

5-2018

Picture Cues and Reading Comprehension: The Impact of Picture Cues on the Reading Comprehension of First Grade Students with Autism Spectrum Disorder

Brittany Rae

St. John Fisher College, bbr07083@sjfc.edu

[How has open access to Fisher Digital Publications benefited you?](#)

Follow this and additional works at: https://fisherpub.sjfc.edu/education_ETD_masters

 Part of the [Education Commons](#)

Recommended Citation

Rae, Brittany, "Picture Cues and Reading Comprehension: The Impact of Picture Cues on the Reading Comprehension of First Grade Students with Autism Spectrum Disorder" (2018). *Education Masters*. Paper 366.

Please note that the Recommended Citation provides general citation information and may not be appropriate for your discipline. To receive help in creating a citation based on your discipline, please visit <http://libguides.sjfc.edu/citations>.

This document is posted at https://fisherpub.sjfc.edu/education_ETD_masters/366 and is brought to you for free and open access by Fisher Digital Publications at St. John Fisher College. For more information, please contact fisherpub@sjfc.edu.

Picture Cues and Reading Comprehension: The Impact of Picture Cues on the Reading Comprehension of First Grade Students with Autism Spectrum Disorder

Abstract

This action research project investigates the effects of picture cues on the reading comprehension abilities of first grade students with autism spectrum disorder (ASD). Data was collected through lesson data, anecdotal notes, student interviews, and parent perceptions surveys. Findings revealed that: picture cues can increase student engagement and comprehension by measure of their ability to answer “wh” questions. Parents perceived an increase in their child’s comprehension with the use of picture cues. Participants reported a preference for reading with picture cues. Implications suggest that picture cues can support reading comprehension in learners with ASD and their ability to accurately answer “wh” questions. Additionally, special educators need to implement multiple individualized reading instruction interventions to best support the diverse needs of learners with ASD.

Document Type

Thesis

Degree Name

MS in Literacy Education

Department

Education

First Supervisor

Chinwe Ikpeze

Keywords

Picture Cues, Reading, Comprehension, Autism, ASD, Visuals

Subject Categories

Education

Picture Cues and Reading Comprehension

The Impact of Picture Cues on the Reading Comprehension of First Grade Students with Autism
Spectrum Disorder

By

Brittany Rae

Submitted in partial fulfillment of the requirements for the degree

M.S. Literacy Education

Supervised by

Dr. Chinwe Ikpeze

School of Arts and Sciences

St. John Fisher College

May 2018

Abstract

This action research project investigates the effects of picture cues on the reading comprehension abilities of first grade students with autism spectrum disorder (ASD). Data was collected through lesson data, anecdotal notes, student interviews, and parent perceptions surveys. Findings revealed that: picture cues can increase student engagement and comprehension by measure of their ability to answer “wh” questions. Parents perceived an increase in their child’s comprehension with the use of picture cues. Participants reported a preference for reading with picture cues. Implications suggest that picture cues can support reading comprehension in learners with ASD and their ability to accurately answer “wh” questions. Additionally, special educators need to implement multiple individualized reading instruction interventions to best support the diverse needs of learners with ASD

Picture Cues and the Reading Comprehension of First Grade Students with Autism Spectrum Disorder

I first met Danny (a pseudonym) when he entered my first grade extended school year self-contained classroom in the summer of 2017. He was a returning first grade student, but it was my first year teaching special education in this district. When Danny entered the classroom he presented as a bright, energetic, and loving student with a diagnosis of autism spectrum disorder. He enjoyed counting, numbers, clocks, cooking, books, reading, and I was especially impressed by his sight word knowledge and his ability to decode words above grade level. However, after spending a few days with Danny working on reading in an individual and small group setting, it quickly became apparent to me that his strong word reading abilities did not translate to his comprehension skills. He would often read an instructional level text with 99 or 98% accuracy, and then only be able to answer 1 out of 6 comprehension questions about the text he had just read so accurately.

This disassociation between word reading and comprehension skills emerged as a pattern I saw in several of the students I worked with and currently work with that have a diagnosis of autism spectrum disorder. I began wondering, reading and researching how I can better support the comprehension of my students like Danny. The desire to improve my own teaching practice and best support my students, led to wonderings and exploring the possibility of using picture cues. Visuals and picture cues are a strategy abundantly and successfully used for functional purposes in my classroom to support transitions, behaviors and much more. The success of visual supports in other aspects of my teaching made me wonder how I could use them to increase text comprehension. That journey has led me here, to an action research study on the impact picture

cues can possibly have on the reading comprehension abilities of my first grade students with autism spectrum disorder.

According to the National Institute of Mental Health, autism spectrum disorder or ASD, is the name for a group of developmental disorders (National Institute of Mental Health, 2018). ASD includes a large range or a “spectrum” of symptoms, skills, and ability levels. People or children with an autism diagnosis often are characterized by ongoing social problems such as difficulty communicating and interacting with others, repetitive behaviors, perseverative tendencies, and/or limited interests or activities. For example, some children or adults with ASD engage in repeated or stimulatory body movements such as rocking, hand-flapping, repeating words or phrases, spinning objects, or large amounts of information on particular topics of high interest. These symptoms, while they range from mild to severe, often impact the individual’s ability to function socially, at school or work, or in other areas of their life (National Institute of Mental Health, 2018).

By definition of their diagnosis, children with ASD also have communication and social deficits (Autism Speaks, 2012). However, being a spectrum disorder, individuals with autism are characterized by a wide range of communication abilities and difficulties. From intake and processing of information, verbal or representational output, picking up on non-verbal cues, body language and interpretation, to reading and writing skills, each individual with ASD is characterized by their own abilities and difficulties in the areas of communication (Autism Speaks, 2012).

Although effective interventions in the five major components of reading, phonemic awareness, phonics, fluency, vocabulary, and comprehension, have been extensively researched and shown to prevent or remediate reading difficulties for most children, these studies fail to

include children with ASD. At present, there is a lack of research on the effects of interventions that target the essential components of reading mandated by the NCLB and IDEA on the emergent reading skills of first grade students with ASD. Therefore, the purpose of this study is to examine the effects of picture cues as a reading intervention to support reading comprehension of first grade learners with ASD. This capstone will focus on the effects of picture cues on the reading comprehension of first grade students with autism spectrum disorder (ASD) in order to determine if visuals are an effective intervention to support reading comprehension in emergent readers with ASD.

This action research study examines the following questions: (1) In what ways if any, did picture cues impact two first grade students with ASDs' ability to answer wh" questions prior to reading and during reading and, (2) how can I help the students better comprehend and answer "wh" comprehension questions using picture cues?

Theoretical Framework

Literacy is a complex multidimensional process which is constantly evolving to keep up with the diverse and advancing world we live in today. As our technology and communication practices quickly change and evolve, so do our literacy skills and abilities. However, despite its fluid nature, all literacy, regardless of the form, traditional or multimodal, or place, in school or out of school, always requires the reader to draw on a wide range of linguistic practices in order to successfully make meaning and interact with a text.

Freebody and Luke (1990) define literacy as "a multidimensional set of social practices that is made up of code breaking, participation with text, social uses of text, and analysis of the text." Literacy is multidimensional because it is composed of various aspects and needs to be approached in a many different ways. Additionally, literacy can be viewed as a social practice

because it is something that people participate and engage in with each other and for social purposes. Freebody and Luke (1990) also state that in order to be literate one must be able to take on various roles, these being the code breaker, text participant, text user, and text analyst.

As the “code breaker” students much break apart and use the technology of language in order to determine what a text says. As the “text participant” students engage with and determine the meaning of the text. As the “text user” literacy learners ask themselves “what do I do within this, here and now?” (Freebody & Luke, 1990, p.7). Texts are social constructions. Therefore, the “text analyst” uses their prior knowledge to better understand the content and meaning of the text, and determine the lens used by the writer when constructing the text. Freebody and Luke (1990) also argue that through social interactions around literacy students learn their position as a reader and what texts are used for. From this definition of literacy, literacy leaners develop an understanding that all text is constructed for a purpose and from varying perspectives, and they acquire literacy by being engaged and immersed in social literacy practices. With this definition of literacy in mind, this action research project works to increase student’s role as a “text participant” and support readers with ASD and their ability to make meaning from the “code” or text they encounter.

Bandura’s (1986) Social Cognitive Theory (SCT), which details learning and behavior as a product of a person’s environment and the people around them, also drives the research and learning associated with this study. According Bandura (1986), learning is a result of personal, behavioral, and environmental influences. SCT asserts that the majority of our human behaviors are learned through observation and modeling. By observing another person, an individual is able to develop an understanding of how to perform new behaviors. This observational information then serves as a guide for the individual when they perform the new behavior

(Bandura, 1986). Additionally, any new experiences a person has are compared or evaluated against their past experiences. SCT is important for understanding, predicting and identifying methods in which behavior of a group or an individual can be modified or changed. In relation to this action research project, which seeks to increase the reading comprehension behaviors of first grade students with ASD, student will be exposed to teacher modeling of picture cue interventions to support text comprehension.

In addition to learning through modeling and observing others, Bandura (1986) states that, "what people think, believe, and feel affects how they behave" (Bandura, 1986, p. 25). This means that a person's expectations, level of motivation, their performance, and feelings of frustration can also directly impact their behavior. As a result, an individual's behavior can often be predicted by their own beliefs towards their ability and capacity for learning. Students' perceptions of their reading ability, aptitude to comprehend what a text means, attitudes towards reading, and level of frustration may also play a large role in this action research study and impact student's performance with picture cue interventions to increase text comprehension.

Transactional theory of reading development suggests that there is mutually important relationship and interaction between the reader and the text (Rosenblatt, 1994). Comprehension results from the transaction between the reader and the text. To apply transactional theory, teachers must show students how to use what they read and what they know to make meaning. In regards to this study, pictures cues will hopefully increase the reader's access to the text and the effectiveness of the transaction between the reader and text in turn promoting meaning making.

This action research project recognizes theory that supports the notion that literacy and learning requires more than just knowledge of the content. Student's need to know how to make meaning and develop an understanding from the various literary sources presented to them.

Specifically, in relation to this research topic, learners with autism spectrum disorder who struggle with text comprehension need the support of effective research based interventions in order to support their ability to make meaning from a text. The ability to make meaning and comprehend literacy and text is an essential component of the literacy acquisition and development of students with ASD. Additionally, comprehension is vital to the success of learners with ASD both in and outside of the classroom.

Research Question

Reading is an essential skill that directly impacts the future success of all children, especially the future life success and vitality of students with developmental delays such as autism spectrum disorder (ASD). (1) In what ways if any, do picture cues impact two first grade students with ASDs' ability to answer wh" questions prior to reading and during reading and, (2) how can I help the students better comprehend and answer "wh" comprehension questions using picture cues?

Literature Review

The purpose of this study was to improve the reading comprehension of two first grade students with autism spectrum disorder. Before conducting action research, it is essential to review the existing literature on students with ASD, their reading patterns and comprehension abilities, and pictures cues as an intervention to support text comprehension. This provides a background for a deeper understanding of the action research topic, current research, and implications.

This review of current literature on the research topic is separated into three distinct themes. The first theme reviews the literature on children with ASD and their associated learning difficulties.

The second theme examines current research on reading comprehension abilities and patterns in children with ASD. The specific reading comprehension abilities and patterns in students with autism spectrum disorder, as well as implications of current research studies on the topic, are important to consider before examining effective ways of supporting reading comprehension in learners with ASD using pictures.

The last theme builds on the importance of research based reading instruction for learners with ASD, and explores current studies that have investigated the use of pictures cues as an intervention strategy or support for students with ASD.

