READING COMPREHENSION STRATEGIES IN CHILDREN WITH HIGH

FUNCTIONING AUTISM: A SOCIAL CONSTRUCTIVIST PERSPECTIVE

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A

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Abstract

Individuals with autism see the world, by definition of the diagnosis, in a very different way than the typical student. Communication, both verbal and non-verbal, is a defining characteristic of this disability. Students with autism both can and need to learn to comprehend when reading to be successful in school and in life. This study evaluated the reading comprehension abilities of three students with autism and using a strength-based approach targeting comprehension strategies. These strategies also appear to have increased the students' communication skills. All participants were medically or educationally diagnosed with autism. All had an educationally-defined label of autism and had been identified as having difficulty with reading comprehension. The study is presented as a case study with limited participants. The author investigated the reading comprehension abilities of each student and through direct instruction provided support for the skills the student already possessed. Additional skills were then introduced thereby increasing the students' abilities to comprehend. An additional effect of increasing student personal communication skills was also noted.

Table of Contents

List of Tables

List of Illustrations

List of Appendices

DEDICATION

This work is dedicated to those who supported me throughout it:

My committed Committee:

Dr. Jean A. Ritchey, Co-Chair, Department of Communication, University of Alaska
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Dr. Teresa D. Bunsen, Co-Chair, School of Education, Counseling and Special
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And to my family:

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I would not have made it without you all!

CHAPTER 1

Introduction

1.1 Social Constructivist Theory and Learning

Social Constructivist theory has as its roots the work of Vygotsky (1929) and

Piaget (Piaget & Inhelder, 1969). Piaget developed the idea that knowledge is

constructed from what the child already knows (Piaget & Inhelder, 1969; Wadsworth,

1996). Vygotsky's work included the idea that children's development is culturally

mediated. From these prolific thinkers and writers has developed the notion of social

constructivism.

Social constructivism combined these ideas, into the theory that the child

progresses from what the child knows through social mediation. In other words, children

learn from others and add the knowledge to what they already know; creating new

knowledge that is influenced by the individuals in their lives.

Jerome Bruner was one of the driving forces shaping social constructivism. His

work illuminated the changes occurring in psychology, sociology, linguistics, and

anthropology. This became social constructivism, a combining of multiple philosophies

that directed the flow of research away from behaviorism to a culturally based theory. In

Acts of Meaning (1990) he demonstrated how the various philosophies combine. As he

said, "...with a few exceptions, notably Vygotsky, we did not pursue the impact of

language use on the nature of man as a species. We were slow to grasp fully what the

emergence of culture meant for human adaptation and for human functioning" (p. 11).

According to Bruner, there are three points that demonstrate how culture is necessary as humans are not complete without it. These are:

- "It is man's participation *in* culture and the realization of his mental powers *through* culture that makes it impossible to construct a human psychology on the basis of the individual alone. (Bruner, 1990, p. 12). In other words, we build on our social connections, and what we know, to create who we are psychologically.

- "By participating in culture, meaning is rendered *public* and *shared* (Bruner, 1990, pp. 12-13). He said in this statement that no one is born into the world as an individual but as a cultural being and we must interact in the public, shared world in order to understand and be understood by others.

- Finally, Bruner stated culture included "what makes human beings tick. It includes a theory of mind, one's own and others... (Bruner, 1990, p.13) In other words, by being part of the culture of humanity around us we make the connections necessary to understand our own theory of mind and others, a necessary event in understanding and making sense of the world we live in.

Social constructivism is building what we know on what we already know, and it is culturally mediated. Without the connection to others, we do not develop appropriately, and are excluded from society. From birth humans may be equipped with

the physiological ability to acquire language, but the establishment of social connections, allows us to truly communicate with others.

This investigation was built in this theoretical basis; individuals build their knowledge of the world from those around them, including family members and teachers. However, children with autism have a difficulty in learning socially from those around them. Knowledge other children will develop almost automatically must be systematically provided to children with autism. In terms of reading, children with autism need direct instruction in comprehension strategies to overcome their difficulties with the issues in understanding that they face as a result of their disability (Munro Flores & Ganz, 2007).

Reading, of course, depends on language; language is a socially mediated development in children. Bruner stated, "Language is acquired not through the role of spectator, but through use. ...The child is not learning simply what to say, but how, where, to whom, and under what circumstances (1990, p. 6)". He went on to say, "Information is indifferent with respect to meaning (1990, p. 4)". Developing the means to acquire information does not mean the individual can make meaning. With individuals with high-functioning autism, also known as Asperger's syndrome, the individual often has the appearance of having language without having the ability to make meaning. An exploration of the definition of autism will provide an illumination of this difficulty impacting individuals with this spectrum differences.

