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The Pre-Instructional and Reading Comprehension Strategies Special Education Teachers Use to Engage and Instruct Elementary Student Readers with ASD

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THE PRE-INSTRUCTIONAL AND READING COMPREHENSION STRATEGIES SPECIAL EDUCATION TEACHERS USE TO ENGAGE AND INSTRUCT ELEMENTARY STUDENT READERS WITH ASD

by

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Lyon (1998) called reading "critical to a child's overall well-being." Given the ubiquity of text in their lives today, reading skills can help students lead productive, meaningful lives. But what about elementary student readers with ASD? Senokossoff (2016) argued that "in addition to the social and emotional difficulties that children with ASD experience, many also struggle with reading comprehension." Research indicates that students with ASD can face deficits associated with self-regulation and sensory overload—associated with visual, hearing, and touch —and this can threaten learning and comprehension (Bogdashina, 2003). Thus, it could be argued that pre-instruction strategies focused on visual, hearing, and touch concepts may be used to prepare students for reading comprehension instruction and have a positive impact on aschievement for student readers with ASD. Founded on this consideration, this study sought to identify a connection between pre-instruction strategies and reading comprehension for students with ASD.

A multiple case study approach was applied to this qualitative study. I used interviews and observations to collect data from four special education teacher participants in four different Midwest elementary schools. Interview transcriptions, field notes, and an observation checklist comprised the data to be analyzed. Interviews made of open-ended questions sought to uncover and understand the pre-instruction and reading comprehension strategies special education

teachers used with the student readers with ASD. Questions focused on visual, hearing, and touch-based strategies, which I referred to as pre-instruction strategies, Computer-Based Interventions (CBI), and reading comprehension strategies. Observations were conducted in the classroom prior to and during reading instruction and guided by an observation checklist developed following teacher interviews. Observations were designed to link strategies discussed during interviews with those used during real time classroom instruction. Each observation sought to determine if special education teachers used pre-instruction strategies to prepare their students for reading comprehension instruction as well as to observe those strategies used for reading instruction. Analysis of the data led to findings which suggest that while special education teachers tend to believe in the benefits of and make pre-instruction strategies available to students with ASD in their classrooms, they do not apply these strategies in the preparation of reading comprehension instruction. Findings also shed light on the types of reading comprehension strategies teachers use in their classrooms, which are framed through the lens of the existing studies and the What Works Clearninghouse, as well as the ways teachers implemented reading strategies, often optimizing their efficacy through strategy combinations. My study revealed significant gaps in the literature and led to recommendations encouraging future studies which examine larger populations, possibly nationwide; those which include participants who work with and instruct student readers with ASD outside of the classroom, such as parents, librarians, and museum educators; studies which include more participatory observations over a longer period of time; studies which examine pre-instruction and reading comprehension instruction strategies for middle and high school readers with ASD; and how/if special education teachers collaborate with school occupational therapists to prepare students for reading instruction.

DEDICATION

A teacher committed to and passionate about serving the needs of students with ASD, I dedicate this dissertation to myself. I dearly love to help students with ASD and I am excited to share the outcomes of this study with teachers in the United States and Saudi Arabia. If the work I have done through this study touches one child's life, I will have done my job.

I dedicate this work to the special education field and the special education teachers who make a difference in the lives of their students each day. These are teachers who choose to take on the complicated and challenging responsibility of meeting the diverse needs of students with special needs. It is my hope that this study and its findings will help further equip these caring and skilled teachers with strategies that can help improve their students' reading ability and achievement.

I also dedicate this dissertation to all students with ASD. These students deserve to learn and to experience the discovery inherent in learning as much as their peers without disabilities. Students with ASD arrive to the classroom with their own unique and special needs and to succeed, they can require different strategies than their peers with and without disabilities. Reading is basic to so much of our daily lives, especially in our text-driven, digital and technological world. But reading, for students with ASD, can pose special challenges. This understanding informed my choice to pursue what I recognize as an important and understudied area of special education. May this study help me and my teacher community better learn to teach our students with ASD to read and make meaning from what they read.

"If they can't learn the way we teach, we teach the way they learn." – O. Ivar Lovaas

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Murfet Amean Alnemr

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LIST OF ABBREVIATIONS

ABA – Applied Behavioral Analysis

APA – American Psychological Association

ASD – Autism Spectrum Disorder

CBI – Computer-Based Intervention

DSM-III – Diagnostic and Statistical Manual III

ESSA – Every Student Succeeds Act

EAHCA – Education for All Handicapped Children Act

FAPE – Free and Appropriate Public Education

IEP – Individualized Education Program

NCLB – No Child Left Behind

NICHD – National Institute for Child Health and Human Development

NLP – Neuro-linguistic Programming

NWEA-Map® – Northwest Evaluation Association

PDD-NOS - Pervasive Developmental Disorder Not Otherwise Specified

PECS – Picture Exchange Communication System

RTI – Response to Intervention

SI – Sensory Integration

SIT – Sensory Integration Therapy

SIOP – Sheltered Instruction Observation Protocol

SVR – Simple View of Reading

TOM – Theory of Mind

ULS – Unique Learning System

WCC – Weak Central Coherence

WHQ – WH Word Questions

WWC – What Works Clearinghouse

Definition of Terms

Evidence-Based Practices
Practices which depend upon scientific evidence as the guide in lieu of practices based on tradition or intuition.

Inclusive Settings
Those classroom settings which welcome and allow learning and social interaction between students with and without disabilities.

Pre-Instruction Strategies
The strategies teachers use prior to instruction and related to the special needs of students with ASD that often involve visual, hearing, and touch issues, as well as emotional and physical space-based concerns. As understood by this study, these are strategies that may be used to prepare students to learn.

RAZ-KIDS®
An online reading program for student use both in the classroom or at home. The program features an online library of 81 'listen-to' and 'read-only' books

Self-Regulation
Also known as emotional self-regulation, this is the ability to react and respond to daily and situational demands and in ways perceived as socially tolerable and likewise, and especially vital to this study, in ways which permit a sense of internal calm and centeredness.

Sensory Integration
The processes by which humans take in the information all around them; how the information is received and how meaning is made given all the senses and how they work together (or not) to bring in data.

System 44®
A computer-based intervention which helps students discover how the English language is a finite system of 44 sounds and 26 letters, which is designed to foster reading achievement.

Visual Stimulation
Also known as visual stimulus, this kind of stimulation is characterized by frequency and phases.

What Works Clearinghouse

Overseen by the U.S. Department of Education Services' Institute of Education Services (IES), the What Works Clearinghouse reviews research on the four Ps: programs, practices, products, and policies in search of evidence-based strategies and interventions proven to work for teachers and their students.

CHAPTER I

INTRODUCTION

Reading has been described as "critical to a child's overall well-being" (Lyon, 1998) because our literacy-driven world demands reading skills. Without these skills, a child facing the future may not experience a productive, meaningful life. "Indeed, the use of effective reading comprehension strategies," McNamara (2007) explains, "is perhaps the most important means to helping readers improve comprehension and learning from text" (McNamara, 2007). Mastropieri and Scruggs (1997) called reading comprehension "the most important academic skill learned in school" (p.1; Khowaja and Salim, 2013). Special education teachers seek to help students with Autism Spectrum Disorder (ASD) develop the skills needed to live happy, healthy, and productive lives. According to Senokossoff (2016), in reference to work by Myles et al., 2002, "In addition to the social and emotional difficulties that children with ASD experience, many also struggle with reading comprehension" (Senokossoff, 2016). Commonly, students with ASD also struggle with deficits related to stimulation and self-regulation, and thus, learning can be threatened when students are "overloaded by too much sound, visual stimulation, emotional or/and physical demand and environmental expectation" (Bogdashina, 2003, p. 11). Thus, it could be argued that for students with ASD, physical and emotional space may play a role in the learning process and thus, pre-instruction strategies focused on visual, hearing, and touch may be used to prepare students for instruction. This study seeks to identify a connection between pre-instruction strategies and reading comprehension for students with ASD.

Autism is described as a "complex neurodevelopmental disorder with no precise

cause…[involving] an impairment of the brain in a way that can be observed through the behavior and emotional characteristics of a person" (Wheeler, Mayton, & Carter, 2015). It has also been defined as a "neurodevelopmental disorder characterized by impairment in social interaction, in communication, skills, and in behavior, which is restricted and repetitive" (Tidmarsh & Volkmar, 2003). While proposed causes for autism are many, there is exists "no clearly known cause for the disorder" (Wheeler, Mayton, & Carter, 2015). A deeper exploration of characteristics related to ASD can be found in chapter two.

The need to provide high-quality instruction to students with ASD is mandated by legislation including the Individuals with Disabilities Education Act (IDEA) and the Every Student Succeeds Act (ESSA), which President Barack Obama signed into law in 2015. ESSA advances the law by a) protecting high-need and disadvantaged students, b) requiring that all students be prepared for college success, c) uses assessments in order to provide data to teachers, parents, students, and the community, d) supports evidence-based practice interventions, and e) maintains accountability for low-performing schools (U.S. Department of Education, 2016). Founded on upholding the requirements of this legislation and in the best interest of students with ASD, this study seeks to identify the strategies, both pre-instructional and instruction-based, teachers use when working toward reading comprehension with their students with ASD. Interview questions and observations will lead to an analysis which may be compared and contrasted to what the literature suggests about a possible connection between the emotional and physical space and the learning process for student readers with ASD as well as offer a better understanding about the strategies teachers actually use in their classrooms to instruct and prepare student readers for instruction. For the purpose of this study, *pre-instruction strategies* are defined as strategies teachers use prior to instruction and related to the special needs of

students with ASD that often involve visual, hearing, and touch issues, as well as emotional and physical space-based concerns. As understood by this study, these are strategies that may be used to prepare students to learn. Further, *emotional space* is defined as how the place, area, or classroom atmosphere impacts a student with ASD's emotional capacity to prepare for instruction (is this a place where the student feels welcome to focus?) while physical space is understood as the classroom atmosphere itself and how it affects the student's capacity to receive instruction (is it loud? Too bright? Over-stimulating?). S*tudent readers with ASD* are defined as elementary students with varying severities of Autism Spectrum Disorder with verbal skills who are instructed in reading comprehension by special education teachers.

This study is informed by reading theories including the Simple View of Reading (Gough & Turner, 1986), Reading is Not a Natural Process (Lyon, 2013), Theory of Mind (Murray, 2008; Baron-Cohen, 2000), Theory of Weak Central Coherence (Abnett, 2013; C. R. Caranahan et al., 2011; Plaisted, Saksida, Alcantara, & Weisblatt, 2003), and Theory of Executive Functioning Deficits (Abnett, 2013; Chiang & Lin, 2007; Griswold, Barnhill, Myles, Hagiwara, & Simpson, 2002; ASBERG, 2010). Each provided a richer understanding of the rationale behind strategies used to support student readers with ASD.

For example, although some researchers and educators argue that oral language exposure leads to a natural reading process for beginning readers, G. Reid Lyon (1998) cited four decades of empirical research suggesting that "reading is not a natural process" (Lyon, 1998). Because this study includes a focus on pre-instruction strategies which prepare students with ASD for reading instruction, theories related to Sensory Integration (SI) also served as beneficial. Sensory integration (or integrative) therapy (SIT) "is designed to restore effective neurological processing and increase the individual's ability to integrate sensory information by enhancing each [of the

three systems]" (Smith et al., 2015, p. 247; Case-Smith, Weaver, & Fristad, 2014). While it became clear during the course of the study that SI and SIT were more frequently used by school occupational therapists than by teachers, the opportunity to interview teachers and observe their real time classroom procedures shed light on both their understanding of sensory integration and whether they applied related pre-instruction strategies prior to instruction, with an emphasis on reading comprehension instruction.

Based on data collection and analyzed following interview questions and observations, this study explores two key aspects: 1) *pre-instruction strategies*: Strategies in use by teachers as they help prepare their students with ASD for reading comprehension instruction and 2) *instruction strategies*: those reading comprehension strategies used by teachers working with students with ASD. Understood against the backdrop of the literature, this study is intended to determine if there is a relationship between pre-instruction strategies and the learning process for student readers with ASD. Overall, the study seeks to identify a) what strategies teachers are using, b) what the literature says about related strategies proven effective and c) in what ways these strategies meet What Works Clearinghouse standards.

Background of the Study

A pilot study conducted in 2016 revealed findings which inspired and informed this research. Elementary school teachers interviewed about reading strategies used with their students with ASD exposed me not only to the reading approaches they employed, but also to the ways they helped prepare and foster instruction through what I have come to call pre-instruction strategies. For example, the teachers adapted their classrooms to decrease overstimulation by dimming lights. They provided touch-based interventions like fidgets, movement-based options such as a wiggly chair, and for those students who appeared to benefit from pressure, weighted

vests were available. My research led me to consider a potential connection between pre-instructional and reading comprehension achievement for students with ASD. Did these pre-instructional strategies help prepare students with ASD for better reading comprehension, were other teachers using them, and what did the literature say about these strategies? Therefore, to further explore a possible connection and toward identifying the pre-instruction and reading instruction strategies used in elementary schools for student readers with ASD, I have designed a qualitative research study where the methodology is based on a multiple case study approach. I designed this study because I seek to contribute new information to my field. According to Richards, the literature is currently lacking in reading comprehension studies involving students with ASD. This study recognized that qualitative research studies are not limited by a specific conclusion but can be shaped over time based on the data collected (Richards, 2015). According to Allington and Cunningham , the need for students to read for meaning grows academically by third grade and continues to increase over time (Allington & Cunningham, 2002; Snyder, Eckert, & Fenster, 2013). This and related research demonstrate that the pivotal age and/or grade levels of general education readers and the importance of reading comprehension can be identified, and therefore, strategies developed for and customized to those specific years. However, this is not necessarily the case for students with ASD. Because ASD adversely impacts reading abilities based on social, language, and cognition skills (Nation & Norbury, 2005; Newman et al., 2007; C. Norbury, 2005; Rehfeldt, Latimore, & Stromer, 2003; Ricketts, 2011; Snyder, Eckert, & Fenster, 2013), reading delays result and manifest themselves at different severities for all readers with ASD. With this in mind, pinpointing a specific grade level for reading comprehension strategies would not serve the needs of all upper elementary student readers with

ASD. Therefore, to identify strategies beneficial to a wider variety of student readers with ASD, this study sampled teachers working with students throughout elementary school.

Problem Statement

The literature reports that students with ASD can decode what they are reading, but often, they struggle with language and reading comprehension. Studies show that while some student readers with ASD can read, they may face difficulties interpreting meaning from text (Whalon & Hart, 2001). These students struggle with literacy acquisition due to several factors. As seen in the literature review, this study attempts to understand pre-instruction and reading comprehension instruction strategies based on ASD-related factors including students' lack of ability to connect with/make inferences about other's feelings; limited self-regulation; lack of prior knowledge; and limited exposure to systematic comprehension instruction. Pre-instruction factors considered include stimulation issues related to the sensory sensitivities associated with ASD, often visual, hearing, and touch-based, as well as the struggles some students with ASD face in an over-stimulating world. It can be argued that external and internal factors can combine to impact the student's ability to self-regulate, concentrate, and stay focused on reading comprehension.

Researchable Problem

While students with ASD can decode, they often face obstacles in interpreting meaning in what they read. Compounding this challenge, when spaces are not conducive to learning, especially related to a student's inability to self-regulate, reading comprehension strategies may be compromised. Studies associated with reading comprehension and students with ASD often focus on decoding, but the literature tends to stop there. Gaps exist in the potential combination

of pre-instruction and reading comprehension instruction strategies which may be used to help students best make meaning out of reading.

Studies Addressing the Problem

General studies on reading comprehension have been conducted; however, a lack of studies focused on reading comprehension and students with ASD remains. Further limited are studies which focus on and recommend to special education teachers effective, evidence-based reading comprehension strategies. Additionally, while studies have been conducted on sensory integration for students with ASD with an emphasis on their use by occupational therapists, the special education field has not recognized a documented connection between internal and external-focused pre-instruction strategies (related to visual, hearing, and touch-concepts) and the learning process. These gaps and limitations shaped the design of my research study.

The National Institute for Child Health and Human Development (NICHD) has focused research efforts on childhood reading since the 1960s. They have studied 10,000 students and published over 2,500 articles and more than 50 books on topics related to reading. These studies take into consideration cognitive, linguistic, neurobiological, genetic, cognitive, linguistic, and instructional aspects impacting early reading skills development (Lyon, 1998). Specific to reading comprehension, Gough and Tunmer identified the role of decoding in reading (Gough and Tunmer 1986), which can be defined as "efficient word recognition" (Hoover & Gough, 1990), and proposed the Simple View of Reading that suggests decoding plus language comprehension equals reading comprehension (Farrell, Davidson, Hunter, & Osenga, 2010). In general, the U.S. Department of Education Studies reports a significant number of research studies have been conducted over the last two decades on strategies to improve reading difficulties (Senokossoff, 2016).

Further narrowing the research focus to reading comprehension and children with ASD, Myles et al., (2002) argue that on top of the social and emotional challenges children with ASD face, many also encounter reading comprehension difficulties. Nation, Clarke, Wright, & Williams (2006) reported that 65% of children with ASD struggle to make meaning from what they read. In terms of strategies, Whalon & Hart (2001) suggest that reading comprehension improved when general education students were taught to use strategies including reciprocal questioning. Likewise, Khowaja & Salim (2013) suggested that Computer-Based Intervention (CBI)—instruction designed to be administered via a computer— can help children with autism learn independently, which may be applicable to reading comprehension.

Students with ASD may find developing and applying oral language skills difficult due to a tendency for overstimulation. This can cause students to lose focus or withdraw. Another obstacle for the student with ASD can be sensitivities to sound, light, and touch. These sensitivities can impact their ability to focus in on tasks (APA, 2013; Senokossoff, 2016). Very few studies have been conducted on sensory-based pre-instruction interventions for students with ASD and of those few studies, the majority focus on sensory tools applied in clinical settings, such as strategies used by occupational therapists. For instance, of the limited number of studies using weighted vests for children with ASD, the majority of findings suggest that these wearable sensory tools—presumed to impact a child's somato-sensory system—prove ineffective and without further research, cannot be recommended for clinical use (Stephenson & Carter, 2008; Alli & Yeshuana, 2016). This study seeks to make a contribution to this understudied topic and simultaneously, shed more light on the elementary school usage of sensory-based pre-instruction strategies and any connection to reading comprehension strategy efficacy.

Deficiency Statement

According to Senokossoff (2016), while the U.S. Department of Education Studies suggests that research has been conducted since the 1990s on strategies to improve reading difficulties, far less research focuses on students with ASD. Given studies which emphasize the significance of reading skills for an effective and meaningful life experience and the difficulties some student readers with ASD face with comprehension, this study seeks to fill that void and as a result, offer recommendations for future studies to continue to fill this remarkable void.

Significance

This study sought to identify a connection between pre-instruction strategies meant to help students with ASD prepare for instruction and reading comprehension strategy success. According to McNamara (2007), "Indeed, the use of effective reading comprehension strategies is perhaps the most important means to helping readers improve comprehension and learning from text". These findings will assist teachers, including special education teachers, those working in inclusive classrooms, resource rooms, and engaged in co-teaching, in learning more about and applying reading comprehension strategies for their students with ASD. The study is also intended to benefit parents of students with ASD providing reading instruction at home. Because the current Saudi Arabian educational climate is not conducive to integrating pre-instruction with instruction strategies into reading comprehension instruction for students with ASD, this study will serve as a model for Saudi Arabian special education professionals like myself who seek to expand and improve resources for students with ASD.

Moreover, according to Florian (2012), today's educators are not only required to help students meet high academic expectations but must also "meet the needs of students with an assortment of cultural, linguistic, and developmental diversity." Kluth & Darmody-Latham

(2003) argue that some teachers feel ill-prepared to teach students with ASD. Thus, this study may provide special education and general education teachers insights into the strategies designed to strengthen reading comprehension for their students with ASD.

Purpose Statement

This qualitative, multiple case study approach was conducted in Southwest Michigan elementary school classrooms. Of particular interest for this study were the strategies that special education teachers used to address preparation for reading instruction because students with ASD often face concentration issues due to self-regulation and overstimulation issues. Likewise, because students often struggle to make meaning from the words they read, the study focused on the real time reading comprehension strategies teachers used for their student readers with ASD framed by the what the literature and the What Works Clearninghouse recommends.

Research Questions

1. What pre-instruction strategies or techniques (visual, hearing, touch) do special education professionals use to help prepare students with ASD for the reading comprehension instruction process?
2. What reading comprehension strategies, including but not limited to direct instruction, reciprocal teaching, and Computer-Based Interventions (CBI) do special education teachers use when instructing students with ASD in reading comprehension?

Theoretical Framework

Like a patchwork quilt, my study framework is comprised of a variety of theories and studies which first helped me unpack and understand the results of my pilot study and second, helped me form the foundation of my current study. Seeking to understand why it was that teachers in my pilot study used pre-instruction strategies like wiggly chairs and fidgets for their

students with ASD, I based my study on the American Psychological Association's (APA) argument that some children with ASD face difficulties developing and applying oral language skills because these students can be challenged by too much stimulation. According to the APA, overstimulation, be that of internal or external origin, can cause students with ASD to lose focus or withdraw and face difficulties with self-regulation. Further, they found that sensitivity to sound, light, and touch can also impact the student's ability to remain centered (Senokossoff, 2016; APA, 2013). My study's focus on pre-instruction strategies is informed by the theory of Executive Functioning Deficits, which argues that students with ASD face self-regulation challenges as the result of neurobiological impairments (Abnett, 2013; C.R. Carnahan et al., 2011). Reading instruction strategies featured are based in part on the work of Khowaja & Salim (2013), which found that Computer-Based Intervention (CBI) can increase learning for students with ASD as well as Olsen, L.J. & Moulton, H.J. (2004), who found that 82% of the schools they surveyed report using sensory tools such as weighted vests, and observed increased self-regulation, increased attention to task, and decreased self-stimulatory behaviors. I also based the reading strategies portion of the study on the Simple View of Reading: A theory which states that decoding plus listening comprehension leads to reading comprehension (Gough & Tunmer, 1986) as well as Lyon's (2013) *Reading is Not a Natural Process* theory, Lyon (2013), which emphasizes the need for explicit reading instruction where students connect text with the sounds the words make. I believe in Lyon's theory because before I attended school as a child instructed by my mother, I learned the alphabet and to sound out words using phonics and phonemic awareness. Paired with access to our family library of picture books, text books, and the Holy Quraan, I found these strategies a success for me and my nine siblings. Thus, through my study, I wanted to find out if teachers used, be that deliberately or organically, strategies based on Lyon's

principles as well as the other theories and studies explored in this framework. I also based my study on the Theory of Mind. Those who possess theory of mind can recognize and sympathize with others' mental states and behaviors, which can lead to reading comprehension. By understanding how others feel, as well as developing an awareness of the variety of outcomes related to their feelings, those with theory of mind are able to recognize influences on current behavior and predict potential aspects of future behavior (Murray, 2008). The Theory of Weak Central Coherence suggests that while students with ASD are able to decode terms and string together the elements of a story, they struggle to make meaning or connect with the reading's main points (Abnett, 2013; Cotter, 2011; Hart & Whalon, 2011; Lombardo & Baron-Cohen, 2011). These theories served as a foundation upon which to build my understanding of pre-instruction and reading comprehension strategies.

Research Design

In order to obtain and analyze firsthand answers to questions regarding classroom, student, and teacher data, I used a qualitative research approach composed of multiple case studies.