Children with ASD and Associated Learning Difficulties

Autism spectrum disorder (ASD) is made up of a group of developmental disabilities characterized by atypical development in socialization, communication, and behavior (American Psychiatric Association, 2000). A recent study estimate that autism impacts every 1 in 91 children ages 3 to 17 years in the United States. This is a significant increase from the previous 2003 estimate of 1 in 150 (Kogan, Blumberg, Schieve, Boyle, Perrin, Ghandour & Van Dyck, 2009). Because of rapid increases in the number of children diagnosed with ASD it is essential that current research be done on the literacy acquisition and development of this group of learners. Additionally, teachers need to be knowledge able of effective intervention strategies to support the development and learning of children with ASD

According to the American Psychiatric Association, an individual must experience at least two of the following to be classified with ASD: (1) limited nonverbal communication to regulate social interaction (i.e., eye gaze, facial expression, body posture, gestures); (2) an inability to form peer relationships appropriate to developmental level; (3) a lack of spontaneous

seeking to share enjoyment, interests, or achievements with others; and (4) limited social or emotional reciprocity (American Psychiatric Association, 1994, p. 57).

By this definition of diagnosis, it is fair to say that children with ASD struggle in the areas of communication and social interactions. In comparison to typically developing peers, ASD children will acquire speech late, and develop substantially less speech than their typically developing peers (Autism Speaks, 2012). As a spectrum disorder, individuals with ASD present with a range of communication abilities and difficulties. From intake and processing of information, verbal, or representational output, picking up on non-verbal cues, body language and interpretation, to reading and writing skills, each individual with ASD is characterized by their own abilities and difficulties in the areas of communication (Autism Speaks, 2012).

Communication struggles for children with ASD have been categorized in to two distinct areas (1) joint attention and (2) symbol use (Wetherby, Prizant & Schuler, 2000). Joint attention refers to an ability to coordinate responsiveness between people and objects. For example, attending to a social partner, appropriately shifting eye gaze, sharing affect or empathizing with another person. Symbol use explains an individual's ability to make meaning from symbols such as language or gestures (Wetherby, Prizant & Schuler, 2000). These communication difficulties are imperative to keep in mind when exploring literature on the reading pattern and abilities of learners with ASD, especially in the area of text comprehension.

In the area of social interaction, children with autism often exhibit an inability to interpret and understand information provided by others. Problems with comprehension are evident not only when attempting to interpret verbal, nonverbal, and social communication, but in written language as well (Myles, Hilgenfeld, Barnhill, Griswold, Hagiwara, & Simpson, 2002; Norbury

& Nation, 2011). These comprehension strengths and deficits impact children with ASD both in and out of school, and impact their reading acquisition and development.

Along with difficulties in social interaction and communication, current studies indicate that children with ASD have significant deficits in the following areas: (1) theory of mind, and (2) executive functioning (Autism Speaks, 2010). Theory of mind refers to a person's ability to comprehend the mental state (e.g. emotions, beliefs, perspectives, intentions, desires, knowledge) of yourself and others (Autism Speaks, 2010). As a result of their lacking theory of mind skills children with ASD often have trouble empathizing, reading emotions of people, understanding how their actions impact other, or seeing the perspectives of other people. These difficulties have also been seen in relation to characters in a book, story, or play (Whalon, Al Otaiba, & Delano, 2009, 2009). Executive functioning is one's ability to manage oneself, resources, and materials in order to successfully complete tasks (Autism Speaks, 2010). These skills include mental control, planning, self-regulation, and time management. These difficulties impact learners with ASD in the classroom. Poor executive functioning often makes it difficult for students to complete tasks, be independent, and manage materials.

Children with ASD exhibit strengths in their rote memory and ability to process concrete information (Frith, 2003; Sigman, Dissanayake, Arbelle & Ruskin, 1997). Learning difficulties typically occur when children with autism are presented with a task that requires processing abstract information sequencing, inferencing, visualizing, or symbol related tasks (Frith, 2003; Sigman et al., 1997) in the area of reading. Other researchers noted that "learning to read builds on cognitive, linguistic, and social skills that have developed from the earliest age" (Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001, p. 34). This can become a problem for students

with ASD because of their varying cognitive, linguistic and social acquisition and abilities, and associated learning difficulties.

With the increasing number of students with ASD in both general education and special education classroom settings at the primary level, many teachers are left wondering “where do young students with ASD need the most support in order to become a successful reader and how do I provide effective reading instruction and interventions in these areas?” Current relevant literature also shows many teachers do not have the training, knowledge, and/or skills to best meet the needs of learners with ASD in the classroom (Accardo, 2015; Accardo & Finnegan, 2017; Brown, Heather, Oram-Cardy, Janis, & Johnson, 2013). Miranda (2003) asserted that up until recently, children with ASD were not provided adequate reading instruction in the classroom because teachers perceived that learners with ASD lacked prerequisite skills (e.g. letter names, letter sound correspondence) and therefore were not ready or able to comprehend instruction in reading. These findings exemplify the importance for further research and a deeper understanding into the best instructional practices for students with ASD. Additional research will help provide effective training and professional development for teachers of students with ASD.

Early research additionally suggests that learners with ASD can make gains in the areas of reading and comprehension when they are provided with intervention (Whalon et. al, 2009). Again, emphasizing the need for future research. However, research synthesis shows a lack of related evidence based strategies and interventions specific to teaching and increasing reading comprehension in students with ASD (Accardo, 2015; Spooner & Browder, 2015; Whalon & Hart, 2011; Whalon et al., 2009). These findings support additional research on effective interventions in reading for students with ASD and validate this action research study as it looks

at picture cues as an intervention to increase reading comprehension of first grade students with ASD.

Reading Comprehension Abilities and Patterns in Children with ASD

Before understanding how to best support the text comprehension abilities of children with ASD, it is imperative to look at the current research on the comprehension abilities and patterns of this population. For all students, both those with and without ASD, literacy learning and development takes place on a continuum. As a child goes through each phase of the continuum of literacy learning, he/she develops skills that help them emerge as successful readers and writers (Pinnell & Fountas, 2007). The five essential reading skills, as defined by the National Reading Panel (2000), include phonemic awareness, phonics, vocabulary, fluency, and comprehension.

A conventional and effective reader must be able to apply their knowledge of phonics and phonemic awareness to accurately recognize and decode words, while fluidly and simultaneously comprehending their meaning both in isolation and in context. For most students, these essential reading skills develop concurrently as they progress through the continuum of reading development and become fluent readers (Mirenda 2003; Nation & Norbury 2005). However, research on children with ASD illustrates that this population often exhibits deficits in the area of reading comprehension (Davidson & Weismer, 2013; Huemer & Mann, 2010; Pimperton & Nation, 2014; Nation, Clarke, Wright & Williams, 2006; O' Connor & Klein, 2004; Whalon & Hart, 2011; Zuccarello, Di Blasi, Zingale, Panerai, Finocchiaro, Trubia, Grazia, Buono, Serafino, Zoccolotti, & Pierluigi, 2015).

Comprehension in reading is the ability to understand and make meaning from text. According to the National Reading Panel (2000), "comprehension is critically important to

development of children's reading skills and therefore their ability to obtain an education" (p. 4-1). Thus, comprehension is not only essential to the academic learning of all students but to their life-long learning and future success. However, current research clearly shows that students with ASD display difficulties in the literacy area of comprehension (Nation et al., 2006; O' Connor & Klein, 2004; Roycroft, 2015; Whalon & Hart, 2011). Furthermore, based on the social, communicative, and behavioral characteristics of students with ASD, these students may even struggle to understand what they have read at a basic level (Brown et al. 2013; Pimperton & Nation, 2014; O' Connor & Klein, 2004).

Based on the difficulties in communication and oral language that typically characterize autism spectrum disorder, it is not surprising that current research highlights comprehension as the largest deficit in reading ability for this population (Davidson & Weismer, 2013; Huemer & Mann, 2010; Pimperton & Nation, 2014; O' Connor & Klein, 2004; Zuccarello et al., 2015). Furthermore, Frith (2003) and Pimperton and Nation (2014) both suggest that the differences in cognitive style associated with ASD may place constraints on their comprehension abilities. This helps explain why reading comprehension is so difficult for learners with ASD. For example, those with ASD often have difficulty integrating information in context, but in order to successfully understand a text, the reader must critically integrate information within a text and from their own knowledge (Frith, 2003; Pimperton & Nation, 2014). Therefore, an impaired ability to integrate information is likely to create difficulties with comprehension when reading for learners with ASD.

Nation, Clarke, Wright and Williams (2006) investigated the general reading skills and patterns in 41 children between the ages of 6 and 15 years old with a diagnosis of autism. In their study, they assessed children on single-word recognition in isolation, non-word, or pseudoword

recognition, text reading accuracy, and reading comprehension. Overall, their results concluded that the word and non-words reading abilities of their subjects with ASD fell in the normal range, however these same subjects demonstrated impairments in their comprehension abilities. These results support the ASD profile of good word reader, poor comprehension found in a variety of studies that assessed the reading patterns and abilities of learners with ASD.

Using a larger sample size of 384 participants and a greater variety of assessment techniques than previous studies, Huemer and Mann (2010) also found that despite accurate decoding skills, children with ASD demonstrate difficulties with their ability to comprehend what they have read. Additionally, their study compared the 384 participants with ASD to a group of 100 participants with dyslexia. Huemer and Mann (2010) found that the dyslexic group showed the opposite patterns of reading ability when compared to the group with ASD. The dyslectic group demonstrated stronger comprehension skills and weaker decoding abilities. The findings of both of these studies confirm a disassociation between decoding and comprehension in ASD.

Davidson and Weismer (2013) conducted a similar study to determine if the poor comprehender profile was apparent during the emergent literacy period (mean age of 5½ years) in children with ASD. Overall mean scores indicated that their participants with ASD scored significantly higher on alphabet knowledge, in comparison to conventions and meaning on the *Test of Early Reading Ability*. Mirenda (2003) also observed that many children with ASD are highly interested in the alphabet and have strong alphabetic knowledge from a very early age. Davidson and Weismer's (2013) findings showed that learners with higher nonverbal understanding and stronger expressive language skills were more proficient readers, and that

learners with poorer social skills had more advanced alphabet knowledge but difficulty with meaning and understanding.

Overall, mean results of the reading patterns of students with ASD confirm a strong decoder, poor comprehender profile (Davidson & Weismer, 2013; Huemer & Mann, 2010; Pimperton & Nation, 2014; O' Connor & Klein, 2004; Zuccarello et al., 2015). However, autism researchers note extreme variability in individual results of learners on the autism spectrum, and caution when interpreting mean results for this population (Davidson & Weismer, 2013; Lanter & Watson, 2008; Nation et al., 2006; Norbury & Nation, 2011).

Davidson and Weismer (2013) found profiles at the extreme ends of the spectrum with high or low performance across all subtests, as well as two other profiles characterized participants who had extremely discrepant scores in alphabet knowledge in comparison to conventions and meaning. Norbury and Nation (2011) validated the previously discussed reading variability in students with ASD, and sought out to develop a better understanding of the differences in reading skills characterized by current autism research. They too noted large individual differences in performance of their participants. Some adolescent participants scored above average for comprehension, while others unable to complete the same tasks. Davidson and Weismer (2013) concluded that “reading outcomes in ASD are related to variations both in decoding and comprehension and in the oral language skills that support the development of these processes” (p. 191). This deduces that a student’s individual language and cognitive abilities are a better indicator of their literacy abilities and reading success, as opposed to the general research findings and “typical” patterns of learners on the autism spectrum.