1.2 What is Autism?

1.2.1 Diagnostic and statistical manual IV-TR (APA, 2000)

Autism can be defined in two ways; there is the psychological definition, used to diagnose this condition medically, and the information used to determine educational qualification. In terms of the Diagnostic and Statistical Manual IV-TR (American Psychiatric Association, (APA), 2000), the currently used psychological book of definitions of mental disorders (referred to as the DSM IV-TR), Autism is a multi-part diagnosis. Per the DSM IV-TR, one must have six characteristics in behavior and communication; two items from (1), and one each from the (2) and (3). The first included a "qualitative impairment in social interaction" (p.75) which involves impairments in multiple non-verbal behaviors, lack of peer relationships, lack of spontaneous sharing of things (enjoyment, interests, achievements), or lack of social/emotional exchange with others. The second group of items stated a "qualitative impairment in communication" (p.75) must exist, which includes delays in or lack of spoken language, and a lack of compensation in other ways; or if the child can speak, they do not initiate or sustain conversations with others; they also might display echolalia, idiosyncratic language, or some kind of repetitive or stereotyped language. The individual must have two of these issues.

The second group involved behaviors related to interests. Individuals who meet this diagnosis have repetitive, often intense interests, activities, or behaviors which are demonstrated by abnormally restricted or intensely focused interests, stereotyped physical

mannerisms such as rocking of the body, hand flapping, or other movements that are repetitive in nature, and adherence to ritual or routine that is inflexible but nonfunctional. Persistence with a body part can also be present. One out of these broad behavioral characteristics must be present.

The third group included delays (or abnormal development) in the areas of social interaction, play (symbolic or imagination), and language used in social communication, and one of these must be part of the issues faced by the individuals. For the broad category of autism, the disability must be noted before the age of three years. Overall, the disability cannot be better identified as Childhood Disintegrative Disorder, or Rhett's disorder (APA, 2000).

Also included under the category of autism (as a sub-category) is Asperger's syndrome; this end of the spectrum includes features of autism. However, at this end of the spectrum, the individual must demonstrate a qualitative impairment in social interaction, indicated by either a marked impairment in the use of multiple nonverbal behaviors (eye-to-eye gaze, facial expression, body postures, gesture) to regulate social interaction, a lack of seeking to share with others (sharing joy, interests, achievements), and/or a lack of social or emotional reciprocity. The requirement to demonstrate restricted repetitive and stereotyped patterns of behavior, interests, and activities is also part of this end of the spectrum of autism. It is demonstrated through an intense interest or preoccupation in one (or more) stereotyped and restricted patterns of interest abnormal either in intensity or focus and an inflexible adherence to specific, nonfunctional routines or rituals. Children with Asperger's syndrome do not have delays in language, but they

do demonstrate stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole-body movements) and persistent preoccupation with part of things. These things must cause a clinically significant impairment in social function, occupational function, or other areas of the person's life.

There is also no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior, or curiosity about the environment in childhood, except in terms of social interaction. As in the main definition of autism, the criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia (APA, 2000). The complete criteria for diagnosis as listed in the DSM-IV-TR (APA, 2000) is listed under Appendix A.

As can be seen by the extent of the manifestations of the diagnosis of autism, it is a disorder that encompasses a fairly broad set of characteristics. Children can demonstrate variations of the criteria and still be considered to have autism; therefore it is considered a spectrum disorder. Those with the criteria for diagnosis for autism but with high intelligence quotient (IQ) scores are often referred to as having high-functioning autism (HFA), as they do not demonstrate the issues faced by those individuals with the disorder that also have lower cognitive functioning. Individuals with Autism Spectrum Disorders (ASD) have specific rights in terms of educational support to assist them to function as independently as possible and to access the general education curriculum in school as possible. These rights, and the educational definitions of autism, are included under the Individuals with Disabilities Education Improvement Act (2004).

1.2.2 Individuals with disabilities education improvement act (IDEIA) (2004)

Educationally, a diagnosis of ASD "means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three that adversely affects a child's educational performance. Other characteristics often associated with ASD are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.... A child who manifests the characteristics of ASD after age three could be identified as having an ASD if the criteria in paragraph (c)(1)(i) of this section are satisfied" (IDEIA, 2004, part 300/A/300.8/c/1(i)). In other words, if a child exhibits characteristics of ASD at any age that impacts the student's education, that student, for the purpose of IDEIA (2004) can be categorized as having ASD and receive educational services under that act. Repeatedly, communication (verbal and non-verbal) are emphasized in diagnosis or categorization of ASD. This Act included all ability levels of individuals with ASD, whether their characteristics fall on the more severely affected or whether they fall under the APA (2000) autism sub-category of Asperger's syndrome, as long as the manifestations impact the educational performance of the individual. Asperger's syndrome is not differentiated under IDEIA (2004); under the APA classification, it is a sub-classification of autism.