Population, Sample, Site (Unit of Analysis)

I focused the study on elementary special education teachers who serve students with ASD in reading comprehension instruction in the elementary school setting. Specifically, classrooms, resource rooms, and self-contained classrooms served as the most appropriate locations for the observation portion of my data collection, for it is in these settings where students learn to read independently and within groups. Likewise, these settings gave me the opportunity to observe the presence (or lack of) and use of pre-instruction and reading comprehension strategies. These

educational settings serve as spaces where teachers and students have the tendency to feel comfortable and as a result, prove conducive to the collection of rich, relevant data related to pre-instruction and reading comprehension instruction, acquisition, and achievement.

Data Collection Procedures

I conducted open-ended, semi-structured question interviews and observations with special education teachers in Southwest Michigan. Through the interview process, participants were asked to share examples and artifacts related to the strategies they use to prepare their students to learn and improve their reading comprehension skills. Interviews were audio recorded and transcribed for analysis. The observation process, in which I assumed the nonparticipant/observer as participant role (Creswell, 2007), employed an observation checklist method based on my literature review and participant interviews (Creswell, 2007; Marshall & Rossman, 2016). To adhere to observational ethics standards, participants were made aware that the observation was taking place and their willingness to participate was ensured throughout the process (Marshall & Rossman, 2016). Field notes were recorded by hand (Richards, 2015; Marshall & Rossman, 2016) and an observational protocol founded on descriptive and reflective notes was employed immediately following observation to best preserve the richest data possible (Angrosino, 2017; Creswell, 2007).

Data Analysis Plan and Crosswalk Table

Data was interpreted using the inductive method for data analysis. Interview transcriptions, field notes, and an observation checklist comprised the data to be analyzed. In order to determine whether or not teachers are aware of and applying evidence-based reading comprehension practices when working with their students with ASD, I compared and contrasted findings from the literature with findings based on data collected from teacher interviews and

observations. Triangulation was facilitated through data drawn from teacher interviews, data drawn from teacher observations, and review by teacher participants of their interview transcripts. To store data, I typed notes electronically and saved data in a way which protected participant anonymity. Interview participants were assigned numbers and their names were not used, thus further protecting their privacy. After collecting information from interviews and observations about strategies to engage and assist students in the reading process, I looked for patterns and themes such as reading comprehension strategies, engagement strategies, use of pre-instruction strategies related to visual, hearing, and touch concepts, use of CBI, and evidence of engagement and reading comprehension. Results were reflective of the dates in which I collected interviews and examples or artifacts of the teachers' work. Initial transcripts included notes, writing in margins, reflective passages in notes, a draft of a summary sheet on field notes, codes and memos, note patterns, and frequency of code. The inductive analysis approach was used to describe, classify, compare, and interpret transcript data into codes and themes.

CHAPTER II

LITERATURE REVIEW

Overview of Literature Review

This review of the literature is designed to uncover a potential connection between pre-instruction and reading comprehension strategies for elementary school age student readers with ASD. It is informed by the idea that for some students, reading comprehension strategies may fall short of their efficiency due to certain internal challenges (deficits in self-regulation skills; visual, hearing, and touch-based issues) and external challenges (classroom atmosphere; overstimulation through noise or light; physical space-based issues). Therefore, the literature review explores the overall statistics and struggles associated with student readers with ASD, considers the possibility that some students may not get their reading comprehension needs met as a result of these internal and external challenges, and explores potential strategies said to help students comprehend what they read in internal and external conditions conducive to learning. It likewise serves to identify any connections researchers have made between pre-instruction and reading comprehension strategies, identify any reasons behind the limited studies conducted on the topic, and to recommend future studies to expand understanding. It poses this question: Have few made a connection between pre-instruction strategies and instruction strategies because this is fairly new ground to be covered or because researchers have deemed such research unusable?

Toward this goal, this review of literature is structured under three main headings: 1) The Current State of Students with ASD; 2) Pre-Instructional Strategies (visual, hearing, touch); and 3) Strategies to Promote Reading Comprehension. Following an introduction to ASD, which also

breaks down the current state of and struggles faced by student readers with ASD, the literature review discusses pre-instruction and reading comprehension strategies that may be used for student readers with ASD. The strategies considered are based on challenges often faced by students with ASD, such as sensory-based (visual, hearing, and touch) and self-regulatory issues, which may hinder their ability to benefit from reading comprehension strategies. Next, this chapter briefly introduces reading and reading theory to prepare for the section on reading comprehension and strategies related to instructing students with and without ASD. The literature review sought to identify what the literature says about related pre-instructional and reading comprehension strategies proven effective and in what ways these strategies meet What Works Clearinghouse standards.

The Current State of Students with ASD

An Autism Spectrum Disorder Overview: Definition and Diagnostic History

Autism Spectrum Disorder (ASD) in terms of the development of its identification and definition was first recognized in 1943 when Leo Kanner coined the term "infantile autism" to describe 11 socially isolated children with communication impairment and inflexible behaviors (Tidmarsh & Volkmar, 2003). Autism was neither diagnostically identified nor was it based on empirical research until 1980 when the Diagnostic and Statistical Manual of Mental Disorders III (DSM-III) was published (Tidmarsh & Volkmar, 2003). Increasingly, in its updated iterations, the DSM has redefined and expanded the criteria and definitions of autism and later, ASD. The DSM IV, published 1994, listed autistic disorder under the umbrella of Pervasive Developmental Disorders (PDD) with Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder, Pervasive Developmental Disorder, and Not Otherwise Specified (PDD-NOS) (Kurita, 2011). The same DSM proposed severities of level one or mild; level two or moderate; and level three

or severe, which fall into "two symptom domains of social communication, fixated interests, and repetitive behavior" (Kurita, 2011). Data for this study was collected from teachers who teach students with mild to moderate ASD who can speak and read (decode). The classification would transition in 2013 when the DSM-V updated the overall classification from PDD to Autism Spectrum Disorder with four subtypes characterized by deficits in social communication and social interaction and restricted repetitive behaviors, interests, and activities (Carpenter, 2013). These four subtypes are Autistic Disorder, Childhood Disintigrative Disorder, Asperger's Disorder, and PDD-NOS (Kurita, 2011).

Today, Autism is described as a "complex neurodevelopmental disorder with no precise cause…[involving] an impairment of the brain in a way that can be observed through the behavior and emotional characteristics of a person" (Wheeler, Mayton, & Carter, 2015). It has also been defined as a "neurodevelopmental disorder characterized by impairment in social interaction, in communication, skills, and in behavior, which is restricted and repetitive" (Tidmarsh & Volkmar, 2003). Proposed causes for autism are many, however, there is exists "no clearly known cause for the disorder" (Wheeler, Mayton, & Carter, 2015).

DSM Classification and Criteria

The DSM-V identifies three levels of severity for ASD with a focus on two key aspects: Social Communication and Restricted Interests & Repetitive Behaviors. Level 1 describes individuals "requiring support," Level 2 describes individuals "requiring substantial support," and those considered to be at Level 3 are described as "requiring very substantial support" (Carpenter, 2013). The DSM-V lays out the guidelines and criteria for ASD, organized into four key areas lettered A-D. These Criteria for ASD are:

A. Persistent deficits in social communication and social interaction across contexts, not accounted for any general developmental delays, and manifest by 3 of 3 symptoms.

B. Restricted, repetitive patterns of behavior, interests, or activities as manifested by at least 2 of 4 symptoms.

C. Symptoms must be present in early childhood (but may not become fully manifest until social demands exceed limited capacities).

D. Symptoms together limit and impair everyday functioning.

The following is a more detailed breakdown of the characteristics associated with these criteria, specific to guidelines A-B: A1. "Deficits in social-emotional reciprocity," which refers to abnormal social approaches and back and forth conversation, low shared interests and emotions, and an absence of socializing; A2. "Deficits in nonverbal communicative behaviors used for social interaction," which includes poor communication, eye contact, body language, challenges with use and comprehension of nonverbal communication, and absence of facial expressions and gestures; A3. "Deficits in developing and maintaining relationships…appropriate to developmental level (beyond those with caregivers)," which includes ability to choose and display socially appropriate behaviors in varied scenarios, trouble with imaginative play, difficulty making friends, and lack of interest in others; B1. "Stereotyped of repetitive speech, motor movements, or use of objects," which includes atypical speech, the use of jargon, repetitive vocal or physical movements, repetitive or stereotyped play with toys and other objects; B2. "Excessive adherence to routines, ritualized patterns of verbal or nonverbal behavior, or excessive resistance to change," which includes motoric rituals, rigid thinking, excessive distress over small matters; B3. "Highly restricted, fixated interests that are abnormal in intensity or focus," which includes preoccupations, obsessions, narrowed interests,

insistence on perfection, attachment to unusual objects, often inanimate, and unusual fears; B4. "Hyper-or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment," which includes a high pain tolerance, touch preoccupation, atypical and excessive visual and sensory exploration of objects (Carpenter, 2013). It could be argued that the criteria presented in B4 relates to the visual, hearing, and touch-based challenges this study associates with pre-instruction strategies.

Demographics

The prevalence of ASD continues to rise worldwide. In the 1960s, studies showed autism rates of 4/10,000 (Uchiyama et al., 2007), and today, that rate has increased to one in 68 (Roane, Fisher, and Carr, 2016). Boys face a higher risk for autism with five times more occurrences for boys over girls (Wheeler, Mayton, & Carter, 2015). The rise in prevalence may be associated with refinements in diagnostic procedures and criteria over time through updates to the DSM, which resulted in a "broader range of social impairment, thereby increasing the numbers of children with this diagnosis" (Tidmarsh & Volkmar, 2003). In terms of its clinical implications, autism is associated with high rates of comorbidity and the prognosis is poor due to impacts on independent living and employment abilities. Early intervention can help improve the prognosis (Tidmarsh & Volkmar, 2003). Given the global increase of children identified on the autism spectrum, it is essential that increasing numbers of educators be prepared to meet the educational needs of students with ASD (Wheeler, Mayton, & Carter, 2015). Relevant to this study, it is important that educators be knowledgeable of and equipped with reading comprehension strategies to serve the growing number of students identified with autism. To that end, the literature review as well as investigations into strategies reviewed by the What Works Clearinghouse were designed to identify evidence-based reading comprehension strategies.

IDEA and ASD in Schools

As our understanding of ASD evolved, so did special education. Historically, in the U.S., students with special needs often received an inadequate education or faced exclusion from classrooms. According to Pulliam & Van Patten (2006), as recently as 1975, "up to half of the estimated 8 million children with disabilities…were either being inappropriately educated or fully excluded from the public school setting. On Nov. 29, 1975, President Gerald Ford signed the Education for All Handicapped Children Act (EAHCA) became the mainstreaming law that required states to provide a free and appropriate public education for children with disabilities from ages 5 to 18. Today, that act is known as the Individuals with Disabilities Act (IDEA) (Esteves & Rao, 2008). As Esteves & Rao (2006) expressed, "What was previously seen as a privilege is now a legal right…All children with disabilities must have an individualized education program (IEP), a free and appropriate public education, and be served in the least restrictive environment." IDEA would be updated with additional amendments intended to expand the focus on access to more "meaningful and measurable programs for all students with disabilities" (Esteves & Rao, 2006; p. Hardman & Nagle, 2004).

Further developments shaped the expanded quality of special education available today. For instance, the No Child Left Behind (NCLB) Act and IDEA 2004, respectively added increased levels of student achievement accountability and qualified teachers, and alternative learning disability identification models including Response to Intervention (RTI), progress monitoring, increased assessment options, and differentiated instruction (Esteves & Rao). Most recently, the Every Student Succeeds Act (ESSA), signed into law by President Barack Obama in 2015, deepened the development of special education. Overall, this act scaled back the federal government's generalization of national standards and afforded individual states to govern

teacher assessment, the assessment of student achievement, maintain accountability for low-performing schools, and appreciate the use of technology in education (Parsons, 2015). Directly related to students with ASD, ESSA better protects high-need and disadvantaged students and requires that all students be prepared for college success—a requirement with important implications for students with ASD to look forward to self-sufficient futures. Importantly, ESSA also emphasizes the use of assessment to provide useable data to teachers, parents, students, and the community while supporting evidence-based practice interventions (U.S. Department of Education, 2016), such as the reading comprehension strategies highlighted in this study.

Connections Between Pre-Instruction and Reading Comprehension

When presented with reading comprehension instruction, students with ASD may struggle with a variety of challenges, which include background knowledge deficiencies, self-regulation as well as issues related to limited interests, impaired language development, an inability to make meaning of the text decoded, and theory of mind issues, which are described later in the chapter. In addition, and essential to this study, as a result of biological and neurological factors, students with ASD also struggle with what Murray (2008), citing Greenspan and Wieder (1998) and Wetherby and Prizant (2000) described as the "dual ability to take an interest in the sights, sounds, and sensations of the world and to calm oneself down" (p. 38, Murray, 2008). When appropriately functioning, Murray explained, "this capacity includes attending to multisensory affective experience and at the same time organizing a calm regulated state and experiencing pleasure" (p. 38, Murray, 2008; Wetherby & Prizant, 2000). When individuals struggle with deficits related to over-stimulation and self-regulation, learning can be threatened. Bogdashina (2003) reported that "autistic individuals have been 'pushed' beyond their limits of sensory endurance. Often this is due to those relating to them not having

understood how 'painful' it is to be overloaded by too much sound; visual stimulation; emotional or/and physical demand and environmental expectation" (p. 12). Thus, it could be argued that reading comprehension strategy implementation may be threatened when a students' internal and external conditions are not conducive to learning for the student with ASD.

Despite these challenges, a better understanding of pre-instruction strategies designed to meet student struggles with stimuli and self-regulation may help to build the necessary bridge leading to decreased over-stimulation, increased self-regulation, and potentially more effective reading comprehension. In tandem, growing research, fortified by expanding knowledge about effective reading comprehension strategies for students with ASD, "provides the foundation for designing high-quality literacy instruction for students with ASD" (p. 10, Carnahan, Williamson, & Hayden, 2009; Chiang & Lin, 2007). Despite these statements, a remarkable research void remains regarding pre-instruction strategies and impacts on the efficacy of subsequent instruction for the student with ASD. In fact, it was my pilot study that prompted this discovery as well as the current study.

Using Pre-Instruction Strategies: A Pilot Study Considerations Informing This Study

The results of elementary school teacher interviews from the pilot study that preceded this work revealed that before and during reading comprehension strategies implementation for their students with ASD, teachers employed a number of pre-instructional strategies (visual supports; weighted vests; fidgets; wiggle chairs; dimmed lights) to decrease over-stimulation, increase self-regulation, and improve classroom settings toward more effective reading comprehension. For example, when asked what strategies she used to help students with ASD become better engaged and responsive while becoming better readers, one teacher responded, "…visual schedules really help with keeping them on track… I also use the wiggle seats and they

seem to like that… I also use sleeves…[and] weighted vests… it just depends on the child… every ASD student has a different sensory need" (Alnemr, 2017). I found these responses compelling and began the search for literature in support of these teachers' philosophies. The paragraphs attempt to identify any connection between the lived experiences of the teachers interviewed in my current study and the literature, as well as how (and if) these pre-instructional strategies meet the standards established by the What Works Clearinghouse (WWC).

Pre-Instructional Strategies and the Literature

Pre-instructional strategies used toward increasing the efficacy of reading comprehension strategy implementation include but are not limited to adapting external conditions, such as classroom conditions (modulating light; limiting distracting noises), visual supports, video modeling, and priming. They also include strategies which target the types of internal conditions that can prevent students with ASD from focusing, centering, and tuning in to instruction. As demonstrated in the paragraphs to follow, in terms of pre-instruction, more focus has been placed on external conditions than on internal conditions

Setting Pre-Instruction Conditions

When considering effective pre-instructional strategies, some scholars advocate for deliberately adjusting classroom conditions. These adjustments might find a teacher dimming classroom lighting or using noise cancelling headphones to encourage student focus in an otherwise noisy school. Before presenting reading comprehension strategies for students with ASD in their 2009 study, Carnahan, Williamson, and Hayden explored techniques to "promote engagement and learning in many academic activities, including literacy and language arts instruction" and called for "setting the conditions for learning" (Carnahan et al., 2009, p. 11).

Pre-Instruction and Applied Behavior Analysis

Reciprocally speaking, the classroom settings can have an impact on behavior and behavior can have an impact on classroom settings. Thus, it is beneficial to the study of pre-instruction and reading comprehension strategies to consider Applied Behavior Analysis (ABA). Research suggests that ABA-based approaches prove beneficial in the creation of effective learning conditions for students with ASD and therefore, "lead to broad-based change" (p. 27, Murray, 2008). Developed by Ivar Lovaas, ABA applies scientific behavior principles toward the development of effective and beneficial routines and repertoires and discourages harmful or unhelpful behavior (Murray, 2008; Lovaas, 2002). It could be said that ABA serves the pre-instruction strategy needs of students with ASD because, despite their tendency to face neurologically-based deficits, these students are "nonetheless amenable to change in response to specific, carefully programmed, constructive interactions with the environment" (p. 24, Murray, 2008; Harris & Handleman, 1994; Koegel, 1995; Lovaas & Smoth, 1989). As a pre-instruction strategy, the natural language paradigm (NLP) sets the conditions for learning by encouraging a naturalistic and play-based setting and includes verbal reinforcement of relevant speech… (Roane et al., 2016). This targets self-management (described in this study as self-regulation), self-initiation, and interacting with others and is another ABA-based approach aligned with helping create internal and external conditions conducive to learning (Roane et al., 2016). With six out of 40 studies meeting standards, the WWC (2016) showed (PRT) positive response training to have no discernible effects related to communication competencies for students with ASD. Arguably, this finding is frustrating given the positive perceptions of ABA in the education field.

Murray (2008) connects the setting, the teacher providing the stimuli, and the how stimuli is delivered with the second tenant of Lovass' ABA theory, which suggests that students with ASD possess several behavioral deficits that may be transformed if addressed. Further, Murray explains that this belief "is that an individual's various behaviors are controlled by different environmental factors" (p. 27, Murray, 2008), which can be associated with a student's external conditions. Thus, this may be linked with the concept of intentionally developing classroom conditions ideally suited to providing reading comprehension strategies to students with ASD. Murray also highlights Lovaas' third ABA tenet, which holds that "persons with autism can learn once a special environment is created" (p. 29, Murray, 2008). Through the use of ABA-based pre-instructional strategies, effective learning conditions for elementary students with ASD have been described as those with the capacity for five to eight students and furnished with a small table and chairs with instruction materials and reinforcement supplies in easy reach to allow the teacher to provide uninterrupted reinforcement with each trial. Murray (2008) stressed that for students with ASD, the classroom is at its best when it is low on visual and auditory distractions. Dividers set up on each side of the work table serve as an ABA-based classroom conditions adaptation strategy proven to decrease visual and auditory distractions (Murray, 2008), and may increase the efficacy of reading comprehension strategies for students with ASD. Despite these significant findings, which appear to keep the unique needs of students with ASD in mind, little attention has been given to these ABA-based potential pre-instruction strategies. While the WWC (2010) recognizes cognitive development for students with disabilities, it did not find a positive effect related to the communication and language competencies required for reading comprehension, however the WWC does note that no eligible study covered literacy. This study strives to begin to fill in this void in the literature.

Pre-Instruction and Restricted Interests-based Strategies

A defining characteristic of individuals with ASD is a tendency to fix on specialized interests (Mancil and Pearl, 2008; Simpson & Myles, 2008). When designing classroom conditions conducive to reading comprehension, teachers may use restricted interests as motivators. According to Mancil & Pearl (2008), "One way to help improve engagement and ensure motivation during academics is to use restricted interest in the instruction and activities" (p. 3). This strategy can set the stage upon which reading comprehension strategies may best perform. "Behavioral intervention studies," report Mancil and Pearl (2008), "have demonstrated that restricted interests may be used to improve functioning of children on the autism spectrum (p. 3; Vismara & Lyons, 2007). Interests, be that trains, geography, ballet, or animals, embedded into instruction has been shown to "increase academic engagement and improve outcomes" (Mancil & Pearl, 2008, p. 4; Boyd et al., 2007). In one study, an elementary school student with ASD's willingness to engage with reading comprehension strategies increased, as did her scores, when Thomas the Train™ illustrations were embedded into the strategy materials. The student demonstrated "great improvements in [her] reading fluency and comprehension" (Mancil & Pearl, 2008, p. 6) after two months of reading with her restricted interest added the reading comprehension strategies materials used (Mancil & Pearl, 2008).

Visual Supports

Researchers identified visual supports as strategies teachers may use to encourage "increased engagement and learning for students with ASD" (Morrison, E., 2007, Honaker, D. & Rossi, L.M., 2005, p. 11). Research indicates that students with ASD are largely visual learners and text can prove overwhelming (Carnahan et al., 2009; Mesibov, Shes, & Schopler, 2005). Thus, visual supports such as visual schedules, graphic organizer, and structured work systems

(Carnahan et al., 2009; Bryan & Gast, 2000; Quill, 2000;) can serve as helpful, accessible pre-instruction strategies used in conjunction with reading comprehension strategies. For example, research indicates that the use of visual supports in concert with other strategies can help increase student participation in reading, language, and literacy activities. Not only can visual supports be helpful when applied by teachers, but research shows that visual supports can help students with ASD to become better independent learners. The elementary school students with ASD who Whalon and Hart (2010) observed as part of their study on reading comprehension "were noted to invoke structure and routines or concrete supports (e.g., dictionary, teacher-created models, visuals) when struggling with reading and language comprehension, thereby demonstrating the capacity for self-monitoring" (Whalon & Hart, 2010). This strategy can be used to enhance reading comprehension strategies, and was developed specifically for students with ASD. Whalon and Hart (2010) observed a kindergarten teacher who stressed early reading/literacy in her classroom by making time for language developing circle activities, many which included pre-instruction strategies. The teacher used a variety of visuals to foster vocabulary and concept development, such as images symbolizing sunny, windy, cloudy, snowy, etc. The use and combination of these pre-instruction strategies appeared to assist the researchers' test sample in engaged participation (Whalon & Hart, 2010). Visual support-based strategies are described below.

Visual Schedules

Because they give students with ASD the chance to know in advance about the subject to be read, assignments to be tackled, or the site which they will visit, such as a museum, visual schedules help students to know what to expect (Williamson et al., 2009). By exploring this data in advance, students can feel better prepared. Carnahan et al. (2009) report that visual schedules

may be organized in written form or may be comprised of images, objects, or icons (Carnahan et al., 2009). These scholars give the example of test subject Christian, a 10-year-old student with Asperger syndrome who uses a visual schedule on the front of his school binder. This schedule, custom fit for his needs, displays his classes and activities along with the time each commences, as well as test subjects Alex (age 10) and Lindsey (age 10), both students with autism, who use picture and word-based visual schedules, which are taped to their desks as they start each school day. The students keep track of their progress by checking off each assignment or activity completed (Carnahan et al., 2009). A teacher interviewed as part of the pilot study, reported that to improve pre-instruction classroom conditions for her student readers with ASD, she used visual schedules. "And the visual schedules really help with keeping them on track," she added, for "They like to be in charge of themselves" (Alnemr, 2017).

Work Systems

As another form of pre-instructional strategies, work systems can provide students with and without ASD with an organized school day experience, which can lead to an enhanced sense of self-regulation. Carnahan et al. (2009) report that structured work systems, a form of visual support, provides students with another way to keep on track with activities and assignments while keeping them learning and engaged. These systems are comprised of four parts: work type; amount of work; completion of work; and next activity (Carnahan et al., 2009; Carnahan, Hume, Clarke, & Borders, 2009; Hume & Odom, 2007; Mesibov et al., 2005). For example, a work system designed for elementary students with ASD might include an enumerated list with pictures and text describing each activity, a column for adding a checkmark when the activity is completed, and images representing available options following the completion of work, such as

working on the computer, reading silently, or writing in a journal (Carnahan et al., 2009).

