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# Teaching Reading Comprehension to Students with High Functioning Autism Spectrum Disorder: A Review of the Literature

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## Abstract

This paper will review the literature surrounding effective reading comprehension strategies for teaching students with High Functioning Autism Spectrum Disorders. Theories were also examined surrounding Autism Spectrum Disorder (ASD), and the cognitive processes that researchers have determined potentially affect students with this disorder and their learning. Individuals with autism need effective strategies for reading comprehension to be consistently implemented in the curriculum in order to promote reading success. This review of the literature examined five different approaches that have proven to be beneficial in studies for students with ASD. Educators should examine, consider, and even combine strategies based individually on student need, and how successful students could be using the approach to improve their reading comprehension skills.

*Key Words:* Autism Spectrum Disorder (ASD), reading comprehension strategies

## Background

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder with a range of associated disabilities. Within the spectrum, both Asperger's Syndrome and High Functioning Autism are classified as having a larger skill set and those affected are more often included in a general education setting. According to the DSM-V, the diagnosis of Autism Spectrum Disorder requires "impairment in reciprocal social communication and social interaction, and restricted, repetitive patterns of behavior interest, or activities... symptoms are present from early childhood and limit or impair everyday functioning" (APA, 2013, p. 53). In the updated DSM-V, released by the American Psychiatric Association, the disorder is now described based on severity level, the intensity of social communication needs, and intensity of restricted, repetitive behaviors. Noted within the DSM-V are the categorical levels stating, "individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder" (APA, 2013, p. 51). With this new medical definition, as Ne'eman and Kapp (2012) state, "the DSM-5 shift to a single unified diagnosis of ASD will likely positively impact access to special education and related services under IDEA for those covered under the unified diagnosis" (p. 3). Services will be maintained and individuals will not lose a diagnosis, and those with previous diagnoses will feel little to no change.

The primary focus of this literature review will center on the reading strategies implemented for students within the inclusion setting. Students with ASD supported in the general education classroom, often include those with Asperger's Syndrome (AS) and High Functioning Autism (HFA). These individuals are now considered to be on the higher end of the spectrum, which would be Level 1 on the severity level, "Requiring support" (p.52). Students with Asperger's Syndrome, according to Heflin and Alaimo (2006), "do tend to demonstrate extensive vocabularies and can talk for long periods of time ...[but] there is a tendency for them to talk 'at' the listener rather than 'to' the listener...[with] impaired use of nonverbal communication and have difficulty reading and sending nonverbal messages" (p. 12). These students often display a narrow set of interests and can have deficits in their social communication, interactions, difficulty with pragmatics of language, and "may display problems with eye contact and facial expressiveness" (p. 12). A second classification of ASD often included on the higher end of the spectrum are students with High Functioning Autism (HFA), and it is often argued that Asperger's Syndrome falls under HFA. Since both disabilities are described with less intensive needs, AS and HFA are now considered to be on Level 1, of the Autism Spectrum Disorder Diagnosis. All individuals are unique and within both disorders students can range from areas of intense strength to areas of weakness.

Today students who have been diagnosed with ASD are learning within the general education setting, and currently the "No Child Left Behind Act of 2001 (NCLB) and IDEA 2004 mandate that all children, including children with ASD, be taught to read in ways that are consistent with reading research" (Whalon, Otaiba & Delano, 2009, p. 2). Students with disabilities are entitled to receive a Free Public Education in the Least Restrictive Environment, and under the laws of the Individuals with IDEA and NCLB, students are able to be included in the general education setting and receive instruction in the environment that best supports their learning needs. Under the IDEA, students are to be included with their peers to have the same access to education. "Students diagnosed with high-functioning autism complete most of their schooling in an inclusion classroom, where the expectation is that they complete the same academic material as their peers" (Walters, 2011, p. iv). General education teachers are becoming more experienced in working with special education teachers to ensure an appropriate learning environment for the students with special needs. This, however, does not mean they are effectively reaching students who may have processing delays, or reading comprehension needs. Educators need to continue to collaborate, to ensure differentiation, as well as promote access to higher level thinking skills more frequently in the classroom.

## **Inclusion and oppression in the general education classroom.**

According to Chiang and Lin (2007), “students with high-functioning autism or Asperger’s Syndrome are increasingly placed in general education classrooms, where they receive literacy instruction with their peers without disabilities” (p. 259). Inclusion can provide many additional benefits for students with AS or HFA: promoting social interaction, increasing skill generalization, and allowing comfort and familiarity with teachers and non-disabled peers.