1.3 Spectrum disorder

ASD are known as spectrum disorders as individuals can manifest in various forms, from the lower, more involved manifestation exhibiting more characteristics of the disorder to minimal, displaying fewer characteristics. Individuals with ASD display a

range of behaviors, mental abilities, and emotional abilities. According to the criteria defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV™-TR) (American Psychiatric Association (APA), 2000), to be diagnosed with autism an individual must display at least six of the eight characteristics listed. These include speech, language, social interaction, play, and unusual stereotypical or repetitive interests in or uses of objects. As a spectrum disorder, the disability manifests itself across a wide range from mild to severe in intensity. Intelligence quotients (IQs) of individuals with ASD vary from severe cognitive deficits (less than 40 on a normal spectrum) to above the typical IQ of 80-110. Those individuals exhibiting IQ's above the normal range are referred to as having high functioning ASD. ASD are referred to as interactive and communicative (both receptive and expressive) disabilities. A complete listing of the diagnostic criteria for ASD is contained in Appendix A.

Because of the nature of the disability, ASD should be considered a serious issue in any manifestation, as it serves to separate the person with ASD from the rest of the human world. Individuals with an ASD often live very lonely lives, and struggle throughout the life cycle, without assistance and/or support (White & Robinson-Nay, 2009; Causton-Theoharis, Ashby, & Cosier, 2009).

1.4 Statistics related to the increase of ASD

According to the latest statistics available from the U.S. Department of Education, there are currently 296,000 students being served under the category of ASD in the United States (United States Department of Education, National Center for Educational Statistics (NCES), 2010). Between the 2002-2003 school year and the 2007-2008 school

year alone, the percentage of children being served in programs for those with disabilities (federal school based programs) for ASD increased from 0.3% to 0.6% (NCES, 2010) . In Alaska, between 1998 and 2007, the numbers increased from 131 to 648 in 6 to 21 year olds (Data Accountability Center, 2011a, 2011b). Thoughtful House Center for Children has stated Alaska has a 1:172 rate of ASD in 8 year olds in the 2008-2009 school year (2010). The prevalence of individuals with ASD in the educational population is rising (Waterhouse, 2008; Fombonne, 1996; Newschaffer, Falb, & Gurney, 2005; Harvard Mental Health Letter, 2010). This increase in the numbers of individuals diagnosed with ASD has been controversial. The concern is whether the criteria expanded resulting in more cases diagnosed, or if there is truly an increased number of individuals with ASD.

It is important at this juncture to note that both the *prevalence* (*total number*) and *incidence* of individuals with ASD are used in the literature. Total number is the number of students in the disability category divided by either the number of births in that year or by public school enrollment, which is measured in incidents per 10,000 enrolled in that year. Incidence is the number of newly *diagnosed* students by either birth rate or school enrollment. The significance and advantages/ disadvantages of using either number to determine how many individuals have or have been newly diagnosed with ASD are discussed in the "Discussion" section. Using either number indicates there are a significant number of individuals now being diagnosed with ASD. An overall increase is estimated as, "increased from 0.6 to 3.1 per 1000 from 1994 to 2003" according to Shattuck & Grosse (2007) (see Appendix A for the entire criteria used to diagnose ASD).

According to the group Fighting Autism (2004a), Alaska had an increase of 2,138% in the number of individuals with ASD between the years 1992 and 2003, with an average increase of 32% annually. They concluded:

> The increase in Autism prevalence is systemic across the entire
>
> United States and should be an urgent public health concern. The majority of
>
> the increase is attributed to young children. The increasing prevalence time
>
> trend provides additional evidence that disease frequency is, and has been,
>
> increasing in the United States. The disease frequency of Autism now surpasses that
>
> of all types of cancer combined (Fighting Autism, 2004a).

Other states have also indicated dramatic increases. California reported an increase from 3,864 cases of individuals identified with ASD in 1987 to 11,995 cases identified in 1998 ("More on the "autism epidemic"," 1999); in the data from 1999, the state reported 24,863 children with ASD in 2003 (Fighting Autism, 2004b). Florida reported a 563% increase in the number of individuals reported to have ASD ("More on the "autism epidemic"," 1999); the data from 2004 tells us there are 7,151 children with ASD in 2003 in schools in Florida (Fighting Autism, 2004b). Currently, the number of individuals born estimated to have an ASD is 1 in 110 nationwide; this is the data for 2006 (Centers for Disease Control and Prevention, 2009).With this growing portion of our society, it is important to address the sociological, educational, and psychological aspects necessary to promote positive life experiences for these individuals and success in school.