Graphic Organizers

When meeting unfamiliar topics during reading comprehension strategy implementation, a lack of background knowledge can create an immediate roadblock for students with and without ASD. Graphic organizers, as pre-instructional strategies based on engagement through visual supports, have been proven effective to help establish a connection between text, topics, and reading comprehension, for they "provide a meaningful framework for readers to form relationships between what they know and textual information, structuring the cognitive effort required to interpret and comprehend text" (Finnegan & Mazin, 2016, p. 201; Wittrock, 1992). This intervention can help students with ASD work toward visualizing connections between concepts, "which in turn helps them understand and retain new information" (p. 201, Finnegan & Mazin, 2016; Darch & Evans, 1986). Prior to engaging in a reading assignment, teachers may provide their students with ASD with graphic organizers with drawings about characters they will hear about and the places discussed in the book. This advanced awareness can help lay the groundwork for visually-driven students to better engage with reading comprehension strategies as a result of becoming more familiar with the forthcoming content and to understand it more readily as it begins, first, with pictures rather than text. Of 15 studies based on interventions related to increasing reading comprehension skills for students with ASD, Finnegan and Mazin (2016) concluded that overall, "the use of graphic organizers appears to be the most effective intervention" (Finnegan & Mazin, 2016). The use of graphic organizers easily fits within the tight time and budget constraints teachers often face. Therefore, this serves as an available, time efficient, and cost-effective intervention (Finnegan & Mazin, 2016).

Video Modeling and Priming

Classroom conditions for more effective reading comprehension strategy employment may be improved when students are prepared to learn by example. Researchers identified video modeling and priming as pre-instructional strategies appropriate for students with ASD (Morrison, E., 2007, Honaker, D. & Rossi, L.M., 2005). This evidence-based practice first prepares students with ASD for success by providing a view of a behavior or procedure via a video presentation followed by engagement in the given activity (Carnahan et al., 2009; Bellini & Akullian, 2007; Bellini, Akullian, & Hopf, 2007; Hume, Loftin, Lantz, 2009). Video modeling is employed in many skills building and behavioral preparation instances from academic use to strengthening social communication (Carnahan et al., 2009; Banda, Matsuzny, & Turkan, 2007; Bellini & Akullian, 2007). Carnahan et al. (2009) described video modeling as it relates to literacy skills building. In reference to the 10-year-old test subjects with ASD observed as part of their study, the researchers suggested that video modeling "might be used to teach social behaviors that influence their participation in literacy activities. For example, these students may need specific instruction in how to engage in language arts activities such as partner reading, literature circles…" (Carnahan et al., 2009). Video models demonstrating text engagement may also be of use for beginning readers with ASD (Carnahan et al., 2009). A study by Williamson et al. (2009) showed how students with ASD learned how to use the think-aloud approach through the use of video modeling (Carnahan et al., 2009; Banda et al., 2007).

As a pre-instructional strategy, priming provides an introduction to the activities or material in advance of their use (Carnahan et al., 2009; Myles, n.d.). This strategy is key for preparing students with ASD to know what to expect in advance of a lesson or activity, be that content-based or strategy-based, and as noted earlier, can provide the essential background

knowledge commonly missing from students' life experiences. Research suggests that priming is beneficial for students with ASD because it can lessen disruptive behavior while promoting an increase in academic response (Carnahan et al., 2009; Koegel, Koegel, Fre, & Hopkins, 2003). According to Carnahan et al. (2009), priming is not a one-size-fits-all approach; it should be customized to fit each student's individual needs. Studies based on visual supports offer encouraging support for pre-instruction, but a What Works Clearinghouse search for studies meeting eligibility standards and showing positive results came up discouragingly short, leading the researcher to ask a question: Could it be that not enough is known about student readers with ASD and thus, the literature suffers a lack of pertinent studies?

Pre-Instruction Through Sensory Integration Techniques and Sensory Tools

Some children with ASD display a comorbidity of a dysfunctional sensory system, which causes the senses to over and/or under-react to stimulation. These sensory issues can be related to the physical behaviors sometimes associated with ASD which include rocking, hand-flaps, and spinning. Within the classroom setting, these behaviors can threaten the efficacy of reading comprehension strategy delivery.

Sensory integration techniques (SIT) are a combination of approaches often recommended and used by occupational or physical therapists to address the variety of sensory dysfunctions that may serve as obstacles to learning preparedness. While commonly facilitated by school occupational or physical therapists, these techniques will be examined in this study as they are used by elementary school teachers in resource rooms and classrooms. SIT "is designed to restore effective neurological processing and increase the individual's ability to integrate sensory information…" (Smith et al., 2016, p. 247; Case-Smith, Weaver, & Fristad, 2014). SIT strategies include *smooshing*, which offers the body deep pressure through compression between

pillows or gym pads and play with textured toys (Smith et al., 2016, p. 247; Bundy & Murray, 2002). Ayers' (1979) early work on SIT maintained that while on the outside, it may appear that the struggling student with ASD "needs speech therapy, reading lessons, or more discipline…the brain is so complex that its operations are never obvious on the surface of things. If speech and reading and behavior are poor because the brain is not working well," Ayers continues, "it makes good sense to build a foundation upon which the brain can work better" (Ayers, p. 145). Bogdashina argues that SIT may be effective in helping students with ASD bridge the gap between dysfunctional sensory system issues and learning based on several studies related to the use of SI-based resources, such as the wearing of weighted vests, for some showed improvements to attention and self-stimulatory and on-task behaviors (Stephenson & Carter, 2009; Cox et al., 2009; Fertel-Daly, Bedell and Hinojosa, 2001; Kane et al., 2004-05; Olson & Moulton, 2004). The variability of sensory problems associated with ASD makes it difficult if not impossible to assign an overarching SIT approach to all individuals with ASD. Each student has their own "unique sensory perceptual profile," explains Bogdashina (2016), "so what works for one will make no difference or may even harm another" (p. 202). My pilot study revealed that a Kalamazoo Public Schools' elementary school teacher uses SIT-based textured toys, sleeves, and a wiggle seat in her resource room when using reading comprehension strategies with her students with ASD.

However, a debate continues over the benefits of SIT for students with ASD. For example, Smith et al. (2016) state, "It is important to point out that the time and resources devoted to administrating SIT take away opportunities to implement scientifically validated procedures" (p. 265). Conversely, it could be stated that concerns over a loss of time and resources do not negate the efficacy of SIT strategies. Bogdashina (2016) reported that "some

professionals insist that there is no research evidence that 'sensory treatments' work with autistic individuals, as no research study has shown that any one particular treatment is beneficial for them" (p. 202). Thus, the literature suggests that the effectiveness of SIT-based tools remains undocumented. For example, according to Morrison (2007), "Despite this and other qualitative reports of the benefits of weighted vests, there is little organized assessment regarding the effectiveness of their use (Morrison, E., 2007, p.; Honaker, D. & Rossi, L.M., 2005).

Reading Theory

Before exploring reading comprehension strategies for students with ASD, a brief investigation into reading theory proves beneficial. Reading requires two essential abilities: the ability to read text and the ability to draw meaning from the text (Abnett, 2013; Catts & Hogan, 2003). The language and cognitive impairments common to students with ASD can create obstacles related to social skills building, recognizing social cues, empathizing with others, and effectively communicating emotions and feelings (Abnett, 2013; Cotter, 2011; Hart & Whalon, 2011; Lombardo & Baron-Cohen, 2011). These deficits have a direct impact on reading comprehension "past a literal level" (Abnett, 2013, p. 6) for early readers with ASD.

Reading at its most basic is understood as the ability to both decode and comprehend (Abnett, 2013; C. Carnaham, Musti-Rao, & Bailey, 2009; Grigorenok et al., 2002; Mirenda, 2003). Gough & Tunmer's *Simple View of Reading* (1986) is a framework which pairs decoding with comprehension to create literacy, also written as a formula: RC=LC x D, where listening comprehension (LC) combines with decoding (D) to make reading comprehension (RC) (Abnett, 2013). The Simple View of Reading may be used by reading teachers to plot where their student readers sit in terms of their skills related to each portion of the formula. According to one study, "Understanding the formula can help educators with assessing reading weaknesses and providing

appropriate [reading comprehension strategies]" (Farrell, Davidson, Hunter, & Osenga, 2010). However, applying the Simple View of Reading to students with ASD can be challenging due to the students' common struggles with the language skills required to master comprehension. Fundamental to his *Reading is Not a Natural Process* theory, Lyon (2013) stresses the need for explicit reading instruction through the use of phoneme awareness, phonics, structural analysis, and comprehension strategies beyond the use of oral language skills. Phoneme awareness proves essential when building English reading skills, for to read an alphabetic language, students are required to connect written words with the sounds the words make; an ability known as the alphabetic principle. Delays in reading fluency, and result in reduced reading comprehension skills, arise when new readers struggle to perceive spoken word sounds (Lyon, 2013).

Another theory related to reading comprehension is known as *Theory of Mind.* To possess theory of mind is to be equipped to "deduce the full range of mental states that cause action" (Murray, 2008, p. 5; Baron-Cohen (2000). It is the ability to recognize and sympathize with others' mental states and behaviors, which include their feelings, intentions, hopes, and behaviors. By understanding how others feel and the variety of outcomes related to their feelings, those with theory of mind are able to recognize influences on current behavior and predict potential impacts of future behavior (Murray, 2008). According to Keenan, 2003, a child's ability to comprehend and respond to communication with others, including their reactions, such as a smile or visual cues of fear or sadness, helps the child better appreciate others' emotions, experiences, and perceptions (Keenan, 2003; Murray, 2008) and this understanding rolls over into reading for meaning. When theory of mind is impaired, report Twachtman-Cullen (2000), the "reserve of background mental state knowledge needed for sense making and the meaningful exchange of information overall (Twachtman-Cullen, 2000, p. 236; Murray 2008) is notably

decreased, weakening reading comprehension. Research suggests that theory of mind impairment is common to students with ASD, and thus, impacts their written text comprehension skills. Overall, this theory suggests that "individuals with autism are not able to perceive or understand the thoughts, feelings, or intentions of others" (Murray, 2008). Abnett (2013) provides a clear example by writing, "to understand why Snow White is apprehensive when taking the apple from the old lady, the reader has to have background knowledge of the danger of taking food from a stranger, and then realize that Snow White is feeling this stranger may be suspicious (Snow White, 1937; Abnett, 2013). Students with ASD reading about Snow White often will not see her point of view, and therefore, their ability to understand the character's experience and draw meaning from the reading is diminished (Colle et al., 2008; Lombardo & Baron-Cohen, 2011). According to Murray, "difficulties understanding relationships and the deficits with reciprocal interactions found in individuals with autism spectrum disorders often hinder their ability to comprehend the written text (Murray, 2008, p. 2). Murray maintains that researchers and experts agree that there is a connection between language acquisition impairment and theory of mind impairment (Murray, 2008; Perner, Frith, & Leekam, 1989).

The belief that the intense attention to detail demonstrated by students with ASD minimizes a focus on and understanding of the bigger picture is known as the theory of *Weak Central Coherence* (Abnett, 2013; C. R. Carnahan et al., 2011; Plaisted, Saksida, Alcantara, & Weisblatt, 2003). While students with ASD challenged by Weak Central Coherence are able to decode the terms and string together the elements of a story, what they struggle to do is to make meaning or connect with the reading's main points. For example, a student reader with ASD may find such interest in the building materials used by the pigs in the fable the *Three Little Pigs* (1840) that they miss out on the message about work versus play. Weak Central Coherence leads

to a loss of full comprehension as extreme focus on details leads to failure to capture the larger issues highlighted in the text (Abnett, 2013). The careful, self-management reading approach of pausing to check and reread text for clarity and meaning is not a commonly applied skill for student readers with ASD, and this lacking is described as the theory of *Executive Functioning* deficits (Abnett, 2013; Chiang & Lin, 2007; Griswold, Barnhill, Myles, Hagiwara, & Simpson, 2002; ASBERG, 2010). A deficiency in Executive Functioning finds readers moving forward in the text even when he/she is making no connection with or understanding the reading. Without this self-governing skill, readers will continue to read on without comprehension (Abnett, 2013; C.R. Carnahan et al., 2011).

Reading Comprehension, Challenges for Readers with ASD, and Strategies

Scholars consider reading comprehension "the most important academic skill learned in school" (Mastropieri & Scruggs, 1997, p. 1). Thus, it may also be argued that reading comprehension is essential for the success of students with ASD. However, students with ASD face reading comprehension challenges. According to McNamara, "Reading can be challenging, particularly when the material is unfamiliar, technical, or complex." Although able to decode individual words, some readers face challenges making meaning when linking the words in a sentence or paragraph together. Readers are able to decode the words, explains McNamara, but lack the skills required to comprehend the meaning in the text. The use of evidence-based reading comprehension strategies has been shown to improve reading comprehension while encouraging readers to gain understanding from difficult texts (McNamara, 2007). A reading comprehension strategy can be defined as "a cognitive or behavioral action that is enacted under particular contextual conditions, with the goal of improving some aspect of comprehension" (Graesser, 2007, p.6). Several scholars have identified the need for a systematic, focused

approach to reading comprehension with an emphasis on early interventions (Whalon & Hart, 2010; Oakhill & Cain, 2007; Paris, Carpenter, Paris, & Hamilton 2005; Snow, 2002) while other scholars call for strategies which are explicit (Lyon, 2013; Woolley, 2011) with skills continually developed within a multiple strategy framework undertaken over time (Woolley, 2011).

Reading Comprehension Strategies for Students with and without ASD

Teaching reading strategies has been shown to improve reading comprehension while encouraging readers to gain understanding from difficult texts (McNamara, 2007). For this reason, it has been recommended that reading strategies serve as an integral aspect of K-14 education (McNamara, 2007). Woolley (2011) suggests that several visual and verbal instructional techniques may be applied toward overcoming cognitive capacity limitations and this can be achieved in a one-on-one or group instructional setting (Woolley, 2011). For vocabulary instruction, the NRP suggests explicit instruction, indirect instruction, multimedia instruction, capacity methods, as well as association methods while recommendations for text comprehension include comprehension monitoring, cooperative learning, graphic and semantic organizers, story structure, and question answering, generation, and summary (Khowaja & Salim, 2013). The NRP suggested these strategies for use with students without disabilities and according to Khowaja and Salim (2013), "very little is known about the use of these strategies for children with autism" (p. 1112; Chiang and Lin, 2007).

Reading Comprehension Strategies for Students with ASD

Because reading is not a process which naturally unfolds, it is essential that reading comprehension strategies be comprised of explicit instruction which systematically address decoding, word-recognition, and comprehension skills (Lyon, 2013). While this applies to all beginning readers, it certainly must be thoughtfully applied in the best interest of student readers

with ASD at risk for reading comprehension challenges. According to Carnahan, Williamson, and Hayden (2009), "many students with ASD struggle with reading comprehension. The differences they demonstrate in language and communication skills, combined with the way they process information from the environment, not only influence comprehension but can also make the task of providing quality literacy instruction daunting" (Carnahan, Williamson, & Hayden, 2009, p. 10)

According to Woolley (2011), "Mental imagery, motivation, and self-regulation are associated with reading engagement and skilled reading comprehension… because [it] is a constructive and reconstructive process that is not only influenced by the text and the task demands but is very much determined by personal factors within the reader" (Woolley, 2011, p. xiv). Thus, Woolley argues that readers better construct meaning by using prior knowledge influenced by self-motivation and self-regulating behaviors. Keeping these primary meaning making elements in mind, research indicates that individuals with ASD often face challenges in gaining background knowledge due to social exclusion (Kluth, 2010) as well as struggle with self-motivation and self-regulation, as connected to the theory of Executive Functioning Deficits (Abnett, 2013; C.R. Carnahan et al., 2011). Therefore, it is essential that reading instruction strategies designed for students with ASD are constructed keeping these developmental barriers in mind. A selection of evidence-based reading comprehension strategies is discussed below.

Question-Generation Strategy

As an effective reading comprehension strategy, the National Reading Panel strongly advocates for question-generation approach (NICHD, 2000; Whalon & Hart, 2010). Whalon and Hart (2010) advocate for questioning strategies, declaring that activities "such as questioning the author and question and answer relationships directly teach children how to form and ask

questions" (Whalon & Hart, 2010 p. 254). Research suggests that question generation guides students to find the main points of a text, understand the big idea and the message, and in terms of assessment, aids in monitoring the acquisition of comprehension (Whalon & Hart, 2011; RAND, 2002; Rosenshine et al., 1996). According to Whalon & Hart (2011), question generation "improves students' ability to make connections, respond to comprehension questions, and produce quality retells" and may "increase not only reading comprehension but also communication skills" (p. 196, Whalon & Hart, 2011; RAND, 2002). Because students with ASD often find themselves imitating others or repeating questions to gain information (Fredeen & Koegel, 2006), encouraging them to practice question generation teaches them to lead with questions and "places students in the active role of initiator" (Whalon & Hart, 2011, p. 196; Rosenshine et al., 1996). This approach includes the strategies of QAR (Whalon & Hart, 2011; Raphael & Au, 2005; Raphael & Wonnacott, 1985) and Reciprocal Teaching (Palinscar & Brown, 1984).

Question-Answer-Relation: QAR

Studies indicate that when students with ASD are exposed to questioning strategy models like QAR and inferential "why" questions, comprehension increases (Senokossoff, 2016). These studies include Asberg and Dahgren-Sanberg (2010) who used the QAR approach with Swedish children who demonstrated discourse comprehension improvement and Hundert and van Delft (2009) who observed increased comprehension in students taught methods of responding to inferential "why" questions (Senokossoff, 2016). El Zein, Solis, and Vaughn (2014) reported on reading comprehension improvements through the use of QAR strategies with students ages 10-15 in studies conducted by Whalon and Hanline (2008) and Asberg and Sanberg (2010) (El Zein, Solis, and Vaughn, 2014).

A form of this question-based strategy, which silos questions into two types: (a) *in the book* and (b) *in my head*, (Whalon & Hart, 2011; Raphael & Au, 2005; Raphael & Wonnacott, 1985) was created for a mature reader able to discern that which can be asked directly from the book itself and that which can be inspired by thoughts about the book but from one's own mind. Therefore, applied using this framework, it may be too complicated for elementary school readers. Whalon and Hart (2011) describe an adaptation ideal for beginning readers where scripts and even cue cards, puppets, and other visual examples may be used to launch question generation. The teacher applies the strategy of Think-Aloud (described below) to use the cue cards to model question generation, and then provides ample guided practice time for students to then generate questions of their own related to the text (Whalon & Hart, 2011). A similar QAR method used for elementary school students encourages teachers to scaffold the instruction toward increasingly shifting the teaching/leading from teacher to student (El Zein, Solis, and Vaughn, 2014; Franzen et al., 1996), which strengthens the student with ASD's ability to take the initiative through questions. The questions were classified into three groups: "right there", "reflect and search", and "on my own". This strategy is known for its ready availability, cost-effectiveness, and ease of use for teachers with time constraints. According to Finnegan and Mazin (2016), "studies that included question and answer strategies, which can be done with no additional materials, show positive outcomes" (Finnegan & Mazin, 2016, p. 211).

Reciprocal Teaching and Building Background Knowledge

Leslie Palinscar and Brown (1984) created a four-strategy framework called reciprocal teaching, which employs question generation and serves as a learning opportunities-based conversation between students and teachers. These strategies are summarizing; question generating; clarifying; and predicting. Through this strategy, teachers and students routinely

swap places in carrying the roles of teacher and student. After some practice, when the student feels comfortable taking the lead as teacher, the teacher then acts as facilitator, oversees progress, and offers feedback. When this strategy is used in a classroom, students may be paired or grouped, and take turns leading the conversation. Kluth (2010) advises that students with ASD will likely need to have this process repeatedly modeled (Kluth, 2010). Studies indicate that students with comprehension difficulties saw reading comprehension improvement, were equipped to more effectively discuss text with others (Lipson & Wixson, 2009), and demonstrated a better grasp of the main points (Palinscar and Brown, 1984). Whalon and Hanline (2008) explored a reciprocal questioning intervention approach with students with ASD ages 7.5-8.7 with and without an introduction to the concepts of a story, which they called a story map. The former approach allowed students to gain a familiarity with the story's setting, characters, main points, etc., prior to the reading of the story. The WWC (2012) found mixed results regarding the efficacy of reciprocal teaching on reading comprehension for adolescents with and without disabilities with only six out of 33 studies meeting standards. The WWC also points to the National Assessment of Educational Progress (NAEP) study undertaken from 2009-2017, which suggests that there is a link between reading comprehension, language development, and background knowledge.

Study results found that student quiz scores increased only after the presentation of the story map (Whalon & Hanline, 2008; El Zein, Solis, and Vaughn, 2014). This connects directly with the strategy of Building Background Knowledge, which serves the student with ASD's need for the kind of contextualizing information helpful to better understand a story that they may miss due to socializing and prior experience limitations. Lacking the foundational pool of prior knowledge which allows a student to make inferences, deductions, predictions, and other

connections about they read can serve as a roadblock to learning and comprehension. According to Williamson, Carnahan, and Jacobs (2012), "If students have little or no experience with the content of a passage, their ability to answer inferential questions can be negatively influenced" (p. 451, Williamson, Carnahan, & Jacobs, 2012; Leslie & Caldwell, 2010). Kluth (2010) argues that when excluded from socializing opportunities with their peers, whether that be on field trips or due to time spent outside the general education classroom in the resource room, some students with ASD miss out on the kind of background knowledge building essential for reading comprehension (Kluth, 2010). This strategy supports Woolley's (2011) position that prior knowledge fosters better reading comprehension (Woolley, 2011). The use of story maps and pre-discussion about characters, setting, events, and main points serve as a proven tool to help students with ASD increase their understanding of the text and test scores associated with monitoring reading comprehension progress (El Zein, Solis, and Vaughn, 2014; Kluth, 2010; Whalon & Hanline, 2008). According to WWC (2007), six of seven studies on this method, also known as dialogic reading, proved beneficial for students without disabilities in terms of their oral language skills, but no impact on phonological processing was demonstrated. Two out of three studies met WWC (2010) standards for students with disabilities, and found that this approach benefits communication and language competencies for students with disabilities.

Direct Instruction

Direct Instruction (DI) is a "systematic approach to instruction that integrates a curriculum designed to build skills sequentially and cumulatively, with a scripted teacher presentation [and] signals and prompts…used to elicit correct student responses" (Finnegan & Mazin, 2016; Watkins, 2008). DI makes the pathway to reading comprehension more of an interactive journey through pre-planned scripts, picture analogies, and techniques that encourage

students to think about the reading using facts, inferences, deductions, inductions, and opposites (Ganz & Flores, 2007; Ganz & Flores, 2009). The approach finds teachers using scripts and picture analogies to elicit student responses, which lead to a discussion of the text and is followed up by error correction, teacher modeling, and time for students to individually practice reading comprehension techniques.

Studies employing Direct Instruction (DI) have found increased accuracy related to reading comprehension probes. For example, in 2007 and 2009, Flores and Ganz investigated reading comprehension outcomes for students with ASD by applying specific instructional strands of DI (El Zein, Solis, and Vaughn, 2014; Flores & Ganz, 2007; Flores & Ganz 2009). In their studies, they created probes related to targeted reading skills and procedures included the use of predetermined script-based directions, en mass responses by students, specific cues used to prompt students to respond, teacher behavior modeling, and practice time for students to work independently. The 2007 program applied facts, inferences, and analogies while the 2009 program used deductions, inductions, picture analogies, and opposites (El Zein, Solis, and Vaughn, 2014; Flores & Ganz, 2007; Flores & Ganz 2009). Their findings showed reading comprehension improvement and the results were interpreted as "being in the highly effective treatment range based on the predetermined standards" (p. 1313, El Zein, Solis, and Vaughn, 2014). Finnegan and Mazin's (2016) investigation into studies promoting reading comprehension skills for students with ASD found that interventions which addressed "comprehension of figurative language (e.g., metaphors, analogies) showed moderate to high effects… [and] this finding is important as it demonstrates that students with ASD are able to interpret and comprehend complex elements of connected text" (p. 209, Finnegan and Mazin's, 2016).