The level of variability found in these studies, as well as in autism reading research as a whole, demonstrates the heterogeneous nature of reading ability across the autism spectrum

(Davidson & Weismer, 2013; Lanter & Watson, 2008; Nation et al., 2006; Norbury & Nation, 2011). The implications of the discussed heterogeneous nature of reading ability across the autism spectrum is for teachers and researchers to use caution when interpreting mean scores, and be careful when making large generalizations about the reading abilities for this.

The National Reading Panel (NRP) review of reading research also identified a number of instructional strategies to support and increase reading comprehension in typically developing children. According to NRP (2000), strategies in vocabulary knowledge, active understanding and engagement within the text, self-monitoring comprehension, question answering, question generation, and the use of semantic organizers to summarize and represent story elements were all determined to be effective and beneficial for increasing reading comprehension in typically developing students. However, there is a lack of research connecting these evidence based strategies to increasing the reading comprehension of students with ASD, despite IDEA and NCLB legislation suggesting that teachers provide students with disabilities such as ASD, with scientifically based reading instruction and interventions. A review and increase in current research connecting the reading patterns and needs of students with ASD, effective practices, and teacher training is essential in supporting learners with ASD.

Existing research on best reading instructional practices of students with ASD also indicates a need to individualize reading instruction. In a 2013 meta-analysis of predictors of reading comprehension difficulties for learners with ASD, Brown, Oram-Cardy and Johnson (2013) determined that ASD should not be associated with one specific reading profile. Based on the variability associated with ASD, they assert a need for teachers to have knowledge of multiple effective practices in order to individualize reading instruction and interventions for the specific student. They also noted that teachers need to be knowledgeable of how to select and

differentiate these research-based practices to meet the needs of their specific students. Further research also shows that there are discrepancies between what research supports and best practices for learners with ASD and what teachers are implementing in their classrooms (Accardo, 2015; Accardo & Finnegan, 2017). This again highlights the importance of teachers having multiple research-based interventions at their disposal when instructing learners with ASD in order to support diverse needs.

Additionally, these findings in regards to the comprehension deficits and variety of reading abilities in learners on the autism spectrum exemplify the importance of using multiple, varied, research-based approaches to teaching and assessing the reading comprehension skills of students with ASD. Approaches to supporting and increasing the reading comprehension of students with autism need to be individualized specifically for the student, rooted in research, and fluid based on the needs and growth of the student.

Visuals and Picture Cues as a Comprehension Intervention for Students with ASD

Prior to implementing picture cues as an intervention in hopes of supporting text comprehension for students with ASD, current literature on visuals and students with ASD will be discussed. We all use visual supports, planners, schedules, calendars, watches, and technology every day to help us be successful. Therefore, it is not surprising that research supports the implementation of visuals to support learners with ASD and other disabilities who struggle with social interactions, behavioral challenges, executive functioning, independence, organization, and communication (Anderson, Smith, & Iovannone, 2018; Arthur-Kelly, Sigafos, Green, Mathisen, & Arthur-Kelly, 2009; Cohen & Sloan, 2007; Dettmer, Simpson, Myles, & Ganz, 2000; Dooley, Wilczenski, & Torem, 2001; Ganz & Flores, 2008; Meadan, Ostrosky, Triplette, Michna, & Fettig, 2011).

While some children with ASD are auditory learners, the majority of children with ASD tend to be visual learners (Autism Speaks, 2012). This means that they understand and/or retain what they see visually better than what they hear. Visual supports are also often helpful for learners with ASD because they are concrete and much more permanent than oral language, thus they provide extra processing time for the child. The concept of visuals and pictures as an intervention for students with ASD is not a new idea. Research over the past decade has demonstrated that pictures and visuals help increase language and communication, ability to transition, organization, independence, and task completion of students with ASD (Caballero & Connell, 2010; Cohen & Demchak, 2018; Dettmer et al., 2000; Dooley et al., 2001; Ganz, 2007; Meadan et al., 2011; Thiemann-Bourque, Brandy, McGuff, Stump, & Naylor, 2016).

Ganz and Flores (2008) conducted a study to look at the impact of visual cues on the play of preschool children with ASD. They hoped to increase the play of three children with ASD and their typically developing peers using picture cues in the form of picture exchange communication and visual scripts. Their results showed an increase in the use of scripted phrases, appropriate comments, and amount of language interactions between all three participants and their peers during play. Research also supports that picture-based cueing systems during classroom free play can increase the engagement of preschool age children with ASD and significant developmental delays (Bevill, Gast, Maguire & Vail, 2001). These results indicate that picture cues are an effective support for increasing and supporting play based language in young children with ASD. They also support the claim that picture cues could also be an effective support for children with ASD in other areas of need such as reading comprehension.

Another largely researched and implemented picture based communication intervention for children with autism is the Picture Exchange Communication System (PECS). PECS was originally developed for nonverbal children with autism to provide them with a functional communication system via the exchange of symbols or pictures (Thiemann-Bourque et. al, 2016). As the name suggests, PECS functions when pictures are exchanged between communication partners to share information, gain understanding, or request something. Research on PECS supports a clear increase in the communicative functions of children with autism when taught this visual based system (Thiemann-Bourque et al., 2016). The implications for these positive findings in the area of communication interventions, is that similar visual supports may also be effective in supporting the comprehension abilities of learners from the same population.

Dettmer, Simpson, Myles, and Ganz (2000) found that pictures or visuals decreased the amount of time it took a child between a teacher given direction and the start of the next activity to begin. Picture cues in this study also caused a significant decrease in the amount of verbal and physical prompts needed during the transition. Dooley, Wilczenski, and Torem (2001) corroborated these results with preschool age children using a visual schedule based on the PECS system. They additionally noted a decrease in negative behaviors of students during transitions with the implementation of picture cues. Cohen and Demchak (2018) also proved the systematic teaching and implementation of visuals effective in enhancing independence and task completion of three students identified with moderate to severe disabilities in general education settings. Cooperatively these studies support visuals as an aide for students with autism supporting smooth transitions, positive behavior and student independence.

With these studies in mind, it is also important to note that current literature emphasizes that visuals are effective when they are implemented natural in environments (e.g. school, home, community) with a large group of children, a small groups, or on an individual basis (Cohen & Demchak, 2018; Cohen & Sloan, 2007; Meadan et al., 2011). Visual supports for learners can include pictures of real objects, photographs, line drawings, clip art, PECS images, and/or words (Meadan et al., 2011). In addition, the types of visual supports teachers have reported they use in their classrooms with students with disabilities vary. Teachers report the implementation of pictures and picture cues in the form of visual schedules, rule reminders, picture prompts, and visual task analysis. These factors are imperative for this action research project when creating visuals to support the reading comprehension of first grade students with ASD.

Cohen and Sloan (2007) findings show that visuals and pictures in the classroom are most effective when they are created based on the individual need, ability level, age, and interest of the child. Whalon and Hart (2011) also pointed out the importance of adapting and individualizing comprehension strategies for learners with ASD by stating that “learners with ASD may learn a strategy that not only helps them to access the general education curriculum in reading but also gives them tools to engage in meaningful academic discussions with peers, thereby promoting both their educational and social communication goals” (p. 202). The concept of adapting and individualizing all aspects of instruction and interventions is essential to keep in mind when teaching students with ASD.

Several studies have looked at the relations between picture illustrations and/or visual manipulatives and reading comprehension of students (Braid & Finch, 2015; Glenberg, Brown, and Levin, 2007; Roser, Martinez, Fuhrken, & McDonnald, 2007; Zambo, 2007). However, it is important to note that the majority of these studies have been conducted on typically developing

children and fail to look at the impact of visual interventions for readers with ASD. While visuals and picture cues have been extensively shown to support students with ASD in the areas of independence, task completion, communication, and social interactions, there is minimal research on the impact of visuals on the reading comprehension of students with ASD. This gap in the research for students with ASD supports the need for further research on visuals and reading comprehension for this population of learners.

Illustrations are often looked at as a visual support that readers encounter while they read and work to make meaning from a text. During their research on picture books and the meaning making of children, Braid and Finch (2015) noted that, “picture books, with their essential interdependence of pictures and words, both demand and foster a complex level of thinking as teachers guide children through the texts” (p. 120). This finding highlights the importance of pictures for children when it comes to understanding and making meaning from the text they are reading. Additional literature also supports that illustrations, when paired with text, can sometimes compensate for poor comprehension skills because they provide the reader with visual representations of main ideas, support characterization, and visually summarize the text (Roser et. al, 2007; Zambo, 2007). Additionally, when learners are taught to pay attention to the pictures in a book, they have been proven to better link background knowledge and create mental models, in turn enhancing their reading comprehension (Braid & Finch, 2015; Duke & Pearson, 2009; Van Meter, Aleksic, Schwartz, & Garner, 2006; Zambo, 2007).

Building on the idea of visuals to increase comprehension, Roser, Martinez, Fuhrken, and McDonnold (2007) conducted a study on the use of visual manipulatives to support text comprehension. They hypothesized that a fictional story could be made more concrete and easily understood by a child when discussed using objects, items, pictures, and maps along with the

text. Their findings supported this claim. Glenberg, Brown, and Levin (2007) also found that allowing readers manipulate objects to imitate characters, actions, and story plot significantly increased reader comprehension as measured by their ability to recall and inference information from what they read. Both of these findings support visuals as a comprehension support for learners by allowing the reader to visualize story elements and relationships therefore increasing their ability to make meaning from the text.

Comprehensively, these studies show that pictures and visuals in conjunction with printed text have the ability to support readers' ability to comprehend what they read. However, current literature also demonstrates a vital need for additional research on pictures and visuals and their impact on the reading comprehension abilities of students with ASD.

Conclusion

Learners with ASD and other disabilities deserve and are entitled to daily high quality instruction rooted in research tailored to meet their individual needs and maximize their potential. Based on the above review of current literature on the topic, a few things are apparent. First, children with ASD exhibit deficits in the areas of language comprehension, communication and social interactions. The profile of a learner with ASD is also characterized with high levels of variability in reading ability however, learners with ASD typically exhibit the most difficulty in the area comprehension. High levels of variability in students with ASD illustrate the need to take caution when interpreting mean results or making generalizations about this population. Variability in learners with ASD also asserts the importance for individualized instruction personalized to meet specific student needs for this population of learners. Finally, the synthesis on visuals as a reading comprehension interventions for students with ASD demonstrates that visuals have been shown to be an effective support for children with ASD and picture cues may

be promising in increasing the reading comprehension in students with ASD. Current literature demonstrates a need for further research on the impact of pictures and visuals on the reading comprehension of learners with ASD.

Method

Research Context

Research for this study took place in a classroom at a suburban elementary school located in Upstate New York. This elementary school has grades kindergarten through fifth grade. According to the 2016-2017 New York State Report Card, the school in which the research was conducted has a total of 573 students. Two hundred and eighty seven of these students are male, while 286 are female. The demographic breakdown in the school shows that 81.8% of the student population identifies White or Caucasian, 5.4% Black or African American, 5.1% Hispanic or Latino, 3.3% Asian or Native Hawaiian/Other, and 4.2% multiracial. Sixteen percent of the student population is economically disadvantaged, while 14% of them qualify for free and reduced lunch. This elementary school houses two of the district's self-contained Special Education classrooms, and 5% of the students enrolled are classified with a disability. 2% of students are English Language Learners.