1.5 Asperger's Syndrome and Autism

Leo Kanner (1943) and Hans Asperger (1944) were the initial researchers who studied ASD. Kanner first described children with developmental problems in the areas of social interaction, fascination with manipulation of objects, and odd postures such as rapid hand flapping and finger flicking. Asperger discussed similar characteristics in children and adolescents, but the individuals he identified had advanced but inappropriate language. Asperger's subjects were children, but spoke as little adults. Kanner and Asperger agreed on central or focal characteristics of individuals with ASD (Frith, 1991).

Asperger's syndrome is considered a high functioning form of ASD, with defining characteristics identical to autism, except these students have an advanced vocabulary without substance in language use. In other words, they are wonderful "word callers" but lack comprehension skills, especially inferential comprehension. Often they are referred to as "little professors" because of the use of multi-syllabic or complex vocabulary (Safran, 2001).

Moyes (2001) stated,

> Asperger's syndrome is diagnosed when a child has two social interaction
> impairments from the first category; one behavior pattern from the second
> category; a clinically significant impairment in social, occupational, or other
> important area of functioning; no clinically significant delay in language (e. g.
> single words used by age two, communicative phrases used by age three); no
> clinically significant delay in cognitive development or age appropriate self-help

skills or adaptive behavior; and when the criteria are not met for another specific

pervasive developmental disorder or schizophrenia (p. 15).

Students with ASD and especially those falling under the sub-category of Asperger's

syndrome, have academic potential and need specialized instruction due to the nature of

ASD to be as successful as their potential portends.

1.6 Reading and students with ASD

ASD is often associated with cognitive deficits or other co-existing conditions;

however, students with ASD *can* and *do* learn, and reading is of paramount importance.

Students with ASD may have a dual diagnosis, with disabilities such as mental

retardation or learning disabilities. This may limit their academic abilities (American

Psychiatric Association, 2000; Hobson, 1993a). Despite the academic limitations many

have learned to read (Hobson, 1993a). Students with high functioning ASD often struggle

in areas of reading comprehension more so than phonetic or word calling abilities or print

conventions. Their ability to retell a story improved with repetition (Colasent & Griffith,

1998), and active use of the story material. Currently there is a dearth of literature

targeting reading and students with ASD.

1.7 Reading instruction

National debates (i.e., The "Reading Wars", "Education Nation"), state standards

(i.e., federal mandates (i.e., No Child Left Behind, 2001) and new concerns with reading

such as the age at which children should be expected to read intensify the scrutiny in the

field. Focal points include but are not limited to: (a) what does it mean to read, (Chall,

1983; Foorman, Francis, Fletcher, Schatschneider, & Mahta, 1998; Goodman, 1996;

Irwin, 1991; Ruddell, Ruddell, & Singer, 1992; Smith, 1994; Van den Broek & Kremer, 2000), (b) how people read (Ruddell et al., 1992; Yopp & Singer, 1992), and (c) effective methods of reading instruction (Dole, 2000; Garner, 1992; Irwin, 1991; Moustafa & Maldonado-Colon, 1999; Price, 1998; Ruddell, 1992; Sternberg, Grigorenko, & Jarvin, 2001; Swanson, 1999). Research has focused on what to teach and how to teach it. Controversial issues which appear in the literature include phonics versus whole language (Graves & Dykstra, 1997; Moustafa & Maldonado-Colon, 1999; Price, 1998; Sternberg et al., 2001), comprehension through teaching of decoding and word recognition (Goodman & Goodman, 1992), and indirect or direct instruction in reading comprehension skills (Brown, Palincsar, & Armbruster, 1994; Dole, 2000; Tierney & Readence, 2000). States (i.e. Texas, Alabama, South Carolina, Oregon, Florida) are determining their educational curriculums based on research conducted within the last ten years by a panel of "experts" (National Reading Panel) determined to fine the "scientific formula" to teaching reading (National Reading Panel, 2000; Flippo, 1999; Manzo, 1998).

One group studying reading began, "defining the term reading comprehension as the process of simultaneously extracting and constructing meaning through the interaction and involvement with written language. It consists of three elements: the reader, the text, and the activity or purpose for reading. The RRSG [Rand Reading Study Group] a heuristic to show how these elements interrelate in reading comprehension an interrelationship that occurs within a larger sociocultural context that shapes and is shaped by the reader and that interacts with each of the elements iteratively throughout the process of reading" (Snow, 2000, p. xiii). It is the interaction between

text, reader, and activity/purpose that lends to using reading comprehension strategies to increase comprehension.