According to the WWC (2007), with one study out of seven meeting standards, direct instruction interventions had no discernible effects on oral language and cognition of students with ASD.

Think-Aloud

Harvey and Goudvis (2000) describe a think-aloud as a common strategy teachers may use to model reading comprehension strategies for their students. A think-aloud finds the teacher reading a text while the class listens. The teacher serves as a model of reading comprehension skills as he or she reads and visually and verbally reacts to what she reads. By displaying a smile, gasp, incredulity, or expressing a look of fear, sadness, or humor associated with the passages read, and by pausing to ask questions related to these displays, the teacher can help the student reader with ASD learn to make associations with emotions and reactions related to the text. For instance, if the book cover shows an image of a dog house, the teacher might say, "I see a dog house on the cover. I think this book may be about a puppy dog" (Kluth, 2010). This strategy can be especially applicable to students with ASD who commonly lack theory of mind (Frith, 1989), whereby observers may recognize in others emotion, feelings, desires, and reactions. The WWC (2014) found a similar strategy, repeated reading, to have potentially positive impacts on reading comprehension for students with learning disabilities, although it only three out of 15 eligible studies met WWC standards.

Computer-based Intervention

Computer-based intervention (CBI) is a technological approach that has been applied for several decades to special education which scholars also recommend "as a supporting tool for teachers of children with autism" (p. 1112, Khowaja & Salim, 2013; Higgins & Boone, 1996; Powell, 1996). One justification for the use of computer-based applications is that students with ASD often require a great deal of individual instruction, and CBI permits students to conduct

computer-based work independently without the need for intensive teacher support. Khowaja and Salim (2013) report that the independent work children with ASD can accomplish using CBI "will increase learning rate as well as well as improve attention span and social behavior" (Panyan, 1984, p. 1112,). Moore and Calvert (2000) compared CBI instruction with traditional reading instruction and concluded that "students paid 97% of their attention to learn vocabulary through CBI and only 62% of their attention if the same thing was taught the by teacher... [and] 74% of nouns using CBI and 41% of nouns through an instructor" (Khowaja & Salim, 2013, p. 1118; Moore & Calvert, 2000). Based on these findings, Khowaja and Salim (2013) argue that CBI can play a positive role in learning for students with ASD.

Of course, it may be said that the use of CBI can have negative impacts. For instance, if students with ASD are too heavily served by the computer, they may miss out on strengthening such skills as socializing, verbal communication, joint attention, and eye contact (Khowaja and Salim, 2013; Ramdoss et al, 2011). Khowaja & Salim (2013) sought out systematic reviews combining vocabulary instruction and text comprehension and the use of CBI. First, they noted that scholars found students with ASD gained knowledge and demonstrated text comprehension and sight word vocabulary improvement through instruction using sight words (Chiang & Lin, 2007). Next, they identified that improvement in student learning was reported in the majority of studies on all five of the NRP reading components involving students with ASD, thus these students may benefit from each of the components when instructors adhere to NRP guidelines (Whalon et al., 2009). Finally, in relation to CBI, they found reports on positive outcomes in terms of literacy and vocabulary skills improvement, however reading and writing skills reports returned both positive results as well as no improvement through the use of CBI (Randoss et al., 2011). Whalon et al. (2010) showed significant language improvement for students ages 3-6

from pre-to-post tests with TeachTown: Basics, which uses audio and visual cartoon elements to provide vocabulary instruction (Khowaja and Salim, 2013; Whalon et al., 2010). Similarly, Bosseleer and Massaro (2003) provided vocabulary instruction to students 4-12 using Baldi/Timo: a 3D interactive agent and results indicate that the students were better able to identify a greater number of words correctly and retain the words given pre-and-post test comparisons (Khowaja and Salim, 2013; Bosseleer & Massaro, 2003). Studies show that students using CBI with an agent remained more attentive and increased their learning when voice and face were combined as opposed to voice alone and that when students read more via CBI than they did of books, reading comprehension increased (Khowaja and Salim, 2013, p. 1118; Whalon et al., 2010; Moore & Calvert, 2000). One study found that "children with autism spend more time on reading material when they accessed it through a computer and were less resistant to its use" (p. 71, Williams, Wright, Callaghan, & Coughlan, 2002).

Examples of CBI used in elementary schools today include *System 44.* According to Scholastic, System 44 is "a foundational reading program designed for the most challenged struggling readers in Grades 3-12. Intentionally metacognitive, System 44 helps students understand that the English language is a finite system of 44 sounds and 26 letters that can be mastered" (Special Education, teacher.scholastic.com, p. 1). CBI-based reading comprehension strategies also include *Read 180*, which is similar to System 44 but designed for struggling readers in grades elementary through high school. The WWC (2010) reported positive reading comprehension outcomes for general education students grades 4-9, however, as no studies met WWC criteria for students with disabilities, no WWC research-based conclusions regarding reading comprehension for students with ASD can be drawn. *Fast Forward*, designed for younger students working with decoding, fluency, vocabulary, spelling, and comprehension,

Read Naturally, which focuses specifically on comprehension, and *Alpha Sequence –Autism Series*, a perceptual training and pre-reading tutorial program available via many devices for use by students with autism and developmental disabilities. Studies, including Heimann, Nelson, Tjus, and Gillberg (1995), show positive impacts on reading, engagement, and enjoyment for students with ASD using the Alpha program (Williams, Wright, Callaghan, & Coughlan, 2002). On Read Naturally, while the WWC (2013) found positive results for overall reading achievement for students without disabilities and possibly positive fluency-based results for students with disabilities, they reported no demonstrated reading comprehension benefits for either student group.

Research Questions

1. What pre-instructional (visual, hearing, and touch) do special education teachers use to help create conditions conducive to learning and reading comprehension for their students with ASD?
2. What reading comprehension strategies, such as direct instruction, reciprocal teaching, and Computer-Based Interventions (CBI) do special education teachers use for their students with ASD?

CHAPTER III

METHODOLOGY

Research Design, Approach, and Rationale

This study sought to identify the strategies special education teachers use with their students with ASD based on two key aspects: 1) what pre-instruction strategies teachers use to prepare their students for reading comprehension instruction and 2) what strategies are used to instruct reading comprehension in self-contained classrooms. Research suggests that students with ASD are able to decode what they read, but due to internal and external issues, they often struggle to comprehend what they read. This study compared the kinds of interventions documented in the literature and used in the field by special education teachers to facilitate meaning making for elementary students with ASD while undergoing reading instruction. It relied on a combination of methods to accurately represent special education teachers' experiences, student impacts and outcomes, and the effectiveness of pre-instruction and reading comprehension strategies.

A multiple case-based qualitative study proved to be the most appropriate approach because this study was designed to gather data on teachers' prior experiences and student experiences and outcomes based on the strategies used. To capture the most authentic data possible from special education teachers working with a small group of students with ASD, I chose the natural settings of the elementary school self-contained classroom. Because I chose to conduct data collection in a natural setting, I chose a qualitative approach. Creswell (2007) writes that qualitative researchers "often collect data in the field at the site where participants

experience the issue or problem under study" (Creswell, 2007). Rather than create a contrived situation where people are brought to a research room or lab, qualitative researchers engage in face-to-face interaction and observation in the subjects' natural setting where they may "gather up-close information by actually talking directly to people and seeing them behave and act within their context" (Creswell, 2007).

Population, Sample, and Site

Special education teachers in a Southwest Michigan suburban school district who teach reading to students with ASD in the self-contained classroom comprise the population studied. I chose to study this population because these elementary school teachers are trained and experienced in working with students with ASD. Significant to my study, this population is aware of the best interventions to use when preparing for and providing reading instruction to students with ASD. (TBD) Southwest Michigan special education teachers who teach reading to elementary students with ASD formed my sample.

To begin the recruitment process, I gained permission to conduct research on this population through the Western Michigan University Human Subjects Institutional Review Board. I will request permission from the HSIRB to photograph, use, and present photographs of any artifacts associated with the interviews and related to the study. Next, I will reach out to school gatekeepers for permission to inform their special education teachers of the opportunity to participate in my research study. To disclose the details of my procedure, I provided these gatekeepers with an interview protocol, which includes an introduction to and central purpose of the study, data collection procedures, confidentiality and risk details, expected benefits, and recruitment consent form (Creswell, 2007), as well as details regarding my observation protocol and observational checklist, which will be informed by my literature review and by individual

participant interviews (Creswell, 2007). Recruitment criteria dictated that volunteer participants be within an age range of 22 to 65 years old. Both male and female teachers were welcomed to participate. Participants were required to have a minimum of one and a half years of experience providing reading instruction for students with ASD.

In order to spread the word of the research participation opportunity, I reached out to professional associates to provide referrals and make introductions to special education teachers. To recruit participants, I sent out an email blast to special education teachers within a Southwest Michigan county with details about my study and a welcome to participate. Once teachers agreed to participate, I applied the snowball strategy in seeking additional participants by asking teachers to suggest names of other potentially willing interview and observation candidates (Creswell, 2007). Once teachers indicated their interest, I provided them with details regarding both the interview protocol and the observational protocol. The interview protocol described participation as a one-on-one, 45-minute interview with the researcher, to take place in the educational setting where they teach reading comprehension. As a form of member checking, the teachers were informed that following the interview, I would provide them with a copy of the interview transcript via email for their review with an invitation to expand upon their responses if they chose. The observational protocol described the observation process, in which I would assume the nonparticipant/observer as participant (Creswell, 2007), and the method by which I would observe the reading comprehension pre-instruction and instruction strategies unobtrusively and record descriptive and reflective field notes (Angrosino, 2007). I described the teachers' participation risks and benefits, and assured their privacy by explaining that the audio recording and transcript will be given a participant number and code name and any potentially

identifying information about the school or teacher will be redacted, and that only the researcher will know the names of schools and participants.

Instrumentation and Data Collection Procedures

My data collection tools included one-on-one, face-to-face semi-structured interviews, observation, interview transcription of participant responses, field notes, examples of visual strategies, and examples of artifacts, eg., sensory tools used. The interview is considered the most commonly used data collection tool in qualitative studies (Lopez & Whitehead, 2012). The researcher chose a semi-structured interview approach because it simultaneously provides a guide to steer the interview in a direction which results in covering the research questions while offering the researcher the flexibility and freedom to ask the questions in any order appropriate to the flow of the interview (Lopez & Whitehead, 2012). This flexibility allowed me to gain richer data because I was able to customize the interview to fit each teacher's natural responses and tangents. Because my study was largely based on the lived experiences of special education teachers providing reading instruction in educational settings to students with ASD, it was essential that I used the one-on-one interview technique to elicit teacher experiences with students and strategies, and better understand teacher backgrounds, motivations, and successes with the strategies they use. I developed my questions based on the purpose of my research study, a careful examination of the available literature, and questions I used previously in my 2016 pilot study.

The following open-ended questions were asked of the teacher participants in a semi-structured way in my research sample:

1. Please describe your history as a special education teacher working with students with ASD and how you came into your current position.

2. Please share with me some of your personal experiences as an ASD teacher.
3. Please talk about your students' learning environment, addressing any benefits and barriers associated with sensory, stimulation, and/or self-regulation.
4. What pre-instruction strategies (example: sensory tools) do you use to help students with ASD become calm and focused before use of reading strategies?
5. Please describe the strategies you use to help students with ASD learn and comprehend from reading instruction.
6. What criteria do you use to select these reading strategies? For example, do you make your selection based on the students' individual needs, on your own experiences with student success, on strategies/products recommended by your school district...
7. What if any Computer-Based Intervention (CBI) do you use with your students with ASD?
8. If you have documentation with you today (such as report cards) that demonstrates student achievement related to the strategies we discussed today, would you please interpret that data at this time?

My data collection protocol includes artifact analysis. Toward establishing a possible connection between pre-instruction strategies and reading comprehension acquisition, identifying and understanding the strategies teachers use to encourage student self-regulation before and during reading instruction proved essential to my study. While it would have been ideal to conduct these interviews in the resource room, to assure that teachers would be available despite their busy schedules, I made the interview setting flexible and left the location choice to the participant. In contrast, toward the goal of capturing data on strategies used in real time, I conducted observations in the educational setting where the teacher administers reading

comprehension instruction: the self-contained classroom. To capture the interview data, I used a recording device for each of my interviews and details about the artifacts (sensory tools) used by teachers in the self-contained classroom were recorded, transcribed, and analyzed. The effective recording of data, whether through the written word or recording device, is described by Marshall & Rossman (2016) as critical to the qualitative study involving artifacts. According to Marshall & Rossman (2016), "Researchers often supplement…interviewing…with gathering and analyzing documents produced in the course of everyday events or constructed specifically for the research at hand (Marshall & Rossman, 2016, p.164).

To gather rich, comparative data on actual strategies use in a natural setting, I chose an observational protocol. Creswell (2007) referenced Angrosino (2007) who described observation as "the act of noting a phenomenon in the field setting through the five senses of the observer, often with an instrument, and recording it for scientific purposes" (p. 166). Marshall and Rossman call observation "central to qualitative research" (p. 143) as well as a "fundamental and highly important method in all qualitative inquiry" (p. 143). Observation describes an assortment of data collection activities, from having a presence in the setting and becoming familiar with participants and their daily experiences to employing a specific checklist strategy to assess what is observed. Regardless of the observational techniques chosen, observation "entails the systematic noting and recording of events, behaviors, interactions, and artifacts… in the social setting" (Marshall & Rossman, 2016, p. 143). Field notes result when a researcher's observations are recorded by notes taken (Richards, 2015; Marshall & Rossman, 2016). My field notes were as detailed and as nonjudgmental as possible (Marshall & Rossman, 2016). To prepare participants for the observation portion of the data collection process, I applied a systematic approach (DeWalt & DeWalt, 2001) whereby I described the observation purpose, identified in

which phase observation would take place, and in what way the resulting field notes will serve the study's research questions (Marshall & Rossman, 2016). An observational checklist was informed by my literature review as well as by individual participant interviews in order to assess the presence or absence of the strategies and related artifacts discussed in the interviews (Creswell 2007; Marshall & Rossman, 2016). I assumed the nonparticipant/observer as participant role identified by Creswell, where I served as a group outsider watching and taking field notes without direct participation. Following my introduction to the group under study, I prepared my field notes by heading my observational protocol with the time, day, and setting (Angrosino, 2007; Creswell, 2007). My observational protocol included descriptive and reflective notes about my observations, perceptions, learning, and experiences, and each observation. Immediately following each observation, I wrote down my notes to best capture the richest data possible while it remained fresh (Creswell, 2007).

Throughout the observational process, I kept in mind Richards' (2015) caution that observation "is one of the hardest ways to make good data records" (p. 46) because the researcher's dual roles of participant and observer tend to conflict. The observational protocol highlighted my intention to use observational data collected in an ethical manner which protected the identity of the participants and their students.

Because I sought to capture visual data on the pre-instruction-based sensory tools used (associated with visual, hearing, and touch), I asked for advanced consent from teacher participants to photograph the tools present in the classroom. Referencing the work of Szto, Furman, & Langer (2005), Marshall & Rossman (2016) suggest that photography can be a helpful data collection resource appropriate for use in interpreting, confirming, and organizing qualitative data (Marshall & Rossman, 2016). The photographs were used as documents to

strengthen analysis and to help categorize the kinds of strategies teachers use in their self-contained classrooms. Teachers were made aware that their identities would be completely protected, and photographs would be taken only of the pre-instruction-based sensory tools and not of the teacher participants or students. Teachers were informed that the photographs may be shared with my dissertation committee, individuals attending any presentations related to my study, and possibly used in my published dissertation. The interview protocol provided to each teacher outlined my intent to use the photographs ethically.

Qualitative research must be designed to emphasize trustworthiness. According to Marshall & Rossman calling the researcher a reliable instrument is inadequate. Therefore, it was necessary for me to identify the traits that made me credible, thus ensuring that my "interpretations of the data are 'trustworthy'" (Marshall & Rossman, 2016). Speaking on ethics and conducting qualitative studies, Creswell (2013) says, "we need to be sensitive to vulnerable populations and imbalanced power relations and placing participants at risk" (Creswell, 2007, p. 56). I upheld ethical behavior and ensured study trustworthiness in a number of ways. I discussed the purpose of the study, including the study protocol credibility, dependability, and transferability, with participant teachers. To foster participant security, I gave teacher participants their choice of interview locations (eg., classroom, resource room, library, office) within the school to allow for their comfort and peace of mind. I also provided participant teachers with copies of the HSIRB and consent forms. I reinforced the option that participant teachers may opt out of the interview process at any time with absolutely no questions asked and with no negative consequences. I also emphasized the confidentiality of the study and that no personal data will be shared, that their names would not be used but instead, their interviews assigned a case number for their protection, and that no personal student data would be released.

Data Analysis

I used the inductive analysis method to analyze my data. According to Thomas, this approach is "a systematic procedure for analyzing qualitative data where the analysis is guided by specific objectives…[to] condense extensive and varied raw text data into a brief, summarized format" (Thomas, 2003, p.2.). The method is based on categorization of main and sub-themes pulled directly from the transcribed participant interview responses and field notes drawn by observations and then further analyzed. Richards says "Coding generates new ideas and gathers material by topic" (Richards, 2015, p.93.) and can help the researcher further develop ideas and build deeper inquiry based on the data. Richards refers to coding as "a first step to rethinking the data" (Richards, 2015, p.74.). I chose the inductive analysis method because it helped me narrow down the important information and most prominent strategies that the teacher participants used. This approach helped me compare and contrast the strategies used by multiple teachers. Further, it helped me identify patterns in strategy use and helped highlight the most commonly used strategies.

I based my inductive analysis on the approach as described by Reeves (2014). Once I conducted and transcribed teacher interviews, I applied Reeves' approach to a computer software program called NVivo, which allowed me to effectively organize, classify, and arrange data by participant number, and identify relationships, patterns, and themes as recommended by Creswell (2013). I began my inductive analysis approach by setting up coding categories which paralleled my research questions. Next, I pulled segments of the transcribed text that fit into categories, careful to separate significant bits of text that did not fit into established categories into a holding category. I sought out subthemes based on major categories through textual analysis and considered the holding category for significant data which fell outside the study scope. I created

a story frame made up of the main categories, sub-themes, and prominent findings from the holding category. I then used the story frame to collapse the stories of each teacher participant and supported those with pertinent quotes that helped illustrate the most important elements of their particular narratives. I created a cross tabulation which helped demonstrate the strengths or prominence of categories across the data. I used the prominent and established grounded themes. Next, I used the prominent/established grounded themes to tell the story of effective reading pre-instruction and instruction strategies special education teachers use for their student readers with ASD, as well as the grounded themes and outliers to recommend further studies. I cross tabulated where the prominent and emergent themes matched and did not match.

Trustworthiness

To establish trustworthiness and validity in my study, I drew from Creswell's argument that validation in qualitative research is "an attempt to assess the 'accuracy' of the findings, as best described by the researcher and the participants… a distinct strength of qualitative research [due to] extensive time spent in the field…the closeness of the researcher to participants in the study…" (Creswell, 2014,). I built trustworthiness into my study through Creswell and Miller's (2000) eight strategies commonly used by qualitative researchers. These are 1) prolonged engagement and persistent observation, 2) triangulation, 3) peer reviewing or debriefing, 4) negative case analysis, 5) clarifying researcher bias, 6) member checking, 7) rich, thick description, and 8) external audits.

First, I built trust with my participants by developing relationships based on commonalities shared between special education teachers and those that advocate for students with ASD. This I bring to the study as a special education teacher and professional, as well as a resident of Southwest Michigan for three years. Before data collection, I conducted a pilot study,

reviewed literature, and aligned my research questions with my interview questions (Poppink, 2016). While in the field conducting interviews, I made thoughtful decisions about what was appropriate and relevant to the study (Creswell, 2014). I used corroborating evidence from interview responses, grade reports, and the literature to triangulate information toward providing findings validity (Creswell, 2014). I used negative case analysis to reconcile negative or disconfirming evidence that did not fit within my inductive analysis categories (Creswell, 2014). As recommended by Merriam (1988), I remained aware of my personal biases throughout the study and remarked on any past experiences or prejudices that may shape my study interpretation or approach. I applied member checking at the teachers' convenience by providing them with the opportunity to respond to their transcripts via email. Teachers were given the opportunity to read through and fact check the transcribed interview for accuracy and to confirm that the transcription truly represents participant responses and intended meanings. Lincoln and Guba (1985) argue that member checking is the "most critical technique for establishing credibility" (Lincoln & Guba, 1985, p.314.). Rich, thick description was achieved by full description of the study participants, which will allow readers to determine if the data is transferable to related and other settings through shared characteristics (Erlandson et a., 1993, Creswell, 2013). My dissertation committee provided the external audit, which Lincoln and Gruba (1985) compare with a fiscal audit, and Creswell (2014) suggests provides a sense of reliability to a study.

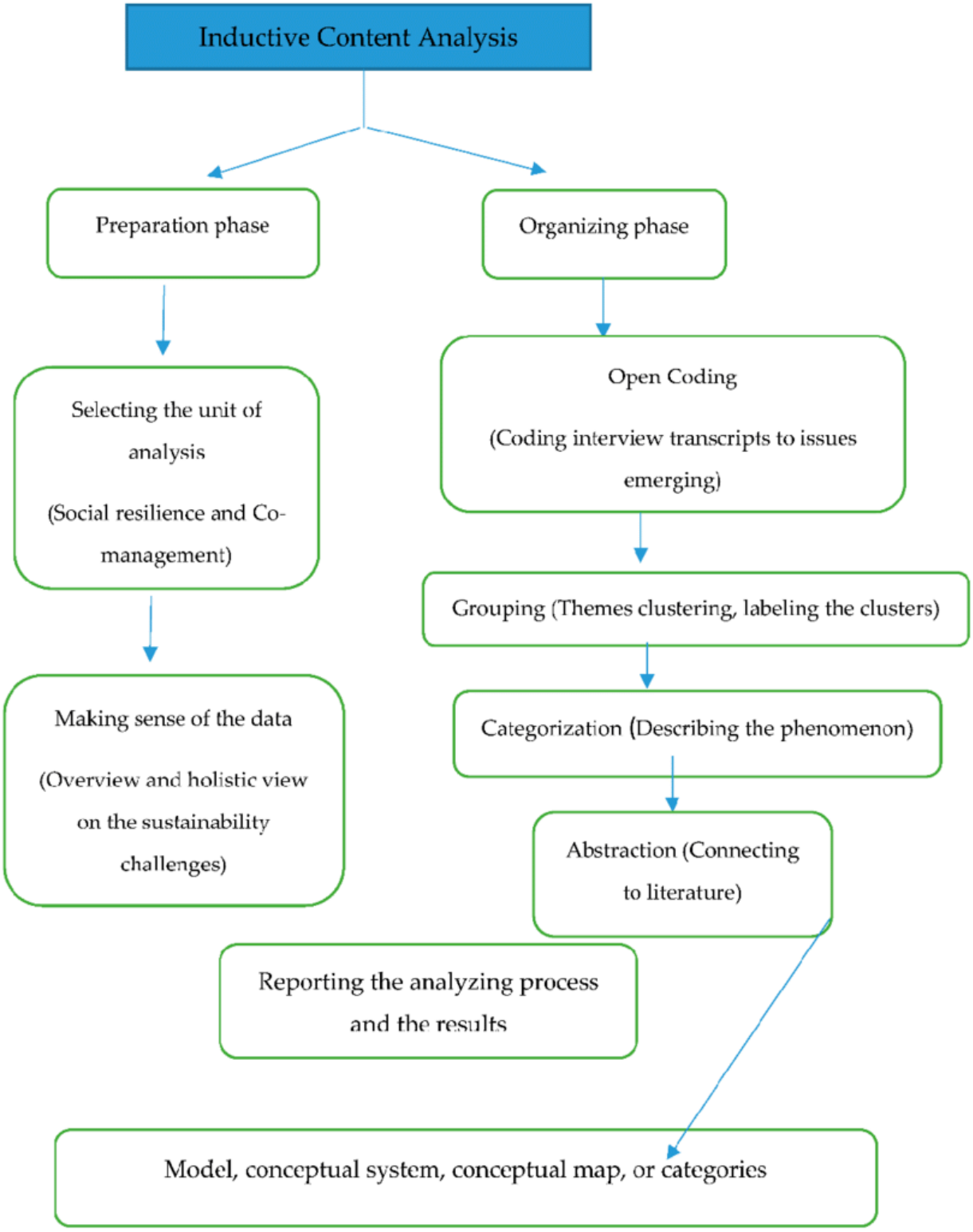

Figure 1. Adopted inductive content analysis diagram (2018)

Delimitations and Limitations

To delimit the generalizability of my study results, I chose to conduct face-to-face interviews and observation with a limited number of teachers (4-6) rather than survey a large number of teachers. This allowed me to obtain richer, more personalized data. I chose to expand the options of interview conduction location beyond the self-contained classroom to allow teachers more flexibility, give them a chance to choose a space where they feel more comfortable, and to prevent any overlap between my interview time and classroom instruction in the resource room. Originally, I considered expanding my study scope to include teachers outside the classroom who provide reading instruction to students with ASD, including librarians who offer programming such as circle time, and museum educators who develop activities which rely on reading comprehension of activity directions. However, I chose to limit my sample to the more defined population of special education teachers who provide reading instruction to students with ASD in educational settings. This delimitation allowed for a more structured and deeper focus and will prove directly applicable to elementary school special education teacher training, strategy awareness, and success when working with their student readers with special needs.

