these studies suggest that students with mild ID may benefit from teachers' use of instructional practices that facilitate comprehension of text *during* instruction.

Teacher Interview Insights

Upon conclusion of the intervention, I interviewed Ms. Calvin, Gerald's special education teacher. Conducting this interview allowed me to make sense of the intervention findings in the context of Ms. Calvin's Independence and Learning Support class. The interview revealed that all of Ms. Calvin's students have significant needs in the areas of word reading and reading comprehension. During guided reading, Ms. Calvin uses reading rotations to target these needs. However, the focus of instruction varies between qualifying and non-qualifying students. Ms. Calvin explained that qualifying students receive more instruction to strengthen their reading comprehension skills but face difficulty when applying those skills independently. Meanwhile, non-qualifying students receive more sight word and phonics instruction but may experience low motivation during instruction because they face significant difficulty reading lower-level texts intended for younger students.

Ms. Calvin also provides students with opportunities to engage with grade-level texts during content-area instruction. She makes these texts more accessible by reading them aloud, thus capitalizing on the fact that students' listening comprehension skills are stronger than their reading comprehension skills. Despite this approach during ELA instruction, students continue to struggle to identify main

ideas, which is an IEP goal for some students. Although Ms. Calvin has received some support in providing literacy instruction, training (e.g., professional development) is typically program-specific and varies from year to year. She continues to need support in delivering effective main idea instruction as well as providing students phonics instruction using age-appropriate curriculum resources.

Implications. All of the students in Ms. Calvin's class struggle with word reading—whether their focus is on reading sight words and CVC words or multisyllabic words. This is consistent with Lemons et al.'s (2013) study in which less than half of the middle school students with ID who were eligible for alternate academic assessments met a 50th percentile benchmark on a first-grade word reading fluency CBM (range: 32.6%-45.2%). This finding reveals that middle school students with ID generally have significant needs related to word reading, as Ms. Calvin reported. Lemons et al. also found, however, that larger percentages of students with ID in higher grade levels meet early-grade CBM benchmarks. For example, 26.3% of fifth-grade students, 45.2% of eighth-grade students, and 56.4% of eleventh-grade students with ID in their sample met the first-grade word reading fluency CBM benchmark. Thus, during and beyond middle school, students with ID may continue to benefit from opportunities to improve their word reading skills. Therefore, teachers need support to provide word reading instruction to students with ID, as expressed by Ms. Calvin. However, the resources teachers use should be age-appropriate to mitigate issues of low reading motivation that students might experience. This caveat is important because significant reading difficulties can lead to low motivation, which can result in less engagement and effort (something that Ms. Calvin observed), which

can ultimately lead to less reading progress and achievement for students (i.e., Matthew effect in reading; Stanovich, 1986).

In addition to targeting the word reading skills of middle school students with ID, teachers need to provide opportunities for students to engage with grade-level texts (Shurr & Taber-Doughty, 2012). By using grade-level texts during literacy-focused lessons, teachers can expose students to content knowledge that they might not otherwise acquire by providing key background information and vocabulary instruction to enhance students' comprehension of that text. Students may also be exposed to the content simply by reading and engaging with the text. Yet, grade-level texts may be inaccessible for students with ID because there is often a mismatch between students' grade level and reading performance (Lemons et al., 2013). To overcome this discrepancy and increase the accessibility of grade-level texts, teachers can read texts aloud. This approach to comprehension instruction eliminates the barrier of word reading issues to allow students with ID to engage with grade-level content. However, it is important to note that this instruction should not replace phonics instruction. Instead, text-reading opportunities with co-occurring literacy instruction should be provided *in addition to* phonics instruction. Regardless, even without the barrier of word reading, teachers need knowledge of instructional practices that help students with ID comprehend text (e.g., by identifying main ideas). Chapter 4 of the current dissertation explores ways for teachers to provide secondary students with ID comprehension strategy instruction to support their comprehension of texts.

Limitations and Areas for Future Research

Several limitations in the current study should be addressed in future research. First, the study was conducted using two A-B single-case designs with one student. Additional participants would have allowed me to employ a multiple baseline design—a more rigorous single-case design that can meet What Works Clearinghouse (WWC) standards for single-case designs (WWC, 2020). Therefore, researchers should consider employing multiple baseline designs when conducting future research that builds on the current study.

Additionally, the modified treatment phase only included five intervention sessions. With additional sessions, Gerald's improvement in sentence-level gist log accuracy may have yielded improvement in his identification of the essential elements of main ideas. In fact, in Vaughn and colleagues' (2012) randomized controlled trial, middle school students with intensive reading needs did not adequately respond to intervention until they received *three years* of intervention. Even so, study results on a standardized reading comprehension measure revealed that although these students were able to maintain their status relative to their typically developing peers, they could not close the gap. Thus, expecting that students with significant reading needs would make gains after just five sessions of intervention may be unrealistic.

Another limitation is that the intervention included decontextualized reading tasks. That is, the intervention did not provide supplemental information, such as background information, that would have provided Gerald a context for reading. Context makes texts more concrete and relevant to a reader's personal life (e.g., functional texts), which may increase text comprehension (Haladyna, 1997).

Therefore, the lack of context in this intervention is an important limitation to acknowledge.

In addition to not targeting background knowledge, the intervention did not target vocabulary knowledge. Both background knowledge and vocabulary knowledge are necessary for inference making and overall reading comprehension (Cromley & Azevedo, 2007; Foorman et al., 2015). Yet, these cognitive resources may be limited among individuals with mild ID (e.g., Van Wingerden et al., 2018). Therefore, future research can investigate the effects of providing background information and vocabulary instruction on text comprehension among secondary students with mild ID.

Because research suggests that fidelity mediates the relationship between reading intervention and student outcomes (Vaughn, Roberts et al., 2013; Vaughn, Roberts, Swanson et al., 2015), it will be important that teachers implement instructional practices with high fidelity. To ensure high fidelity of implementation, researchers might consider providing teachers with professional development and coaching. According to Kraft and colleagues (2018), coaching involves observing teachers' implementation of an intervention and providing teachers with feedback to help them improve. Coaching is particularly important for future research in this area because it promotes both teacher fidelity and student academic outcomes (Kraft et al., 2018). Additionally, Ms. Calvin noted that she has received training in the past without any follow-up support. Professional development and coaching would address this gap in instructional support.

Furthermore, there may have been misalignment between the assessments used in the intervention and what the assessments were designed to measure. In Part 1 of the study, Gerald was required to generate main idea statements to demonstrate his overall comprehension of a paragraph. However, Gerald's writing skills influenced his performance on these assessments, which was not an intended purpose. In Part 2 of the study, assessments required Gerald to complete sentence-level gist logs, which measured his ability to process sentence-level information. Yet, these graphic organizers are not an indicator of Gerald's main idea identification or ability to answer text-specific comprehension questions, as evidenced by his modified treatment phase data. Therefore, in future studies, it might be worth exploring other measures of reading comprehension. For example, in Shelton et al.'s (2019) synthesis, six studies assessed participants' ability to recall information orally to measure reading comprehension. Not only can oral retell demonstrate students' comprehension of a text, but it can also reveal specific misconceptions students have about the text—making oral retell a potentially valuable assessment *and* instructional tool.

There are important interview limitations to consider as well. First, because the qualifying students had only one special education teacher, Ms. Calvin was the only teacher interviewed during the study. Therefore, the ways that her literacy instructional experiences are similar to or different from the experiences of other teachers of middle school students with mild ID are unknown. Second, I did not conduct a formal interview with Ms. Calvin before the intervention began. Interviewing Ms. Calvin in advance would have provided insight into her students'

literacy needs and allowed me to target Gerald's needs, in particular, during the intervention. Finally, Ms. Calvin's literacy instruction was not observed, which could have helped triangulate the findings related to the literacy instruction she provides students. Researchers can expand upon the current interview findings in future studies—while avoiding these limitations—by interviewing more teachers of middle school students with mild ID and supplementing those interviews with observations of teachers' typical literacy instructional practices.

Conclusion

Conducting the current formative experiment and accompanying interview allowed me to investigate factors that influence the effectiveness of sentence-level Get the Gist. Although neither iteration of the intervention improved Gerald's main idea identification, the findings of this mixed-method study make important contributions to the literature on reading comprehension for secondary students with mild ID. In particular, teachers need access to practices designed to help students synthesize information across text to comprehend the text's macrostructure. Additionally, teachers need access to effective, age-appropriate phonics instruction to meet the needs of middle school students who display significant needs related to initial literacy skills. By having access to evidence-based instructional practices as well as professional development and coaching to support their implementation of these practices, teachers can provide multicomponent literacy instruction throughout the school day to target the word reading and comprehension skills of middle school students with mild ID.