1.8 Learning disadvantages and reading research

Research on learning disadvantages was prominent (Kaderavek & Justice, 2000; Sternberg et al., 2001; Swanson, 1999). However, research in reading instruction for students with ASD has been emerging. Parameters reviewed for research in students with ASD and reading included the years 1986 through 2006, and the studies had to refer to reading instruction and ASD. There were several studies dealing with students with ASD and reading instruction. Church, Alisanski, and Amanullah (2000) conducted a chart-review or an examination of student files. Their study indicated reading difficulties were included within students' records, but did not distinguish between phonetic and comprehension difficulties. Myles, Hilgenfeld, Barnhill, Griswold, Hagiwara, and Simpson, (2002) discovered significant issues with comprehension in students with ASD, including issues with affect and comprehension. Students who do not understand others' perspectives, or pay attention to detail and description may not comprehend the text (Gut & Safran, 2002). Colasent and Griffith (1998) established students learn curriculum best when read stories that relate to the curriculum; they also declared repetition of reading improved students story recall. One study determined students had a schema for understanding concrete material that was similar to that of typical children, an important consideration in prior knowledge necessary for comprehension (Tager-Flusberg, 1985) Finally, Williams, Wright, Callaghan and Coughlan (2002) studied the instruction of students with ASD using both book based and computer based instruction. In this study

computer based learning seemed to improve student recall and comprehension of materials. These studies are all beginnings in understanding reading and students with ASD.

Chiang and Lin (2007) reviewed 754 articles written between 1986 and 2006, using as a factor for inclusion in their review the studies included at least one student with an ASD. In their review they divided reading into reading comprehension (understanding text) and functional reading (the ability to match text and pictures) and the ability to follow written instructions. Of the 11 studies they determined met the criteria for their review, only four focused on comprehension. They included: Kamps, Locke, Delquadri, and Hall (1989); Kamps, Barbetta, Leonard and Delquadri (1994); Kamps, Leonard, Potucek, and Garrison-Harrell (1995); and O'Connor and Klein (2004). The first three focused on the use of peers in increasing academic skills, while the last explored strategies for instructing students with ASD in reading, This study focused on using, "answering prereading questions, completing cloze sentences embedded in the text, resolving anaphora by identifying relevant antecedents [use of a grammatical substitute or repetition for effect, with reference to antecedents to help the student know who or what the author was referring to], and control (reading only)" (O'Connor & Klein, p. 115). The limited number and diverse nature of the studies available all indicated the need for further research into the difficulties encountered by students with ASD in reading.

1.9 Statement of the problem

The strategies used by students with ASD in understanding (comprehending) what they read was the focus of this study. Understanding how students came to use these strategies was also examined. Strategies students were aware of, but did not understand or needed instruction to use were also determined. Finally, the reasons students read were examined, as this is often an important point in the literature, that reading is making meaning and meaning varies according to the reader's purpose for reading (Goodman, 1996; Irwin, 1991; Smith, 1994).

1.10 Significance of the study

Students with ASD have, by definition of the disability, a difficulty with language. Specifically, they have a disturbance in their use of language for social communication (APA, 2000). Comprehension of written material depends on understanding the language and also the social concerns that are part of reading that result from the interaction between the reader and the aspects of the text. Understanding the strategies these selected individuals use to comprehend allowed instruction of additional strategies. It also allowed the researcher to examine how the participant comprehends and manipulates language. According to Goodman and Goodman (1992), oral reading production is a reflection of, "the underlying competence and psychosociolinguistic processes that have generated it" (p. 107). As the incidence of students diagnosed with ASD increases, there has been an increased need to teach skills for independence. The ability to comprehend what is read is one of the most primary precursors to full

independence. This study is significant because it explored concerns not previously addressed, in an area vital for school and life success.

1.11 Rationale for the study

This study was concerned with discovering reading comprehension strategies that students with ASD used. Currently only five of the six studies available about this topic address comprehension. None directly addressed the strategies used or the reasons students read, both important considerations in comprehension (Irwin, 1991; Smith, 1994).

Understanding what strategies students are aware of allowed for better effort in instructional method. To teach something entirely new takes more time and more intense methods than to bridge the gap in understanding. If we know what strategies students are aware of, we can better plan to help them add strategies to their repertoire.

Finally, this study is significant because it evaluated the purposes for which these students read. Understanding their purpose allows the educator to help the student align their strategies to gain the most from what they are reading (Goodman,1996). For example, if students read a text book to answer specific questions rather than gain information on a larger topic, the students may need their attention focused on different areas; they may also need instruction is using headings, particular types of print (italics, bold, words in different colors), or other text specific strategies to gain the appropriate information (Irwin, 1991). The students in this study are referred to as students with ASD, specifically those with evidence of hyperlexia (advanced word reading abilities without commensurate comprehension skills). Since there is a large variation in abilities

in reading in individuals with ASD, examination of their strengths and needs to support comprehension is essential (Nation, Clarke, Wright, & Williams, 2006).