For students on the spectrum, inclusion teachers should be aware of the strengths and needs of the student, but teachers also need to view them as having significant potential and value as contributing members of the community. According to the discussion by Biklen, Kasa-Hendrickson, and Kliever (2006), “disability becomes an idea that precludes the possibility of human development, including, importantly, the development of a literate presence” (p. 175). Students with disabilities are often oppressed based on the label they are given, and may not consistently be considered “able” to be critical, conscious members of the classroom. They are also often assumed to have limited abilities past the skill set their teachers are providing them. Through two examples of strong individuals who became well known for surpassing the limits of the diagnosis, the authors Biklen et al (2006), continue to demonstrate how “maintaining the invisibility of literate potential was supported by deeply ensconced beliefs that Phillis Wheatley and Helen Keller represented static categories of personhood and so were themselves spiritually and intellectually fossilized, unable to grow towards citizenship, literate or otherwise” (p. 168).

Teachers may disregard or discount students with disabilities in a discussion, instead of providing additional supports, or even sufficient time to consider the task or question. In some circumstances, a student with ASD might be found to be lacking the skills needed for a task, such as reading comprehension, and in order to remedy the situation, teachers may move towards what critical educational theorist Paulo Freire (2000) warns to be the “banking method.” Within this structure, teachers “give” students these skills which, “turns them into ‘containers,’ or ‘receptacles’ to be ‘filled’ by the teachers...the more completely he/she fills the receptacles the better a teacher she is, the more meekly the receptacles permit themselves to be filled the better students they are” (p. 72).

Ultimately, teachers need to embrace a more transformative pedagogy, with all students, including those students with ASD. Freire discusses this pedagogy, which is fundamentally based on requirements of love, humility, faith, hope, trust, and critical thinking. By becoming mindful of these necessary requirements, enveloping an inclusion model, and incorporating appropriate strategies, both teachers and students with ASD will profit from this shift.

## **Importance of reading comprehension.**

Reading is a primary skill in life, and comes with a myriad of purposes including reading for information, functional reading, and reading for enjoyment. Lanning (2009) cites The RAND Reading Study Group, in defining reading comprehension “as the

process of simultaneously extracting and constructing meaning” (p. 1). The entire process is highly complex and requires a variety of processes to take place within the reader in tandem. Reading is defined by Bell (2007), as the “integration of phonological (phonics), orthographic processing (sight words), contextual fluency, oral vocabulary, and comprehension” (p. 393). All of these aspects are vital and are interconnected, requiring development as the reader engages in the reading process. “There is evidence that poor comprehenders in both the typically developing and atypically developing populations have difficulty shifting their attention from word-level reading to text comprehension” (Randi, Newman, Grigorenko, 2010, p.2). In early grades many literacy programs are focused on the phonics aspects of reading and developing fluent readers, however fluency does not always connect directly to comprehension skills.

Approaches within the classroom tend to shift from a more direct style of teaching, working with sounds and words within shorter reading passages, to constantly constructing and reconstructing meaning throughout much longer reading pieces. Harvey and Goudvis (2000) stated, researchers are “able to identify strategies that represent the essence of reading comprehension by systematically investigating the reading strategies that proficient readers use to understand what they read” (as cited in Lanning, 2009, p.2). By considering student strengths and needs, educators can determine strategies that will be most beneficial to the specific students.

Teachers need to be wary of the “trends” often experienced in teaching reading. The trends or emphases on certain aspects of reading can lead to gaps in the critical thinking skills of students. Bell (2007), explains that the focus on isolated skills proves “more gains in word attack than word recognition, paragraph fluency, and reading comprehension. As history has shown...[concentrating on an] aspect of the reading process, getting wrapped up in one philosophical ball of yarn, does not teach reading to children” (p. 392). Over emphasis can especially be detrimental for students with ASD, due to the fact that transitions to new mindsets can be difficult. Through the implementation of effective reading comprehension strategies students with HFA or AS, as well as other struggling readers, will be able to become good readers, efficiently implementing multiple strategies during reading.

The main question this review of the literature will address is which strategies are effective for students with ASD, specifically which have proven benefits and which hold potential, requiring continued research. In order to deeply consider the reading comprehension strategies, theories which address the development of reading comprehension skills in students with ASD need to be analyzed. Effective strategies, potential strategies, and future considerations for research will also be examined.

## **Current Theories Impacting Students with ASD and Reading Comprehension**

There are a variety of theories as to why students with High Functioning Autism and Asperger’s Syndrome have reading needs within the inclusion setting. Past research studies have “indicated that individuals with Asperger syndrome often have above-average intelligence but have difficulty with reading comprehension... however, there is a lack of research in exploring literacy instruc-

tion for students with Asperger Syndrome” (as cited in Chiang & Lin, 2007, p. 265). The most current theories on reading in HFA and AS include examination of the memory, Weak Central Coherence Theory, Theory of Mind, and Hyperlexia.