Chapter 4: Main Idea Strategy Instruction to Support Middle School Students with Intellectual Disability

Ms. Calvin teaches eight middle school students with mild intellectual disability (ID) in the independence and learning support program at Robertson Middle School. During their reading period, Ms. Calvin—with the support of three paraeducators—provides students with explicit decoding instruction with many opportunities to practice reading fluently. Ms. Calvin also aims to provide the same students with opportunities to practice reading and comprehending text during their English language arts (ELA) period. However, most of her students read texts at a kindergarten level, which does not provide meaningful opportunities for students to demonstrate comprehension. Therefore, Ms. Calvin reads higher-level texts aloud to her class (while students listen but do not follow along on their own copy of the text) and assigns students comprehension tasks to complete afterwards, such as answering comprehension questions or identifying main ideas.

After analyzing students' responses over several weeks, Ms. Calvin realized that what she had been doing was not working. The data revealed that many students were struggling to answer questions correctly and identify main ideas successfully. For example, some students simply read or copy the first sentence of the text as the main idea, while other students use their own words but provide irrelevant or inaccurate information. Therefore, she decided to meet with Ms. Parra, Robertson Middle School's special education coordinator. During her meeting with Ms. Parra, Ms. Calvin learned that she had not been providing comprehension instruction, after

all. Instead, she had merely been assessing students' comprehension. Ms. Parra explained that comprehension instruction teaches students how *to make sense of text, while comprehension assessment can inform comprehension instruction by showing teachers what students do and do not understand.*

Reading comprehension at the upper elementary and secondary levels is important for all students, including students with ID. The ability to comprehend text helps older students access grade-level content, thus increasing their knowledge in areas such as ELA, science, and social studies. Reading comprehension is also essential for non-academic purposes. Accessing text supports independent living, allows students to learn about the world around them, and provides students with enjoyable leisure activities (Browder et al., 2009). Despite the importance of reading comprehension, many secondary students with ID struggle with this skill.

The Simple View of Reading posits that word recognition and linguistic comprehension are necessary for reading comprehension (Gough & Tunmer, 1986). However, many students with ID may struggle with word recognition. Van Wingerden et al. (2017) reported that older children with mild ID (ages 8-11) decode words at significantly lower rates than their peers demonstrating typical development. However, findings suggest that students with ID can benefit from word recognition instruction. For example, Allor and colleagues (2010) found that, after receiving 1-1.5 years of daily systematic instruction in foundational literacy skills (e.g., phonemic awareness, letter-sound correspondence, and decoding), students with moderate ID demonstrated significantly more growth in reading than their peers who received

typical special education instruction. Thus, research suggests that students with ID can benefit from explicit phonics instruction and intervention.

Because students with ID have various reading needs and vary in their response to intervention, thus requiring many years of decoding and fluency intervention (Allor et al., 2010; Hill & Lemons, 2015), teachers should consider administering reading curriculum-based measures (CBMs), such as in word reading or passage reading fluency, to monitor students' response to intervention and individualize intervention accordingly. In fact, research suggests that special education teachers can reliably administer word reading and passage reading CBMs to students with ID and use the data to inform reading instruction (Hill & Lemons, 2015). For more information on using curriculum-based measurement with students with ID, see Lemons et al. (2016).

According to the Simple View of Reading, even when students have sufficient decoding skills that support their ability to read texts, they may still struggle with reading comprehension due to linguistic comprehension challenges. For example, Van Wingerden et al. (2017) reported that older children with mild ID scored significantly lower than their peers with typical development on an assessment of listening comprehension, which is often used to measure linguistic comprehension. Students with ID may face linguistic comprehension challenges for various reasons, including having limited background knowledge, not understanding the vocabulary in a text, and being unable to synthesize the information (either when reading or listening to text) to identify main ideas.

The inability to identify main ideas in text has important implications for middle school students with ID. The expectation in many middle school general education curriculums—which students with ID should have access to—is that students will be able to identify main ideas when reading or listening to text to demonstrate their comprehension in ELA and other content-area classes. Additionally, main idea identification supports students' ability to summarize texts (Kintsch & van Dijk, 1978). In particular, students can analyze important text details to identify the main ideas of a text and then synthesize the main ideas to summarize the text, thus demonstrating their overall understanding of the text. Therefore, main idea identification is an important skill for students with ID to master.

In a synthesis of interventions targeting reading comprehension among individuals with mild ID, Shelton et al. (2019) identified multiple studies that provided main idea instruction to individuals with mild ID. In one study, for example, young adults with mild ID successfully learned how to paraphrase expository passages by using the RAP strategy (Hua et al., 2014). RAP stands for: (a) **R**ead the paragraph; (b) **A**sk myself, "What was the main idea and two details?"; and (c) **P**ut it in my own words. Although students may be able to use this strategy to summarize texts independently, students must first know what a main idea is and how to identify a main idea. One strategy that students can use to identify main ideas is Get the Gist (Klingner et al., 1998). Teachers can provide explicit instruction on Get the Gist to help students with significant reading needs identify main ideas before expecting students to demonstrate their overall understanding of a text. The current manuscript explains how teachers can provide middle school students with ID explicit Get the

Gist instruction and facilitate systematic practice of the strategy to support their reading comprehension needs.

Because main idea identification is particularly important for comprehending texts, Ms. Calvin wanted to teach students how to use a strategy that would help them develop this skill. Once again, Ms. Calvin met with Ms. Parra to see if she had any suggestions or ideas on ways to help her students identify main ideas correctly. Ms. Parra introduced Ms. Calvin to the Get the Gist strategy and referred her to the Collaborative Strategic Reading (CSR) website (https://toolkit.csrcolorado.org) for more information. After reviewing Get the Gist resources, Ms. Calvin decided that she would provide students Get the Gist instruction to help them identify main ideas of text. However, Ms. Calvin knew that she would need to supplement this instruction with additional support to meet her students' significant reading needs.

Get the Gist

To improve students' main idea identification skills, teachers can provide instruction on how to use Get the Gist. Get the Gist is a strategy from CSR, an evidence-based instructional approach designed to improve students' reading comprehension (Klingner et al., 1998). In fact, higher quality CSR instruction, including instruction on Get the Gist, has been associated with higher scores on a standardized measure of reading comprehension among middle school students with mild to moderate disabilities (Boardman et al., 2016). For more information on Get the Gist and the other CSR components, see the IRIS module on CSR (IRIS Center, 2020).

Students can use Get the Gist to identify the main idea—or the *gist*—of a section of text by identifying who or what the section is about and explaining the most important information about who or what they identified. However, middle school students with ID may need additional instruction and guidance to comprehend texts. Furthermore, Get the Gist is mostly focused on reading comprehension, yet reading grade-level texts may not be a feasible option for many middle school students with mild ID. Therefore, the current manuscript also describes how teachers can capitalize on this existing strategy and accompanying instructional procedures while also providing supplemental supports to facilitate main idea identification and overall text comprehension among middle school students with ID.

How to Prepare for Get the Gist Instruction

During the planning of Get the Gist instruction, teachers should make decisions regarding (a) what text to use, (b) how students will access the text, and (c) where students will pause reading to use Get the Gist. Teachers should also determine what knowledge students need in advance to comprehend the text. The steps to take during planning are outlined below.

Step 1: Choose an age-appropriate, engaging text.

As inclusion efforts continue for students with disabilities, students with ID should have access to general education content. Thus, during instruction, teachers should provide middle school students with ID access to age-appropriate texts, which offer exposure to relevant cultural symbols and complex vocabulary (Browder et al., 2009; Shurr & Taber-Doughty, 2012).

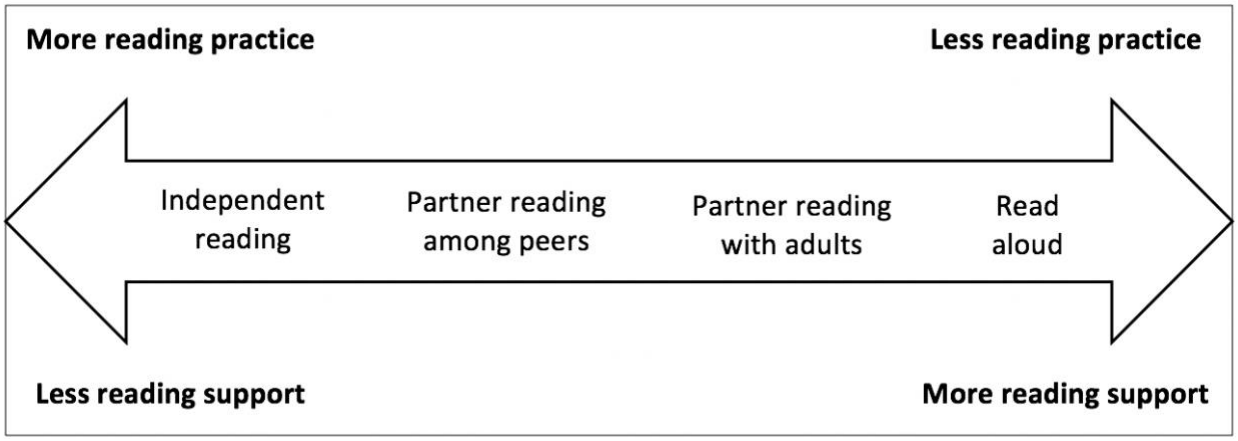
These age-appropriate texts should also be engaging. That is, students should be able to process the texts deeply, using active strategies and thought processes (Kamil et al., 2008). Thus, engaging texts spark conversation among the teacher and students. Sometimes, the general education curriculum lists a text that is both age-appropriate and engaging. If that is the case, teachers are ready to move on to the next step of preparing for Get the Gist instruction. If, however, a text from the curriculum is not engaging, or if teachers are tasked with choosing a text on their own, they should identify a text that: (a) has appropriate content for middle school students (and perhaps real-world application), (b) aligns with the general education curriculum, and (c) provides students with multiple opportunities to identify the main ideas of the text. Teachers can access free texts that meet these criteria at https://www.readworks.org, https://www.newsela.com, and https://www.commonlit.org.