1.12 Research questions

This study was designed to determine the reading comprehension strategies used by students with ASD. Students in the study are referred to as students with Autism syndrome disorders (ASD). This describes students who meet the educational definition of Autism (IDEIA, 2004). The research questions asked were:

R_1 Do students with ASD use particular reading comprehension strategies, and what are those strategies?

R_2 Are there other strategies that students with ASD are aware of but would like or need instruction in order to use them effectively?

R_3 What are the purposes for which students with ASD read?

1.13 Assumptions

This study assumed:

1. Reading comprehension strategies can be identified into categories (Irwin, 1991).

2. Students could identify needs in reading comprehension strategies instruction (Johnson, 2005).

3. Making meaning (comprehending) is the goal of reading, rather than word identification (Smith, 1994).

1.14 Limitations of the study

For the purpose of this study, the following general limitations were recognized:

1. Sample size: The number of students participating in the study was limited. The study did not allow for generalization due to the small number of participants (Small, 2009)

2. Complexity of process: Reading is a complex process involving many different aspects (Smith, 1994). This study only addressed strategy use. It was limited in that it only included three strategies, when there are five that Irwin (1991) listed, as well as subcategories.

3. Variety in past instructional experiences: Students came from a variety of locations, and have been provided with differing instructional practices throughout their school lives. Each of the students in the study had previously been instructed in other school districts and settings prior to the study. Two of the three were part of the researcher's intensive needs classroom; one student was included in regular education, with support from a special education teacher and outside consultant.

1.15 Definition of Terms

For the purpose of clarity and mutual understanding the terms used in this proposal are defined below:

Reading: The process of making meaning from written text (Goodman, 1996).

Reading comprehension: The use of strategies to make meaning from written text (Irwin, 1991; Smith, 1994).

Autism: (Autism Spectrum Disorders, ASD) Please see Appendix A for the complete definition of Autism according to the Diagnostic and statistical manual of mental disorders, 4th edition, DSM^{IV} (IV-TR ed.) (APA, 2000).

Asperger's Disorder: An individual with this disorder displays severe and sustained impairment social interaction, development of restricted, repetitive behaviors, interests, or activities, causing significant impairment in social, occupational, or other areas of functioning, but does not include significant impairments in language acquisition, or a clinically significant impairment in cognitive development prior to age 3. Reciprocal social interaction is impaired in a gross and sustained manner. (APA, 2000).

High Functioning Autism: An individual with autism who also has an intelligence quota in the upper ranges, above 100, and higher social and emotional functioning.

Theory of Mind: The ability to understand that others may hold ideas, beliefs, and mental states (Brownlow & O'Dell, 2009).

Reading strategy: Mental and behavioral activities that people use when attempting to understand and increase comprehension of text (Harvey & Goudvis, 2000; Taylor, Graves, & Van den Broek, 2000).

Hyperlexia: An advanced word reading ability without concurrent comprehension skills (Nation, 1999).

Paraprofessional: Also known as a classroom aide or classroom assistant; an individual who works with educational professionals in the support of students

with special needs in adapting access, or providing support with behavior,

transitions, schedules or other needs while in the school environment.

CHAPTER 2

Literature Review

This review of the relevant literature will be divided into three parts. First, the literature on reading will be reviewed. Next, literature on ASD and the difficulties encountered in educating this population of students will be reviewed. Finally, the connections in reading and communication will be reviewed.

2.1 Reading

Reading instruction in the nation's first public schools was presented from texts students brought; most often the hornbook (Plimpton, 1916) and catechism (Reynolds, 1976), or Noah Webster's *The American spelling book: containing the rudiments of the English language, for the use of schools in the United States* (1816). Since schooling moved from the home into more public venues, reading has been a focus of instruction. As early as 1833 some of the first texts for reading instruction were created, the McGuffey Readers.

Schooling continued to expand, and by the 1900s education was mostly universally expected for all white children in public or parochial schools. Children of color attended segregated schools until *Brown et al. v. Board of Education of Topeka, et al.* (1954) 347 U.S. 483 put forth the ruling that de facto segregation was illegal under the constitution (Brown Foundation for Educational Equity, Excellence, and Research, 2011). Students with disabilities would not be admitted to public education for another 20 years (Education of all Handicapped Children Act, 1975).