## Memory.

In considering the memory of individuals with High-Functioning Autism and Asperger’s Syndrome, “a functional MRI study by Koshino, Carpenter, Minshew, Cherkassky, Keller, and Just (2005) found under connectivity in areas related to the verbal working memory network for HFA” (Kamio & Toichi, 2007, p. 875). Memory can directly impact daily functions as well as connecting past experiences and new experiences. Williams, Goldstein and Minshew (2006), linked memory to student critical thinking skills with their research suggesting: “children with autism acquire less information from complex stimuli, including complex scenes, sentences, and stories. This difference in memory functioning may contribute to their impaired adaptive functioning in social communication and problem solving” (p. 10). This under connectivity and difficulty committing multifaceted reading components to memory can add to frustration, as more intricate readings require multiple reading processes to occur simultaneously.

Results from Kamio and Toichi (2001) study on memory, noted “evidence of impairment in long term memory when verbal materials to be remembered were semantically or contextually related” (p. 964). Additional research from Kamio and Toichi’s (2007) study on memory illusion in individuals with HFA points out that “working memory in ASD might be underdeveloped,” but stated that further evidence would need to be examined before making distinctions between HFA and AS in this area (p. 874). According to Bartlett’s (1939) theory on schema, new information is usually “added, ignored, or transformed through such an active process, and false memory is considered to be its by-product. Thus, HFA are suggested to have difficulties in forming schema. If schemata are not formed appropriately, new information remains fragmented” (as cited in Kamio & Toichi, 2007, p. 873). This perspective of memory could relate to how students have difficulty connecting details to larger parts of information. Students with HFA and AS are often noted to have difficulty repairing false prior knowledge or perceptions, which could be attributed to their struggle with memory and building on their schemas, as well as creating and organizing new ones.

## Theory of mind.

Other researchers point to a controversial standpoint discussed as the Theory of Mind. Theory of Mind is defined as the ability to empathize with others and “infer what others are thinking in order to explain and predict their behavior” (Happe, 1999, p. 217). According to Baron-Cohen (2001), the individuals who are on the high functioning end of the autism spectrum demonstrate deficits in a theory of mind which “attributes social impairments to difficulties ascribing mental states to oneself and others” (as cited by Beamont & Newcombe, 2006, p.365). Likewise, according to this theory, students with autism lacking this theory of mind, “could often be suffering from a type of ‘mind-blindness’” (Frith & Happe, 1994, p. 116). This perspective seeks to explain why students with ASD struggle with social interactions and reading cues.

Baron-Cohen, Jolliffe, Mortimore, et al. (1997), examined different tasks such as a “Strange Story” task and an “Eyes Task” studied the social development of the person as well as the language of their eyes to determine how they read emotions and behaviors. Following their study, they found some “results as providing experimental evidence for subtle theory of mind deficits in individuals with autism or AS” (p. 16). Additionally, Westley (2004), agrees that individuals with ASD, display needs in the capacities of “interpreting and recognizing emotions, determining character goals, pragmatic language skills, registering false beliefs, and trickery” (as cited by Gately, 2008, p. 41). Grasping irony and other non-literal language usage is also difficult for some individuals. Martin and McDonald (2004), confirm, “the ability to infer the mental states of others has been considered pivotal to one’s ability to engage in effective communication and has been much studied in relation to Autism” (p. 312). Conclusions have been drawn when comparing groups, according to Martin and McDonald (2004):

Individuals with both first order and second order TOM (i.e., the ability to infer the beliefs of one person about the beliefs of another person) could comprehend all inferential language, including irony. Thus, the extent to which the autistic individuals could understand figurative language was dependent upon the level of TOM possessed. (p.312)

Furthermore, the level of TOM a person with ASD maintains could be linked to needs in social interactions in the classroom as well comprehending and discussing a text.

There has not been one proven theory that accurately fits all learners on this spectrum, in fact, Happe (1999) validates, “the theory of mind account, indeed all deficit accounts of autism, fail to explain why people with autism show not only preserved but also superior skills in certain areas” (p. 217). The TOM approach is often scrutinized for stating that lacking theory of mind is a straightforward deficit in individuals with autism. Other theorists and researchers oppose this perspective, and feel that instead of determining this thinking process to be a deficit, they argue that individuals with autism propose a different way of thinking.