Step 2: Determine how students will access the text.

The ultimate goal of text reading is comprehension, which we need to access information. However, there are multiple ways students can access information in a text—via independent reading, partner reading, or read alouds. These methods vary in the amount of reading support (e.g., corrective feedback) and practice students receive (see Figure 4.1).

Figure 4.1

Options for Text Reading



The method teachers facilitate so that students can access a text depends on the complexity of the text and the reading abilities and needs of the students in the class. Teachers can review students' data from passage reading fluency CBMs and use the guidelines presented in Figure 4.2 to determine which method of text reading to use. Teachers should also keep in mind that they may still need to provide students with individualized decoding and fluency support during independent and partner reading.

Figure 4.2

Decision Rules for Determining Text-Reading Methods

Question	Answer	Decision
1. Will the majority of my students be able to read the chosen text with at least 95% accuracy?	Yes	Facilitate independent reading.
	No	Ask yourself Question 2.
2. Will the majority of my students be able to read the chosen text with at least 90% accuracy?	Yes	Facilitate partner reading among peers.
	No	Ask yourself Question 3.
3. Will approximately half of my students be able to read the chosen text with at least 90% accuracy?	Yes	Facilitate partner reading with adults.
	No	Conduct a read aloud.

Independent reading

In order to read a text independently, students need to be able to read the text with little help and without making frequent errors (e.g., with at least 95% accuracy). Independent reading may be a challenge for students if the text is indeed age-appropriate (as recommended) and written with complex vocabulary and sentence structures, since students typically do not receive reading support during independent reading. Thus, partner reading may be a better option as it provides students the opportunity to read and receive support while doing so.

Partner reading

During partner reading, students provide each other with support (e.g., corrective feedback) as they read the text. To prepare for partner reading, teachers first pair students with similar reading levels. However, a rule of thumb is to pair a slightly more fluent reader with a slightly less fluent reader so that the more fluent reader can model fluent reading to their partner (Fuchs et al., 2000). One way to pair students using this approach is by: (a) ranking students in order by their fluency level according to passage reading fluency CBMs (highest to lowest fluency), (b) dividing the list in half to create two lists, and (c) pairing each student with their peer in the corresponding position on the other list. For more guidance on how to facilitate partner reading among students, see Wexler et al. (2019). Finally, teachers and paraeducators can be paired with students for partner reading. This approach may be useful in classes where some students (but not enough) can model fluent reading for their peers during partner reading (Wexler et al., 2008). However, if few students can

read the text fluently, then teachers should consider conducting a read aloud so that all students can access the text.

Read alouds

In order to read an age-appropriate text, partner reading requires a minimum level of fluency skills that few students in a particular class may meet. Therefore, students may need to use another method to access the information in text. A teacher, peer, or recording can read the entire text aloud to students, allowing all students access to the text and a model of fluent reading. Students should have a copy of the text to follow along silently, thus maximizing the time students are engaged with text. Nonetheless, read alouds ensure that issues with decoding or fluency will not impede any student's comprehension of the text. Instead of dividing their cognitive effort between reading and comprehending, a student can focus entirely on comprehension—that is, on making sense of the text. Using read alouds does not mean that students in need of phonics instruction or fluency practice will not receive it; they can just receive the necessary support at another time. Additionally, as students' decoding skills improve, students can receive more opportunities to practice Get the Gist while reading, thus improving *reading* comprehension.

Ms. Calvin decided to focus on expository texts that aligned with science and social studies content. For example, in order to correspond with her science unit on climate, Ms. Calvin incorporated "Is the Earth Getting Warmer?" (Readworks, 2013) into her ELA instruction. Although the text is age-appropriate and engaging, at a Lexile of 1090, it was written above the average instructional level of her class. To

ensure her students could access the information in the text despite the mismatch, Ms. Calvin decided that she would read the text aloud.

Step 3: Divide the text at stopping points.

Once teachers have chosen an engaging, age-appropriate text and determined how students will access the text, teachers can begin preparing the text by dividing it at various stopping points. Each stopping point provides teachers with an opportunity to provide main idea identification instruction and practice. Therefore, each section of the text should provide enough information for the class to use Get the Gist successfully. However, the section should not be so long that students have to keep track of too much information, thus leading to cognitive overload (Cunningham et al., 2010).

Ms. Calvin planned to teach students how to use Get the Gist to identify main ideas. Since each paragraph of "Is the Earth Getting Warmer?" had its own main idea, she decided that each section would be just one paragraph. Ms. Calvin inserted a line between paragraphs to indicate that each paragraph was a different section.

Step 4: Determine what information students need before reading.

Oftentimes, older students need information other than what is explicitly stated in the text in order to comprehend the text. Without having knowledge of this additional information, middle school students with ID may struggle to comprehend age-appropriate text, despite any main idea instruction they receive. Therefore, before delivering Get the Gist instruction, teachers should consider providing students with any information they need to identify the main ideas within the text as well as make sense of the text overall. During planning, teachers should spend time determining the

background knowledge and vocabulary knowledge students need to comprehend the text as well as how to provide students with the necessary background information and vocabulary instruction *before* text reading begins.

Background knowledge

Seminal research has revealed that background knowledge is essential for reading comprehension. For example, Recht and Leslie (1988) reported that, regardless of reading ability, middle school students with more background knowledge of baseball had better recall of a story about a baseball game, better recognition of important ideas in the story, and better summaries of the story. Thus, background knowledge is a major contributor to comprehension.

Many middle school students with ID may lack sufficient background knowledge to support their comprehension of grade-level texts. As a solution, teachers should provide students with necessary background information before reading a text, which will allow students to engage more deeply with the text (Kamil et al., 2008). To determine what background information to provide students, teachers can answer the following question: "What information do my students need to have that is not included in the text but is necessary to understand the text?" For information on how to provide students with necessary background information, see the Delivering Get the Gist Instruction section below.

Vocabulary knowledge

In addition to background knowledge, vocabulary knowledge is necessary for comprehension. Students cannot be expected to understand the overall meaning of a text if they do not understand important words in that text. Although some vocabulary

knowledge can be obtained while reading, incidental vocabulary learning (i.e., learning the meanings of words from context) is not likely for many students, including students with ID (Shamir & Maor, 2018; Swanborn & de Glopper, 1999). Thus, teachers should provide students vocabulary instruction before reading to support their comprehension of text.

Students with ID may benefit from receiving explicit instruction of a small number of words to avoid overloading their working memory. In particular, teachers can provide vocabulary instruction on 1-3 high-frequency, unfamiliar words with high utility (i.e., words that are useful for a variety of contexts). This approach is beneficial for students with limited vocabulary knowledge because it not only supports their understanding of a particular text, but it also supports their ability to understand text and language overall. Teachers of middle school students with ID should also consider providing instruction on essential *content-area* vocabulary. Although these words may not be high-frequency or high-utility, they are necessary to understand the content that students will be exposed to in text. See below for information on how to provide explicit vocabulary instruction.

Delivering Get the Gist Instruction

At the beginning of a Get the Gist lesson, teachers should provide middle school students with ID necessary background information and vocabulary instruction. Next, teachers are ready to provide Get the Gist instruction. When providing this instruction, it is important that teachers incorporate high-leverage practices (McLeskey et al., 2017), including features of effective instruction (Archer & Hughes, 2010), that promote text comprehension by supporting students' ability to

use Get the Gist. Features of effective instruction are lesson characteristics that support learning, particularly among students with disabilities. Explicit instruction with modeling, systematic instruction with scaffolding, opportunities to respond and practice, and immediate corrective feedback are essential features of effective instruction to include for middle school students with ID. These features are incorporated into each step of Get the Gist instruction.

Step 1: Provide background information.

There are many suggestions for ensuring that students have the background knowledge they need to comprehend a text. Although many teachers are familiar with activating prior knowledge, it is important to recognize that not all students have prior knowledge to activate. Furthermore, students' prior knowledge may not be accurate or relevant for comprehension of the particular text. Therefore, it is especially effective (and efficient) to simply *tell* students what they need to know. Teachers should be explicit and concise when sharing necessary background information with students. They should also consider using aids—such as images or short videos, models, or demonstrations (approximately 2 minutes)—and allowing students to discuss these aids to process the background information provided.