This particular school is one of six schools in the district. The district has four K-5 elementary schools, one middle school with grades 6th through 8th, and one high school with grades 9th through 12th. The district demographic and free and reduced lunch data according to the 2016-2017 New York State Report Card is as follows.. The district's gender breakdown was 50.7% male and 49.3% female. Of those students, 2% are identified as English Language Learners, 8% are identified as students with disabilities, and 18% qualify as economically disadvantaged. The district has a 96% attendance rate for the 2015-2016 school year, and a 98%

average graduation rate. Fifteen percent of the students in the district are eligible for a free lunch, 3% are eligible for a reduced lunch. It is important to note that the demographics and socioeconomic status of the students that attend the school in this district in Upstate New York differs from some of the more diverse schools in the area. In this particular district, the graduation rate, and the average percentage of students who receive free or reduced lunch rate are much lower when compared to other surrounding districts.

The classroom in which this research was conducted is a self-contained, special education classroom, with a student to teacher ratio of 8:1. Additionally, this classroom has three classroom teacher assistants and a full time speech and language pathologist. The class consists of kindergarten and first grade students, who are classified with a variety of disabilities including autism spectrum disorder and other developmental disorders, for which they have an Individualized Education Plan or IEP. There were six students in the class: three kindergarteners and three first graders. All students were male. All of the students are classified as having a disability that has impacted their ability to meet grade level standards in a general education setting. Therefore, an 8:1:1 special classroom setting has been deemed their least restrictive environment for learning. Every student in the class receives related services in compliance with their IEP. These services included speech and language therapy, occupational therapy, physical therapy, music therapy, assistive technology, vision services and/or hearing services. The students in this room were all on track to earn the same diploma as their general education peers. Curriculum is driven by the student's individualized IEP goals and by modified grade level curriculum.

Participants

The participants in this study were two of the six kindergarten and first grade students in the classroom described above. Participants were chosen based on the following criteria (a) diagnosed with ASD (b) first grade students reading at a Scholastic *Next Step in Guided Reading* level of aa or higher (equivalent of early kindergarten reading ability), (c) absent <10% of school days in the past three months, and (d) at least one parent accessible to researcher. These participants were classified as having a disability that has impacted their ability to meet grade level standards in a general education setting. The two students in this study have a diagnosis of autism spectrum disorder and an Individuals with Disabilities Education Act (IDEA) classification of autism or Multiple Disabilities. One student is also identified with a hearing and vision impairment. He wears hearing aids, glasses, and uses a Frequency Modulation system or FM system in the classroom. One has Childhood Apraxia and uses an Augmentative Alternative Communication device or AAC, to supplement verbal communication.

All students are verbal, but display significant delays in their speech and language abilities. Student needs in the classroom are academic, behavioral, and social/emotional in nature. Students require smaller class-size, 1:1 and small group instruction, and opportunities for multiple teachings and repeated practice of new and previously mastered skills. Some of the students struggle socially, and benefit from the use of social stories, visual supports, and explicit instruction about social interactions. Reading comprehension and decoding were the areas of need for all students in the class. Although the two participants read below grade level, they met the minimum requirement for participation in the study which included awareness of emergent reading skills such as concepts of print, letter sounds, segmenting and blending, and sight words.

Danny (a pseudonym) is a happy and loving boy who is very motivated by text and books. He was diagnosed with ASD at the age of two and later diagnosed with Pica eating

disorder at the age of four. In addition to his diagnosis, Danny also wears glasses and bilateral hearing aids for his hearing and vision difficulties. At the time this study was conducted, he was 7 year old and a first grader with an IEP and classification of autism in the K/1 self-contained classroom the study took place. He was also receiving support in speech/language therapy, occupational therapy, physical therapy, vision therapy, teacher of the deaf/hard or hearing services, and adaptive physical education. Danny enjoys counting, iPad and computer time, cooking, playing with clocks, watching helicopters, and using the sensory table. He also loves to look at books independently, with a peer or with an adult. Danny is well liked by his peers, however he still requires some adult support and prompting to promote appropriate communication and social interactions.

Danny has a strong understanding of basic pre-reading/foundation skills. According to *Next Step Guided Reading Assessment*, he is currently reading at a Level D (comparable to end of the year kindergarten reading ability). He understands concepts of print, including where the cover is, the first word, reading left to right, and 1:1 correspondence. Jayden demonstrated above grade level sight word knowledge. He uses his decoding skills, picture cues, and his sight word knowledge to help him read the text on the page. Danny is a very strong decoder and whole word reader, but his comprehension of what he has read or listened to is still emerging and inconsistent at times.

Jayden (a pseudonym) is a happy active boy who enjoys school and is proud of his accomplishments. At the age of four, he received a diagnosis of ASD and childhood apraxia of speech. At the time this study was conducted, Jayden was 6 years old and a first grader with an IEP and classification of autism in the K/1 self-contained classroom which the study took place. In addition to the self-contained special education classroom, Jayden was also receiving support

in speech/language therapy, occupational therapy, physical therapy, music therapy and adaptive physical education. During free time, Jayden enjoys stimulatory play (spinning small toys in his fingers), looking at books with familiar authors and characters, academic songs on YouTube, time on the iPad, running in the gym with his peers, swinging on the swings, and going outside on the playground. He has been observed to become easily frustrated or upset when there are changes to a schedule or when he is having a difficult time communicating his wants and needs. I visual picture schedule, PECS, and a picture based “First, Then” chart have all been used as successful interventions.

Jayden demonstrates an emergent understanding of foundational literacy skills. He is able to identify all uppercase letters, lowercase letters, and letter sounds. He knows 13 out of 25 sight words from the districts kindergarten sight word list. He often gets excited when he finds a sight word he knows in a book. The student shows an understanding of concepts of print, including where the cover is, the first word, reading left to right, and 1:1 correspondence. According to *Next Step Guided Reading Assessment*, he is currently reading at a Level B (comparable to early/middle of the year kindergarten reading ability). Jayden enjoys listening to books. He is increasingly interested in books with familiar characters such as *Pete the Cat* or *David*, and shows preferences for familiar authors as well. His comprehension skills are still emerging. Jayden is able to answer yes/no questions, vocabulary-related questions ("what is this?"), follow directions ("touch ___"), and respond to some “wh” questions about a text.

Researcher Stance

The researcher is currently a graduate student at St. John Fisher College in the process of receiving a M.S. in Literacy Education. She holds a Bachelor’s of Science in Inclusive Childhood Education and Interdisciplinary Arts for Children from The College at Brockport and

four initial NYS Teaching Certifications in Early Childhood B-2, Students with Disabilities B-2, Childhood Education 1-6, and Students with Disabilities 1-6. The researcher is the special education teacher in the kindergarten and first grade self-contained classroom described above. The classroom has a student to teacher ratio of 8:1. Additionally, she has five years of professional teaching experience as a general education kindergarten teacher, a fourth and fifth grade self-contained special education teacher, and a universal prekindergarten teacher. As the action researcher in this study, she acted as an active participant observer, leading lessons and administering assessments in conjunction with the study, as well as conducting interviews with the participant, surveying the participants' parents and recording observational data (Mills, 2018). As a teacher researcher, lessons and assessments delivered in conjunction with the study were audio recorded and field notes were taken to ensure accuracy. Mills (2018) states, "Such recording is a necessary part of being an active participant observer" (p. 85).

According to Mills (2018), "action research is a systematic inquiry conducted by teacher researchers, principals, school counselors, or other stake holders in the teaching/learning environment to gather information about how their particular schools operate, how they teach, and how well their students learn" (p.10). This study works to gather information and gain a better understanding of the correlation between decoding and comprehension skills in students with ASD. While teaching reading students with ASD in her classroom, the action researcher reports finding inconsistencies or deficiencies in the comprehension abilities of her students compared to their word reading abilities. These observations developed the wondering about increasing and best supporting reading comprehension in her students. The researcher posed an inquiry into picture cues as a reading comprehension support for students with ASD based on her previous success implementing pictures in the classroom to support learners with ASD and other

developmental disabilities with various behavioral, social, and communication needs. Current literature also supports pictures and visuals as an effective tool for this population; however, there is minimal research on using pictures to increase and support text comprehension. Through this study in her position as a teacher, the research hopes to collect data to gain insight into this wondering, analyze the data and the current relevant literature on the topic, and take action to make instructional changes in her classroom based on new understandings developed during this study.

Informed Consent and Protecting the Rights of Participants

As with any research study, the participants' rights and informed consent is of the utmost importance. Prior to collecting data each of the participant's parent or guardian were contacted via email to tell them I would be sending home an informed consent permission slip. The permission slip outlined the purpose of the study, my request for their child participate, their rights and additional contact information if they wanted more details on the study. Parents and guardians were informed that pseudonyms would be used for each of the participants and the name of the school and the school district would not be divulged to help protect the identities of the student participants. The parents signed and dated the permission slip prior to the start of data collection. After permission slips were collected from both families, the two students were also verbally asked if they would like to take part in my study. Both students agreed to participate with verbal "yes." Finally, as the study progressed, a family perceptions survey was sent home to parents and guardians of the two participants via email and hard copy. Families were informed of the role this survey and the data collected from it played in the study and the fact that, like the study itself, the perceptions survey was optional and completely voluntary. Both families willingly completed the survey and sent them back to school in a reasonable timeframe.

Data Collection

Throughout the duration of this study, data was collected in various forms including both qualitative and quantitative forms to provide a robust perspective on the research topic. Data were collected in the form of lesson data, lesson reflections, anecdotal notes, student interviews, parent perceptions surveys, quantitative data, and descriptive statistics. Lessons were conducted over the course of three weeks once a day during individual student guided reading times.

Guided reading lessons were conducted by the action researcher and video/audio recorded for quality and credibility of the data collected. Lessons were 20 minutes long and were conducted in an individual 1:1 setting. Guided reading in the classroom follows a modified version of *The Next Step in Guided Reading* by Jan Richardson used district wide at the K-5 elementary level. According to research, guided reading is one of the most powerful instructional methods any teacher can use to help students become independent readers (Richardson, 2009). *The Next Step in Guided Reading* by Jan Richardson is a guided reading model and assessment tool that is designed to promote reading independence and aligned with Common Core State Standards. The program includes guided reading lesson plan templates for various levels of readers, a leveled assessment library with literary and informational texts that reflect the complexity and text features recommended by the CCSS, comprehension questions that require students to read closely and give text-based answers, and guides for teachers to make data-driven instructional decisions.

In the special education self-contained classroom, district curriculum and assessments were modified and tailored based on student's specific abilities, learning plans and IEP goals. Over the course of three weeks, 10 lessons were taught to each of the two participants. This provided data for 20 total lessons, which were analyzed. Of the 20 lessons, seven were conducted

without the use of picture cues, four with each participant, and 12 were conducted with the use of picture cues when answering “wh” comprehension questions, six for each participant. Lessons conducted without the use of picture cues supports provided baseline data for this study.

The basic format of each reading lesson is as follows. The session begins with the student rereading a familiar text at their independent or instructional level in order to promote success, independence and confidence. The student then is introduced to a new text and the focus of the current session. Assessment and observation of the participants (made up of learners with ASD) showed that text comprehension was an area of need. The teacher’s observations of student reading behaviors and reading assessments reflected a disassociation between decoding/word recognition abilities and text comprehension. For example, one of the participants received a 1/6 comprehension score and a 95% accuracy rate on his last benchmark reading assessment. Therefore, the focus of the participants reading lessons has been on comprehension, specifically answering “wh” comprehension questions. Prior to reading the book, the teacher pre-taught any new vocabulary, reviews sight words, and the students participate in a picture walk to activate prior knowledge related to the topic of the text. Next, the student and the teacher read the text together chorally. Finally, the student read the book aloud on his own to the teacher. During this reading, the teacher notes any miscues and actively supports the reader. The last part of the lesson consists of comprehension questions, activities and/or retelling of the text individualized to the student. Currently, the participant’s comprehension lessons using guided reading is specifically focused on responding to “wh” questions such as "who, what, when, where, why" in regards to the text they have just read.