## Weak central coherence theory.

The Weak Central Coherence Theory is another perspective on how individuals with ASD process information, which affects their reading comprehension ability. “The weak central coherence (WCC) account (Frith, 1989) hypothesizes a biased cognitive style towards local rather than global information processing in autism...[this type of processing] predicts good performance on rote memory of words or phrases, and poor performance on higher-order semantic processing” (Kamio & Toichi, 2007, p. 874). Frith’s (1994) theory further described this weakness as an imbalance during the process of integrating information within a person with autism. WCC is also often connected to weaknesses seen in executive functions and social interactions. Yet, Martin and McDonald (2004), also gives some consideration to weak central coherence explaining, “the difficulty experienced by individuals with Autism when comprehending certain linguistic devices may stem not from social inference difficulties per se, but from a more pervasive inability to use context to derive meaning” (p. 312). From this perspective of WCC, this imbalance could interfere with multiple processes in those with ASD.

Additionally, this theory relates to the noted struggle of students with HFA using anaphoric cueing within a text. During reading, anaphoric cueing is the act of referring back to a previously explained or known section of the text through pronoun usage. From the WCC perspective, strengths found in students with HFA or AS within science and math are easily explained as well as their struggle with reading comprehension and oral language. Specifically, within reading the “WCC tries to describe how individuals with ASD are often detached and very detailed-focused” (Ball-Erickson, 2012, p. 15). Results from studies on the WCC theory are often rebuked, since the collected data, according to Beaumont and Newcombe (2006), is mainly narrative and is insufficient in the quantitative measures for support. Other researchers, such as Jolliffe and Baron-Cohen (2001), also contest this theory stating that WCC “may only characterize the spontaneous processing preference of individuals with ASD...[these individuals] may be capable of processing information in context if they are instructed to do so or consciously decide to do so, based on task demands” (Beaumont & Newcombe, 2006, p. 368). The theory itself relates only to the cognitive functions of autism and thus refers to it as a characteristic instead of overarching need. Skepticism surrounding this theory remains and further research is needed; Martin and McDonald (2004) suggest, “the role of WCC processes in relation to ambiguous messages is, therefore, another area for investigation. Perhaps a number of different deficits interact to produce the variety of language difficulties observed in individuals with AS.... [this] as of yet, remains unanswered” (p. 327). Overall, this theory is also held as a narrow perspective for individuals with High Functioning Autism or Asperger’s Syndrome.

## Hyperlexia.

Hyperlexia is often linked or found in individuals with ASD, and while it is not directly connected to the spectrum, individuals with ASD many display characteristics deemed “hyperlexic.” The term hyperlexia, as examined by Grigorenko (2003), is often described as showing signs of “word reading accuracy skills in advance of reading comprehension, several other features have been described including an unusual preoccupation with reading, very early (and sometimes spontaneous) onset of word recognition and a general mismatch between proficient reading accuracy” (as cited by Nation et al., 2006, p. 917). Within the context of reading, this issue can be difficult to spot in earlier grades during student observations; especially since these students can present apparent fluency and sight words strengths which can be misleading unless their comprehension is directly examined.

Students with hyperlexia usually “show remarkably advanced word recognition skills; such apparently well-developed reading skills are usually only superficial...reading accuracy is well-developed and precocious but reading comprehension is severely impaired” (Nation et al., 2006, p. 912). Readers with a high decoding ability, who can read fluently with even pacing, do not consistently demonstrate an equal ability in their reading comprehension competence. Bell (2007) added, “hyperlexics are usually unable to comprehend ‘large units’ of reading, and have problems relating ideas and making inferences” (p. 380). Students with hyperlexia or students with autism who demonstrate these tendencies, often have strengths in their visual imagery; “children with autism may capitalize on rote memorization and recognize words on the basis

of shape or pattern recognition” (Nation et al., 2006, p. 912). These strengths in phonics and decoding with comprehension needs can be found in students without them being fully considered hyperlexic. Additional characteristics, detailed by Bell (2007) of students with hyperlexia include, “significant difficulty in understanding language, memorizing the sentence structure without understanding the meaning, difficulty answering ‘Wh’ questions, such as ‘What...?’ ‘Where...?’ ‘Who...?’ and ‘Why...?’;[and] thinking in concrete and literal terms, having difficulty with abstract concepts” (p. 380).

The more metacognition and abstract imagery within readings can be challenging for students with ASD, especially when their strengths are in more concrete detailed terms. Upon examining weakness in problem solving, critical thinking, and more complex processes, Bell (2007) adds that “imagery used to process parts (static/symbol imagery) and wholes (dynamic/ concept imagery) correlates to the above strengths and weaknesses” (p. 385). Studies by Klein and O’Connor (2004) resound that, “not all students who show hyperlexia have a diagnosis of autism; conversely, most high-functioning students with autism show a disjunction between decoding and comprehension, but one that is less extreme than ‘hyperlexia’” (p. 115).