Ms. Calvin determined that before reading "Is the Earth Getting Warmer?", students needed to know how Earth's average temperature has changed over time. She chose to present a time series that shows that, from 1884 to 2019, there has been an increase in the number of areas of Earth that are warmer than the global five-year average (NASA Scientific Visualization Studio, n.d.). Before showing the time series, Ms. Calvin explained, "You are going to watch a video that demonstrates how the

Earth's temperatures have changed over time. Blue means the areas were cooler than the Earth's five-year average. Yellow and red mean the areas were warmer. Pay attention to how the colors change as the video goes on." After playing the time series, Ms. Calvin asked students to answer the following questions with a partner: "How did the colors change from the start of the video to the end of the video? How, then, have Earth's temperatures changed from 1884 to 2019?"

After students discussed their answers and shared out loud, Ms. Calvin explained, "Towards the beginning of the video, we saw a lot of blue, which means there was cooler weather near 1884. However, by the end of the video, there were more yellow and red, so there is warmer weather today. We are going to read an article titled "Is the Earth Getting Warmer?" We now know that Earth is getting warmer, but we are going to read the article to find out why *it's getting warmer."*

Step 2: Provide explicit vocabulary instruction.

After providing background information, teachers should provide students explicit vocabulary instruction. Teachers can provide this instruction by presenting students with a student-friendly definition of each word. Next, teachers can present examples and non-examples of target vocabulary and explain them by referring back to the definitions (Knight et al., 2018). Finally, teachers can provide students opportunities to practice identifying examples and non-examples and discussing them with a partner. For additional guidance on how to provide explicit vocabulary instruction, see Swanson et al. (2017).

To comprehend "Is the Earth Getting Warmer?", Ms. Calvin's students needed to become familiar with many new words and concepts. One important word

for students to define was produced. *In the third paragraph alone (see Figure 4.3), 'produced' was mentioned three times. Not only is 'produced' a high-utility word, but it is also a word that students will receive repeated exposure to in the text. Ms. Calvin explained, "Before we start reading, let's define the word 'produced'. 'Produced' means made. What does 'produced' mean?" After providing students with an example and non-example, Ms. Calvin said, "If a cow 'produced' milk, that means the cow…" Here, Ms. Calvin was looking for students to respond by saying "made milk." Next, Ms. Calvin provided a non-example: "Now, when we* drink *milk, did we produce milk? Explain why or why not to your neighbor." After the discussion, Ms. Calvin connected the term 'produced' to the text by saying, "In the article we are about to read, we are going to learn how carbon dioxide is produced. This means we are going to learn how carbon dioxide is…" Ms. Calvin's students finished her sentence by saying "made."*

Figure 4.3

Paragraph 3 of "Is the Earth Getting Warmer?"

However, climate change can also be caused by changes in the amount of certain gases in the atmosphere. Broecker had noticed that the amount of carbon dioxide—a colorless, odorless gas—was slowly building up. While some carbon dioxide is produced through natural processes, large quantities of it are also produced by humans. Carbon dioxide is generated in especially large amounts when we burn fossil fuels, such as oil, coal, and natural gas. This burning happens when we drive cars, use electricity, and make certain products. When released into the atmosphere, carbon dioxide traps heat. Broecker reasoned that if people produced a lot of carbon dioxide, then enough heat would be trapped that the Earth would begin to warm. He called this "global warming."

It is important to recognize that the meanings of some words may be unfamiliar to students yet non-essential to understanding the overall meaning of the

text. These are typically words that students are only exposed to once or twice in a text—thus, there are not multiple opportunities to engage with them (Kamil et al., 2008). Teachers can simply define these words as they encounter them in the text. For example, the word *quantities* may be unfamiliar to many students, but "Is the Earth Getting Warmer?" only provides one opportunity for students to engage with this word. Therefore, once the class reaches this sentence, Ms. Calvin may simply insert the definition into the sentence by stating, "While some carbon dioxide is produced through natural processes, large quantities—*or amounts*—of it are also produced by humans."

Step 3: Explain what a main idea is and why main ideas are important.

In the first Get the Gist lesson, teachers should define *main idea*. Specifically, teachers should explain what a main idea is and why main ideas are important to identify. In subsequent Get the Gist lessons, teachers can ask students to discuss the definition of *main idea* with a partner, as a form of review.

During her first Get the Gist lesson, Ms. Calvin could say, "We are going to find the main ideas in each paragraph of '*Is the Earth Getting Warmer?*' A main idea is the most important information about what we are reading. Finding the main idea helps us understand what we read and helps us learn new information. This means that when we find out the most important information in different sections of '*Is the Earth Getting Warmer?*', we are understanding what we are reading about *and* we are learning."

Step 4: Explicitly teach students how to use Get the Gist to identify a main idea.

The Institute of Education Sciences published a practice guide that highlighted five evidence-based recommendations to improve literacy among students in grades 4-12 (Kamil et al., 2008). One of the recommendations was to "provide direct and explicit comprehension strategy instruction" (Kamil et al., 2008, p. 7). Thus, after teaching students what a main idea is, teachers can introduce Get the Gist. Specifically, teachers can explain to middle school students with ID that Get the Gist is a strategy to help them identify main ideas. Teachers should then read the first section of the text (regardless of how students will access the remainder of the text) and provide explicit instruction and modeling of Get the Gist once they reach the stopping point. Specifically, teachers should give clear directions and conduct a model for each step of Get the Gist. During the model, teachers can use think-alouds to demonstrate how they think about the text (e.g., by rephrasing complex sentences to make them more accessible) and how they apply Get the Gist to the text. This explicit instruction with modeling will prepare students to begin using Get the Gist.

Ms. Calvin read the first two paragraphs of "Is the Earth Getting Warmer?" aloud to introduce the text. Next, she read the third paragraph and then explained, "Now that I read the paragraph, I want to find the main idea. The first question I need to ask myself is 'Who or what is the paragraph about?' Let's see. I remember the paragraph talked a lot about carbon dioxide, so I'm going to circle all the times I see 'carbon dioxide' in the paragraph. Carbon dioxide is mentioned five times. Carbon dioxide might be what the paragraph is about since it is mentioned more than anything else. Next, I need to ask myself: What is the most important thing about carbon dioxide? Now, I'm going to reread and underline what the paragraph says

about carbon dioxide. The paragraph explains that carbon dioxide is a gas that has been 'building up.' It also tells me how carbon dioxide is produced or generated, which both mean made*. The paragraph also says that carbon dioxide 'traps heat,' which can make the Earth 'begin to warm.' Hmm… I think that last part has the most important information, but I need to say it using my own words—that means saying it a different way. Let's see. I am going to say, 'The most important thing to know is that carbon dioxide can trap heat, which makes the Earth warm.' That must be the main idea of the paragraph because that is the most important thing about carbon dioxide."*

Step 5: Provide systematic instruction with scaffolding

Upon providing explicit instruction, teachers should introduce whole-class guided practice with the next section of the text. During guided practice, teachers use scaffolding to support students as they use Get the Gist. There are many options for incorporating scaffolding. Teachers can provide aids, such as cue cards that list or depict the steps of Get the Gist. Teachers can also facilitate instructional scaffolding by providing students sentence stems (i.e., the beginnings of sentences). Students can use sentence stems to answer questions at each stopping point. Providing middle school students with ID systematic instruction in this manner—guided practice with instructional scaffolds—will provide students with the support they need to use Get the Gist.

Ms. Calvin facilitated guided practice using the next paragraph of "Is the Earth Getting Warmer?" First, she gave each student a copy of the Get the Gist cue card (see Figure 4.4), which included sentence stems, to identify the main idea of the

paragraph. She read the paragraph aloud and then explained, "Now, we are going to find the main idea together. Let's look at our directions on this card. The directions tell us that we need to ask ourselves, 'Who or what is the paragraph about?' After Ms. Calvin and the students discussed the text, she prompted students to use the sentence stem to answer the question. We can start our answer by saying, 'The paragraph talks the most about.'" Next, Ms. Calvin pointed students' attention back to the cue card and said, "The next step on the cue card is to ask, 'What is the most important thing to know about the who or what?' First, who or what is this paragraph about again? That is what we need to find the most important information about." Once students identified the most important information, Ms. Calvin referred students to the sentence stem they could use to answer the question. "Let's use our sentence stem: 'The most important thing to know is.'"

Figure 4.4

Get the Gist Cue Card

1	**Who or what is the paragraph about?** *The paragraph talks the most about…*
2	**What is the most important thing to know about the who or what?** *The most important thing to know is…*

After students discuss the main idea of a section of text, teachers may decide to extend the activity by asking students to use the information they discussed to write down the gist in approximately 10 words (i.e., step 3 of Get the Gist). However, depending on a number of factors (e.g., students' writing skills), it may be appropriate for students to share their gist statements orally without writing them.

Step 6: Provide students with opportunities to respond and practice.