In addition to the above guided reading format, lessons that involved the picture cue intervention included looking at 8-10 picture cues, a mix of clip art and photographs specifically

tailored to text, before, during, and after reading the text. Prior to the picture walk, the researcher used the picture cues to pre-teach new vocabulary. During the picture walk and choral reading, the researcher and the students connected specific picture cues as they related to the text. For example, if the page was talking about a lady bug, the researcher would hold up the ladybug picture cue for students to see or the researcher would ask students to find the picture cue or cues that went with what they just read. After choral reading students would then read the book independently. During independent reading, the researcher again referred to the picture cues after the student reads each page by prompting the student to find the picture cue that went with the text they just read. Finally, during the comprehension portion of the lesson, the researcher asked the student 4-6 various “wh” questions specific to the text. The students were able to reference the book and/or the picture cues to help them answer the questions; however, the researcher did not prompt students to do so. The researcher accepted correct response in the form of verbal answers, physically picking up and passing or handing a picture cue to the researcher in response, holding up or pointing to the correct picture cue in response, pointing to the corrected word or words in the book, and/or pointing to the correct image in the book. Lesson observation notes, comprehension data and lesson reflection notes were all recorded on the “Lesson Data Collection Form,” Appendix A.

During lessons associated with this study, the researcher audio recorded the student-teacher dialogue of the lesson, audio recorded student responses to “wh” comprehension questions, took anecdotal lessons during the lessons, and recorded. On a study specific data sheet, the researcher additionally recorded the date of the lesson, the title of text used, the text level, the student’s initials, the types of “wh” questions being asked, student’s accurate or inaccurate responses to the questions, the total percentage of “wh” questions answered correctly

and whether or not the comprehension questions asked were supported with picture cues. After each lesson, the researcher wrote up a one-paragraph reflection on the lesson. In these reflections, the research worked to discuss how they thought the lesson went, what she noticed during the lesson, why they thought the lesson went the way it did, and any other factors that affected the lesson overall thoughts and next steps.

In addition to data collected during lessons, the participants were both interviewed during the study as a form of data collection. Each participant was interviewed after their final lesson #10. Due to the social and communication difficulties experienced by children with ASD and supported by research, participant interviews consisted of simple researcher developed questions to elicit discussion and student thoughts. According to Brown, Oram-Cardy and Johnson (2013) when questioning students with ASD, the language needs to be simple, direct, and succinct. They also noted that students with ASD require more processing or “wait time” when responding to questions and simplifying or rephrasing questions can be helpful as needed. The questions posed to students with ASD in alignment with this action research study during the interview were as follows, (1) what helps you more when you read, the pictures or the words? (2) Which did you like better: doing reading with the extra pictures or doing reading without the extra pictures? (3) Did the extra pictures help you answer the questions better? These interviews were audio recorded for validity and quality.

Finally, parents of the participants were surveyed. The survey had to do with the perception of their reading abilities and comprehension abilities especially as related to picture cues. This parent survey can be located in Appendix C.

Data Analysis

Data were analyzed recursively. This means that data were analyzed as they were generated, not necessarily at the end of the study. Final analysis occurred at the end of the study using constant comparison method using both inductive and deductive methods as well as constant comparison (cite your textbook) Forms of data included anecdotal lesson notes, lesson reflections, student interviews, parent perceptions surveys and quantitative data. To analyze the data, all of the information collected during the research study was closely read and carefully annotated. Reflective notes and observations during each lesson were carefully read and used to modify the next lessons. To analyze these forms of data, all hand written lesson notes, reflections, and student interviews were transcribed. After all 20 lessons were completed, anecdotal notes and reflections were carefully transcribed, read and reviewed. As I read the data, I noted how the two students performed when I used picture cues versus when I did not use picture cures. Descriptive statistics was used to document not only the students' scores per passage read, but also the number of questions answered correctly with or without picture cues. Percentage scores were also noted. The data were organized into tables to easily see the progression of the students' performances and any changes that occurred over time. Information such as anecdotal notes, student interviews, and parent surveys were also coded to look for themes based on reoccurring similarities and patterns.

These data were compared for patterns, consistencies or discrepancies. Anecdotal lesson notes were taken during each lesson conducted in association with this study. Directly after each lesson a 2-3 paragraph reflection was also written as an additional measure of data. These reflections answered the four following questions: How did the lesson go? Why do you think the lesson went the way it did? Were there any factors that impacted the lesson? Based on the lesson what are the next steps? At the end of the 10 lessons, each participant was briefly interviewed.

Lesson notes, reflections and interviews were then read through multiple times. The data was coded by looking for and noting reoccurring ideas and themes throughout the lessons. Coding the data allowed the researcher to notice emerging patterns and similarities. Data was also read closely to look for any possible disconfirming evidence.

During the research study, descriptive statistics was used to analyze the data (Appendix A.) After every few lessons, data were organized and digitally input into three different tables to report out findings. The tables used to organize quantitative data were as follows and can also be found in Appendix D. (1) "Individual Student Lesson Data" for each participant, which included: Lesson #, Date, Text Title and Level, Picture Cues (Y/N), "wh" Questions Correctly Answered, % of "wh" Questions Correctly Answered. (2) "Overall Data by Student and Total" which included: Correctly Answered without Picture Cues, % Correctly Answered without Picture Cues, Correctly Answered with Picture Cues, % Correctly Answered With Picture Cues, for each student and cumulative totals. (3) "Types of Question Data" which included: Correctly Answered Without Picture Cue % Correctly Answered Without Picture Cues, Correctly Answered With Picture Cues, % Correctly Answered With Picture Cues, all organized by the type of "wh" question. Quantitative data collected provided information on student comprehension with or without pictures over the progression of the 10 lessons.

Finally, all the different types of data samples that were collected were looked at as a whole and analyzed by looking for patterns and consistent information across the various forms of data. Using more than one method to collect data and looking for consistent information across various forms of data is called triangulation. Triangulation in research and data analysis ensures the validity and quality of the study. Descriptive statistics was used to calculate simple percentages. Throughout this data analysis process, themes that emerged were identified across

multiple forms of data including student interview responses, guided reading lesson notes, lesson reflections, quantitative data on the number of comprehension questions answered accurately with and without the picture cue intervention, and the parent survey responses. These will be discussed further in the findings and discussion section of this study.

Findings and Discussion

The purpose of this study was to examine the effects of picture cues as a reading comprehension intervention for learners with ASD in order to improve the text comprehension of two first grade students with autism spectrum disorder. During this action research study, quantitative and qualitative data were collected and analyzed to determine the impact of picture or visual cues on the reading comprehension of two first grade students with ASD during guided reading lessons. Diverse methods of data collection were implemented to ensure triangulation. The data collected during action research was organized in anecdotal lesson notes, lesson reflections, student interviews, parent perceptions surveys and quantitative data. After analyzing the data, four consistent themes became apparent.

The first theme reveals that picture cues can support students with ASD and their ability to answer “wh” comprehension questions about texts they have read. Study data demonstrated that students were more likely to accurately answer “wh” comprehension questions when they were taught using picture cues during their guided reading lessons. An increase in the accuracy of student answers with the use of picture cues as an intervention was quantitatively tracked, observed, and self-identified by the participants throughout lessons associated with this study.

The second theme reveals that picture cues have a positive impact on the perceptions of students with ASD and their families. Both participants and their parents/families reported that they felt they were better able to comprehend what they read when pictures or visuals were

presented alongside the text. Careful researcher observations, anecdotal lesson notes and thoughtful lesson reflections additionally reflected a common and consistent increase in the student's level of active engagement and involvement in the guided reading lesson, and in the text itself, with the picture cue intervention. This reoccurring commonality reveals the third thematic finding of this action research study; that picture cues increase learner's with ASD level of engagement in the text during guided reading lessons.

The fourth and final theme reveals the importance of diverse individualized reading comprehension strategies for learners with ASD. The lesson data and reflections established the need for more than one reading strategy or intervention in order for student participants to be successful in their reading and their comprehension of the text. The researcher reported the necessary implementation of additional interventions and strategies, along with the picture cues, individualized to the students' needs during guided reading lessons in order for each student to be successful.

Picture Cues Support Reading Comprehension in Learner's with ASD

The data collected during this research study suggests that picture cues are a successful reading comprehension intervention for students with ASD. Further, the findings in this study supports the statement that picture cues implemented during guided reading lessons increased the students' ability to correctly answer "wh" comprehension questions about texts they have read. Study data demonstrated that students were more likely to accurately answer "wh" comprehension questions when they were taught using picture cues during their guided reading lessons. An increase in the accuracy of student answers with the use of picture cues as an intervention was quantitatively tracked, observed, and self-identified by the participants throughout the lessons associated with this study.

Table 1 and Table 2 illustrates the quantitate data that was collected during the 10 individual guided reading lessons with each participant. The columns of each table show the lesson number, the date the lesson was conducted, the text and text level used, whether or not picture cue interventions were implemented, the number of “wh” comprehension questions answered correctly out of the total number of “wh” questions asked, and the percentage of accurately answered comprehension questions for each lesson and each participant. When looking at column four, five and six for each student’s participant, we can see a clear trend.

Table 1

Student 1 Lesson Data: Danny

Lesson #	Date	Text Title and Level	Picture Cues (Y/N)	“wh” Questions Correctly Answered	% of “wh” Questions Correctly Answered
1	3-20-2018	<i>What Can you See in the Dessert?</i> Level C	N	2/5	40%
2	3-21-2018	<i>Who is Hiding</i> Level C	N	2/6	33%
3	3-22-2018	<i>I Write</i> Level C	N	1/5	20%
4	3-29-2018	<i>I Like Dogs</i> Level C	Y	4/5	80%
5	4-9-2018	<i>Look at the Bugs</i> Level C	Y	4/6	67%
6	4-10-2018	<i>Seasons are Fun</i> Level D	Y	2/5	40%
7	4-11-2018	<i>Night Animals</i> Level D	N	2/5	40%
8	4-16-2018	<i>Who Would You Like to Be?</i> Level D	Y	3/5	50%
9	4-18-2018	<i>Shark and Crab</i> Level D	Y	3/5	50%
10	4-19-2018	<i>What Can You Do in a Park?</i>	Y	4/6	67%

		Level D			
--	--	---------	--	--	--

Table 2

Student 2 Lesson Data: Jayden

Lesson #	Date	Text Title and Level	Picture Cues (Y/N)	“wh” Questions Correctly Answered	% of “wh” Questions Correctly Answered
1	3-23-2018	<i>I See The Cat</i> Level B	N	2/4	50%
2	3-26-2018	<i>I See Colors</i> Level B	N	4/6	67%
3	3-28-2018	<i>Today is Monday</i> Level B	N	3/6	50%
4	3-29-2018	<i>What Can I See?</i> Level B	Y	4/6	67%
5	4-9-2018	<i>That Bug</i> Level B	Y	5/6	83%
6	4-10-2018	<i>What do You do in the Weather?</i> Level B	Y	6/6	100%
7	4-11-2018	<i>Night Animals</i> Level B	N	3/5	60%
8	4-17-2018	<i>People Have Jobs</i> Level B	Y	4/6	67%
9	4-18-2018	<i>Wolf Countdown</i> Level B	Y	6/6	100%
10	4-20-2018	<i>Party Shapes</i> Level B	Y	5/6	83%

The data indicated that both participants experienced a higher accuracy percentage of “wh” questions answered correctly during lessons where picture cues were present. For example, looking at Table 1, Danny had 40%, 33%, and 20% when taught without the picture cue intervention. When the intervention was added to his guided reading lessons, he was able to

achieve accuracy scores ranging from 40% up to 80%. These trends are also seen in Table 2 with Student 2, Jayden, who scored in the range of 50% to 67% without picture cues, and then 67% to 100% accuracy with picture cues.