Overall, these theories have examined the areas of need of individuals with Autism Spectrum Disorder, High Functioning Autism and/or Asperger’s Syndrome. They scrutinized potential reasons why these students struggle early, but more notably in the later grades when more intensive focus is placed on comprehension in reading. Students, no matter if they are considered disabled or non-disabled, should be approached as *able* learners and teachers need to have faith, as well as hope, in their potential to grow and contribute in learning. The goal is to examine strategies, keeping in mind potential needs and strengths of high functioning students with ASD, and devise beneficial strategies to ensure success in reading comprehension.

## Proven Effective Strategies

Clearly, teachers are obligated to implement methodologies that will allow for these students to become fully functional members of society. In considering how to more fully address students who may be struggling to comprehend, teachers should take into account that the research as well as the very nature of the spectrum of autism, “suggests that not one single strategy or method of teaching reading comprehension will be 100% effective for each and every child with ASD...ASD is very complex and each student diagnosed...has unique learning needs and styles” (Ball-Erickson, 2012, p. 25). Therefore various teaching and learning strategies should be examined and teachers need to be able to determine, based on the strengths and needs of their student(s), which approaches will be most beneficial.

## Guided reading.

Implementing a Guided Reading approach within the classroom allows for development of skills across a range of reading levels and skills. Burkins and Croft (2010), offer explicit methodologies for teachers and explain, “Guided reading is about supporting

students as they develop strategic approaches to meaning making” (p. 22). These researchers make the clear distinction that Guided Reading has a process and should be “session-like,” where the students generally are doing the majority of the reading, thinking, and discussing. Guided Reading is an approach that needs to be set apart from other methods, by distinguishing it from small group work. Burkins and Croft (2010) reiterate that, “small group reading instruction, however, is not guided reading...[since] small group reading instruction may also be shared reading, word work practice, read aloud, and so forth” (p. 22). While, this is not to say that small group instruction is not a beneficial modality, it is important to make the distinction from Guided Reading.

Originally the model is attributed to Fountas and Pinnell (2001); Guided Reading approach has “three fundamental purposes: to meet the varying instructional needs of all students in the classroom; to teach students to read a variety of increasingly challenging texts with understanding and fluency; and to construct meaning while using problem solving strategies” (Simpson, Spencer, Button et al, 2007 p.3). Guided Reading sessions follow the structure of “before reading, during reading, and after reading” segments. At the start of the lesson for the “before reading,” a text is selected on an instructional level between 90-95% reading accuracy. These levels are determined prior to conducting sessions, based on Running Record analysis and other methods such as a Critical Reading Inventory, or Diagnostic Reading Inventory. The instructional level is where the student will be within their “Zone of Proximal Development” as described by the educational theorist, Lev Vygotsky. This is where the teacher is able to provide scaffolding for the learner, teach them to depend on the text, foster their independence, and the reader is most likely to benefit from the strategic application and practice of their skill (Burkins & Croft, 2010).

A study conducted by Simpson et al. (2007) examined the effects of guided reading instruction with 11 students with Autism Spectrum Disorder who exhibited average intellectual abilities and their growth in reading abilities over the course of one year. Students within this study demonstrated growth within their comprehension and overall reading skills. Furthermore, some added benefits of a guided reading approach, is that it “occurs in a small group setting to allow for interaction among the teacher and readers...because each group of readers has different strengths and needs, each guided reading lesson varies in the skills that the teacher focuses” (p.3). One of the criticisms of this study was the size; given a larger group of students with ASD it would be difficult to replicate in larger public schools.

Overall Guided Reading allows the teacher to design instruction based on interests, need, and levels. Students are expected to spend majority of the session time reading, and then discussing the text. Within the before, during and after stages of the session, students are using a myriad of different skill sets, reading to themselves, and quietly to the teacher. Students also incorporate expressing ideas to each other, and discussing what they read, thus benefiting from hearing other student’s thoughts and strategies. Guided Reading allows the students to become an active contributor in learning and the teacher is able to scaffold, based on the need of the students during the session.