Teachers should continue to provide students with opportunities to apply Get the Gist to remaining sections of the text. With sufficient explicit instruction and whole-class guided practice, some students may be ready to use the strategy with less teacher prompting. For example, teachers may provide fewer prompts to guide students as they use their cue cards. Teachers can also give students opportunities to collaborate with each other during peer-mediated practice. Peer-mediated practice allows students to collaborate in pairs or small groups to complete academic tasks (Wexler et al., 2015). This practice can supplement the explicit instruction and scaffolding students receive by allowing students the opportunity to practice using Get the Gist as well as receive feedback from their peers, whether or not students access the text via partner reading—another form of peer-mediated practice. In fact, research has shown that peer-mediated practice can be an effective feature to include in instruction among students with ID, between students with ID and their peers with other disabilities, as well as between students with ID and their peers without disabilities (Schaefer et al., 2016; Shelton et al., 2019). Thus, students can collaborate with peers across various settings to identify main ideas using Get the Gist.

As students worked in pairs to identify the main idea of the third paragraph in the article, Ms. Calvin encouraged students to use the partner cue card and take turns asking each other the guiding questions presented on it (see Figure 4.5). The cue card prompted students to ask each other, "How do you know?" and to answer that question with evidence from the text by using the following sentence stem: 'I know because the paragraph said.' Ms. Calvin also encouraged students to express agreement or disagreement with their partners using respectful language. During

these 2- to 3-minute discussions after each remaining paragraph, Ms. Calvin monitored students' participation, encouraged students to use their new vocabulary (e.g., 'produced'), and provided support and feedback when necessary.

Figure 4.5

Get the Gist Partner Cue Card

	Partner A	Partner B
1	**Who or what is the paragraph about?**	*The paragraph talks the most about…*
2	**How do you know?**	*I know because the paragraph said…*
3	**What is the most important thing to know about the who or what?**	*The most important thing to know is…*
4	**How do you know?**	*I know because the paragraph said…*

Step 7: Provide immediate corrective feedback.

During all of the practice opportunities students receive (whether during guided practice with teacher scaffolding or peer-mediated practice), it is essential that teachers provide students with immediate corrective feedback on their use of Get the Gist. This feedback should be specific and include explanations that encourage students to respond correctly in the future. Below are some suggestions on providing students with corrective feedback.

- Capture students' attention before providing any error correction. *Example: "Let's look at this paragraph as a class to make sure we all know who or what it is about."*
- Scaffold the error correction as necessary. *Example: The directions tell us that we first need to ask, 'Who or what is the paragraph about?' I'm going to*

reread the paragraph, and I want you all to circle who or what each sentence is about."

- Repeat the question to allow students to respond correctly. *Example: "Now, take a look at who or what you circled the most. That is who or what the paragraph is about. So, take another two minutes to share with your partner who or what the paragraph is about and to make sure you agree with each other. Remember: whoever or whatever you circled the most is who or what the paragraph is about."*

Finally, teachers should remember to provide students with praise, in addition to error correction. Rather than making generic statements such as, "Good job!" or "That's correct!" teachers should tell students what was correct about their responses. It may also be helpful to explain *why* the response was correct to reinforce students' use of the strategy.

In response to the main idea one student identified, Ms. Calvin stated, "Yes, the main idea is that scientists think climate change may lead to hurricanes, floods, or sea-level rise. How do you know this? Yes, we know this because the paragraph tells us the different things scientists think may happen because of climate change."

Conclusion

Teachers can provide middle school students with ID Get the Gist instruction to support their ability to identify main ideas in age-appropriate texts, which will allow them to acquire new knowledge. Get the Gist instruction can help direct students' thinking of the text and facilitate their comprehension as well. Teachers can increase the likelihood that this instruction is effective by incorporating features of

effective instruction, such as frequent opportunities to practice and frequent feedback. Peer-mediated comprehension practice is one approach teachers can use to incorporate these features. Thus, by providing students explicit Get the Gist instruction and accompanying practice, teachers can support text comprehension among middle school students with ID.

Chapter 5: Conclusion

To take advantage of postsecondary opportunities, such as employment, all individuals benefit from reading and comprehending text. For individuals with mild intellectual disability (ID), in particular, being able to read and comprehend text may promote success in postsecondary programs dedicated to adults with ID, such as Transition and Postsecondary Programs for Students with Intellectual Disabilities (funded by the U.S. Department of Education). However, research reveals that individuals with mild ID may face significant reading challenges that can impact reading comprehension. For example, in a study of children with and without mild ID, Van Wingerden et al. (2017) reported that children with mild ID performed significantly lower than their peers with typical development on measures of decoding (d = 5.32) and listening comprehension (d = 1.32)—the primary predictors of reading comprehension, according to the Simple View of Reading (Gough & Tunmer, 1986).

Given the literacy needs of individuals with mild ID, I conducted the current dissertation to identify instructional practices that improve the literacy skills of individuals, primarily middle school students, with mild ID. First, I conducted a research synthesis to determine the characteristics and effectiveness of interventions that targeted the reading comprehension skills of individuals with mild ID (Chapter 2). The findings of this synthesis identified important intervention elements that can yield positive results for individuals with mild ID. Based on my synthesis, I conducted a mixed-method study that included an intervention (conducted using a formative experiment approach) and an interview (Chapter 3). Specifically, I

employed two single-case designs to test the effects of a sentence-level reading comprehension intervention with one middle school student with mild ID. As part of the study, I also conducted an interview with the student's teacher to contextualize the intervention findings and inform future intervention research related to the literacy skills of middle school students with mild ID. Upon conclusion of the study, I wrote a practitioner manuscript that outlines how teachers can provide explicit main idea strategy instruction and other necessary support to middle school students with ID who have varying levels of reading skills (Chapter 4).

In this chapter, I will summarize the findings and limitations of my research synthesis (Chapter 2) and mixed-method study (Chapter 3). I will also explain how the practical implications of the synthesis and mixed-method study (i.e., intervention and teacher interview) informed the practitioner manuscript (Chapter 4) and then review the guidance provided in this manuscript. I will conclude by exploring future research directions based on the mixed-method study.

Research Synthesis

Educators need access to instructional practices and interventions to target the reading comprehension needs of individuals with mild ID. Therefore, my goal in conducting the research synthesis was to identify studies that have explored the effects of reading interventions on the reading comprehension skills of individuals with mild ID. Specifically, I investigated the features of these interventions and the extent to which they were effective. Fourteen studies qualified for inclusion in my corpus.

The synthesized findings of these studies revealed that single-component interventions (i.e., interventions that target one component of reading—specifically reading comprehension) were more effective than multicomponent interventions (i.e., interventions that target more than one component of reading). Single-component interventions may have been more effective because the majority of the single-component interventions incorporated explicit instruction on a comprehension strategy, which is an effective feature of comprehension instruction (National Reading Panel, 2000). Another common feature of effective interventions in my corpus was peer-mediated practice (e.g., text-based discussions). Thus, receiving opportunities to read and collaborate, in addition to explicit comprehension strategy instruction, may promote reading comprehension among individuals with mild ID. One limitation of my corpus is that only six studies targeted the reading comprehension needs of middle school students with mild ID. Therefore, I conducted a study to address these gaps and extend the findings of my research synthesis.

Mixed-Method Study

In Spring 2020, I conducted a mixed-method, exploratory study to develop and pilot an intervention that provided one middle school student with mild ID sentence-level comprehension instruction. I used a formative experiment approach to evaluate the effects of the intervention. The pedagogical goal of the intervention was to improve the student's ability to identify main ideas within expository passages. The initial intervention built on the findings from the synthesis by incorporating explicit instruction on a sentence-level comprehension strategy. The formative experiment allowed me to adapt the initial intervention based on identified factors

that enhanced or inhibited the effectiveness of the intervention (Part 1 of the study). Both the initial intervention and the modified intervention (Part 2 of the study) were piloted using an A-B single-case design, and the effects were analyzed both visually and quantitatively.

During the initial treatment phase, I provided the participating student explicit instruction on sentence-level Get the Gist—a strategy that involves identifying sentence-level information (i.e., who or what each sentence is about and two important words in each sentence) in order to generate a statement identifying the main idea of a paragraph. After two instructional sessions, the student's main idea identification skills did not improve. In fact, the student focused more on writing conventions (e.g., punctuation and capitalization) than on identifying the main idea and writing the main idea statement in his own words.

In response to the student's performance during the initial treatment phase, I revised the intervention and assessment for Part 2 of the study. Specifically, I incorporated a sentence-level gist log, a graphic organizer to record sentence-level information from the paragraph, which could be used to identify the essential elements of a main idea (i.e., who or what a paragraph is about and the most important information about who or what was identified). Although the participating student's sentence-level gist log accuracy increased during the modified treatment phase, his identification of main idea elements did not improve. Therefore, there was not a functional relation between the sentence-level Get the Gist intervention and the student's main idea identification.

It is important to acknowledge the limitations of the formative experiment. For example, the modified intervention was only conducted with one student for five treatment sessions. It is possible that with additional participants and sessions, a functional relation between the intervention and main idea identification may have been observed. However, the intervention did not include a standard approach to providing background information or vocabulary instruction, both of which facilitate reading comprehension (Recht & Leslie, 1988; Van Wingerden et al., 2017). Thus, researchers should consider targeting the background knowledge and vocabulary knowledge of middle school students with mild ID within interventions that aim to improve their reading comprehension skills.