This data illustrated both in Table 1 and Table 2 means that both participants consistently answered more comprehension questions correctly when they were taught using the picture cue intervention versus when they were taught without the intervention. This supports the idea that picture cues can increase the reading comprehension of learners with ASD by measure of their ability to accurately answer comprehension questions after reading a text.

Table 3 shows the number of questions answered accurately out of the total number of questions asked without picture cues, and the number of questions answered accurately out of the total number of questions asked with the picture cue intervention. This data was broken down individually for each student, as well as combined in the fourth row of the table to look at the cumulative totals.

The data from this table also supports the finding that both student participants with ASD demonstrated higher text comprehension when they were taught with the addition of picture cues to their guided reading lessons.

Table 3

Overall Data by Student and Total

	Correctly Answered Without Picture Cues	% Correctly Answered Without Picture Cues	Correctly Answered With Picture Cues	% Correctly Answered With Picture Cues
Student 1: Danny	7/21	33%	19/32	59%
Student 2: Jayden	12/21	57%	30/36	83%
Cumulative	19/42	45%	49/68	72%

Totals				
--------	--	--	--	--

Looking at the data from Table 3, Student 1 was able to accurately answer 33% of comprehension questions during the 4 traditional guided reading lessons conducted without picture cues. During the 6 lessons conducted with the picture cues intervention, the same student was able to answer 59% of comprehension questions accurately. The table shows that this participant’s ability to correctly answer “wh” comprehension questions increased by a total of 26% with the implementation of picture cues.

The same trends can also be observed for student 2 who demonstrated a 57% accuracy rate for questions asked during lessons without picture cues and 83% accuracy for questions asked during lessons involving the picture cue strategy. While this student demonstrated stronger comprehension and a better ability to accurately answer “wh” comprehension questions at the start of the action research, she still increased her accuracy percentage by a total of 26% with the implementation of picture cues. These findings are supported by the research of Roser, Martinez, Fuhrken, and McDonald (2007) as well as that of Zambo (2007) whose studies indicated pictures, manipulatives, or illustrations, when appropriately paired with text, can often compensate for poor comprehension skills because they provide the reader with visual representations of main ideas, support characterization, and visually summarize the text. Additionally, they are better able to link background knowledge and create mental models, which in turn enhanced reading comprehension (Braid & Finch, 2015; Duke & Pearson, 2009; Van Meter, Aleksic, Schwartz, & Garner, 2006; Zambo, 2007).

The average of all student data collected throughout this study was also included in Table 3. Row 4, “Cumulative Totals” indicated that without the picture cue intervention collectively all student participants in the study were able to answer 45% of “wh” comprehension questions

accurately. With the addition of the picture cues intervention, their ability to answer the same “wh” comprehension questions increased by 26% resulting in 72% of questions correctly answered with picture cues. These numbers are the average of all student participant data from the study.

Overall, the data compiled in Table 1, Table 2, and Table 3 show that during this study, picture cues increased both participants’ ability to accurately answer “wh” comprehension questions about texts they had read. These findings support the claim and current literature that exemplifies picture cues as an effective intervention to support and increase student reading comprehension (Braid & Finch, 2015; Glenberg, Brown, & Levin, 2007; Roser, Martinez, Fuhrken, & McDonnald, 2007; Zambo, 2007). Specifically, this data supports picture cues as a reading comprehension intervention for first grade learners with ASD who struggle with text comprehension.

Picture Cues can Increase Positive Perceptions and Engagement of Learners with ASD

The second finding of this action research study reveals that picture cues used as an intervention have the ability to positively impact student engagement and the perceptions that students with ASD and their families have towards their reading and comprehension abilities. Both participants and their parents/families reported that they felt they were better able to comprehend what they read when pictures or visuals were present alongside the text. The findings of this study also support the claim that picture cues can increase the amount of engagement in the text for first grade students with ASD. Careful researcher observations, anecdotal lesson notes and thoughtful lesson reflections also indicated that there was a common and consistent increase in the students’ level of active engagement and involvement in the guided reading lesson, and in the text itself, with the presence of the picture cue intervention.

Table 5 shows quantitative data collected from a perception survey sent to parents after the completion of all 20 lessons. On the survey, parents indicated their feelings toward 8 different statements about their child’s reading and comprehension abilities. Parents were asked to select an option ranging from 1 through 4 to indicate whether they agreed or disagreed with the statement. This survey provided information about their child’s current reading, decoding, and comprehension abilities. The *Family Perceptions Survey* used in conjunction with this study can be viewed in Appendix C.

Table 5

Family Perceptions Survey Data

Survey Question:	Scores Reported by Parents:			
	Agree 4	Neutral 3	Disagree 2	Disagree 1
My child enjoys reading.	100%	0%	0%	0%
My child is a strong reader.	0%	50%	0%	50%
My child easily reads the words on the page.	50%	0%	0%	50%
My child easily understands what they have read.	0%	50%	0%	50%
My child understands what they see in a picture/visual.	50%	50%	0%	0%
My child understands words in print or text.	0%	50%	50%	0%
Pictures paired with text help my child understand what they read.	100%	0%	0%	0%
Text with no pictures help my child understand what they read.	0%	50%	0%	50%

The data collected with the use of the *Family Perceptions Survey* and compiled in Table 5, shows that in general, parents stated their child enjoys the act of reading. One family perceived their child as a relatively strong reader, while the other family perceived their child as a moderately weak reader. One family indicated that their child easily reads the words on the page, while the other family indicated that their child had difficulty reading the words on the page. This information provides the teacher data on the family's perceptions of their children's decoding abilities. Additionally, one family indicated that their child easily understood what they read, while the other family indicated their child did not easily understand what they have read. This information provides data on the perceived comprehension abilities of the participants.

When looking at the specific family responses to each question on the perception survey, a general trend can be observed. All participant families perceived their children to better comprehend a text when pictures or visuals are present. The parents' perception of their child's reading ability notwithstanding, all parents thought that their children were better able to understand pictures versus text in a book. Additionally, they conveyed that text with no pictures was much more difficult for their child to comprehend.

The family perception survey supports earlier assertion about the efficacy of picture cues as a comprehension aid for students with autism. This information also aligns with study findings that picture cues have the ability to support reading comprehension in first grade students with autism.

In summary, this data demonstrates that families of the first grade students with ASD who participated in this study, all strongly agreed that their child better comprehended texts when there were pictures paired with the text. Parents of the participants reported that they thought their children had moderate to significant difficulty when it came to understanding what

they read. Parents thought that their children were better able to understand what they saw in a pictures or a visual. Additionally, when pictures were paired with the text, parents reported a perceived increase in their child's comprehension. These findings were consistent between parents who thought their children were a strong reader, and parents who perceived their child as a weak reader.

Student participants also indicated a preference for reading with the use of picture cues. After the completion of all 20 lessons, both students were interviewed on their thoughts towards guided reading lessons, both with and without the picture cue intervention. The questions asked to students as a platform for discussion can be viewed in Appendix B. During the interviews anecdotal notes were collected. The interviews were also audio recorded, transcribed, and coded to determine the presence of reoccurring themes and to look for commonalities.

When asked what helps them more when they read, the pictures or the text, both student participants indicated that the pictures were more helpful to their reading. This information may indicate that students prefer pictures over written word and that student's actively use and rely on visuals to make meaning of what they read. This finding relates back to a study conducted by Aukerman and Schuldt (2016) which looked at how pictures impact positively or negatively, meaning making of a text among second grade students. In the study, it was determined that students with weaker reading abilities more heavily relied on images and illustrations to make meaning and comprehend what they had read, while those with stronger reading abilities relied less on the pictures and more on the written word. Both participants in the current study were still emergent readers and were reading below grade level. Their tendency to rely more on images and less on the written word to make meaning aligns with Aukerman and Schuldt's (2016) findings.

When asked which format of guided reading they liked better: reading with extra pictures or reading texts in a normal way without pictures, both students indicated that they preferred lessons with picture cues over lessons without them. One of the students stated, “I like the pictures,” in response to this interview question (Participant 2, Student Interview, April 20, 2018). This data supports the claim that first grade students with ASD demonstrate a clear preference towards reading with the picture cue intervention.

Anecdotal lesson notes and lesson reflections also displayed a common theme of engagement, higher student morale, and increased visual contact with the text during lessons where the picture cue intervention was used versus typical guided reading lessons. In the several lessons with the picture cue intervention, the researcher noted that student seemed happy and that participants were much more willing to complete the work. The researcher also observed and noted an increase in engagement and the amount of time student spent looking at the books when picture cues were present. After the completion of Lesson 9 with both participants individually, I documented what I noticed during both lessons. I noted that students seemed to be more interested and engaged with the books, and wondered if this was a result of pre-teaching with pictures” (Lesson Reflection, April 18, 2018). This common theme was also revealed in multiple anecdotal lesson notes and reflections during data coding. For example, after a different lesson earlier on in the study, the researcher wrote “participant 2 maintained a lot more visual contact with the book today than typically observed, ” (Lesson 6, Participant 2, Lesson Reflection, April 10, 2018)

Data coding also revealed the reoccurring theme of higher student morale and more positive attitudes, and better behaviors towards reading during lessons when picture cues were used with participants. In lesson reflections, the researcher discussed how these changes in

student behavior and morale could possibly be linked to the implementation of the picture cue intervention and its ability to support first grade readers with ASD:

Today, I noticed that Jayden was much more willing to engage with the picture cues and genuinely seemed excited about reading the book *People Have Jobs* with me. I knotted these observations in my lesson notes. Thinking about it now, I wonder if these positive changes in his behaviors and attitudes towards reading have anything to do with the use of the picture cues. It is possible that he is adjusting to the implementation of the picture cues in our normal lesson routine and anticipating we will use them. It is also possible that the picture cues helped to support his learning. Therefore, he feels more confident in his abilities and is more excited and willing to participate in lessons. I think it's also important to point out that today's guided reading text and picture cues focused on various occupations. Our current social studies unit is on the same topic, community people and places. It is possible that Jayden had more background knowledge, interest and familiarity with this topic before reading the book. This also could be the cause of the positive changes noted in my lesson observation today. (Lesson Reflection, April 17, 2018)

This statement shows that picture cues could have been the cause of an increase in student morale and participation. It is also possible that the use of visuals to support their reading and comprehension that students felt more confident in their ability to answer comprehension questions. This therefore could have positively impacted the outcome of their responses as well as their feelings towards their own reading abilities and the visuals in general. These study findings collectively from the family perception survey, student interviews, lesson observations

and researcher reflections indicate that picture cues may have the ability to increase engagement levels and positive perceptions in learners with autism and their families.

Importance of Multiple Individualized Comprehension Strategies for Learners with ASD

The third and final theme reveals the importance of diverse individualized reading comprehension strategies for learners with ASD. The lesson data and reflections established the need for more than one reading strategy or intervention in order for student participants to be successful in their reading and their comprehension of the text. The researcher reported the necessary implementation of additional interventions and strategies, along with the picture cues, individualized to the students' needs during guided reading lessons in order for each student to be successful.