## Direct instruction.

There are a variety of educational programs providing Direct Instruction (DI) for students who have disabilities or are identified as struggling readers and is a prominent approach to teaching students with ASD reading skills and comprehension. Flores and Ganz (2009) conducted a study with four students identified as having ASD or a Developmental Disability and focused on improving their reading comprehension using a scripted, DI reading model. The implementation of the DI was proven to be effective in these students not only by the DI data collection, but also using curriculum based assessments, and running records to measure student progress. Results of their study revealed “a functional relation ...between Direct Instruction and reading comprehension skills... all students met criterion across the picture analogies, deductions, inductions, and opposites conditions” (p. 50). DI, also referred to as explicit teaching, may prove to be beneficial to students with ASD because they struggle with maintaining attention. Sustaining focus can be frustrating at times, according to Klein and O’Connor (2004) because, “many students with autism appear to have difficulty integrating information” (p. 116). Using only one type of strategy, however, can prove to be detrimental for students, especially for those with ASD who may exhibit difficulty with changes and transitions. Adjusting to new strategies and approaches, as students move through the grades, requires transitional periods for many students not just those with ASD. This can lead to frustration and avoidance during activities. Additional studies need to be conducted to examine this approach to address concerns on length of time using DI and grade levels. Flores and Ganz (2009) stated, “it is also unknown whether long-term use of DI reading comprehension with these populations would be the most efficient and successful form of remediation” (p. 52). Hart and Whalon (2011) demonstrated through their study of students with ASD between the grades of K through 5<sup>th</sup> grade, that teachers too often used direct instruction in early grades and shifted to a collaborative approach in later grades. They added that early teacher directed questioning molds students into passive receivers of information. Hart and Whalon (2011) moreover found that “by fifth grade, students with ASD may require consistent, supportive strategies for monitoring comprehension” (p. 251).

A study conducted by Asberg and Sandberg (2010), considered the effects of using discourse training, or a specific set of procedures, to increase comprehension in 12 Swedish students with high functioning autism. This study found a positive shift in student comprehension abilities, by combining both social constructivist view of Vygotsky, and the educational theorists Kozulin and Garb (2002) perspective on focusing on the student’s process of learning as a whole, instead of the end result. The goal of the research was to determine if reading comprehension improved by implementing “[1] a shared and explicit set of concepts for talking and thinking... (2) under scaffolding and modeling from the teachers...to integrate different sources of linguistic information within narratives and to integrate story information with prior knowledge” (p. 91). The teachers reported they would use the approach again, but would not necessarily be a good fit for students who are not able to think in more “abstract terms” (p. 95). While there may be considerable pros and cons to direct instruction, teachers need to find a balance in their classrooms. A multifaceted strategy approach, while recognizing student strengths and needs, may provide more benefits than relying too heavily on one method.

## Self-regulating.

Another strategy that has been proven to be effective in students with ASD is teaching self-regulating strategies such as anaphoric cueing and reminder cues. By teaching strategies to help monitor comprehension, students will have more effective tools to examine if they are maintaining meaning as they read. According to Snowling and Frith (1986), “specific comprehension failure, we demonstrated, is a serious handicap, on the other hand, a hyperlexic children’s ability to comprehend is actually often better than has previously been believed... this ability can apparently be increased by the provision of explicit cues” (p. 441). Anaphoric cueing, specifically, is when the reader “refer[s] back to an earlier part of the text to understand the current part or the pronoun being used” (Christian- Sauders, 2012, p.13). In the study of reading comprehension in high functioning students with ASD, O’Connor and Klein (2004), found that applying anaphoric cueing with students was effective, in that, “students were required to select an antecedent pronoun ...none were able to produce every answer immediately, but some commented on this fact, reread portions of the text to locate relevant information, and subsequently showed gains in comprehension” (p. 125).

Potential application of this strategy could include modeling and instruction combined with computer assisted software to further motivate students; furthermore, the researchers continued to explain, “pronouns and possibly other forms of anaphora could be highlighted on the screen, and students could be required to ‘mouse-click’ on the antecedent referent before proceeding” (O’Connor & Klein , 2004 p. 125). The use of this strategy, since many students are motivated by modern technologies, would allow these students to connect and construct their knowledge base, with eventual fading as the student builds their independence. Whalon, Otaiba and Delano (2009), promote code-focused instruction in combination with computer assisted technology explaining, “evidence is insufficient to advocate using computer-assisted instruction as a sole instructional mode, but rather suggests this method can support and enhance the learning of children with ASD” (p. 9). In this way computer assisted technology, should be implemented as a tool to assist learning, in practicing and honing reading skills.

Whalon, Otaiba, and Delano (2009) confirm the research potential stating: “cueing systems that help clarify abstract and decontextualized language such as anaphoric cueing are promising and need further study” (p. 10). Strategies that assist students in deeply considering the text is the goal in acquiring more successful comprehension in students with ASD.