Upon completion of the intervention, I interviewed the participating student's teacher. The purpose of the interview was to explore the teacher's perceptions of her students' literacy needs, the approaches she takes to address their needs, and the barriers she faces related to addressing their needs. The interview also helped to contextualize the findings of the intervention. Finally, I hoped the interview findings could inform future research on literacy instruction for middle school students with mild ID.

During the interview, the teacher explained that the majority of her students—students who did not qualify for participation in the mixed-method study—read close to a kindergarten level. Therefore, much of her reading instruction, in particular, focused on word reading. However, one challenge she faced providing this instruction was that she lacked age-appropriate phonics resources (e.g., texts) to motivate students during instruction. For the students who read with greater accuracy (i.e.,

students who were eligible to participate), the teacher focused more on reading comprehension by assigning students tasks that required them to read texts and answer comprehension questions or identify main ideas. Students often struggled to complete these tasks independently and accurately. Thus, the teacher also needed access to practices or strategies to facilitate students' reading comprehension, including their ability to identify main ideas.

Finally, the teacher provided literacy instruction of grade-level texts in content areas (e.g., English language arts). Because of the difficulties her students faced with decoding and reading comprehension, the teacher read texts aloud and scaffolded instruction to help students access the information within the text. Thus, she facilitated students' listening comprehension. In future studies, interviews should be conducted with a larger number of teachers of middle school students with mild ID. Conducting classroom observations, in addition to these interviews, will give researchers the opportunity to triangulate the interview findings.

Practical Implications

The mixed-method study of the current dissertation has several practical implications. First, the study highlighted the importance of having background knowledge and vocabulary knowledge. Yet, students with mild ID may have limited knowledge in these areas (e.g., Van Wingerden et al., 2017). Therefore, teachers may need professional development on why and how they should provide background information and vocabulary instruction to improve text comprehension among middle school students with mild ID.

Second, teachers of middle school students with mild ID need to be able to target students' individual reading needs, while also ensuring that all students have access to grade-level text. The use of grade-level content is important so that students have increased access to the general education curriculum. The participating teacher addressed students' varying literacy needs by providing reading instruction during guided reading and focusing on listening comprehension during content-area instruction. Thus, the teacher identified an instructional approach (i.e., reading instruction *and* listening comprehension instruction) that she could use to meet these diverse needs. Other teachers may be able to use this same approach by providing reading instruction appropriate for students' particular decoding needs and fluency levels as well as comprehension instruction using grade-level, content-area texts. Despite using this approach, the participating teacher still needed particular comprehension instructional practices that she could facilitate or strategies that her students could use independently.

Based on these practical implications as well as the practical implications of my synthesis, I wrote a practitioner manuscript that provides guidance to teachers on how to promote comprehension of grade-level texts among middle school students with ID. In the manuscript, I explain that teachers can begin a literacy lesson by providing essential background information to ensure that all students have the foundational knowledge necessary to comprehend the text. Teachers can also provide vocabulary instruction so that students understand any words that are essential to comprehending the particular text.

After providing background information and vocabulary instruction, teachers can facilitate the reading of the text. Teachers' approach to text reading depends on the reading needs and abilities of students. For example, if students have significant decoding and fluency needs, teachers may decide to read the text aloud or play an audio version of the text. Otherwise, teachers can allow students to read the text independently or in pairs. After reading or listening to one section of text, teachers should facilitate students' comprehension of the section. I suggested facilitating students' comprehension of a section of text by incorporating text-based discussions and comprehension strategy instruction—two practices supported by studies in the corpus of my synthesis. While giving students instruction and opportunities to learn how to use a comprehension strategy, teachers can promote students' comprehension of a particular text by facilitating text-based discussions, thus providing middle school students with ID the support they need to comprehend grade-level texts.

Future Directions

The current dissertation has important findings and implications that can be addressed in future research. For example, Chapter 3 suggests that middle school students with mild ID may benefit from comprehension instruction that includes both background information and vocabulary instruction. Thus, two research questions to be addressed in future research include: (a) To what extent do background information and vocabulary instruction improve text comprehension among middle school students with mild ID? and (b) To what extent does main idea identification strategy instruction, in addition to background information and vocabulary instruction, improve text comprehension among middle school students with mild ID?

Answers to these questions would increase our understanding of instructional approaches that address the literacy needs of middle school students with mild ID.

Given the research and practical implications of Chapter 3, it is important for teachers to implement future interventions that target reading comprehension among middle school students with mild ID. In order to facilitate high levels of fidelity of implementation among participating teachers, researchers can provide teachers with initial training and follow-up coaching (with performance feedback) to improve and maintain high levels of fidelity. Thus, researchers may also explore: (a) To what extent does professional development (i.e., initial training and follow-up coaching) improve teachers' provision of background information and vocabulary instruction? and (b) To what extent does professional development improve teachers' implementation of main idea identification strategy instruction? This research could identify ways that instructional coaches and other school leaders could support teachers in providing evidence-based literacy instruction to middle school students with mild ID.

Finally, the interview findings presented in Chapter 3 revealed that the participating teacher strives to address both the word reading needs and comprehension needs of her middle school students with mild ID. However, more information is needed about how other teachers address the literacy needs of middle school students with mild ID. Therefore, researchers can investigate answers to the following questions: (a) What literacy instruction do teachers provide middle school students with mild ID, and to what extent is the instruction evidence-based and of high quality? and (b) How do teachers describe their literacy instructional decisions

for middle school students with mild ID, and what factors do they identify as impacting those decisions? Examining these questions via observations and interviews could help identify various ways to target teachers' literacy instruction and, ultimately, the literacy skills of their students with mild ID.

Conclusion

The current dissertation explored literacy instruction and intervention for middle school students with mild ID. The synthesis presented in Chapter 2 revealed the importance of explicit strategy instruction to improve reading comprehension outcomes for individuals with mild ID. Thus, I incorporated this feature into the intervention piloted within a formative experiment, as explained in Chapter 3. Although the intervention (which provided explicit instruction on sentence-level Get the Gist) was not effective, the experiment suggested that middle school students with mild ID may benefit from an intervention that targets their background knowledge and vocabulary knowledge, in addition to their main idea identification skills. Furthermore, the interview I conducted after the completion of the formative experiment revealed the need for instructional practices that address the comprehension needs of middle school students with mild ID who have varying decoding needs. I incorporated these considerations into Chapter 4, which provides directions and examples of how teachers can facilitate grade-level text comprehension among middle school students with ID. Specifically, I explain how teachers can deliver explicit main idea strategy instruction supported with background information, vocabulary instruction, and peer-mediated practice.

As the research synthesis in Chapter 2 revealed, there is a limited amount of research on interventions that aim to improve reading comprehension among middle school students with mild ID. Yet, these interventions are needed to provide students with opportunities to access information as well as skills to promote employment, independent living, and financial wellbeing. As such, the current dissertation aimed to contribute to the literature on reading comprehension among middle school students with mild ID. Specifically, the dissertation provides important information that can be considered in future research on the reading comprehension needs of middle school students with mild ID. Building on this dissertation in the future may equip teachers with greater access to information, instructional practices, and resources to target the wide range of literacy needs that middle school students with mild ID have. Ultimately, continued research in this area may improve the literacy outcomes of middle school students with mild ID, thus promoting secondary and postsecondary success.

Appendix A

Table 2.1

Gersten et al. (2005) & What Works Clearinghouse (2017) Quality Indicators

Study	Type of Design	Conditions Described Thoroughly	Fidelity of Implementation Reported	Multiple Comprehension Outcome Measures Used	Standardized Comprehension Outcome Measure(s) Used	Appropriate Sample Attrition Reported	Baseline Equivalence
Allor et al. (2010)	Experimental	✓	✓	X	✓	X	X
Cohen et al. (2006)	Quasi-experimental	✓	X	✓	X	N/A	X
Hua et al. (2014)	Experimental	✓	✓	X	X	✓	N/A
Lundberg & Reichenberg (2013)	Experimental	✓	X	✓	X	✓	N/A
Mastropieri et al. (2001)	Experimental	✓	X	X	X	X	✓
Miller et al. (2011)	Experimental	✓	✓	✓	X	✓	N/A
Van den Bos et al.	Experimental	✓	X	✓	X	X	X

(2007) – IDG							
Van den Bos et al. (2007) – IN	Experimental	✓	X	✓	X	X	X

Note. IDG = instruction and discussion in small groups; IN = instruction to individuals; ✓= quality indicator is met; X = quality indicator is not met; N/A = not applicable.

Table 2.2
What Works Clearinghouse SCD Standards (WWC, 2017)

Study	Design	Systematically Manipulated IV	DV Measured Repeatedly Over Time and by >1 Assessor	IOA Reported for ≥20%	Reported IOA at ≥80% Reliability	Minimum Number of Phases & Data Points per Phase
Bilgi & Özmen (2018)	MPxP	✓	✓	✓	✓	X
Grünke et al. (2013)	MBxP	✓	X	X	X	X
Hua et al. (2012)	MBxP	✓	✓	✓	✓	✓
Hua et al. (2013)	ATD	✓	✓	✓	✓	✓
Hua et al. (2018)	Response-guided, randomized MBxP	✓	✓	X	✓	✓
Özmen (2011)	ATD	✓	✓	✓	✓	✓

Note. DV = dependent variable; MPxP = multiple probe design across participants; MBxP = multiple baseline design across participants; ATD = alternating treatment design; ✓= quality indicator is met; X = quality indicator is not met.