After careful reading, rereading, and coding of lesson notes and reflections, it became clear that the researcher was using strategies in addition to the picture cue intervention. For example, modeling was necessary during early lessons in order to show participants how to implement picture cues successfully and correctly during their guided reading lessons. In anecdotal lesson notes, the researcher noted that she “modeled various ways to use the picture cues with the student” (Lesson 4, Anecdotal Notes, Participant 2, March 29, 2018). Modeling is also an evidence based practice for supporting students. In this particular example modeling was a necessary strategy used in conjunction with the picture cues in order to support student participation in the current study. Without the implementation of this additional individualized strategy, the picture cues would have had no meaning or value to student participants.

In anecdotal notes and reflections the researcher often noted the other strategies were necessary to support students learning during lessons, both with and without the picture of you in your mansion. The researcher indicated this need by stating:

Today I found myself needing to implement a lot of sentence starters to evoke any response from the student during the comprehension portion of the lesson.” (Lesson Reflection, April 18, 2018)

The researcher also noted the implementation of other visual-based picture strategies to best support students during guided reading lessons. The following statement, was taken directly from anecdotal lesson notes:

Today I used a visual schedule during the lesson to map out what we would be doing during guided reading. The student was very distracted and anxious. Visual schedules had been used with the student at the beginning of the year when we were establishing routines and procedure. (Lesson 8 Anecdotal Notes, Participant 1, April 16, 2018)

This quote taken directly from the researchers notes shows how additional visual strategies were necessary to support student learning and success in the study. Without the implementation of a visual schedule during this particular lesson, the student may not have been able to complete the reading or comprehension portions of the lesson due to their noted distractibility and anxiety at the time.

This data clearly indicates a need for the implementation of multiple individualized and differentiated strategies in conjunction to the picture cue intervention during the current study. It became clear that multiple strategies were necessary in order to support students’ success during guided reading lessons and while answering “wh” comprehension questions. While students were found to be more successful in answering comprehension questions after a lessons taught using the picture cue intervention, it’s essential to note that other strategies were also necessary in order to support student learning and participation. These results may indicate that the picture cue intervention, while helpful, was not enough to fully support student’s reading and

comprehension success. This information supports the claim that it is necessary to use individualized and diverse reading and comprehension strategies in order to best support student needs in readers with ASD.

This finding relates directly to existing research on best reading instructional practices of students with ASD, which indicates a need to individualize reading instruction for students with ASD (Brown et. al, 2013; Accardo, 2015; Accardo & Finnegan, 2017; Nation et al., 2006; Norbury & Nation, 2011). Specifically, in a 2013 meta-analysis of predictors of reading comprehension difficulties for learners with ASD, Brown, Oram-Cardy and Johnson (2013) determined that ASD should not be associated with one specific reading profile. Based on the variability associated with ASD, they advocated for the need for teachers to have knowledge of multiple effective practices in order to individualize reading instruction and interventions for specific students. They also argued that teachers need to be knowledgeable about how to select and differentiate these research-based practices to meet the needs of their specific students. Further research also indicated that there were discrepancies between what research supports and best practices for learners with ASD and what teachers are implementing in their classrooms (Accardo, 2015; Accardo & Finnegan, 2017). This research aligns with the findings from the current study that highlights the importance of teachers having multiple research-based interventions at their disposal when instructing learners with ASD.

These findings can also be connected to several autism researchers who note extreme variability in individual results of learners on the autism spectrum, and caution when interpreting mean results for this population (Davidson & Weismer, 2013; Lanter & Watson, 2008; Nation et al., 2006; Norbury & Nation, 2011). The implication of this is that while students in this particular study did demonstrate an increase in their ability to accurately answer “wh”

comprehension questions with the use of picture cues, study results need to be interpreted with caution as to not make generalizations for this population of learners. Additionally, study findings exemplify the importance of implementing multiple individualized and differentiated strategies to meet diverse learning needs of students with autism.

Implications

The findings of this study have implications that may help special educators support the reading and comprehension abilities of their students with autism. First, pictures cues may be an effective strategy to increase reading comprehension in learners with ASD and their ability to accurately answer “wh” questions. Braid and Finch (2015) and Zambo (2007) argued that when learners are taught to pay attention to the pictures in a book, they are better able to link background knowledge and visualize, in turn enhancing their reading comprehension. This research paired with the current study created support for the use of picture cues to support reading comprehension in learners with ASD and their ability to accurately answer “wh” questions. The implication of this is that, when appropriate, teachers should utilize pictures cues paired to text in order to activate prior knowledge, self-monitor comprehension, foster visualization, and support access and understanding to the text.

Secondly, special educators need to implement multiple individualized reading instruction interventions to best support the diverse needs of learners with ASD. Brown, Oram-Cardy and Johnson (2013) assert a need for teachers to have knowledge of multiple effective practices in order to individualize reading instruction and interventions for the specific student. They also caution as to not make generalizations for this heterogeneous population of learners. This means that while the two first grade students in this particular study did demonstrate an increase in their ability to accurately answer “wh” comprehension questions with the use of

picture cues, these results need to be interpreted and implemented by other teachers and researchers carefully and thoughtfully. For example, use of picture cues proved to be an effective strategy for the two participants in the study. However, picture cues may not be effective for a different student with ASD that also struggles in the area of reading comprehension for a variety of reasons. For this reason, it is essential that teachers are knowledgeable of their students' needs and abilities, and thoughtfully used this knowledge to implement multiple individualized and differentiated strategies to meet diverse learning needs of learners with autism.

Conclusions

The purpose of this study was to examine the effect of the picture cues on the reading comprehension of two first grade students with ASD. Two research questions guided the study: 1) In what ways if any, did picture cues impact two first grade students with ASDs' ability to answer wh" questions prior to reading and during reading and, (2) how can I help the students better comprehend and answer "wh" comprehension questions using picture cues?

This study is important because it examined a well-known intervention for children with ASD in a new way to support reading comprehension, an area of need according to research for this population of learners. The results of this study showed that picture cues can increase student engagement and comprehension by measure of their ability to answer "wh" questions. Parents perceived an increase in their children's comprehension with the use of picture cues. Participants reported a preference for reading with picture cues. The implication of this study suggest that pictures cues can support reading comprehension in learners with ASD. Teachers should utilize pictures cues to activate prior knowledge, self-monitor comprehension, and support access and understanding to comprehension questions. Students with ASD benefit from individualized

reading instruction and diverse strategies in alignment with NRP recommendations. This is important information for teachers of students with ASD.

Limitation of the Study

The limitations of the current study are as follows: First, not enough time was spent on data collection, and the amount of data collected only provided a small window into the impact of picture cues on the reading comprehension of the two student with autism. Each student only received 6 lessons with the picture cue intervention over the course of two weeks. While this time frame did provide some helpful study data, a longer data collection time would have enabled me teach more lessons that would allow for deeper analysis. This study also only took place in one classroom with one teacher and with only two participants. Additionally, participants were both male and from the same grade level and age group. The school in which this study was conducted also had some additional days off for conferences and school breaks while this study was being conducted. One of the participants was and had doctor's appointments in the middle of the study. This further reduced the time for the study which may have impacted the data and results of the study.

If this study were to be conducted again, a few other things would be considered. First, a longer data collection time and a greater number of lessons conducted would provide more data, which would allow for deeper analysis. Data collection and analysis would have been collected using more and diverse participants from different classrooms, and diverse reading levels. Additionally, data would have been enhanced through interviews with other teachers of ASD students.

In conclusion, current research and literature shows that providing this population of learners with effective research based interventions is the most effective way to support their text

comprehension and other diverse reading needs. This action research study has demonstrated that picture cues may be one way teachers of students with ASD can increase the reading comprehension, increase student engagement, and promote positive comprehension perceptions in readers with ASD.

References

- Accardo, A., & Papay, Clare. (2015). *Effective Practices and Teacher Self-efficacy in Teaching Reading Comprehension to Learners with Autism Spectrum Disorder*, ProQuest Dissertations and Theses.
- Accardo, A., & Finnegan, E. (2017). Teaching reading comprehension to learners with autism spectrum disorder: Discrepancies between teacher and research-recommended practices. *Autism : The International Journal of Research and Practice*, 1362361317730744.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th ed.). Washington, DC: Author.
- Anderson, C., Smith, T., & Iovannone, R. (2018). Building Capacity to Support Students with Autism Spectrum Disorder: A Modular Approach to Intervention. *Education & Treatment Of Children*, 41(1), 107-138.
- Arthur-Kelly, M., Sigafoos, J., Green, V., Mathisen, B., & Arthur-Kelly, R. (2009). Issues in the use of visual supports to promote communication in individuals with autism spectrum disorder. *Disability and Rehabilitation*, 31, 1474–1486. doi: 10.1080/09638280802590629
- Aukerman, M., & Chambers Schuldt, L. (2016). “The Pictures Can Say More Things”: Change Across Time in Young Children's References to Images and Words During Text Discussion. *Reading Research Quarterly*, 51(3), 267-287.
- Autism Speaks Inc. (2012). *Supporting Learning in the Student with Autism* [Ebook] (pp. 80-98).

Autism Speaks Inc. (2010). Executive Functioning and Theory of Mind Toolkit [Ebook] (pp. 6-7).

Bandura, A. (1986). *Social Foundations of Thought and Action : A Social Cognitive Theory*.

Bevill, A., Gast, D., Maguire, A., & V. (2001). Increasing Engagement of Preschoolers with Disabilities through Correspondence Training and Picture Cues. *Journal of Early Intervention, 24*(2), 129-45.

Braid, C., & Finch, B. (2015). "Ah, I Know Why...": Children Developing Understandings through Engaging with a Picture Book. *Literacy, 49*(3), 115-122.

Brown, H., Oram-Cardy, J., & Johnson, A. (2013). A Meta-Analysis of the Reading Comprehension Skills of Individuals on the Autism Spectrum. *Journal of Autism and Developmental Disorders, 43*(4), 932-955.

Caballero, A, & Connell, J. (2010) Evaluation of the Effects of Social Cue Cards for Preschool Age Children with Autism Spectrum Disorders (ASD). *Journal of Behavior Assessment & Intervention in Children, 1*(1), 25-42.

Cohen, A., & Demchak, M. (2018). Use of Visual Supports to Increase Task Independence in Students with Severe Disabilities in Inclusive Educational Settings. *Education & Training In Autism & Developmental Disabilities, 53*(1), 84-99.

Cohen, M., & Sloan, D. (2007). *Visual strategies for people with autism*. Bethesda, MD: Woodbine House.

Davidson, M., & Ellis Weismer, M. (2014). Characterization and Prediction of Early Reading Abilities in Children on the Autism Spectrum. *Journal of Autism and Developmental Disorders, 44*(4), 828-845.

- Dettmer, S., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2000). The use of visual supports to facilitate transitions of students with autism. *Focus on Autism and Other Developmental Disabilities*, 15, 163–169. doi: 10.1177/108835760001500307
- Dooley, P., Wilczenski, F. L., & Torem, C. (2001). Using an activity schedule to smooth school transitions. *Journal of Positive Behavior Interventions*, 3, 57–61. doi: 10.1177/109830070100300108
- Duke, N., & Pearson, P. (2009). Effective Practices for Developing Reading Comprehension. *Journal of Education*, 189(1-2), 107-122.
- Freebody, P. & Luke, A. (1990). 'Literacies' Programs: Debates and Demands in Cultural Context. *Prospect* 5 (3), 7-16
- Frith, U. (2003). *Autism: Explaining the enigma* (2nd ed.). Malden, MA: Blackwell.
- Ganz, J. B. (2007). Classroom structuring methods and strategies for children and youth with autism spectrum disorders. *Exceptionality*, 15, 249–260.
- Ganz, J. B., & Flores, M. M. (2008). Effects of the use of visual strategies in play groups for children with autism spectrum disorders and their peers. *Journal of Autism and Developmental Disorders*, 38, 926–940. doi: 10.1007/s10803-007-0463-4
- Glenberg, A. M., Brown, M., & Levin, J. R. (2007). Enhancing comprehension in small reading groups using a manipulation strategy. *Contemporary Educational Psychology*, 32, 389–399.
- Huemer, S. V., & Mann, V. (2010). A comprehensive profile of word reading accuracy and comprehension in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 40, 485–493.
- Individuals with Disabilities Education Improvement Act, 20 U.S.C. § 1400 *et seq.* (2004).