## Providing visual frameworks.

According to O’Connor and Stichter (2011), “problem-solving frameworks are typically described as tools that provide students with a process to execute the steps involved in effective problem solving” (p.12). These frameworks provide a concrete, graphic structure for students with ASD who can be very visual learners. The results from their study, focused on addressing challenging behavior and problem solving, but could also be applied to social stories and literature for other students to teach generalization of skills. Using frameworks across multiple content areas could also

assist students in monitoring their reading, as an approach for students who need consistent comprehension strategies. “The use of clear visual analogies [like the graphic organizer of a house] by which the student is able to tap into their visual strengths to picture the process, has been shown repeatedly in our experience to provide value added in teaching these kinds of processes” (p. 14). Organizers such as these can not only assist in problem solving real life scenarios, but can also act as plot analysis organizers for the higher grades, or be used as visual organizers such as story maps for younger learners. Whalon, Otaiba, and Delano, (2009) illustrate that students with ASD can be instructed to develop questions using “a visual cue card paired with a script...[which] can be systematically faded to a visual cue paired with a signal word, a visual cue alone, and so forth until the child with ASD generates questions independently” (p. 10). These organizers and cue cards can help students maintain their comprehension as well as extend their focus during reading.

Visual organizers are also confirmed by Gately (2008) to be beneficial for students to organize information or generate connections within a story. O’Connor and Klein (2004) state, “students with autism appear to have difficulty integrating information...they might be also expected to have difficulty integrating information from previous text to understand the gist of the passage” (p. 116). Providing structure or visuals during an activity, like a book preview, is recommended. Kluth and Darmody- Lantham (2003), add that “pictures and drawings are not the only ways to clarify speech and communicate with students with autism; the written word can also be used as a visual support” (p. 534). As student’s progress extends past book preview or maps, other visuals, such as checklists, and cues can also provide alternate support.

Another way to incorporate this strategy is by practicing student visualizing, through discussions, and while reading. A program called “Visualizing and Verbalizing,” designed by Nancy Bell (2007), focuses on understanding and interacting with both the oral and written language. Strategies from this program work to promote the student’s ability to create images in their mind; thus engaging themselves as active participants in the reading and building higher order thinking skills. The strategies employ connecting the parts or details to the whole, as well as considering main idea, drawing conclusions, making inferences, and predictions. Colored cards assist in providing a visual for students in the number of connections through the story they should make. As the lesson or session is taking place, the teacher listens to the student’s visualizations and verbalizations, and proceeds to “ask factual and higher order thinking questions based on the student’s imagery” (Bell, 2007, p. 259). This allows students to connect the visuals provided, to the imagery they are making as they read.

This type of strategy support allows the teacher to determine the number of visuals needed for reading and also allows room for differentiation between students or reading groups. Teachers can expand on the strategy by modeling and connecting to student interests, ultimately, together they are working towards independently using the strategy. Kluth and Darmody- Lantham (2003), recommends that educators “encourage expression in all students... [and] teachers need to offer a range of choices and allow students to talk and share, and act in diverse ways “(p. 534). By providing actual visual frameworks or requiring students to create the images through facilitated teacher discussion, students are included in the

reading process, connecting to the images provided, ultimately, to create their own images in their minds during reading.

## Peer tutoring.

Peer tutoring strategies provide social and academic benefits for both typical students and students with disabilities. These supports have a steady focus on cooperative interactions in the classroom and the structure mainly consists of the selection of students, peer training, teacher monitoring, and peer delivered support. The Class Wide Peer Tutoring (CWPT) strategy, “has been proven to be effective across a variety of subjects and grade levels in increasing academic achievement for students with and without disabilities” (Kamps et al., 1994, p. 50). According to Maheady and Gard (2010), students are interacting together, they can work in paired partners, compete and earn points for team performances, which allows for immediate error corrections and application of procedures for reciprocal tutoring (as cited in Walters, 2011, p. 35).

Kamps et al (1994) research study, found students with ASD, as well as their typical peers, were able to improve both their academic and social skills, while interacting with each other and earning points for their team. Moreover this study stated, “initial implementation of CWPT resulted in a higher [reading comprehension] mean percentage correct for 13 of 14 peers” (Kamps et al, 1998, p. 54). Later in Kamps et al (1994) study, the strategy proved to have maintained the students’ growth in reading comprehension. Carter and Kennedy (2006) illustrated that this approach, “as with other peer mediated strategies, peer support interventions comprise a structured approach to involving classmates directly in the delivery of educational and social supports” (p. 285). Walters (2011), adds that, “CWPT is a teaching strategy that any teacher can change in order to fit their classroom activities, available teaching materials, and social environment” (p. 35). In a different study, Maheady, Michiell-Pendl, Mallette, and Harper (2002), compared peer mediated strategies to the traditional “teacher questions, student answers” methods, and found that the 21 students involved in the study scored their personal highest ever on the test, and also verified both students with disabilities and their normally achieving peers benefited equally. In the traditional teacher question answer model, 15 % of students were actively involved, whereas 85% were engaged in a peer mediated team support activity with the teacher (as cited by Harper & Maheady, 2007, p. 106). Moving towards an active approach connects back to Paulo Freire, integrating faith and belief in the students as contributors in the learning environment.