Due to time and travel constraints, I restricted my study to special education teachers in Southwest Michigan. Certainly, this limits the data analyzed to a specific region of the Midwest, and may not paint a national picture of strategies used throughout the country. Thus, additional studies conducted on a state and nationwide basis would further build on this research and help us better recognize the nationwide strategies special education teachers find successful when preparing their students for and providing reading instruction to students with ASD across the

country. Likewise, this study is limited to elementary school special education teachers and the reading comprehension scores of students with ASD also at the elementary school level.

It cannot speak to related reading comprehension strategies, struggles, and successes at the middle and high school levels. Similarly, the study excludes strategies used by general education teachers, as well as parents who teach reading at home, and librarians and museum educators who provide reading instruction and reading-based programming to students with ASD. Therefore, further research is recommended toward obtaining related strategies used by other educators who provide reading instruction and reading-based programming to students with ASD.

Chapter Three Summary

Research shows that students with ASD can decode what they read, but due to internal and external issues, these students can also encounter reading comprehension challenges. I structured my study design to identify and understand the kinds of interventions special education teachers use to facilitate meaning making for elementary students with ASD while undergoing reading instruction with an emphasis on determining a potential link between a student's internal and external pre-instruction status and reading comprehension acquisition. The study was conducted using a qualitative approach to capture data on four Southwest Michigan elementary school special education teachers' prior experiences and student achievement based on the strategies used. Observations took place in the educational setting where teachers commonly taught reading comprehension. Face-to-face, one-on-one, semi-structured interviews were conducted in the school settings of the teachers' choice and were comprised of questions intended to address strategies special education teachers use to encourage their students to self-regulate and further, to comprehend what they read. Questions were designed to identify the pre-

instruction strategies, such as sensory tool interventions, used to help students who are prone to environmental overstimulation to self-regulate prior to reading instruction, and further, evidence-based practices used to facilitate deeper comprehension during reading instruction, such as Computer Based Intervention (CBI).

The inductive approach was used to organize, classify, and analyze the data collected. The results of the study led to a clearer understanding of the strategies and interventions some elementary school special education teachers used to help pre-instruct and provide reading instruction and comprehension to students with ASD.

CHAPTER IV

RESULTS

This chapter highlights findings from the study's inductive analysis. Sections include a) a summary of the study's purpose and research questions, (b) participant profiles and demographics, and (c) a presentation of the study themes. The purpose of this qualitative, multiple case study was to identify a connection between environment and the learning process for student readers with ASD based on 1) *pre-instruction strategies:* environmental/engagement strategies identified in the literature and observed in use by teachers to help prepare students with ASD for the reading comprehension process and 2) *instruction strategies:* reading comprehension strategies identified in the literature and used by teachers working with students with ASD. The study sought to identify what strategies teachers used, what the literature reports about related strategies, how these strategies met the What Works Clearinghouse standards, and teachers' perspectives of these pre-instruction and reading comprehension-based strategies.

To provide clarity for teacher participants and for the study itself, as reflected in research question one, I define pre-instruction strategies as those which may be observed in self-contained classroom settings as helpful in creating effective learning conditions for students with ASD, especially as it relates to reading comprehension instruction. These tools are described as visual, hearing, and touch-based in nature. They can also be described as such products as weighted vests, noise cancelling headphones, wiggly chairs as well as sound and light manipulation (quiet room; dimly lit room). The pre-instruction strategies and tools detailed in the study were those identified by the participant teachers during interviews and as observed in their self-contained

classrooms. As reflected in research question two, I define reading comprehension strategies as instructional tools which lead to reading-based understanding where students with ASD can decode and comprehend text. I sought to uncover those strategies which teachers use to help their students with ASD develop skills necessary to understand concepts including main points, characters, and outcomes related to text-based passages.

These questions informed the study:

1. What pre-instructional strategies (visual, hearing, touch) do special education teachers use to help create an environment conducive to learning and reading comprehension for the students with ASD?
2. What reading comprehension strategies, such as direct instruction, reciprocal teaching, and Computer-Based Interventions (CBI) do special education teachers use for their students with ASD?

Thus, Chapter Four presents the perspectives, responses, voices, and observed actions of four special education teachers (with coded names A, B, C, and D) who provide reading comprehension instruction to elementary students with ASD in self-contained classrooms.

Participant Inclusionary Criteria and Profiles

Volunteer study participants were required to be within an age range of 22 to 65 years old with at least one and a half years of experience instructing student readers with ASD. Male and female teachers were invited to participate. Study participation requests were disseminated by professional associates to provide recommendations of and referrals to special education teachers. A two-prong approach was comprised of an email blast sent out to elementary schools in southwest Michigan school district and recruitment letters sent out to teachers inviting their participation. I applied Creswell's (2007) snowballing strategy to encourage participant teachers

to suggest the names of other potentially willing candidates. Four female teachers with ages ranging from 20s to 50s expressed their study participation interest and were chosen for interviews and observation. A participant profile for each teacher follows. See table 1 for more information.

Teacher A

Teacher A, a female, brings 26 years of teaching experience. She has been teaching in the self-contained classroom for 18 years. She has a bachelor's degree in special education with an early childhood endorsement. She teaches third through fifth grades.

Teacher A teaches in a suburban elementary school located in the southwest region of Michigan with a student population of 366 with a teacher to student ratio of 17.0. Students identify as 46.7% white, 31.4% African American, and 9.8% as two or more races. Of these students, 76.5% are eligible to receive free or reduced lunch.

Teacher B

Teacher B, a female, has five years of teaching experience with four of those years teaching in the self-contained classroom. She graduated with a master's degree in special education with endorsements in ASD, cognitive impairments, learning disabilities, and language arts. Teacher B teaches fourth and fifth grades.

She teaches in a suburban elementary school located in the southwest region of Michigan and attended by 366 students where the student to teacher ratio is 15 to nine. Forty-one percent of students identify as African American, 31.4 % identify as white, and 15.6% identify as Hispanic. Free and reduced school lunch recipients total 79.8% of the student population.

Teacher C

Teacher C, a female, has both four years of teaching experience and four years teaching in the self-contained classroom. She has her bachelor's degree in special education and plans to seek endorsements in ASD, cognitive impairments, and learning disabilities. Teacher C teaches first and second grades.

She teaches in a suburban elementary school located in the southwest region of Michigan and attended by 259 students with a teacher to student ratio of 19 to nine. The student population is made up of 57.5% students who identify as white, 27.8% who identify as African American, and 6.6% who identify as two or more races. Of these students, 45.2% are eligible for free or reduced lunch.

Teacher D

Teacher D, a female, has both four years teaching experience and four years teaching in the self-contained classroom. She graduated with her master's degree is special education and has endorsements in ASD, cognitive impairments, and learning disabilities. She teaches second and third grades.

Teacher D teaches in a suburban public school located in the southwest region of Michigan with 480 students in grades K-5. The student population identifies itself as 42.7 % White, 37.5 % African American, and 9.6% two or more races. The student to teacher ratio is 18 to one. Sixty-nine percent of students qualify for free or reduced lunch.

Table 1. Participant Profiles

Participants	Teacher A	Teacher B	Teacher C	Teacher D
Gender	Female	Female	Female	Female
Academic degree	Bachelor degree in special education	Masters in special education	Bachelor degree in special education	Masters in special education
Years of teaching experience	26	5	4	4
Years of teaching experience in resource room and self contained	18	4	4	4
Endorsements	Early childhood endorsements	ASD, cognitive impairment, learning disabilities, language art	Planning to get ASD, cognitive impairment, learning disabilities	ASD, cognitive impairment, learning disabilities
Grade level	3rd-5th	4th-5th	1-2nd	1st-3rd

Table 2. Students' Racial Distribution

Racial Group	Hispanic	Withe	African American	Asian	Native American	Pacific Islander
School A	7.9%	46.7%	31.4%	3.8%	0.3%	-
School B	15.6%	31.4%	41.0%	-	-	-
School C	2.7%	57.%	27.8%	5.4%	-	-
School D	8.5%	42.%	37.5%	1.5%	-	0.2%

Table 3. Students' Eligibility for Free or Reduced Lunch

	MI Average (2016-2017)	Eligible for free breakfast/lunch	Ineligible for reduced breakfast/ lunch
School A	46%	76.5%	23.5%
School B	46%	79.8%	20.2%
School C	46%	45.2%	54.8%
School D	46%	69.0%	31.0%

Presentation of Research Questions and Themes

Toward analyzing the interview and observation data, the researcher read and reread the interview transcriptions, which were carefully transcribed and reviewed for clarity and authenticity by interview participants. Observation checklists and margin notes from each observation were also reviewed and checked against the teachers' interviews. All data was coded into the NVivo Software, which allowed data to be organized and batched into themes and sub-themes.

Two key questions informed the study:

1. What pre-instructional strategies (visual, hearing, touch) do special education teachers use to help create an environment conducive to learning and reading comprehension for students with ASD?
2. What reading comprehension strategies, such as direct instruction, reciprocal teaching, and Computer-Based Interventions (CBI) do special education teachers use for their students with ASD?

Research Questions

Toward identifying a connection between pre-instruction strategies (visual, hearing, touch) and the learning process for student readers with ASD, the researcher formed two main research questions based on pre-instruction strategies teachers used to prepare their students for the reading comprehension process as well as the reading comprehension strategies used by teachers during the reading comprehension process. The section that follows introduces each of the two research questions and explores the responses given by the study's four teacher participants.

Research Question One: **Pre-instructional Strategies**

Research question one asked four special education teachers to discuss the pre-instructional strategies (visual, hearing, touch) they use to help create a classroom environment conducive to learning and reading comprehension for their students with ASD. Engagement with the interview transcripts drove the emergence of four strategy-based themes: a) touch and movement-based; b) hearing-based; c) physical space-based, and d) emotional-space based.

a) Touch- and movement-based. Touch-based strategies proved the most prolifically used and discussed. One-hundred percent of teachers interviewed discussed some form of touch-based strategies and likewise, none connected these pre-instruction strategies directly to reading. In general, teachers appreciated the touch-based/kinesthetic strategies for their ability to help students with ASD self-regulate, reset after intense activity or emotions, and better engage with assigned tasks and lessons. Participant A welcomes students in need of touch-based support the chance to use sensory tool-based apparel. "When a kid needs something," she said, "I'll go in my closet and pull out a weighted vest or something." She discussed the centers she set up for students to work independently while she works one-on-one with students. These centers, seen in the observation-based portion of the study, were supplied with a variety of fidgets as well as

other touch-based resources like containers of rice and beans. “Each day, students have a sensory break time,” Participant B replied, when asked about her pre-instructional strategies, “where they have access to weighted blankets, yoga balls, water beads… sand, rice…” Rotating to different stations in seven minute rotations for about 25 minutes, students undertake this break time with lights off and soft music playing to bolster the results of the touch-based sensory tools. Wiggle seats, cushions, and fidgets are made available to students if they need them “throughout class to aid in their engagement.”

Participant C does not schedule a specific sensory time, “but I am aware of sensory needs,” she explained, “and I try to build it into the day.” Within her classroom’s structured social play, she provides “sensory bins” with rice and beans “just to address some of those sensory components throughout the day.” Similar to all of the teachers interviewed, she did not link pre-instructional strategies directly to reading, but Participant C recognizes such touch-based tools as fidgets as effective in helping “manage behavior” before moving on to a task. Participant D designed stations for sensory breaks. “If I feel like they need a sensory break or it’s just too overstimulating,” she said, I’ll definitely stop and see where they’re at with things.” Touch-based strategies include a bouncy ball, foam cube, fidgets, and a trampoline. “One of my students has one of those wobbly chairs,” she said. She spoke highly of the effectiveness of the chair. “I feel the wiggly chairs are really useful,” Participant C explained, “because one of my students is always jumping around and it does help.” Further describing her student and his experience with the chair, she said when he “goes overboard” with the chair, she cautions him to use it “as a tool not a toy and don’t go crazy with it.” But the way the chair helps the student rock and settle into a self-regulating rhythm “really does help.”

Participant B discovered that engagement can be strengthened after students with ASD "get out all their wiggles." Thus, prior to activities such as ELA or written work which require extended periods of sitting, students are provided with a dance or movement break. Participant C describes student seat or station rotation as a useful movement-based strategy. She explained that "students don't sit in one seat the whole time; they rotate every 15 minutes so they're getting movement." The wiggly chair has been credited with providing students with ASD the rocking movement that makes a difference in self-regulation that may lead to improved engagement. Participant C found the wiggly chair an effective movement-based strategy for her intensely active student who practices repetitive jumping. The wiggly chair, she maintained, "really does help [him] because he just rocks back and forth. He gets to move as he's learning while he's on the chair. It helps for some of the kids that need the movement."

b) Hearing-based. Fifty-percent of teachers interviewed use a hearing-based strategy with their students with ASD. In response to pre-instructional strategies used to help students with ASD engage, Participant B noted headphones as a hearing-based tool used throughout class to support engagement. Participant C also makes headphones available to her students and uses them "almost on a daily basis." Some kids, she said, "use them more than others. It's definitely an accommodation that we provide." Also, under the heading of hearing-based strategies, one teacher discussed the use of soft music playing during sensory breaktime.

c) Physical space-based. Fifty-percent of teachers interviewed spoke to this strategy type. To respond to her students' self-regulation and emotional/sensory stimulation challenges, Participant B purposefully designs her classroom to be as free from overstimulation as possible. "In class," she explained, "we are careful not to overstimulate our students, which means we have lights turned down, low sounds, and we offer headphones to students who still have

difficulties processing typical sounds in class." Similarly, Participant C made note of lighting and facilitating the pre-instruction environment. "I try to keep the lights dim," she explained, "to address sensory and self-regulation. Importantly, however, she did remark that most of her students ask for the lights to be turned up more brightly. "They like it when It's brighter in here." Participant C also discussed her attempt to maintain "very clear boundaries of the classroom layouts" and "make it very visual and clear" where to find each part of the classroom. She feels strongly that clear classroom boundaries help self-regulation, for students are more equipped to know where to find the things they need.

d) Emotional space-based. Fifty-percent of teachers used this type of strategy. When asked about pre-instruction strategies, Participant A's first response focused on maintaining a positive classroom space. "What I find," she said, "is just keeping it a positive learning environment." She spoke of a young man with a bad home life and what she does to provide a safe and positive space for him, which includes things that relieve stress, like coloring. Self-regulation struggles arise for her students "who are unable to communicates their needs in the typical way," and as a result, Participant B explained that communication-based sensory tools are made available to students fighting to make their needs known. They will often "scream, cry, or drop to the ground when frustrated. During these times," she said, "we refer back to their communication system and offer them sensory tools to help them process."

Pre-instruction Observation

Before moving on to research question two, which focuses on reading comprehension strategies, it is beneficial to explore the researcher's observations of teacher participants' classroom experiences as they relate to pre-instruction strategies. The researcher conducted observations over one period each of reading comprehension instruction with the same teachers

interviewed during the study. A five-part observation checklist, designed prior to the observations, contained the following yes/no components:

Observation Checklist

Yes	No	
☐	☐	1. Pre-instructional strategy tools present in learning environment.
☐	☐	2. Teacher made use of one or more of the pre-instructional strategies he/she indicated during interview before reading comprehension strategies were used.
☐	☐	3. Teacher did not use of one or more of the pre-instructional strategies he/she indicated during interview before reading comprehension strategies were used.
☐	☐	4. Teacher made use of one or more of these tools during use of reading comprehension strategies.
☐	☐	5. Teacher did not make use of one or more of these tools during use of reading comprehension strategies.

The researcher took field notes in the margins to better describe the phenomena seen during the observation.

Pre-instruction tools, also known as sensory tools, were present in one-hundred percent of the classrooms observed. The tools common to all four teachers observed were fidgets. Teachers offered them in various shapes and colors. After fidgets, the next most frequently observed tools foam shapes, balls, beads, and beans, which were present in 75% of the classrooms visited. On the days of the observation, 50% of teachers made weighted blankets and puzzles available. Other singular uses included but were not limited to: Visual schedules; putty; trampoline; wiggly seat

and/or wiggly bench; Squiggle Wiggle Writer®; Play-Doh®; Yoga ball; and noise-cancelling headphones. The researcher asked for permission from each of the four participants to photograph the pre-instruction strategy-based tools in their classrooms. These photographs are presented in appendix C.

Participant A's classroom presented a variety of pre-instruction strategy-based tools with an emphasis on kinesthetic (lots of squeeze-based tools) and visual (colorful) objects. During the period of time she was observed providing reading comprehension instruction to her students with ASD, she did not make use of the pre-instruction strategy-based tools. Participant B's classroom featured the largest number of pre-instruction strategy-based tools and included a weighted blanket, sleeping bag, and noise cancelling headphones in addition to touch-based options (largely squishy, malleable things). The researcher observed her using visual schedules, movement strategies, a projector that casted visuals of characters discussed during reading instruction, and noise-cancelling headphones. One child held a plastic egg throughout the entire observation. Participant C focused more than other participants observed on creating an atmosphere for her students than in providing an array of sensory tools. For example, she was observed dimming the lights and adjusting the temperature (not too hot, not too cold). Participant C was not observed using sensory tools during her reading comprehension instruction. Participant D's classroom featured pre-instruction strategy-based tools with a focus on the touch-based (malleable, squeezable, and manipulatable), as well as movement-based, such as a wiggle seat and trampoline. She was observed allowing students to self-regulate using the sensory tools provided. For example, one non-verbal student used visuals to help him focus and he was welcomed to hold onto a fuzzy pipe cleaner throughout the entire period.

Overall, teachers interviewed and observed discussed the benefits of pre-instruction tools and their efficacy in aiding in self-regulation and engagement for their students with ASD. Likewise, classroom environments were facilitated based on student needs. Teachers were observed using pre-instruction strategies during the observations and this was done to prepare students in general. However, of important note, no participants made a connection between pre-instruction strategies and reading comprehension strategies. Although the tools were present, the teachers chose to focus more on academic reading comprehension strategies.

Research Question Two: Reading Comprehension Strategies

Research question two asked four special education teachers to discuss the reading comprehension strategies, such as sight words, direct instruction, and Computer-Based Interventions (CBI), they use for their students with ASD.

Teacher-derived questions. One-hundred percent of teachers interviewed discussed questioning as an effective reading comprehension strategy for their students with ASD. Based on responses by the teachers interviewed, which focused solely on teacher-derived questions, questioning strategies are presented as those which can be described as using *WH Questions* and *Stop and Think Questions*.

WH questions. WH questions also served as a frequently discussed reading comprehension strategy as 75% discussed their use and efficacy. Participant B described the use of WH questions used while implementing the read aloud strategy. “During the read aloud,” she said, “we also focus on the WH questions [and ask] who was in the story, what happened, where did it happen, when did the story take place, why did it happen?” To help them reach their reading comprehension goals, Participant C encourages her students to “target… WH questions on their own.” These students, she said, are reading at “pretty significantly below grade level.”

She also uses WH questions as a monitoring strategy and stressed repetitively that her two main tools for reading comprehension and her students with ASD were the combination of sight words and WH questions. While she did not refer to WH questions by name, Participant D described the same reading comprehension strategy when she said, "And while we're reading I'm always like 'slow down' and after each page we read I always try and ask questions like 'who's the character?' 'what's his name?'"

Stop and think questions. She did not specify a strategy with a name common to the literature, but Participant A described the use of questions asked throughout reading practice as an effective strategy for her students with ASD who have low reading levels. As they practice reading, she said, "we ask questions as they go instead of at the end of the story. Just stopping and not letting them get too far." This, she does out of experience gained as an individual with her own comprehension issues, which will be described in more detail in the strategies criteria section. Participant B also stops at each page "to talk about what happened and to look at the visuals" and "at the end of the story we usually do a whole group wrap up activity such as… answering comprehension questions with visual supports." Participant D is sure to stop page by page to ask questions and encourage her students to stop and think.

Sight words. Sight words emerged as the second leading reading comprehension strategy employed the teachers interviewed with 75% of teachers identifying sight words as an effective option. According to Participant A, working "on sight words is a really good way" to help her students learn reading. In fact, the teacher has a curriculum based on sight words. She described the strategy as supportive of a "skill set that you have to have to be able to read." Sight words, explained Participant A, "starts with the first 50 words," she said, "and you just practice." Participant C, who emphasized her appreciation for and use of visually-based reading

comprehension strategies for her students with ASD, uses sight words, administered as flash cards, not only for reading instruction but also to monitor and adjust lessons to student progress. Participant D also uses sight words in the same way. She gave the example of her non-verbal student and his work with sight words. “I test him,” she explained, “and circle and cross it out” and through this process, the student practices and learns words through flashcards and likewise, the teacher is able to evaluate his reading progress on a regular basis.

Visuals, pictures, and graphic organizers. Seventy-five percent of teachers interviewed identified visuals, pictures, and graphic organizers as effective reading comprehension strategies for their students with ASD. Participant B identified pictures, visuals, graphic organizers are reading comprehension strategies used in her classroom. Pictures, such as those featured on the cover of book under discussion, are used to engage in conversation and as discussed just below, help students make predictions and activate their prior knowledge. Also, during their read aloud, they “stop at each page to… look at the visuals.” At the end of the story, her students work together to complete a “whole group wrap up activity, such as filling out a graphic organizer and answering questions with visual supports.” Using visuals served as the first response that Participant C gave when asked about the reading comprehension strategies she uses with her students with ASD. In lieu of limiting student responses to the written word, especially as it applies to reading assignments, Participant C prefers to offer “visual answer options.” She blends the previously discussed WH questions strategy with pictures and provided the example of her students significantly below grade level. With “the WH questions,” she said, “if I show a picture and we may be targeting ‘who…’ I may say ‘the girl is painting’ and then ask who is painting.” Participant D also pairs WH and Stop and Think questions with pictures. “I try to stop,” she explained, “before I do predictions about the story and looking through the pictures.”