Rudolf Flesch, a reading and writing expert who immigrated to the United States in 1938, wrote *Why Johnny can't read and what you can do about it* (1955). This controversial book critiqued the American educational system focusing on students' reading inabilities. Flesch advocated teaching reading through phonics rather than the use of readers that taught in a more sight word and whole language approach.

Several prominent studies and papers have been produced in the history of reading research since the so-called "reading wars" in the 1970s and 1980s. Writers of note included Smith (1994), Adams (1994), and Brice-Heathe (1983). Others included Chall (1983), Fontas and Pinnell (1996), Goodman and Goodman (1992) and Goodman (1996). These researchers have explored topics such as (a) the connection between literacy and culture (Brice-Heathe, 1983), (b) what we do physiologically when we read (Smith, 1994), (c) what reading instruction is (Goodman & Goodman, 1992), and (d) what it means to read scientifically (Adams, 1994). The U.S. government has formed committees to determine what reading instruction needs to contain according to evidence based practices (Anderson, Hiebert, Scott, & Wilkinson, 1985; National Reading Panel, 2000). The U.S. has mandated programs designed to increase the literacy of our students, including the Head Start Program (Elementary and Secondary Education Act (ESEA), 1965) and the Reading First initiative (U.S. Department of Education, 2009). Both were served as an effort to determine what will create success for the most children in the public school setting.

Research was aimed overall on determining why students were not able to read. At the heart of the discussion was the role of instruction in phonics versus the "whole-

language" approach to instruction. The entire body of work focused on reading instruction rather than reading as process (Reyhner, 2008; Chall, 1967; Spector, 1995)

In the nineties, that focus changed to reading as a process, and reading comprehension became the heart of research. Previously warring entities appearing to agree that both methods of instruction were important and that the research should be on how children make meaning of what they are reading (Dahl & Scharer, 2000; Adams, 1994).

Current best practices in literacy instruction focuses on determining where the students needs lie (phonetic instruction as needed) and teaching students to make meaning of what they read (Klingner, Urbach, Golos, Brownell, & Menon, 2010; Enriquez, Jones, & Clarke, 2010; Bitter, O'Day, Gubbins, & Socias, 2009; Ediger, 2007) Meaning making is the crux of the issue for students with ASD in reading (Gira, 2010; Gately, 2008). Often, students are able to word-call and appear able to read words of great complexity (Smith-Myles, Hilgenfeld, Barnhill, Griswold, Hagiwara, & Simpson, 2002). As students age in the educational setting, however, their inability to understand theory of mind, or that others may not have the same ideation and views that they do, impacts their ability to comprehend (Mason, Williams, Kana, Minshew, & Just, 2008; Wahlberg, & Magliano, 2004; Norbury, 2005) .

2.1.1 A short history of reading instruction in the United States

Reading instruction began in the early United States as a way for the common person to be able to read their Bible and keep up with the household. Instruction in reading has been a part of public schooling since its inception. How to teach reading and

what it meant to comprehend has been a challenge to educators since the first readers were created.

The first classroom texts were religious texts (the Hornbook, the catechism), and the *New England Primer*, prior to the Revolution, and the *Elementary Spelling Book* (1816) by Noah Webster after. These works introduced religious basics and instilled a sense of patriotism in the nation's students (Reynolds, 1976). A Public Broadcasting special entitled "School: The story of the American public education" (Roundtable Inc., 2001) reiterated the notion religious and moral education of children was a focus of early American schools.

The first textbook was the Bible. Passages were memorized, recited, and copied to learn to read and write. Plimpton (1916) documented the use of the hornbook for instruction, noting they were brought over with the Pilgrims who continued to use them. These hornbooks contained the alphabet, numbers, and sometimes religious iconography, and varied in substance and design. The first commercially published textbook was the New England Primer, which was used between 1760 and 1843.

The first widely used readers were of the ilk of the McGuffey Readers (McGuffey, 1936), a series of books now experiencing resurgence in popularity among home schooling families. Written by Reverend William Holmes McGuffey and published by the Truman and Smith publishing company of Cincinnati, Ohio, McGuffey's readers consisted of six texts published between 1841 and 1885. The books were moralistic and focused on presenting the white, Anglo-Saxon Protestant perspective. According to Vail (2005), McGuffey's Eclectic Readers were so important in the classroom that, "While the

chief aim of the readers must be to teach the child to apprehend though from the printed page and convey this thought to the attentive listener with precision,…The school readers are the proper and indispensible texts for teaching true patriotism, integrity, honesty, industry, temperance, courage, politeness, and all other intellectual values" (p.2). In other words, these readers shaped the moral constitution of America while teaching students to comprehend.