Incorporating interactive strategies such as peer mediated tutoring, students with disabilities are also able to work in a small group setting while also practicing their social skills. Miller, Fenty & Scott (2011) suggests that “because real school settings naturally involve a mix of desired academic and social behaviors, providing social skills instruction in the context of academic instruction and incorporating a self-monitoring component has the potential to ... generalize skills to new settings and could increase the social status and acceptance of students with problem behaviors” (p. 372). Alternatively, peer tutoring could be incorporated as needed, and with “general educators, peer support strategies appear to constitute a flexible, practical approach for differentiating instruction within increasingly diverse classrooms...these strategies can be

implemented on an individual basis without necessitating class wide changes in instructional approaches” (Carter & Kennedy, 2006, p. 288). Implementing a peer approach benefits both the teacher and student in allowing classmates to interact and grow together.

Incorporating more opportunities for students to learn in cooperation, increases student independence advancing in both the social and educational contexts. Embracing students with ASD as able, active participants in the learning community proves to the student and their peers that they can also work towards becoming critically engaged students.

## Moving Forward

A multi-dimensional approach to address the various strengths and needs of a classroom has much greater probability of reaching those students with ASD who struggle with reading comprehension. The National Reading Panel (2000) explains “reading comprehension of text is best facilitated by teaching students a variety of techniques and systematic strategies to assist in recall of information, question generation, and summarizing of information” (NRP, 2000, online). Implementing strategies into the reading curriculums that offer a melting pot of explicit, collaborative, visual, and guided reading activities has the potential to meet the needs of students with ASD while also developing their critical and higher level thinking skills. Still for today’s educators, “research evaluating reading interventions for children with ASD is preliminary and therefore insufficient to guide practice” (Whalon, Otaiba & Delano, 2009, p.11). Future research studies need to be developed and incorporated to determine the benefits for students with ASD.

Based on experiences in the classroom with the Autistic Support population, students demonstrate comprehension and critical thinking needs notably in the middle to upper grades within English and reading classes. When students are met with difficult tasks in reading, challenging behaviors and close work with paraprofessionals occur in the inclusion setting, often stigmatizing them in relation to their peers. If reading comprehension skills are addressed intensively and collaboratively in the younger grades, with a variety of these approaches, potentially there could be higher reading comprehension successes in students with ASD. Shifts in pedagogical approaches and an increase in implementation of effective strategies could also benefit the students in allowing for more productive inclusion and social interactions for these students on the spectrum.

## Impact on thesis.

In conducting this review of the literature, initial perceptions on High Functioning Autism and Asperger’s Syndrome, how students are referenced, and the needs which need to be addressed through the strategies all were aspects which were under consideration. Research conducted on these strategies was also immensely important to determine how appropriate they would be for students. Modes such as a more visual strategy for teaching, and peer tutoring have also proven benefits for the ASD study group. Furthermore, combinations of these strategies focus on the some of the



strengths of students with ASD, while targeting their weaknesses to allow for growth in critical reading comprehension.

The terminology in referencing the population of students with ASD was also strongly examined. In education, the terms used has remained the same, while in the medical field, the labels on the spectrum have shifted towards levels of support required. This does not directly impact the current research or approaches, however, as education shifts and the use of the levels is determined, further considerations will need to be made as newer studies are conducted. Additionally, I have found different strategies, such as those integrated with speech pathology, and teaching social skills, and implemented the strategies into my own teaching practice. While they have proven benefits, as they are used across specific content areas, they lack concrete evidence and data, with multiple study groups to determine effectiveness with connection to the ASD population.

## Pieces for practice.

Overall the goal of examining the literature concerning the development of critical comprehension strategies is to determine which would be more effective for teachers to implement. As illustrated by Bell (2007), “reading is at the heart of all school-based learning. It is critical to every content area – science social studies, English, health, language arts and math. Yet, not all students learn to read, despite the many years they may spend in the classroom” (p. 391). Students with ASD especially need these skills to apply across content areas. They must develop and connect with the reading strategies that are most efficacious for them with the goal of higher rates of success in comprehending what they read. Working with a spectrum disorder, educators need to be considerate of the reality that students will be on a range of levels on the continuum, all with unique strengths, needs, and interests. This is where reflection and action are beneficial in determining approaches for students with ASD. Shifting and seeking new potential approaches or combinations is where students will prosper and develop the most.

Additionally, trust and faith that progress can be made in students with ASD, is essential in the classroom. By maintaining a reflective pedagogy and praxis, as recommended by the educational revolutionary, Paulo Freire, teachers can determine effective strategies to meet the needs of the students with ASD, and assist in developing critical reading skills of all students.

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