Predictions and prior knowledge. Seventy-five percent of participants identified predictions and prior knowledge as a reading comprehension strategy. Making predictions and using prior knowledge served as the first responses Participant B gave when asked about her reading comprehension strategies. “We usually begin the whole group reading time,” she explained, “by looking at the pictures and using the words in the title.” She went on to provide an example of how she activates students’ prior knowledge while engaging in the prediction process. “For example, if the [book] cover has a picture of a pumpkin, we will discuss what we know about pumpkins (fall, Halloween, jack o’ lanterns, pie, Thanksgiving, etc.).” Participant C uses predictions during WH question time. In addition to asking questions page by page, Participant D engages the students in making “predictions about the story.”

Sharing and summarizing. Twenty-five percent of teachers identified sharing-based strategies when teaching reading comprehension to students with ASD while 25% noted a summarizing strategy. Participant D went into detail about the benefits of sharing found in active engagement and added, “I think it does help with comprehension.” She talked about Sheltered Instruction Observation Protocol (SIOP) training, which holds that active engagement is effective because a student does not necessarily need to speak English to learn it. The strategies include but are not limited to turn and talk and think-pair-share. This allows reading students to “think first, partner up, then share out loud,” she explained. Participant B described summarizing as a reading comprehension strategy used with her students with ASD. “At the end of a story,” she said, “we usually do a whole group wrap up activity” where she employs a graphic organizer, answers comprehension questions, and strengthens the learning with visual supports.

Computer-Based Intervention (CBI). Seventy-five percent of teachers used CBI strategies with their students. Participant A emphasized that as a reading comprehension teacher

working with students with ASD, she is "not afraid of using computers." She uses Scholastic's System 44, as first suggested by her school district. She spoke highly of the program, of a student currently using it, and about how she plans to seek more training "and hopefully I'll have her and a few other students on [System 44]." Participant A appreciates how the program "starts with the same skills" and how, because of its design, "you don't have to reinvent the wheel" each time it is used. She further advocated for the program by sharing the story of a lecture she had recently attended where a trauma expert spoke about computer-based intervention. The lecturer, a physician, "told us she wished every child in the country used this reading program." Participant A followed that up by saying that she is "all about" whatever can be done to help make a difference in the educational journeys of her students. "Education in almost a science," she said, and now we have science to back us." When detailing her multidisciplinary use of CBI, Participant B identified a reading intervention program called Lexia Reading Core. The program, she explained, "targets missing ELA skills that students need to reach grade level proficiency." Lexia serves as an alternative to traditional literacy programs. It is intended to serve students' unique needs. Curriculum can be incorporated into the Lexia app, which then adapts to student responses and offers them lessons designed to target address their areas of challenge while making good use of students' unique strengths (lexialearning.com, 2019).

At the time of the interview, Participant C reported that she did not use anything specifically CBI-related. However, she did note a program called RAZ-KIDS and how, although not in use in her classroom, it was available. RAZ-KIDS is an online reading program for student use both in the classroom or at home. The program features an online library of 81 'listen-to' and 'read-only' books (raz-kids.com). "I do have two students that I'm planning to teach how to use it," she said, "so they can use it independently. But that's the only problem." At the time of the

interview, Participant D elected not to use CBI in her classroom. She shared that she was not familiar with CBI products and resources, with the exception of Unique Learning System (ULS). ULS provides a combination of tools designed for students with special needs and provides students with rigorous curriculum created to meet students' needs (Nina Harris School, 2019, pcsb.org) "I know a lot of people using ULS," she said, "but I know it's too much for my kids." She does consider the possibility of researching ULS, "but for now," she concluded, "I don't use any CBI."

Criteria: Selection of Pre-instruction and Reading Comprehension Strategies

While teacher participants offered varied responses when asked about the criteria used to select their pre-instruction and reading comprehension strategies, their overall selection-based criteria aligned. Criteria was based on teachers' prior experience with students with ASD as well as students' individual needs as seen through the lens of behavior and academic ability. Experience played an important role in strategies used, especially for Participant A.

She expressed that when she first began teaching, she and her colleagues were not welcomed to use curriculums but were required to create their own. Therefore, she applied trial and error with "a basement of 20 boxes of stuff" tried over the past 20-25 years to find out what worked with her students. Today, supported by two decades of experience, she confesses that at the end of the day, "I just enjoy trying to help these kids." Through the years, she developed an appreciation for topics and themes which appear to draw and engage some students with ASD. "I find that [they] just love the factual stuff," she said, "and they do better with non-fiction sciency [*sic*] stuff." She strives to present her students with "information that's at their level" and to ensure that "they understand what they are reading." She does not use much of the school's curriculum, she reported, save her sight word program. "You take kids from where they are and

you move them forward…" she said, "You piece it together… just follow where they're at…[for] at this age, you're lucky if you can get them to learn numbers." Participant A also identified a schedule she keeps on the board as well as visual schedules designed for her students. The schedule on the board helps inform strategy selection as it "helps me keep track of what they're up to and if there's something I need to help them with."

For Participant B, pre-instruction strategy selection is influenced by behavior. When working with students who struggle to communicate their needs, she and her teaching team often reach for communication systems and sensory tools which aid in self-expression and self-regulation. Frustrated, these students "will often scream, cry, or drop to the ground when frustrated. During these times," she explained, "we refer back to their communication system and offer them sensory tools to help them process." Recognizing that activities which require that students sit for an extended period of time can benefit from pre-activity "wiggle" sessions, Participant B employs dance and movement break strategies.

Reading instruction strategies are based on her individual students' needs as well as personal experience, as described by Participant A. "I have a bank of strategies to pull from," she said, "that I have used before and have had success with in the past." Thus, her reading strategies include a "whole group reading activity each week where I'm directly modeling how to utilize these strategies." Individual student needs are addressed during leveled ELA groups. Every day, Participant B facilitates "leveled ELA groups where I pick specific activities based on each of the students' needs." Weekly progress monitoring also helps Participant B determine individual student needs "based on their specific IEP goals and objectives." Student needs are also considered for CBI-based reading comprehension strategies, which are chosen for students required to reach grade level proficiency.

Managing behavior steers selection of pre-instruction strategies as well as reading comprehension strategies for Participant C's students. When asked if she must manage student behaviors before reading instruction, Participant C replied, "Absolutely. I have to manage behavior before we move on to the task." Thus, the management of behavior informs strategies used, such as providing fidgets or small treats, like a single Skittles® candy. "Thus," she said, using the example of her orally fixated student, "he's…right there with us and his mind isn't somewhere else." In addition to managing behavior, Participant C described students' needs as driving reading strategies selection, because "that's what we're all about: individualized student education." Like Participants A and B, she also noted experience, sharing that in her experience, individualized student education is about "conducting simple assessments and seeing what students are most successful with and tailoring" it to meet their unique needs.

Prior experience and student needs also shape Participant D's strategy selection. Regarding pre-instruction strategy criteria, she stated, "it just depends on the needs." Like all teacher participants, she identified personal experience as a guide to strategy selection. "I've definitely learned that over years…" what sensory tools best meet students' needs. Sometimes, her strategies are based on immediate needs based on her classroom observations. During groups, she explained, "if I see that they're super wiggly, I'll go get the foam cube so that they're not so busy with their hands." While her district does not dictate that she uses certain strategies, professional development does influence Participant D when choosing reading comprehension strategies. She also turns to books to discover additional strategies. "I just like to pick strategies out of books," she said, such as 'Teach Like a Champion.' She recognizes that in terms of CBI, it is "too much" for her students. "I look at their individual needs and see what they need to work on," she said, "and then I look in the book and see what strategies they haven't used." She

applies this personal strategy because she believes "it's good to introduce something new and practice it. And if we practice it and we don't get it… good, at least we practiced it, then we can move on to different strategies." Participant D spoke to the participants' shared, overall belief that strategy criteria is "based on where I see my kids at and their needs and what I believe they can learn and… trying from there. It's really just trial and error."

Progress Monitoring and Monitoring Progress

One-hundred percent of teachers discussed aspects related to progress monitoring, or what they understood to be progress monitoring, in three ways. First, 75% referred even if briefly to district-wide assessment, which can be defined as any assessment for literacy, math, and behavior administered on a consistent basis to all students in a grade level. However, it is important to distinguish that "classroom assessment or teacher designed tests are not considered to be a district-wide" (IOWA Department of Education, 2018). Fifty percent of teachers identified sight words as a form of assessment when asked to speak to progress monitoring and monitoring progress. Participant A described progress monitoring as "a big thing" at her school and one that recently became more complicated. She briefly detailed the binders—comprised of IEPs and assessments—built for each student. Participant B went into more detail about progress monitoring by discussing the computer adaptive Northwest Evaluation Association/Measure of Academic Progress (NWEA/MAP) testing used by her district three times per school year to "determine each student's academic growth over time." The NWEA/MAP is computer adaptive, which means student responses to questions, as well as their prior answers, dictate the ebb and flow of the assessment (claytonschool.net, 2019). Reading and comprehension, she explained, are also assessed thrice annually using the Fountas and Pinnell Benchmark. Participant B also conducts weekly progress monitoring of students "based on their specific IEP goals and

objectives." Sight words served as Participant C's most frequently used form of progress monitoring. She gave the example of her student with a goal of increasing his sight word recognition by 20 words per school year. She acknowledged the potential for other kinds of assessment and described as Participant B had, about the Fountas and Pinnell Benchmark. However, overall, she prefers the simplicity and immediate feedback produced by the sight words system. She described it as "just an easy thing to target and to show progress." Like Participant A, Participant D uses progress monitoring binders and she also referred to the use of sight words. "…I have their goals printed out," she said, and pointed to the binder of her non-verbal student, saying, "he's working on the sight words." Each of her students have a binder and tabs on what their most recent work.

Teacher Perceptions about Working with Students with ASD

Four sub-themes emerged during the interview analysis. These were based on teachers' perceptions about working with students with ASD: a) The Challenges and Positive Aspects of Working with Students with ASD; b) Meeting Students' Needs; c) Student Behavior, and d) Student Development.

The Challenges and Positive Aspects of Working with Students with ASD

During the course of the study interviews, 100 percent of participants talked about the challenges of working with students with ASD while 75% discussed aspects related to the positive aspects. With 26 years of experience as a special education teacher, Participant A found an interest in the "very unique and very interesting cases" of the children with whom she worked early on in her career. On the positive aspects, she explained, "It's been fun and I've always enjoyed finding ways to try and help the kids." Participant A highlighted the gift of observing

students with ASD achieving their first reading success. “Watching them… read for the first time or listening to them,” she said, “you can tell they’re proud of themselves.”

During her four years in a self-contained classroom and five total years of teaching, Participant B has worked with a variety of students with varying levels of abilities and strengths. Some of her students with ASD display limited verbal abilities and while others are verbal but academically low. In terms of challenges, Participant B noted that some students with ASD have “trouble self-regulating their emotions and sensory stimulation” and thus, she meets these challenges by manipulating the learning environment and providing sensory tools. She described learning social skills, independence, and learner behaviors (raising a hand, group work, lining up and using the hallway) as “a huge part of my classroom.” As a result, she enjoys observing the student interaction she nurtures. “One of my favorite parts of my job,” she said, “is seeing my students grow and interact with their general education peers.”

When speaking of the positive aspects related to working with students with ASD, she emphasized the pleasure of observing her “students who have learned how to read” as well as “seeing some of my students grow beyond their PECS [Picture Exchange Communication System] books and to communicate full sentences independently.” When asked about working with students with ASD, Participant C described it as “definitely challenging. I have all kinds of stories.” She summed it up by confessing that no day goes by where she does not experience “the challenges of being a teacher who works with students with autism.” She identified limited communication and problem behavior as leading challenges in her classroom. Her students need a fair amount of support to be verbal. She also addressed the difficulty in redirecting a student with ASD by using, for example, a raised voice across the room as this may “set all the kids off because they are sensitive to loud noises.” During her four years of experience as a teacher

working with students with ASD, Participant C discovered that "we experience the challenges day in and day out, but when you have breakthroughs it makes it all feel worth it." For example, in terms of positive aspects, the teacher shared that sense of triumph, "…when you have children that learn certain words and you see little bits of progress here and there."

Participant D echoes Participant A's experience that working with students with ASD leads to a classroom of learners with very different skills and abilities. Likewise, she reflected Participant C's response regarding behavior-based challenges when she stated, "They're good at speaking and reading," she said, "but behavior wise they're not so high. They're pretty low." During her four years working with students with ASD, Participant D was also met with the challenges of difficult parents. "These parents… are a bit more difficult to deal with," she said, "I have to learn to deal with them as well." Despite the challenges, Participant D finds positivity in working with students with ASD, wrapping up her history as a special education teacher by saying, "…that's how I became an ASD teacher and I love it."

Meeting students' needs. One-hundred percent of the teacher participants discussed perceptions based on meeting the needs of their students with ASD.

Understanding and anticipating needs. Striving to first understand and even anticipate their students' needs (especially based on predictable behaviors), and then effectively meet those individual needs surfaced frequently throughout the interviews. Through time and experience, they learned how to identify and meet their students' diverse needs. For example, Participant A came to learn that students with ASD "just love the factual stuff" as well as science fiction stories. Thus, she made and continues to make an effort to meet her students' individual needs by providing reading materials which satisfy their interests and reading levels. "I have to make sure they understand what they're reading," she explained. Recognizing that her students with ASD

commonly have low reading levels, she continues to practice reading with them. She also noted that often she finds, “these kids don’t wanna bother with reading and would rather draw.” Thus, she makes it possible for kids to color and use their creativity. Aware of her students’ self-regulation challenges, she and her teaching partners “are careful not to over-stimulate our students,” thus they deliberately modulate classroom light and sound to meet student needs. In terms of student ability, she discussed her early observations of the wide landscape of skills she saw in students with ASD from kindergarten through second grade. “What I found unique… was the range of ability and disability. There were kids that were really smart,” she said, “and I couldn’t keep material for them and then there [were] kids that were really struggling.”

Communicating needs. Participant B also reflected on students unable to communicate their needs as some of their peers might. They “struggle with expressing what they want or need,” she said, “and will often scream, cry, or drop to the ground when frustrated.” Thus, Participant B refers back to the students’ preferred communication system, such as PECS or an iPad. Similarly, Participant C meets students’ communication needs through the use of communication systems including PECS and by dimming “lights to address sensory and self-regulation.” Accommodations are provided for students, such as nose cancelling headphones and sensory bins filled with touch-based experiences like rice and beans are made available to students. When she identifies inattentive behavior in her highly orally-fixated student, she employs a “touch your nose” strategy which she has custom fit to meet his needs. She uses this strategy frequently due to the high probability that he will comply, contain his behavior, and move on to the learning task. The choices she and her colleagues make are based on students’ needs, as she said, “because that’s what we’re all about: Individualized education.”

Consequently, she conducts simple assessments to identify where students find success, and then she uses that data to tailor instruction to their needs.

Meeting students where they are at. When meeting students where they are, Participant D talked about the awareness of rituals, routines, and repetitive behaviors associated with students with ASD. She provided the example of her student who "sticks his hand out and says all these scripts to movies… Sometimes it's a little distracting," she admitted, "…but I know he sometimes needs to do that before he can do anything else." The teacher explained that it took real world classroom experience for her to finally understand those skills which allow students to, for example, recite the batting averages of every player in Major League Baseball, but not possess the ability to comprehend the basics of a baseball game or list all the parts that comprise an automobile, but not possess the ability to understand driving. Because this kind of aptitude splits off from and represent only a portion of a larger set of skills, and are thus often inapplicable to workforce readiness, they are referred to as splinter skills. She might have to ask the student to quiet down for the sake of his fellow classmates but assures him that he is not in trouble and often allows him to ride it out, for it meets his need and allows him to then get focused on his work. In terms of meeting sensory-based issues, she said, "it just depends on the needs." She meets the needs of wiggly, fidgeting kids through sensory strategies like trampolines and foam cubes and other kinesthetic tools that allow students "a sensory break [to] just decompress before going back to stations." Trial and error also play a part in Participant D's classroom where strategies are based "on where I see my kids at and their needs and what I believe they can learn and us just trying from there." In terms of abilities and in conjunction with Participant A's observation of the wide range of abilities related to students with ASD, she recognizes the diversity of skill levels within one classroom, which drives meeting several

students where they are at. “Even though [the students] are in the same classroom,” she expressed, “they all have different skills and abilities.”

Student Behavior

One-hundred percent of participants addressed issues of behavior related to their students with ASD, but in contrast to all other sub-themes, this issue prompted the least discussion. When asked about behavior and students with ASD, Participant A recalled her early teaching career and “one little boy who would just go crazy and was really angry. A lot of it,” she explained, “was just managing his behavior.” Just the opposite can be seen, she said, when behavior is impacted by the pride of learning to read for the first time. “Behaviors are hard,” she stated, and then added as a solution, “I like to provide structure.” Participant B makes working with behavior a part of her students’ classwork, for she emphasizes learner behavior skills. She spoke to the challenges some students have with self-regulation and over-stimulation, which can lead to behavioral roadblocks as well as providing movement breaks and room rotations for students to help them release their wiggles and fidgets. Behavioral issues proved more of a concern for Participant C than for Participants A and B. Alongside limited communication, Participant C emphasized “problem behavior” as a concern she faces “every day for the majority of the day…” In harmony with Participant B, she addressed issues related to self-regulation and overstimulation, and keeping lights dim. She was the only participant to identify clear classroom boundaries and layouts as beneficial to self-regulation, arguing that student behavior tends to improve when “it’s more clear to them where things are in a classroom.” Participant D briefly highlighted the behavioral aspects related to rituals and repetitive behaviors. She spoke of behavioral issues related to splinter skills and how this caused some students with ASD to be “all

over" the place. She discussed students who displayed promising reading and speaking skills, "but behavior wise, they're not so high; they're pretty low."

Student Development

Aspects of student development emerged during the teacher interviews. Teacher participants took pride in discussing the growth and positive outcomes they have observed in their students. For example, Participant A celebrated that moment when a student with ASD discovers that he or she can read. In contrast to aspects of slow development, she remarked on the encouragement experienced with her students reading at the age of 4. Ultimately, she demonstrated her philosophy on development by saying, "You take kids from where they are and you move forward." Participant B spoke of slow development and limited verbal abilities as well as students with verbal abilities "but who are very low academically." She also spoke of having "the pleasure of seeing some of my students grow beyond their [Picture Exchange Communication System] books and to communicate full sentences independently," in addition to "students who have learned how to read…" She identified the fruits of student development as one of her favorite parts of her job and spoke highly of watching her students "grow and interact with their general education peers."

While in comparison with the three other teachers interviewed, Participant C stressed the difficulties associated with ASD-based issues that impede development, she suggested that seeing "little bits of progress here and there" made a difference for her as a special education teacher. Breakthroughs, she said, "makes it all feel worth it." When discussing development, Participant D placed a focus on the technique of stopping to gauge where her students are at and this helps her to determine how they are developing on an ongoing basis. "I'll definitely stop and see where they're at with things," she explained of her daily teaching schedule. Speaking to

development, she remarked that her young readers are doing well. “All the kids, even the ones that are a little lower, are making progress.”

Triangulation of Evidence

Evidence credibility can be achieved when qualitative researchers employ the three-pronged process of triangulation. The process allows researchers to compare different data sources toward verifying the credibility of their evidence and ultimately, study validity. Through triangulation, consistency and agreement are both checked and can be reached across three different data resources (Almutairi, 2018; Brantlinger, et al., 2005; Pugach & Johnson, 2002; Stake, 2010). This study triangulated interview transcripts, observation checklists and field notes, and member checking to determine consistency of data and themes.

Creswell (2007) describes the validation strategy known as member checking as a technique where the researcher turns to the participants for feedback and perspectives, especially related to credibility, on the study interpretation and findings. Creswell (2007) quoted Lincoln and Guba (1985) who argued that member checking is “the most critical technique for establishing credibility.” Participants are encouraged to provide thoughtful critique of developing analyses and emerging themes in lieu of a general review of transcripts or raw data (Creswell, 2007). Thus, once the researcher drew up a cogent draft of the themes and subthemes and compiled a preliminary analysis, she provided documents to and solicited feedback from her teacher participants.

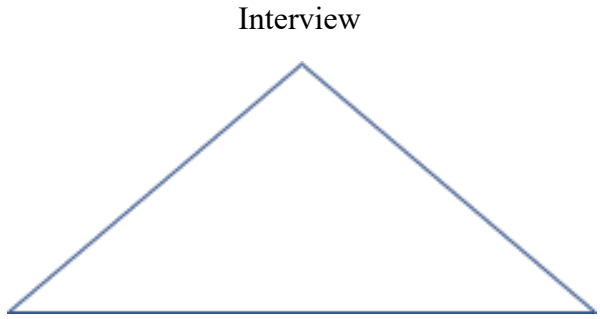

Figure 2. Triangulation of evidence. This figure illustrates the three points of the analysis.

Chapter Four Summary

In preparation for the study findings, discussion, and recommendations featured in Chapter Five, Chapter Four highlighted results of the teacher interviews and observations. It began with a summary of the study's purpose and research questions, provided brief participant profiles and demographics, as well as a look at the strategy selection criteria, and presented the major themes and sub-themes which emerged throughout the interview, observation, and analysis process. In this qualitative, multiple case study, which seeks to shed light on a connection between pre-instruction strategies and learning for students with ASD, teachers were observed during reading comprehension instruction and asked a series of interview questions. The researcher aimed these questions at gaining a deeper understanding about those pre-instruction strategies (visual, hearing, touch) used to help prepare students for reading instruction and what reading comprehension strategies teachers used with their students with ASD. A definition of pre-instruction strategies described the researcher's use of the term as it relates to those interventions, be they space-based (dimming lights, noise reduction) or engagement and self-regulation-based (fidgets, balls, visual schedules, weighted blankets). Next, the chapter moved into the major and minor themes section by unpacking the research questions and

interview questions as seen through the lens of study participant responses and their lived experiences in the classroom. The chapter explored sub-themes which emerged during the interviews. The chapter closed with a brief presentation of the researcher's triangulation process.

CHAPTER V

DISCUSSION

The purpose of this case study is to identify a potential connection between pre-instructional (visual, hearing, touch) and reading comprehension strategies teachers use to engage, instruct, and improve reading comprehension outcomes for elementary students with ASD.

This study uses a qualitative method through semi-structured interviews with four special education teachers. These teachers work in self-contained classrooms with elementary students who have autism. The study combined interviews and observation, demonstrates teacher resources through artifact photographs, and emphasizes how students learned reading skills through progress monitoring. A reservation checklist also played a role to determine if the teachers use the strategies they mentioned during their interviews.

Chapter five presents an analysis of the teacher participants' responses and answers the research questions based on teachers' lived experiences and as the strategies they use relate to the studies explored in the literature review. When applicable, I relate findings by the What Works Clearinghouse to the strategies examined. Based on the finding, this chapter also highlights study limitation and discusses implications and recommendations.

Results Related to Research Questions and the Literature

In the special education field, studies have not provided sufficient evidence of a connection between preparing a student with pre-instruction strategies and presenting a student

with a reading lesson or text. Therefore, this study focused on the pre-instruction strategies teachers used prior to instruction, the reading strategies teachers used with their students with ASD, and sought to demonstrate any connection between the two. The study is based on two research questions:

1. What are the pre-instructional strategies (visual, hearing, touch) do special education teachers use to help create conditions conducive to learning and reading comprehension for the students with ASD?
2. What reading comprehension strategies, such as direct instruction, reciprocal teaching, and Computer-Based Interventions (CBI) do special education teachers use for their students with ASD?

To generate the finding, the researcher analyzed data from the semi-structured interviews and observations and broke them down into categories and subcategories. Further, when understood based on current studies, the data collected answered the research questions as discussed below.