- Kogan, M., Blumberg, S., Schieve, L., Boyle, C., Perrin, J., Ghandour, R., & Van Dyck, P. (2009). Prevalence of parent-reported diagnosis of autism spectrum disorder among children in the US, 2007. *Pediatrics*, 24, 1395-1403.
- Lanter, E., & Watson, L. (2008). Promoting literacy in students with ASD: The basics for the SLP. *Language, Speech, and Hearing Services in Schools*, 39, 33–43.
- Meadan, H., Ostrosky, M., Triplett, B., Michna, A., & Fettig, A. (2011). Using Visual Supports with Young Children with Autism Spectrum Disorder. *TEACHING Exceptional Children*, 43(6), 28-35.
- Mills, G. E. (2014). *Action Research: A Guide for the Teacher Researcher*. Upper Saddle River, New Jersey: Pearson Merrill Prentice Hall.
- Mirenda, P. (2003). “He’s not really a reader...”: Perspectives on supporting literacy development in individuals with autism. *Topics in Language Disorders*, 23(4), 271–282.
- Myles, B. S., Hilgenfeld, T. D., Barnhill, G. P., Griswold, D. E., Hagiwara, T., & Simpson, R. L. (2002). Analysis of reading skills in individuals with Asperger Syndrome. *Focus on Autism and Other Developmental Disabilities*, 17(1), 44-47.
- Nation, K., Clarke, P., Wright, B., & Williams, C. (2006). Patterns of reading ability in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 36(7), 911– 919.
- Nation, K., & Norbury, C. (2005). Why reading comprehension fails. *Topics in Language Disorders*, 25(1), 21–32.
- National Institute of Mental Health (2018). *Autism Spectrum Disorder*. Retrieved February 2, 2018, from <https://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd/index.shtml>.

- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4769). Washington, DC: Government Printing Office.
- No Child Left Behind Act, 20 U.S.C. 70 § 6301 *et seq.* (2001).
- Norbury, C., & Nation, K. (2011). Understanding Variability in Reading Comprehension in Adolescents with Autism Spectrum Disorders: Interactions with Language Status and Decoding Skill. *Scientific Studies of Reading, 15*(3), 191-210.
- O'Connor, I., & Klein, P. (2004). Explorations of strategies for facilitating the reading comprehension of high-functioning students with autism spectrum disorders. *Journal of Autism and Developmental Disorders, Vol., 34*(2), 115–127.
- Pimperton, H., & Nation, K. (2014). Poor Comprehenders in the Classroom: Teacher Ratings of Behavior in Children with Poor Reading Comprehension and Its Relationship with Individual Differences in Working Memory. *Journal of Learning Disabilities, 47*(3), 199-207.
- Pinnell, G., & Fountas, I. (2007). *The Continuum of Literacy Learning, Grades K-2 : A Guide to Teaching.*
- Rayner, K., Foorman, B., Perfetti, C., Pesetsky, D., & Seidenberg, M. (2001). How psychological science informs the teaching of reading. *Psychological Science, 2*(2 Suppl), 31-74.
- Richardson, J. (2009). *The next step in guided reading.* New York: Scholastic.
- Rosenblatt, L. (1994). *The reader, the text, the poem: The transactional theory of the literary work* (Paperback ed.).

- Roser, N., Martinez, M., Fuhrken, C., & McDonnold, K. (2007). Characters as guides to meaning. *The Reading Teacher*, 60(6), 548–559.
- Roycroft, H. (2015). Autism Spectrum Disorder and Reading Comprehension: Challenges and Implications in the Primary School. *Reach*, 29(1), 55-65.
- Sigman, M., Dissanayake, C., Arbelle, S., & Ruskin, E. (1997). Cognition and emotion in children and adolescents with autism. In D. J. Cohen & F. R. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (2nd ed., pp. 248–265). New York: John Wiley.
- Spooner, F., & Browder, D. M. (2015). Raising the bar: Significant advances and future needs for promoting learning for students with severe disabilities. *Remedial and Special Education*, 36(1), 28-32.
- Spooner, F., Knight, V. F., Browder, D. M., & Smith, B. R. (2011). Evidence-based practice for teaching academics to learners with severe developmental disabilities. *Remedial and Special Education*, 33(6), 374-387.
- Thiemann-Bourque, K. T., Brady, N., McGuff, S., Stump, K., & Naylor, A. (2016). Picture Exchange Communication System and Pals: A Peer-Mediated Augmentative and Alternative Communication Intervention for Minimally Verbal Preschoolers with Autism. *Journal Of Speech, Language & Hearing Research*, 59(5), 1133-1145.
- Van Meter, P., Aleksic, M., Schwartz, A., & Garner, J. (2006). Learner-generated drawing as a strategy for learning from content area text. *Contemporary Educational Psychology*, 31, 142–166.
- Wetherby, A. M., Prizant, B. M., & Schuler, A. L. (2000). Understanding the nature of communication and language impairments. In S. F. Warren, M. E. Frey (Series Eds.), A.

- M. Wetherby, & B. M. Prizant (Vol. Eds.), *Communication and language intervention series: Volume 9. Autism spectrum disorders: A transactional perspective* (pp. 109–141). Baltimore, MD: Paul H. Brookes.
- Whalon, K. J., Al Otaiba, S., & Delano, M. E. (2009). Evidence-Based Reading Instruction for Individuals with Autism Spectrum Disorders. *Focus on Autism and Other Developmental Disabilities, 24*(1), 3-16.
- Whalon, K. J., & Hart, J. E. (2011). Children with Autism Spectrum Disorder and Literacy Instruction: An Exploratory Study of Elementary Inclusive Settings. *Remedial and Special Education, 32*(3), 243-255.
- Zambo, D. M. (2007). What Can You Learn from Bombaloo? Using Picture Books to Help Young Students with Special Needs Regulate Their Emotions. *Teaching Exceptional Children, 39*(3), 32-39.
- Zuccarello, R., Di Blasi, F., Zingale, M., Panerai, S., Finocchiaro, M., Trubia, G., Serafino, B., Zoccolotti, P. (2015). Reading decoding and comprehension in children with autism spectrum disorders: Evidence from a language with regular orthography. *Research in Autism Spectrum Disorders, 17*, 126-134.

Appendix A

Picture Cues and Reading Comprehension Study

Lesson Data Collection Form

Researcher Initials: _____

Student Initials: _____

Lesson Date: _____

Text Title: _____ Text Level: _____

Lesson Observation Notes:

Comprehension Data:

Picture Cues: YES / NO

Question # :	Type of "wh" question:	Response:	+/-	Notes:
1				
2				
3				
4				
5				
6				

_____/____ Correct

% Correct:

Lesson Reflection Notes:

Appendix C

Picture Cues and Reading Comprehension Study

Family Perceptions Survey

Please take a brief moment to complete the survey on your child’s reading. I appreciate your thoughts and feedback. Thanks in advance for your time and support!

Parent/Guardian Name: _____ Date: _____

Student Name: _____

	Agree	Neutral	Disagree	
My child enjoys reading.	4	3	2	1
My child is a strong reader.	4	3	2	1
My child easily reads the words on the page.	4	3	2	1
My child easily understands what they have read.	4	3	2	1
My child understands what they see in a picture/visual.	4	3	2	1
My child understands words in print or text.	4	3	2	1
Pictures paired with text help my child understand what they read.	4	3	2	1
Text with no pictures help my child understand what they read.	4	3	2	1

Appendix D

Picture Cues and Reading Comprehension Study

Quantitative Data Tables

Table 1

Student 1 Lesson Data: Danny

Lesson #	Date	Text Title and Level	Picture Cues (Y/N)	“wh” Questions Correctly Answered	% of “wh” Questions Correctly Answered
1	3-20-2018	<i>What Can you See in the Dessert?</i> Level C	N	2/5	40%
2	3-21-2018	<i>Who is Hiding</i> Level C	N	2/6	33%
3	3-22-2018	<i>I Write</i> Level C	N	1/5	20%
4	3-29-2018	<i>I Like Dogs</i> Level C	Y	4/5	80%
5	4-9-2018	<i>Look at the Bugs</i> Level C	Y	4/6	67%
6	4-10-2018	<i>Seasons are Fun</i> Level D	Y	2/5	40%
7	4-11-2018	<i>Night Animals</i> Level D	N	2/5	40%
8	4-16-2018	<i>Who Would You Like to Be?</i> Level D	Y	3/5	50%
9	4-18-2018	<i>Shark and Crab</i> Level D	Y	3/5	50%
10	4-19-2018	<i>What Can You Do in a Park?</i> Level D	Y	4/6	67%

Table 2

Student 2 Lesson Data: Jayden

Lesson #	Date	Text Title and Level	Picture Cues (Y/N)	“wh” Questions Correctly Answered	% of “wh” Questions Correctly Answered
1	3-23-2018	<i>I See The Cat</i> Level B	N	2/4	50%
2	3-26-2018	<i>I See Colors</i> Level B	N	4/6	67%
3	3-28-2018	<i>Today is Monday</i> Level B	N	3/6	50%
4	3-29-2018	<i>What Can I See?</i> Level B	Y	4/6	67%
5	4-9-2018	<i>That Bug</i> Level B	Y	5/6	83%
6	4-10-2018	<i>What do You do in the Weather?</i> Level B	Y	6/6	100%
7	4-11-2018	<i>Night Animals</i> Level B	N	3/5	60%
8	4-17-2018	<i>People Have Jobs</i> Level B	Y	4/6	67%
9	4-18-2018	<i>Wolf Countdown</i> Level B	Y	6/6	100%
10	4-20-2018	<i>Party Shapes</i> Level B	Y	5/6	83%

Table 3

Overall Data By Student and Total

	Correctly Answered Without Picture Cues	% Correctly Answered Without Picture Cues	Correctly Answered With Picture Cues	% Correctly Answered With Picture Cues
Student 1: Danny	7/21	33%	19/32	59%
Student 2: Jayden	12/21	57%	30/36	83%
Cumulative Totals	19/42	45%	49/68	72%

Table 4

Types of “Wh” Question Data

Type of “wh” Question	Correctly Answered Without Picture Cues	% Correctly Answered Without Picture Cues	Correctly Answered With Picture Cues	% Correctly Answered With Picture Cues
Who	1/8	13%	8/11	73%
What	11/13	85%	16/19	84%
Where	3/6	50%	7/8	89%
Why	0/9	0%	3/12	25%
When	1/3	33%	6/10	60%
Which	3/3	100%	9/10	90%

Table 5

Family Perceptions Survey

Survey Question:	Scores Reported by Parents:			
	Agree 4	Neutral 3	Disagree 2	Disagree 1
My child enjoys reading.	100%	0%	0%	0%
My child is a strong reader.	0%	50%	0%	50%
My child easily reads the words on the page.	50%	0%	0%	50%
My child easily understands what they have read.	0%	50%	0%	50%
My child understands what they see in a picture/visual.	50%	50%	0%	0%
My child understands words in print or text.	0%	50%	50%	0%
Pictures paired with text help my child understand what they read.	100%	0%	0%	0%
Text with no pictures help my child understand what they read.	0%	50%	0%	50%