Table 2.3
Single-Component Intervention Study Participants

Study	Number of Participants	Age/Grade	Participant Descriptors	Disability Category
Group Design				
Hua et al. (2014)	*N* = 10 (5 T; 5 C)	Mean age: 20.4 T; 20.8 C	Asian American: 2 T White: 3 T; 5 C Female: 3 T; 2 C Male: 2 T; 3 C	Mild ID: 4 T; 3 C Mild ID & ADHD: 1 T; 2 C Mean IQ: 71.6 T; 72.6 C
Lundberg & Reichenberg (2013)	*N* = 40 (estimated 19 T; 21 C)	Age range: 13–18 Mean age: 15.3	Female: 14 Male: 26	Mild ID: 40
Miller et al. (2011)	*N* = 38 (20 T; 18 C)	Grade 3: 5 T; 2 C Grade 4: 7 T; 8 C Grade 5: 5 T; 5 C Grade 6: 3 T; 1 C Grade 7: 0 T; 2 C	Black: 15 T; 14 C White: 5 T; 4 C Female: 6 T; 4 C Male: 14 T; 14 C	Mild ID: 6 T; 5 C SLD: 14 T; 13 C Prerequisite: 1st grade ORF level for ES and 3rd grade ORF level for MS as measured by DIBELS; difficulties in reading comprehension as measured by Kaufman
Van den Bos et al. (2007) – IDG	*N* = 18 (9 T; 9 C)	Mean age: 31.1 T; 39.7 C	Female: 9 T; 5 C Male: 0 T; 4 C	Mild ID: 18 IQ Range: 45–69

				Mean IQ: 58.1 T; 55.7 C Prerequisite: 30 correctly read words/minute on standardized One Minute Test of reading
Van den Bos et al. (2007) – IN	*N* = 20 (10 T; 10 C)	Mean age: 31.3 T; 43 C	Female: 5 T; 9 C Male: 5 T; 1 C	Mild ID: 20 IQ Range: 45–69 Mean IQ: 59.6 T; 57.0 C Prerequisite: 30 correctly read words/minute on standardized One Minute Test of reading
Single-Case Design				
Bilgi & Özmen (2018)	*N* = 3	Mean age: 12.67 Grade 5: 1 Grade 7: 2	Female: 1 Male: 2	Mild ID: 2 Borderline ID: 1 Mean IQ: 66.67
Grünke et al. (2013)	*N* = 6	Mean age: 12.17 Grade 5: 3 Grade 8: 3	Female: 4 Male: 2	The study was conducted in Germany, so the participants were not identified by

				disability. However, their general intellectual abilities were within the lowest quartile on the ZVT (Oswald & Roth, 1987), which includes participants with mild ID by WHO standards.
Özmen (2011)	*N* = 5	Mean age: 13.19 Grade 6: 1 Grade 7: 2 Grade 8: 2	Male: 5	Mild ID: 5 Mean IQ: 66.5 (based on 4 available scores)

Note. N = full sample; T = treatment; C = comparison; IQ = intelligence quotient; ADHD = Attention Deficit Hyperactivity Disorder; SLD = Specific Learning Disability; T1 = treatment group 1; T2 = treatment group 2; IDG = instruction and discussion in small groups; IN = instruction to individuals; ORF = oral reading fluency; ZVT = German Number Combination Test; WHO = World Health Organization.

Table 2.4
Multicomponent Intervention Study Participants

Study	Number of Participants	Age/Grade	Participant Descriptors	Disability Category
Group Design				
Allor et al. (2010)	*N* = 59 (34 T; 25 C)	Mean age: 7.94 T; 7.72 C Grade range: 1–4	Black: 19 T; 12 C White: 6 T; 5 C Latinx: 6 T; 7 C Other: 2 T; 1 C Unknown: 1 T Female: 10 T; 12 C Male: 24 T; 13 C	IQ range: 40–69
Cohen et al. (2006)	*N* = 52 (20 T; 32 C)	Mean age: 33.4 T; 33.1 C	Female: 50% of T; 35.5% of C Male: 50% of T; 64.5% of C	Mild ID: 52 Mean IQ: 66 T; 62.6 C Prerequisite: Good accuracy (not defined)
Mastropieri et al. (2001)	*N* = 24 (12 T; 12 C)	Mean age: 12.75 LD; 13 ID Grade: 7	Black: 1 White: 21 Latinx: 2 Female: 7 Male: 17	Mild ID: 4 LD: 20 IQ range: 48–70 ID; 81–113 LD Mean IQ: 64.0 ID; 88.8 LD
Single-Case Design				
Hua et al. (2012)	*N* = 3	Mean age: 20	Female: 1 Male: 2	Mild ID: 2 Severe LD: 1

			White: 3	Mean IQ: 74.67
Hua et al. (2013)	*N* = 4	Mean age: 19.5	Female: 1 Male: 3	Mild ID: 1 Mild ID & ADHD: 1 Mild ID & Asperger syndrome: 1 Severe LD & language disorder: 1 Mean IQ: 66.75
Hua et al. (2018)	*N* = 5	Mean age: 20	Female: 1 Male: 4 White: 5	Mild ID: 4 Mild ID & DS: 1 Mean IQ: 64.4

Note. N = full sample; T = treatment; C = comparison; IQ = intelligence quotient; ID = intellectual disability; LD = learning disability; ADHD = Attention Deficit Hyperactivity Disorder; DS = Down syndrome.

Table 2.5
Single-Component Intervention Study Characteristics

Study	Description of Conditions	Description of Sessions	Effect Size	95% Confidence Interval
Group Design				
Hua et al. (2014)	*Treatment:* Participants were taught to (1) read a paragraph; (2) ask themselves, "What was the main idea and two details?"; and (3) put the answers into their own words. *Control:* Life skills instruction	Two 60-minute sessions/week across 6 weeks	g = 3.70 for identification of main ideas; 2.46 for identification of details	[1.66, 5.74] for identification of main ideas; [0.82, 4.10] for identification of details
Lundberg & Reichenberg (2013)	*Treatment (Reciprocal Teaching):* Participants were taught summarizing, questioning, clarifying, and predicting techniques in pairs or in groups. *Control (Inference Making):* Participants were required to answer "right there," "reflect and search," and "why" questions.	Two 30-minute sessions/week across 8 weeks	Estimated g = 0.09 for sentence comprehension; 0.61 for passage comprehension	[-0.54, 0.71] for sentence comprehension; [-0.02, 1.25] for passage comprehension
Miller et al. (2011)	*Treatment:* Participants were taught rule statements and multistep procedures with explicit instruction for identifying main ideas.	Four 45-minute sessions/week across 3 weeks	g = -0.01 for unit test 1; 0.58 for unit test 2; 0.85 for unit test 3; 0.53 for story retell 1; 0.40 for	[-0.65, 0.63] for unit test 1; [-0.07, 1.23] for unit test 2; [0.18, 1.51] for unit test 3; [-0.12, 1.18] for story retell 1; [-0.24,

	Control: Typical basal instruction		story retell 2; 0.75 for story retell 3	1.047] for story retell 2; [0.09, 1.404] for story retell 3
Van den Bos et al. (2007) – IDG	*Treatment (Reciprocal Teaching):* Participants were taught summarizing, questioning, clarifying, and predicting techniques in small groups. *Control (later became Treatment 2):* No instruction	15 weekly 60-minute sessions across 3 months	g = 0.57 for sentence comprehension (adjusted); 0.42 for expository passage comprehension (adjusted); 1.47 for narrative passage comprehension (adjusted)	[-0.54, 1.32] for sentence comprehension; [-0.46, 1.41] for expository passage comprehension; [0.00, 1.96] for narrative passage comprehension
Van den Bos et al. (2007) – IN	*Treatment:* Participants were taught summarizing, questioning, clarifying, and predicting techniques individually. *Control (later became Treatment 2):* No instruction	15 weekly 60-minute sessions across 3 months	g = 1.42 for sentence comprehension (adjusted); 0.31 for expository passage comprehension (adjusted); 1.11 for narrative passage comprehension (adjusted)	[0.91, 3.06] for sentence comprehension; [0.53, 2.52] for expository passage comprehension; [0.53, 2.52] for narrative passage comprehension
Single-Case Design				
Bilgi & Özmen (2018)	*Treatment:* Participants were taught the structure of expository texts using modified multicomponent cognitive strategy instruction.	11 intervention sessions 3 days/week across 6 months (total: 865-957 minutes)	Average of 100% PND for main idea identification and quality of summaries	N/A

Grünke et al. (2013)	*Treatment:* Participants were taught to complete story maps to identify the important elements in a story.	10-14 30-minute daily intervention sessions	Average of 100% PND for comprehension questions	N/A
Özmen (2011)	*Treatment 1:* Participants read completed compare/contrast graphic organizer before reading text. *Treatment 2:* Participants read similarities section of text, restated the similarities, added similarities to blank compare/contrast graphic organizer, and repeated the previous steps for differences.	4-5 15-36-minute daily intervention sessions	Average of 100% PND for identification of similarities and 90% for identification of differences in Treatment 1; Average of 92% PND for identification of similarities and 100% for identification of differences in Treatment 2	N/A

Note. IDG = instruction and discussion in small groups; IN = instruction to individuals; PND = percentage of non-overlapping data; N/A = not applicable.