Research Question One: Pre-instructional Strategies

Four pre-instructional themes emerged as the researcher analyzed the data based on those strategies teachers use to help students prepare to comprehend reading instruction strategies. These pre-instructional strategies are a) touch and movement-based, b) hearing-based, c) physical space-based, and d) emotional space-based. Each strategy theme was supported by tools available inside the teachers' classrooms as seen during the observations.

Touch- and movement-based. Touch and movement-based strategies proved to be the most used pre-instruction strategies for students with ASD. One of the leading examples teachers that interviewed related with relaxation and focus in the classroom is the weighted vest. While

some studies suggest that the wearing of weighted vests resulted in increased engagement and self-regulation (Bogdashina, 2003; Stephenson & Carter, 2009; Cox et al., 2009; Fertel-Daly, Bedell & Hinojosa, 2001; Kane et al., 2004-05; Olson & Moulton, 2004), it may be argued that there is still a void in the literature related to the efficacy of strategies like weighted vests. According to Morrison (2007), although some report on the benefits of weighted vests, organized assessment of their efficacy remains understudied (Morrison, E., 2007; Honaker, D. & Rossi, L.M., 2005). Studies on weighted vests for children with ASD Stephenson and Carter (2008) reported that the effects of weighted vests provided neither powerful nor effective interventions. When comparing two different weighted vests in 2017, Mot and Mot found the weighted vests unable to provide the deep touch and pressure required to impact a child's nervous system. The researchers called for more rigorous research studies on touch-based strategies.

I observed a variety of fidgets made available to students as well as bins of touch-based organic matter such as rice, sand, and beans. These strategies were often used daily during break time and were not only limited to use prior to reading lessons. Some teachers scheduled specific times to use the touch-based tools, but also made decisions based on student needs. For example, teachers reached for the wiggly seat in situations where a fidgeting student required movement to self-regulate and according to the teachers interviewed, increase his focus on instruction.

Teachers discussed how movement can impede the learning process and likewise, when managed in such a way that, as one teacher described it, help a student get the wiggles out, can help a student find the calm required to engage in instruction. Thus, prior to teaching lessons, teachers interviewed offer their students physical activity time. For example, students are welcomed to dance, jump, or exercise. In this way, the teacher assures that the students are not required to sit in one spot for a long period of time. Sometimes students need to move while

sitting. As a solution, teachers referenced use of the wiggly chair, which allowed students to rock, sway, and move in such a way that their levels of concentration and engagement may be increased. Also observed as present in these classrooms, the wiggly chair gave these students the experience of moving and eased the frustration some students with ASD experience when seated in one place for a long time. Participants reported that moving while learning fostered more effective reading comprehension outcomes for some students with autism.

Hearing-based. Teachers used noise cancelling headphones to support students who are easily distracted or overstimulated by outside noise. This connects with Bogdashina's (2003) finding that some individuals with autism struggle with sound overload. One of the teachers said she uses headphones every day for students to help them engage in the text. The teacher also mentioned that she chose to use the headphones for some students more than for others. Also, as a part of the auditory experience, teachers play music to stimulate student focus and self-regulation. For example, one of the teachers used calming music at the beginning of each class period to help students get ready to learn, as well as to focus and engage. This is consistent with a study by Woolley (2011) which bridged self-regulation with reading engagement and skilled reading comprehension. Pre-instruction strategies involving self-regulation also connect with the theory of Executive Functioning Deficits, which suggests that due to neurobiological impairments, students with ASD face self-regulation challenges (Abnett, 2013; C.R. Carnahan et al., 2011).

Physical space-based. Because some students with autism struggle with self-regulation issues related to environmental factors such as noise, light, and sound, some teachers in the current study manipulated their classrooms to create more effective learning environments. An awareness of their students' challenges with sensory input connects with Carpenter's (2013)

finding that students with ASD commonly experience hyper-or-hypo-reactivity to sensory input. According to the teachers interviewed, some teachers prevent student overstimulation by dimming lights, controlling noise levels and sounds, and presenting clear classroom layouts and boundaries. Bogdashina (2003) described this need by describing how "painful" it can be for students with ASD to be overloaded by too much stimulation. Further, Murray (2008) related preparing the learning environment to Ivar Lovaas' work on ABA and how when addressed, those deficits which students with ASD face can be transformed. Likewise, Murray draws on Lovaas in suggesting that "persons with autism can learn once a special environment is created" (Murray, 2008, p. 29). Connected with the concept of clear classroom layouts and boundaries noted in the current study, Murray (2008) found that keeping supplies organized and within close reach permitted uninterrupted activity between the teacher and student. The same study emphasized that the learning environment works when sight and sound distractions are limited.

Emotional space-based. Study participants revealed that students engage and learn better in classroom environments which allow them to communicate their needs and experience positivity. Use of a pre-instruction activity, such as coloring, allowed one student with ASD and a difficult living situation that opportunity to relax, relieve stress, and get ready to learn the forthcoming reading lesson. There are times, teachers expressed, where the struggle to communicate their needs negatively impacts the emotional state of their students with ASD prior to a lesson. This connects with the DSM classification and criteria for ASD as well as Tidmarsh & Volmar's (2003) description of the neurodevelopmental deficits which characterize ASD, including an impairment in communication skills as well as in behavior. In the current study, teachers described the mounting frustration associated with a student's inability to communicate his or her needs. The subsequent screaming, crying, and throwing fits can impeded the student's

ability to engage and prepare to learn. Thus, teachers discussed the emotional space-based strategies they used to reconnect the communication system for their individual students, to provide students with the appropriate sensory tools, and facilitate understanding which leads to better self-regulation and onward, to more effective learning.

Research Question Two: Reading Comprehension Strategies

The teachers interviewed and observed revealed a variety of reading comprehension strategies used for their students with autism. Some strategies reflected those discussed in the literature review while some were based more on teacher experience.

Question generation. Question generation rose as the leading reading comprehension strategy discussed by teachers who provide reading instruction to students with ASD. Teachers found that question generation activities helped their students make connections, which not only helped them effectively respond to questions but also to construct questions of their own, although teachers interviewed focused exclusively on teacher-generated questions with their responses. Teachers used WH questions to ask about who, what, where, when, why, and how. Teachers also used another form of question generation, stop and think questions, where they stopped throughout the reading experience to ask questions to help students think during the reading process. This allowed questions for consideration throughout the story rather than simply at the end of the reading. The reading comprehension success observed by all four teachers is consistent with research which suggests that questions help to improve reading skills by fostering connections that lead students to effectively answer comprehension questions (Whalon & Hart, 2011). This is because the purpose of questioning to help students to find the main ideas and message. Beyond that, in terms of assessment, questioning's purpose is the student's acquisition of comprehension. While the strategy goes by a different name than WH or stop and think

questions as described in this study, shared book reading, was reviewed by the WWC (2015). Eight out of 13 studies met standards and returned mixed results on comprehension and language development.

Sight words. According to the teachers interviewed, sight words served as the second most frequently used reading comprehension strategy. Teachers found sight words effective because of the strategy's visual design, which often appeals to students with ASD. One teacher discussed pairing sight words with question generation while another based a curriculum on this strategy. Teachers appreciated the foundational aspect of sight words as a means to building a skill set necessary for reading ability. Sight words offered teachers and students opportunities for word recognition and practice, especially through the use of flashcards. Through practice, students developed skills and teachers circled or crossed out the words mastered. Thus, sight words also served as a way to monitor student progress. This is consistent with Chiang & Lin (2007) which found that students with ASD demonstrated an increase in vocabulary and text comprehension through the use of sight words. Sight words in the form of cue cards, studied by Whalon & Hart (2011), can transition into question-based strategies, discussed next. Found that sight word instruction led to improved reading abilities and reading confidence. Importantly, the study also found that sight word instruction required another form of literacy instruction to be beneficial (Hayes, 2016). A WWC search of sight words returned no results.

Visuals, pictures, and graphic organizers. When teaching reading comprehension to their students with ASD, the teachers interviewed for this study noted visuals, pictures, and graphic organizers as useful strategies. Teachers used book covers to facilitate discussion, encourage students to make predictions, and to act as a catalyst for their prior knowledge. Pictures featured inside the books were also used and students worked together to fill out graphic

organizers and answer questions at the close of a reading assignment. One teacher made visual answer options available to her students and combined WH questions with visuals. These applications reflect the literature. Research supports heightened engagement and learning through the use of visual supports for students with ASD (Morrison, E., 2007, Honaker, D. & Rossi, L.M., 2005). Rao and Gagie (2006) reference Kluth and Darmody-Latham (2003) which recommended the use of visuals, including graphic organizers, Venn diagrams, and flow charts when providing verbal instruction to students with ASD. Rao and Gagie (2006) also argue that students with ASD require more visual supports than their peers without ASD. The researchers describe visual supports as those that capture and keep a student's attention, and as a result, help the student to get focused on instruction and better understand concepts while reducing anxiety and more effectively communicating their thoughts. They posit that visual supports provide the structure, routine, and sequence that some students with ASD require to manage and complete everyday activities. Studies also show that graphic organizers are effective to help link text, topics, and reading comprehension, by offering student readers a relationship-forming framework (Finnegan & Mazin, 2016; Wittock, 1992). The opportunity to visualize connections between concepts has been shown to help students with ASD understand new data (Finnegan & Mazin, 2016; Darch & Evans, 1986). To connect back to the teacher offering visual answer options, studies suggest that because students with ASD are visual rather than hearing/auditory learners, they may benefit from alternative communication forms (Cohen, 1998). No results were returned when searching visual supports in What Works Clearinghouse.

Predictions and prior knowledge. Teachers interviewed also identified predictions and prior knowledge as a preferred reading comprehension strategy. Teachers use a variety of prompts to activate students' prior knowledge while reading and likewise, encourage concepts

connection and learning how to take a good guess about what comes next by using prediction. This is supported by Woolley (2011) who argues that prior knowledge leads to better reading comprehension. Prediction has been suggested as a part of reciprocal teaching (Palinscar and Brown, 1984) and Cooperative Integrated Reading and Composition®, further examined in the discussion to follow. Two of three studies met WWC (2010) standards for students with disabilities and demonstrated that predictions and prior knowledge strategies benefit communication and language competencies for students with disabilities.

Sharing and summarizing. Discussed the least, but still significant, 25-percent of teachers interviewed pointed to the strategies of sharing while 25-percent noted summarizing as useful for their student readers with ASD. Sharing was described as a beneficial form of active engagement which aided in comprehension. Examples of these sharing-based strategies are turn and talk and think-pair-share (TPS). The WWC (2010) reviewed two of three studies which met eligibility standards for a similar strategy called dialogic reading, which showed potentially positive effects on language and communication for students with disabilities. Summarizing proved effective for a teacher when engaging in a whole group wrap up activity. In summarizing, the teacher combines a variety of the strategies discussed in this study, including using a graphic organizer, questions, and visual supports.

Computer-based intervention (CBI). While teachers use of CBI to teach reading comprehension instruction to their students with ASD may have differed in this study from enthusiastic use to no use, their perceptions of CBI were positive across the board. Fifty percent of the teachers knew about and actively used CBI strategies for their student readers with ASD while fifty percent knew some or little about CBI and chose not to use it for reading instruction. As I found in my pilot study, Scholastic's System 44®, also known as Read 180®, proved

attractive to teachers because it was intuitive, well-designed, and effective. This is aligned with the WWC (2016) finding that Read 180® had positive general comprehension and literacy achievement effects and potential positive effects on reading fluency.

Another CBI program used by a teacher interviewed for this study is Lexia Reading Core. According to three studies which met standards and were reviewed by the WWC (2009), Lexia Reading showed potentially positive effects on comprehension but effects on general reading achievement were not demonstrated. These findings align with studies which suggest that CBI can make a difference for students with ASD based on better attention given through individualized instruction and use of the sight words strategy (Panyan, 1984; Moore & Calvert, 2007; Khowaja and Salim, 2013; Chiang & Lin, 2007). Teachers interviewed who praised CBI did so in part because of its ability to retain student attention and willingness to partipate. This is in keeping with a study which found that student readers with ASD increase their reading time when reading is computer-based (Williams, Wright, Callaghan, & Coughlan, 2002).

RAZ-KIDS was also highlighted during the interview process. One study found that RAZ-KIDS motivates students to engage in literacy instruction, but it did not explore reading comprehension (Mackmin, 2010). Another study found that while RAZ-KIDS improved reading fluency and exposure to more data through the use of sight words, the program did not appear to increase reading comprehension scores for K-8 students with LD (Marchand, 2015). One teacher highlighted the Unique Learning System (ULS) and remarked on its ubiquitous use, but she felt it was too much for her students. One study which examined middle school students with mild CI suggests that teachers using ULS had a positive perception of the impact on student academic achievement levels (White Condon, 2017). When studying metacognitive reading strategy and comprehension for students with ID, Cox-Mango (2018) argued that ULS's scaffolding

approach, which facilitated information chunking to serve students with memory issues, led to significant emerging reading comprehension skills improvements for students.

Discussion of Teacher Findings

Analysis of the study data drawn from teacher interviews and observations yielded compelling findings. Based on my interviews and observations, pre-instruction tools are available in education settings. The teachers interviewed believe that they positively impact the outcomes of instruction and overall achievement. However, through the observation phase, I discovered that teachers did not apply pre-instruction strategies prior to or during reading comprehension instruction. Some teachers used these strategies to prepare students to be engaged, for example, to get centered and focus on instructions for the next activity. I did observe that pre-instruction strategies were used during break time to help the students transition to the next activity. It appears that these strategies are used in the general preparation of overall instruction, but not applied in the specific instance of reading comprehension instruction. Given this data, it is clear to me that none of the teacher participants made a connection between pre-instruction strategies and reading comprehension strategies for students with ASD. Instead, the teachers focused more on academic outcomes than on results associated with pre-instruction as a school occupational therapist might be. This is not an unusual finding, for special education teachers are characteristically and understandably concerned with their students' academic achievement. The idea of including an Occupational Therapist in the classroom to help professionally work with students with ASD requiring self-regulation strategies and work with sensory tools. This would take the pressure off of special education teachers and allow them to focus on education and not as much on behavior. This is also suggested because the large majority of research on sensory tools has been acquired in OT offices and not in classrooms. At

the same time, is this feasible? Would administration agree to the cost that this might add to their annual budgets? Would they see the benefit?

According to the findings, the reading strategies employed appear to link together to form a strategy chain. In many cases, the use of one lead to the use the next. For example, a teacher used sight words to then help generate questions. In another example, a teacher used visuals to help build prior knowledge before using reading comprehension strategies based on prediction and prior knowledge. A surprise finding came in the dual use of sight words as both a reading strategy and a means of progress monitoring as both Participants C and D revealed.

When employing the summarizing strategy, one teacher blends three strategies by using a graphic organizer, asking questions, and applying visual supports. This aligns with the literature which combines strategies for more effective outcomes. For example, while none of the teachers interviewed identified reciprocal teaching by name, in essence, one-hundred percent of interview participants applied some or all of Palinscar and Brown's (1984) four-pronged reciprocal teaching (summarizing, question generation, clarifying, and prediction) to their reading comprehension instruction. Another strategy which teachers did not mention by name, but that combines the strategies they discussed throughout their interviews is Cooperative Integrated Reading and Composition® (CIRC®). This multiple strategy program includes pairing students to read to one another, making predictions, and summarizing stories. Two of five eligible studies met WWC (2012) standards and findings suggested potentially positive effects on comprehension but no observed impact on general reading achievement. The WWC (2012) reported mixed results regarding the efficacy of reciprocal teaching on reading comprehension for adolescents with and without disabilities with only six out of 33 studies meeting standards. In 2013, WWC reported that no reciprocal teaching studies meet their evidence standards because

none meet Students with Disabilities scope eligibility. This renders the WWC unable to speak to the efficacy of reciprocal teaching with students with learning disabilities.

According to the literature, schedules or work systems posted on the board, as one teacher in the current study described, were shown to help students with ASD stay abreast and engaged with and thus, learn from the assignments (Carnahan et al., 2009; Carnahan, Hume, Clarke, & Borders, 2009; Hume & Odom, 2007; Mesibov et al., 2005). The literature suggests visual supports as effective strategies in helping students with ASD prepare to learn and to learn reading comprehension concepts. While 75-percent of teachers interviewed did discuss visual supports as part of their reading comprehension strategies, I found it surprising that they did not discuss visual supports as part of their pre-instruction strategies. It cannot be overlooked how frequently teacher participants discussed instruction in terms of visuals. “The biggest thing we do,” Participant C said,” is visuals” when asked about the reading comprehension strategies she uses with her students with ASD.

Strategies utilizing visual components can help keep students and teachers on track prior to instruction. One teacher found that visually-based strategies, including the use of a schedule posted on the bulletin board, or customized visual schedules for students, helped her keep track of what the students may need and those areas where they need assistance. The use of visually-based strategies is consistent with the literature as studies found visual supports for students with ASD led to heightened engagement and learning (Morrison, E., 2007, Honaker, D. & Rossi, L.M., 2005). A study by Williamson et al., (2009) provides the example that students with ASD using visual schedules prior to an assignment better know what to expect. Through teacher responses, I was surprised by the sense that teacher expectations can have an impact on learning.

This presented itself as a teacher talked about her beliefs on that which her students can learn.

Possible Reasons for a Lack of Research

It may be argued that as special education teachers were described in this section, researchers studying interventions for students with ASD may also choose a laser-focus on academic achievement over addressing the internal and external challenges discussed in this study. This may explain, at least in part, the lack of studies exploring pre-instruction strategies. Through my literature review, it also occurred to me that given the lack of studies undertaken to better understand the student reader with ASD on multiple levels, it may be true to say that as a field, we may not feel informed enough to explore the efficacy of the pre-instruction strategies I have discussed here as they related to students with ASD. Further, because interventions such as SIT are primarily used by occupational and physical therapists outside of the classroom, and are described using the vocabulary of psychologists, these strategies may not be on the radar of the special education researcher. Moreover, because of the low instance of studies wed with the low-rate of evidence that sensory-based pre-instruction strategies are effective for students with ASD, awareness of these strategies may be low as well as overall perceptions of them. However, the findings from both my pilot study and the current study oppose the latter point, as the majority of teachers were aware of these strategies, held positive perceptions about them, and made them available to their students with ASD. I would also argue that the lack of a common language to describe pre-instruction strategies may lodge a roadblock in between our shared understanding of their uses and benefits and the ability to assign criteria standards to them, such as experienced using the WWC as a guide. When searching the WWC database for studies using such terms as fidgets, graphic organizers, dimmed lights, and similar terms associated with pre-instruction strategies, I struggled to find reviews. Could it be that this lack of a universal language prevents

us from research that would lead to an understanding of what is meant by visual supports, noise cancelling headphones, and wiggly chairs?

Implications

My study findings may raise awareness of the special needs of students with ASD and the kinds of resources available for pre-instruction and reading comprehension instruction. The findings may serve to help teachers discover and consider strategies to help their student readers with ASD and inspire them to combine strategies to maximize their potency. For researchers, the findings may encourage new research that expands and deepens the results of this study. Importantly, it is my hope that my study will touch the lives of students with ASD in Saudi Arabia who currently lack pre-instruction-based resources and the high-quality of reading comprehension strategies available in the U.S. I believe that students with ASD in Saudi Arabia would benefit from such pre-instruction strategies as weighted vests, fidgets, and wiggly chairs. The chance to raise international awareness of their availability and use was one of the driving forces behind this study.

Recommendations for Future Research

Given the study findings, the following recommendations should be considered for future research.

1. In my future research on reading comprehension strategies, I will collect data from those who serve students with ASD outside the classroom, such as general and special education teachers and librarians within the school, as well as museum educators and parents to better understand the connections between overstimulation and those resources available.
2. A similarly designed study examining a large sample size would provide a wider range of teachers' reading comprehension strategy similarities and differences.

3. Interviews with and classroom observations of teachers of middle and high school age student readers with ASD would further deepen understanding of available strategies, their use, and the results of their use.
4. Future studies are needed to understand how co-teachers collaborate and use pre-instruction and reading comprehension strategies in inclusive classrooms for their students with ASD.
5. Future quantitative studies using surveys to collect data on pre-instruction and reading comprehension strategies for students with ASD would help enumerate efficacy and increases in achievement.
6. Studies with a national range would help shed light on those pre-instruction and reading comprehension strategies which teachers coast to coast use for their students with ASD.
7. Future studies which bring an occupational therapist into the classroom prior to and during reading comprehension instruction will illustrate the potential uses and efficacy of pre-instruction strategies such as SIT.
8. A study where the researcher gathers field notes by serving more as a participant than an observer (Creswell, 2007) of one to three students over the course of a semester or school year to determine if pre-instructional and reading comprehension strategies were successful.
9. In future studies, it would be useful to understand how (and if) special education teachers collaborate with occupational therapists using sensory integration therapy (SIT), especially for students with severe overstimulation.

Recommendations for future studies ask a variety of questions toward a better understanding of pre-instruction and reading instruction strategies, as well as their connections. I called for studies which explore strategies used by those who teach student readers with ASD outside of the classroom, studied a larger and more widespread sample sizes, change the

interviewer's role to participant, and extended the reach to middle and high school students. I called for studies which examine co-teacher collaboration when using pre-instruction strategies, bring occupational therapy into the study, and use survey-based qualitative methods to gather rich data. It is also my desire that future studies will expand geographically to benefit Saudi Arabian student readers with ASD. These studies will also serve special education teachers who work with students with ASD.

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Appendix A

Teachers' Recruitment Email

October 25, 2018

Dear Teachers,

My name is Murfet Alnemr, and I am completing my Ed.D. in Special Education and Literacy at Western Michigan University. I would like to invite you to participate in a research project that I think will benefit all teachers who work with and parents of students with autism spectrum disorder (ASD). The purpose of this study is to reveal a connection between pre-instructional and reading comprehension strategies special education teachers use to engage and instruct their elementary-age student readers with ASD. This research project is part of the requirements for the doctoral degree in Special Education and Literacy at Western Michigan University, in which I am a student.

Specifically, you are invited to share your personal experiences employing strategies which create an environment conducive to learning as well as providing reading comprehension strategies for students with ASD.

You are receiving this invitation to participate because your institution has classrooms serving students with ASD.

About the Study

My study is informed by the idea that if the student environment is not conducive to learning, the efficacy of the strategies employed will suffer. It may be true to say that for some students, reading comprehension strategies fall short of their efficiency when certain environmental and self-regulatory structures are not in place. Therefore, my research seeks to identify the potential structures that need to be in place in order to move student readers with ASD from decoding to comprehending in an atmosphere conducive to learning. It asks, have few made a connection because this is fairly new ground to be covered or because researchers have deemed such research unviable? Your participation will help my research demonstrate those strategies, environmental and reading comprehension-based, that teachers are employing with their students with ASD today.

The criteria to participate in the study are as follows:

1. A minimum of one year and a half experience as a ASD elementary school teacher.
2. A minimum of one year experience using reading comprehension strategies with students with ASD.
3. Use computer-based instruction (CBI) as one reading comprehension strategies for students with ASD.

The following would disqualify a teacher from participating in this study:
An ineffective or minimally effective overall teacher evaluating rating for the past one to two years.

Participants in this study will be asked to complete a one-on-one confidential, 45-minute semi-structured interview followed by an observation of one class session. The interview will take place in a comfortable and confidential setting of your choice. After the interview, you will be given the option of reviewing and responding to the transcript of the interview. Both the audio recording and interview transcript will use a participant number and code name and any potentially identifying information about you or your school will be redacted. Only the researchers will know the names and schools of actual participants. If you choose to participate, you will be contributing to an important area of ASD and reading comprehension research.

Of course, I expect that you will need more information to make your decision. Please contact me at murfeta.alnemr@wmich.edu or (608) 320-3988 and I will answer any questions and make sure you have all the information you need. By contacting me, you are making no commitment unless you decide to complete the informed consent to participate after we talk.

Thank you for your consideration of this request to be part of an important study. I would appreciate a response to this email. You can call me directly or email a contact number, date, and time for me to call you.

Sincerely,

Murfet Alnemr

Appendix B

Consent Form

Western Michigan University

Department of Special Education and Literacy

Principal Investigator:	Dr. Luchara Sayles Wallace
Student Investigator:	Murfet Alnemr
Title of Study:	**The Pre-instructional and Reading Comprehension Strategies Special Education Teachers Use to Engage and Instruct Elementary Student Readers with ASD**

You have been invited to participate in a research project titled "*The Pre-instructional and Reading Comprehension Strategies Special Education Teachers Use to Engage and Instruct Elementary Student Readers with ASD".* This study will serve as Murfet Alnemr's research project for the requirements of obtaining a Doctor of Education. This consent document will explain the purpose of this research project and will go over all of the time commitments, procedures used in the study, and risks and benefits of participating in this research project. Please read this consent form carefully and completely and please ask any questions if you need more clarification.

What are we trying to find out in this study?
The purpose of this case study is to identify a potential connection between pre-instructional (visual, auditory, tactile) and reading comprehension strategies teachers use to engage, instruct, and ultimately improve reading comprehension outcomes for elementary students with ASD.

Who can participate in this study?
You can participate in this study if you are a special education teacher who specifically works in a classroom with ASD students. Additionally, participants must meet the following criteria:
1. A minimum of one year and a half experience as a ASD elementary school teacher.
2. A minimum of one year experience providing reading instruction for students with ASD.
3. Prior/current use of computer-based instruction (CBI) as one strategy for providing individualized reading instructions for ASD students.

The following may disqualify you from participating in this study:
An ineffective or minimally effective overall teacher evaluating rating over one to two years.

Where will this study take place?
The interviews for this study will take place at a location that is convenient for you and also private, safe, and comfortable for both you and the researcher.

What is the time commitment for participating in this study?
Your total time commitment to the study will be approximately 45 minutes during which time the researcher will engage you in a conversation about your personal experience with students with ASD. Time spent in observation by the researcher will not call upon your direct participation or time. If you choose to, you may review and respond to your interview transcript to clarify or make additions if you feel you have more to say.

What will you be asked to do if you choose to participate in this study?
If you agree to participate, you will take part in a 45-minute in-depth, semi-structured interview with the researcher, who will later visit your class to conduct observation for one class period. During the interview you will be asked a series of questions related to your experience with students with ASD. At the time of the observation, the researcher will use a checklist to record field notes related to pre-instructional and reading comprehension strategies used. The interview will be audiotaped and later transcribed. You will receive a copy of the transcript via email with an invitation (optional) to review and add to it should you wish to clarify anything you said in the interview or add more information.

What information is being measured during the study?
The interview will contain a few demographic questions to assist the researcher in profiling the participants of study. This information will not include your name or other identifying information that could be attributed back to you. Data drawn from the interview questions and observation checklist will be based on your experiences using pre-instructional and reading comprehension strategies to improve reading outcomes for your students with ASD.

What are the risks of participating in this study and how will these risks be minimized?
There are no known risks for your participation in this study; however, the topic may stimulate emotional responses for some participants. If this occurs, the researcher may pause or stop the interview if you appear to be in a state of emotional distress. You may also choose to stop the interview if you feel emotionally overwhelmed.

What are the benefits of participating in this study?
There are no known immediate benefits to participants for involvement in this study; however, you may experience some emotional benefit from being afforded an opportunity to express your personal experience working with students with ASD. Moreover, you may experience a feeling of benefit from helping other teachers and parents of students with ASD.

Are there any costs associated with participating in this study?
There will be no monetary costs for participation.

Is there any compensation for participating in this study?
There is no compensation for participating in this study.

Who will have access to the information collected during this study?
The principal investigator and the student investigator will be the only persons to have access to the information collected as part of this study. Once transcribed, the digital recordings of the interviews will be deleted and the remaining transcription will have all identifying information

redacted or replaced by a participant number or code. Data from the study will be maintained on an encrypted and password-protected electronic storage device and is stored in a locked file or cabinet in the researcher's office until the conclusion of the study when the data will be transferred to and maintained by the Western Michigan University research archives for a minimum of three years, then destroyed. All information will be treated with complete confidentiality. You will be assigned a specific participant number to protect your identity and ensure confidentiality of your responses. Research findings will be published as part of the student's research project and may also be utilized by the researchers in future publications or presentations.

What if you want to stop participating in this study?
You can choose to stop participating in the study at any time for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences, penalty, or judgment if you choose to withdraw from this study.
Should you have any questions prior to or during the study, you may contact the student investigator at (608) 320-3988 or via email at murfeta.alnemr@wmich.edu. You may also contact the primary investigator, Dr. Luchara Wallace at (269) 387-5941or via email at luchara.wallace@wmich.edu. You may also contact the Chair, Human Subjects Institutional Review Board at (269) 387-8293 or the Vice President for Research at (269) 387-8298 if questions arise during the course of the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

_____
Please Print Your Name

_____ _____
Participant's signature Date

Appendix C

Interview and Observation Protocols

Project: The Pre-instructional and Reading Comprehension Strategies Special Education Teachers Use to Engage and Instruct Elementary Student Readers with ASD

Start Time Interview: _____ Observation: _____

End Time Interview: _____ Observation: _____

Date Interview: _____ Observation: _____

Location Interview: _____ Observation: _____

Participant #: _____

Thank you for consenting to participate in this study. I would like to record the interview so the study can be as accurate as possible. You may request that the recorder be turned off at any point of the interview. This interview will probably take 45 minutes to complete.

Lead-in: Today, we are going to explore your experiences with ASD students reading comprehension strategies. I would like to understand the nature of your experience teaching ASD students. I am most interested in giving other teachers the opportunity to adapt your strategies into their classrooms.

Interview Questions

The following open-ended questions were asked of the teacher participants in a semi-structured way in my research sample:

1. Please describe your history as a special education teacher working with students with ASD and how you came into your current position.
2. Please share with me some of your personal experiences an ASD teacher.
3. Please talk about your students' learning environment, addressing any benefits and barriers associated with sensory, stimulation, and/or self-regulation.

4. What pre-instructional strategies (sensory tools such as weighted vests, wiggle seats) do you use to help students with ASD engage before use of reading comprehension strategies?
5. Please describe the reading comprehension strategies you use with your students with ASD to improve their reading comprehension skills.
6. What criteria do you use to select these reading strategies? For example, do you make your selection based on the students' individual needs, on your own experiences with student success, on strategies/products recommended by your school district...
7. What Computer-Based Intervention (CBI) do you use with your students with ASD?
8. Can you talk about or provide documentation regarding your progress monitoring results and/or benchmarks related to standardized assessment?

Observation Checklist

Yes	**No**	
□	□	1. Pre-instructional strategy tools present in learning environment.
□	□	2. Teacher made use of one or more of the pre-instructional strategies he/she indicated during interview before reading comprehension strategies were used.
□	□	3. Teacher did not use of one or more of the pre-instructional strategies he/she indicated during interview before reading comprehension strategies were used.
□	□	4. Teacher made use of one or more of these tools during use of reading

comprehension strategies.

□ □ 5. Teacher did not make use of one or more of these tools during use of reading comprehension strategies.

My data collection protocol includes artifact analysis. Permission to photograph sensory tools and other pre-instructional strategies used by teachers will be requested on the consent form. To ensure the security and privacy of students and teachers, photographs will focus solely on artifacts and will be taken exclusively during/following the interview portion of the data collection process.

Thank you for your time today. I appreciate your willingness to participate in the study. The information you shared is valuable and will be treated with complete confidentiality. The next step will be for the recording to be transcribed. Once the recording of your interview is transcribed, I will contact you so you may review the transcription (optional) to ensure that it is accurate and reflects what you said. For security purposes, the use of your name and any transcription information that identifies you, your school, or district will be redacted.

Your review of the transcript is completely voluntary. If you choose to review and edit where you see fit, it will help me validate the research and make it more credible and reliable. It may take me a few weeks to get the transcript of your interview back to you. Specifically, I will ask you to:

1. Read for accuracy. The transcription will verbatim, but you may want to elaborate upon, correct, or add to one or more areas of your responses.
2. Reflect on how well the transcript tells your story. Feel free to fill in any gaps.
3. Be sure that the transcript accurately captures both how you experienced things and how you make sense of your experiences.

I will send you the same prompts when I send you the transcript. You will receive it as a word attachment to an email, so please provide me with a private email account, if you wish me to send it there rather than to your school account. I suggest you download the electronic word file of your interview transcript and use track changes (if you are comfortable with that process) to make your edits and revisions. If you would rather use a different process to highlight any additions you make to the transcript, just let me know at the time, so I am clear on how I will get your feedback. Do you have any questions?

Again, thank you for giving your time and voice to this study.

Murfet Alnemr

Appendix D

HSIRB Application

Western Michigan University

HSIRB Application

The Pre-instructional and Reading Comprehension Strategies Special Education Teachers Use to Engage and Instruct Elementary Readers with Autism Spectrum Disorder

Principal Investigator: Dr. Luchara Wallace
Student Investigator: Murfet Alnemr

Abstract

The purpose of this study is to identify a connection between pre-instructional and reading comprehension for students with Autism Spectrum Disorder (ASD). This qualitative, multiple case study will use a semi-structured interview and observation approach in an educational setting, such as the classroom, of the interview participant's choosing.

Purpose/Background Information

This research is intended to determine a relationship between pre-instructional and the learning process for student readers with ASD while highlighting empirically proven, evidence-based interventions and environmentally-based interventions, such as sensory integration techniques, available to special education teachers and their students. A pilot study conducted two years prior to this study led to findings which inspired and informed this research. Elementary school teachers interviewed about reading comprehension strategies used with their students with ASD exposed me not only to the reading approaches they employed, but also to the ways they helped create effective learning conditions for their students. My research led me to consider a potential connection between pre-instructional and reading comprehension achievement for students with ASD. Studies exploring reading comprehension and students with ASD are limited, as are studies focused on the outcomes related to creating learning-conducive environments for students with ASD.The No Child Left Behind provisions of the Elementary and Secondary Education Act (ESEA) of 2001 and the Individuals With Disabilities Education Improvement Act (IDEA) of 2004 require that all children receive evidence-based reading instruction consistent with the findings from the National Reading Panel (NRP) based on their study called, Children With Autism Spectrum Disorder and Literacy Instruction: An Exploratory Study of Elementary Inclusive Settings, (2001). The 2000 NRP study report recommended that state and federal policies and laws, such as ESEA and IDEA, follow the five essential components of reading designated by the NRP,which are "phonemic awareness, phonics, oral reading fluency, vocabulary, and comprehension strategies" (Whalon & Hart, 1). The report of the 2000 NPR study indicates that children with ASD benefit from reading instruction consistent with the NRP

recommendations. The study confirmed that students with ASD require strategies to support reading comprehension and to promote their verbal contributions to academic difficulties around text. Observations which revealed that children with ASD often needed outside support during classroom activities prompted researchers to seek self-engagement in literacy-related activities (Children with Autism Spectrum Disorder and Literacy Instruction: An Exploratory Study of Elementary Inclusive Settings, 2011). Findings from a study, Reading Comprehension Profiles of High-Functioning Students on the Autism Spectrum (2012), reveal that considering reading comprehension for students with ASD instead of the sole ability to read is important for their educational journey to help them ease through life development including career path and quality of life. Commonly, students with ASD also struggle with deficits related to stimulation and self-regulation, and thus, learning can be threatened when students are "overloaded by too much sound, visual stimulation, emotional or/and physical demand and environmental expectation" (Bogdashina, 2003, p. 11). Thus, it could be argued that for students with ASD, environment may play a role in the learning process and thus, pre-instructional strategies, such as sensory integration and sensory tools, may be used to prepare students for reading comprehension strategy implementation. CBI employs technology for both vocabulary and text comprehension instruction. While it has been suggested by professional educators that use CBI strategies can also use them for children with disabilities, little is known about the use of these strategies for children with autism today. Further study is needed to identify the most effective ways of adapting reading comprehension and CBI strategies to increase reading proficiency for students with ASD.

Subject Recruitment

Participants for this study will be recruited from Kalamazoo community schools in Southwest Michigan. The target population for this study will be four to six teachers from different elementary schools. The age range of the four to six teachers that are being interviewed is between 22 and 65 years old with male and female teachers included. To gain access, the researcher will ask written and verbal permission from the principal to approach teachers who may be willing to work with the study. The researcher will also contact professionals such as social workers who may be able to contact teachers on behalf of the researcher. Also, the researcher will use a snowball sampling technique which helps the research to find other potential subject by asking the first participant. Once the researcher has received permission to contact teachers who meet the study criteria (i.e. Elementary Special Education teachers who serve students with ASD with reading comprehension strategies), the researcher will pay a visit to those teachers with a study recruitment flier that explains the study and provides details about what participation in the study would require of the teacher. The flier will also contain the researcher's contact information so that the teacher can contact her for further information if the teacher is interested in potentially becoming a participant in the study. If, after receiving the flier, a teacher expresses further interest, the researcher will respond by sharing and explaining the consent form and answering any questions the potential participant might have.
Once the researcher verifies that a teacher meets the study criteria and that teacher agrees to complete the consent process, the researcher will accept the teacher as a potential participant in the study. From the pool of qualified teachers who indicate that they are willing to sign the consent, and thus, participate in the study, the researcher will select the final four to six potential

participants based on maximal variation. The factor the researcher will consider for maximal variation are grade levels of the students in the teacher's classroom. Upon receiving signed consents from four to six qualified teachers, the researcher will end the recruitment process and send thank-you notes to any teacher who responds after that point.

Informed Consent Process

As stated above, in the recruitment process, the researcher will provide the interested respondents with more specified information. During initial meetings, the researcher will explain the study and answer potential questions from the interested respondents. Once the interested respondents wish to participate in the study and meet all of the study criteria, the researcher will complete the consent process by giving the potential participants a consent form that must be completed and returned to the researcher. The consent form can be returned in person, scanned and sent via mail, or by fax. Please see the Appendix B for the consent form.

Research Procedures

Methods of Data Collection

To collect data, the researcher will rely on semi-structured interviews and observation As interview participants, teachers will be asked to share examples and artifacts related to the strategies used to create an environment conducive to reading comprehension instruction for students with ASD. During the observation portion, the researcher will observe teachers employing the pre-instructional and reading comprehension strategies discussed during the interview process.

Instrumentation

The seven states of an interview (Qualitative Inquiry & Research Design, 2007) will be used to ensure efficacy: The interview questions will be based on the purpose of the study. In sequence, the interviewer will create an outline and plan for the interviews and observations. Semi-structured interview questions will be open-ended, general, and focused based on the research questions (Qualitative Inquiry & Research Design, 2007). The researcher will use a digital recorder to save the information from the teacher interviews for the teachers chosen and complete a form of questions created prior to the interviews. The researcher will design several pages, consisting of a few questions, in length with space to write in answers. The interview will be one-on-one and conducted in a small office or school room that allows the teacher to be in a familiar place and allows the researcher to effectively use audio recording. Later, the voice recordings will be transcribed for a readable set of data (Qualitative Inquiry & Research Design, 2007). Please see attached Appendix C for the interview protocol. Informed by the one-on-one, semi-structured interviews, the researcher will conduct observations of each teacher during a class period. The observational protocol will be composed of an observational checklist allowing the researcher to check off evidence of pre-instructional and reading comprehension strategies used, as well as field notes recorded by hand during the classroom observation. Please see attached Appendix D for the observation protocol.

Location of Data Collection

The interviews will take place at a location selected by the interviewee that affords safety and security for both the interviewer and the interviewee as well as complete privacy for the interviewee. To insure that the data collected is a full and rich rendition of participants' experiences, I will provide each participant with a full transcription of their interview with an invitation to add to or further develop the conversation through added text.

Duration of the Study

The total time required of each participant is approximately 45 minutes to respond to the interview questions. Once the researcher has transcribed the interview, participants will be given one week to add or further develop the conversation. The overall length of approval for this study is one year.

Methodology

Design

As mentioned above, this study will use a qualitative research approach as a multiple case study. Each participant teacher will be treated as an individual case; thus, the approach will be a collector case study. The researcher will determine the context of the setting, participants, and description of the qualitative study. Through the process of NVivo coding, the researcher will separate the data into different categories of the analysis and label the categories in the code. Next, he or she will develop a short table of basic information using NVivo codes and then expand on that information.

Analysis

With the data collected from interviews observations, and photographs of artifacts, the researcher will interpret the data by following the inductive analysis method for data analysis (Reeves, 2014). Results are reflective of the date the researchers collected interviews, observations, and examples or artifacts of the teachers' work. To store data, the researcher will type the notes electronically, save the data, and ensure that equipment worked properly. The researcher will decide how to represent the data in a poster presentation. After collecting information from interviews and observations the researcher will look for patterns and themes such as *pre-instructional strategies, sensory tools use, reading comprehension strategies,* and *use of CBI.* The researcher will prepare and organize the data into transcripts and images while using codes and determine how it would be interpreted. Initial transcripts include notes, writing in margins, reflective passages in notes, a draft of summary sheet on field notes, codes, observation checklist, and memos, note patterns, and frequency of code. The inductive analysis approach will be used to describe, classify, compare, and interpret transcript data into codes and themes (Reeves, 2014). The analysis will determine information about what the researcher expected to find before the study, surprising information that the researcher did not expect to find, and information that is conceptually interesting or unusual to the researcher.

Dissemination

The information is being collected for a dissertation and completion of a doctoral degree. The information will be disseminated by Western Michigan University consistent with graduate school guidelines.

Risks and Cost to and Protections for Subjects

This study will comply with all the HSIRB guidelines put forth by Western Michigan University. Steps will be taken to safeguard the privacy and confidentiality of each study participants. A protocol of informed consent will be followed in order to see that each participant's privacy is protected. The Western Michigan University HSIRB approval process will be completed before the data collection process begins. Since the researcher will engage each participant only about their work with students, there is little risk of emotional distress; however, participants will be informed that they may stop the interview if they experience discomfort or distress. The only cost to participants will be the time to prepare for and participate in the interview.

Benefits of Research

The goal of this study is to provide data that will be useful for school districts, teachers, but also parents of student readers with ASD as they seek practices to help students with ASD move from decoding to comprehension.

Confidentiality of Data

All information collected as part of this research will be treated with confidentiality and ethical respect by following HSIRB practices. Participants in this study will be assigned a pseudonym so that information that they provide will not be attributed to them. Only the researchers will have a record of the participants' names and the school that corresponds to each participants' pseudonym. Audio transcripts will be destroyed once the transcription process has been completed and written record is produced. All research data will be kept for a period of three years after the study has been completed in a locked file at the principal investigator's office at Western Michigan University, or in its archives, and then destroyed.

Appendix E

HSIRB Approval Letter

WESTERN MICHIGAN UNIVERSITY

Institutional Review Board
FWA00007042
IRB00000254

Date: February 21, 2018

To: Luchara Wallace, Principal Investigator
Murfet Alnemr, Student Investigator

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 16-01-43

This letter will serve as confirmation that the change to your research project titled "What the Strategies DO ASD Teachers Use to Help Student with Autism Spectrum Disorder Engage in Reading Instruction and Respond to the Teacher" requested in your memo received February 21, 2018 (to remove student investigator Azala Al Ghamdi) has been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

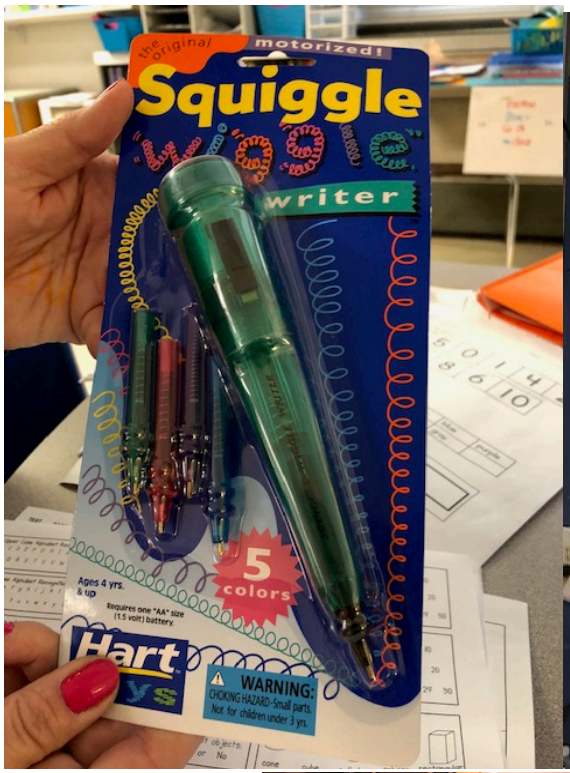
Approval Termination: **February 3, 2019**

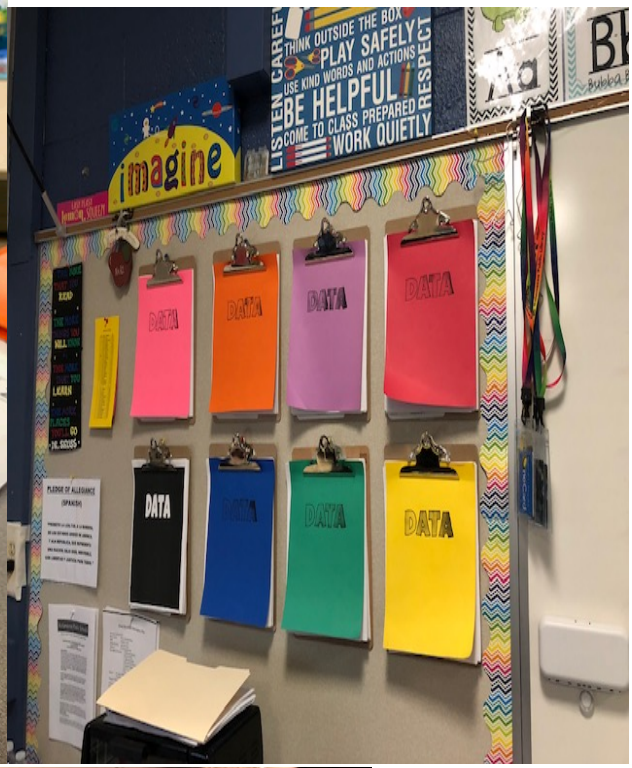
Office of the Vice President for Research
Research Compliance Office
1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
WEBSITE: wmich.edu/research/compliance/hsirb

CAMPUS SITE: 251 W. Walwood Hall

Appendix F

Artifacts



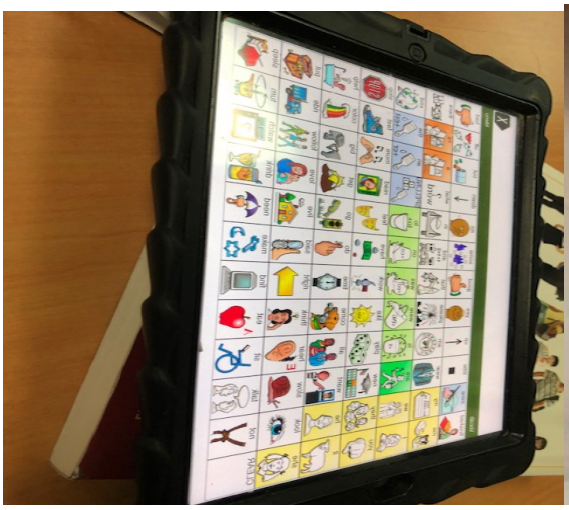


Appendix G

Artifacts

Appendix H

Artifacts



Appendix I

Artifacts