Table 2.6
Multicomponent Intervention Study Characteristics

Study and Design	Description of Conditions	Description of Sessions	Effect Size	95% Confidence Interval
Group Design				
Allor et al. (2010)	*Treatment:* Participants applied comprehension strategies (e.g., predicting, inferring, and summarizing). *Control:* Typical basal instruction	40–50-minute daily sessions across 46–106 weeks	*g* = -0.13 for passage comprehension (adjusted)	[-0.30, 0.74] for passage comprehension
Cohen et al. (2006)	*Treatment:* Participants selected keywords and phrases, identifying text theme, paraphrasing meaning, and rereading text to increase understanding. *Control:* No instruction	Two sessions/week across 60 weeks	*g* = 0.80 for sentence comprehension (adjusted); 0.03 for passage comprehension of short texts; -0.05 for passage comprehension of long texts (adjusted)	[0.02, 1.16] for sentence comprehension; [-0.52, 0.59] for passage comprehension of short texts; [-1.08, 0.05] for passage comprehension of long texts
Mastropieri et al. (2001)	*Treatment (Peer Tutoring):* Participants were taught partner reading and error correction, story retell, and paragraph summarization in pairs. *Control:* Typical basal instruction	Daily 50-minute sessions across 5 weeks	Estimated *g* = 1.12 for passage comprehension	[0.19, 20.45] for passage comprehension

Single-Case Design				
Hua et al. (2012)	*Treatment:* Participants (1) previewed generic comprehension questions, (2) read the text three times and received corrective feedback after the first and second readings, and (3) answered the generic comprehension questions.	3 15-minute sessions/week across 9-21 intervention sessions	Average of 0% PND for content-specific comprehension questions	N/A
Hua et al. (2013)	*Treatment 1:* Three-second CTD was employed as participants previewed target vocabulary words and their definitions on flashcards before reading. *Treatment 2:* Control condition	2 15-minute sessions/week across 12 intervention sessions	Average of 18.25% PND for comprehension questions	N/A
Hua et al. (2018)	*Treatment:* Participants (1) previewed generic comprehension questions, (2) read the text three times and received corrective feedback after the first and second readings, and (3) answered the generic comprehension questions. Goal setting was incorporated.	5-14 intervention sessions	Average of 8.6% PND for index of narrative complexity of oral retell	N/A

Note. PND = percentage of non-overlapping data; CTD = constant time delay; N/A = not applicable.

Appendix B

Appendix B-1

Sample Passage

A sunflower is a big, circular, yellow flower. Sunflowers need a lot of sun to grow. Sunflowers are actually made up of lots and lots of tiny flowers. The center part is made of one kind of flower, and the petals around it are another kind of flower.

Sunflowers are used in different ways. For example, sunflower seeds are good to eat. People, birds, and other animals, including squirrels and chipmunks, love to eat sunflower seeds. They can be difficult to eat if they are still in their shells, but they are filled with protein and are good for you! Sunflower seeds also have a lot of oil in them. **It** can be squeezed out and collected. Many people use sunflower oil for cooking.

Use the passage to answer the following questions:

1. What do sunflowers need a lot of?
2. What is one part of the sunflower that is made up of a different flower?
3. What is one type of animal that eats sunflower seeds?
4. What do people use sunflower oil for?
5. The passage reads: "**It** can be squeezed out and collected."

   In the sentence above, who or what is **it**?

Appendix B-2

Main Idea Directions Card (Side 1)

1. Read the sentence.
2. Circle **who or what** the sentence is about.
3. Underline **two important words** about the who or what.
4. Complete steps 1-3 for each sentence in the paragraph.
5. Write down **who or what** you circled the most.
6. Write down the **most important information** about the who or what using some of the underlined words.
7. Use the Main Idea Checklist (Side 2) to check your main idea.

Main Idea Checklist (Side 2)

Ask yourself…	Yes or No
Did I include who or what in the paragraph I circled the most?	
Did I give the most important information about the who or what?	
Did I write the main idea in my own words?	
Is the main idea between 8 and 13 words?	
Is the main idea all in one sentence?	

Appendix B-3

Sentence-Level Gist Log

Sentence	Who or What the Sentence is About	Two Important Words About the Who or What	
1			
2			
3			
4			
5			

Appendix B-4

Intervention 2.0 Directions Card

<table>
<tr><td>Steps</td><td>Ask Yourself…</td></tr>
<tr><td>1. Read the sentence.</td><td></td></tr>
<tr><td colspan="2">If you see he/him, she/her, they/them, or it/this…

a) Who or what is ___?
b) Reread the sentence to find out.
c) If the sentence doesn’t tell you, then reread the sentence before that sentence to find out.
d) Write down the answer next to the word in the paragraph.</td></tr>
<tr><td>2. Write down who or what the sentence is about.</td><td>Who or what does the sentence give us the most information about?</td></tr>
<tr><td>3. Write down two important words about who or what the sentence is about.</td><td>What are two words that tell us something important about ___?</td></tr>
<tr><td>4. Repeat steps 1, 2, and 3 for each sentence in the paragraph.</td><td></td></tr>
<tr><td rowspan="2">5. Write down who or what the whole paragraph is about.</td><td>Who or what did I write down the most in the first column?</td></tr>
<tr><td>If there are two who or whats I wrote down the most, ask yourself:

Which who or what do I think is more important?</td></tr>
<tr><td>6. Circle 3, 4, or 5 different words under the Two Important Words column that I can use to explain the most important information about ___.</td><td>Are there any words under the Two Important Words column I wrote down more than once? Which words tell me something important about ___?</td></tr>
<tr><td>7. Write down the most important information about who or what the whole paragraph is about.</td><td>What is the most important information about ___ using the important words I circled?</td></tr>
</table>

Appendix B-5

Fidelity Checklist

Student Initial: _____

Instruction

- ☐ Introduced the passage
- ☐ Introduced the task (i.e., completing the Sentence Log)
- ☐ Facilitated each step of the strategy for Paragraph 1
    - Student or interventionist reads each sentence
    - Student or interventionist writes who/what the sentence is about
    - Student or interventionist writes two important words about the who/what for each sentence
    - Student and interventionist discuss who/what the paragraph is mostly about
    - Student and interventionist discuss the most important information about the who/what for the paragraph
- ☐ Facilitated each step of the strategy for Paragraph 2
    - Student or interventionist reads each sentence
    - Student or interventionist writes who/what the sentence is about
    - Student or interventionist writes two important words about the who/what for each sentence
    - Student and interventionist discuss who/what the paragraph is mostly about
    - Student and interventionist discuss the most important information about the who/what for the paragraph

Assessment

- ☐ Gave student Sentence Log and passage stapled together
- ☐ Read the directions to the student
- ☐ Started the timer
- ☐ Ended the assessment at or before 15 minutes
- ☐ Did not provide students with any instruction or other support

Appendix B-6

GM's Social Validity Survey Ratings

Survey Item	GM's Rating				
	Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
Understanding what I read is important to me.	X				
It is easy to use the Sentence Log when I read.		X			
Using the Sentence Log helps me understand what I read.			X		
I like using the Sentence Log when I read.	X				
It is easy to talk to someone about what I am reading.	X				
Talking to someone about what I am reading helps me understand what I read.	X				
I like talking to someone about what I am reading.		X			

Appendix B-7

Interview Protocol

1. How would you describe the literacy needs and abilities of participating students (i.e., the three students who participated in the formative experiment)? How are their needs and abilities similar to or different from non-participating students (i.e., the five students who did not participate in the formative experiment)?
2. What are the literacy goals you have for participating students? How are these goals similar to or different from the goals you have for non-participating students?
3. How do you provide literacy instruction to meet the literacy goals of participating students? How is this literacy instruction similar to or different from literacy instruction for non-participating students?
4. In what ways does the literacy instruction you provide help or not help participating students achieve the literacy goals you have for them? How is this similar to or different from what helps or does not help non-participating students?
5. What supports do you have or can you access to help you provide participating students with literacy instruction to meet the literacy goals you have for them? How is this similar to or different from the supports that help with non-participating students?
6. What obstacles do you face that make it difficult to provide participating students with literacy instruction that helps them meet the literacy goals you

have for them? How is this similar to or different from the obstacles you face for non-participating students?

7. What preservice preparation or classes or in-service professional development or trainings have you received on teaching students with ID or providing literacy instruction?

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