According to the National Park Service, McGuffey was a Scottish immigrant and Professor at the Miami University in Ohio. Renowned as a lecturer on moral and Biblical subjects, McGuffey was approached to create a series of readers for use in instructing primary level students, after being recommended for the job by Harriet Beecher Stowe. Eventually, a fifth and sixth reader were created by his brother. The readers consisted of poems, stories, speeches, and essays from writers such as Milton, Webster, and Lord Byron. McGuffey encouraged teachers to read these aloud to their students, providing questions after each passage for teachers to ask of the students. His focus was on spelling, increasing vocabulary, and encouraging public speaking through stories that instilled Presbyterian, Calvinist beliefs in students (National Park Service, 1993).

Vail, (1911), in his work, stated reading instruction using the McGuffey readers was taught through the alphabetic (phonetic) principal:

As at first published, the lower books of the McGuffey Readers had no trace of the modern methods now used in teaching the mastery of words--even the alphabet was not given in orderly form; but the alphabetic method of teaching the

art of reading was then the only one used. The pupil at first spelled each word by naming the letters and then pronounced each syllable and then the word (p.4).

The books, McGuffey's and similar texts developed throughout the United States as the "Common School" era expanded public schooling, came to be known as basals. The stories written for these textbooks became more focused on particular sounds and sound groupings that students were expected to memorize and reproduce-the basis of the phonetic instructional method.

Basal readers were replaced in the 1950s when Scott Foresman produced the "Dick and Jane" series, a series of books designed to present whole words repeatedly so students would remember them. This line of reasoning came from behaviorist thinking, and caused a backlash from those supportive of traditional phonics learning (Reyhner, 2008).

The first work to attack the new books was *Why Johnny can't read* (Flesch, 1955). Using scathing language and ridicule, Flesch asserts there were no issues with the teaching of reading until the basals were replaced. However, we know this to be incorrect as the United States published illiteracy rates during the period 1870 through 1979 indicate a substantial decline in illiteracy (20% to .6% as cited in Snyder, ed., 1993), but 20% of the population were unable to read or write in any language while schools were using the phonetic method of instruction. This number does include illiteracy for individuals of color, who were not included in schools until much later.

2.1.2 The reading wars

The battle over phonics-vs.-whole language instruction was fought not only in the news, but in Congress as well. Those supporting phonics instruction blamed declining test scores they saw in the 1990's on the whole-language movement; those in the whole-language camp blamed poverty, and used ethnographic studies to support their position (Reyhner,2008). National debates, state standards, federal mandates and new concerns with reading intensified the scrutiny in the field. Focal points included what does it mean to read, (Chall, 1983; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Goodman, 1996; Irwin, 1991; Ruddell, Ruddell, & Singer, 1992; Smith, 1994; Van den Broek & Kremer, 2000), how people read (Ruddell et al., 1992; Yopp & Singer, 1992), and effective methods of reading instruction (Dole, 2000; Garner, 1992; Irwin, 1991; Moustafa & Maldonado-Colon, 1999; Price, 1998; Ruddell, 1992; Sternberg, Grigorenko, & Jarvin, 2001; Swanson, 1999).

Research in the mid- and late- nineties, and into two thousands focused on what to teach and how to teach it. Controversial issues which appeared in the literature include phonics versus whole language (Graves & Dykstra, 1997; Moustafa & Maldonado-Colon, 1999; Price, 1998; Sternberg et al., 2001), comprehension through teaching of decoding and word recognition (Goodman & Goodman, 1992), and indirect or direct instruction in reading comprehension skills (Brown, Palincsar, & Armbruster, 1994; Dole, 2000; Tierney & Readence, 2000). The controversy continues today, with the introduction in 2001 of the No Child Left Behind Act (NCLB) (No Child Left Behind Act of 2001). According to the full title of NCLB, the aim is to, "close the achievement gap with

accountability, flexibility, and choice, so that no child is left behind" (Sec. I) through improvement of test scores, creation of state standards, and the closing of the achievement gap between schools regardless of their socio-economic status or racial makeup (NCLB, 2001). The gap in achievement was to be closed through several programs including the Reading First provision (NCLB U.S.C. 20 § 6319, Section 1002).

NCLB (2001) was enacted in 2001, and was set to expire in 2007. It was reauthorized in 2007 and is scheduled to be replaced. Currently, President O'Bama has enacted the Race to the Top program, and is currently working on reauthorization of the Elementary and Secondary Education Act (1965), the precursor to NCLB (2001). Race to the Top (2009) (RTT) was a United States Department of Education program designed to stimulate reforms in state and local district K-12 education. It was part of the American Recovery and Reinvestment Act of 2009 (2009). A competition in which states vied for points to obtain funding to support "strategies that are most likely to lead to improved results for students, long-term gains in school and school system capacity, and increased productivity and effectiveness" (Race to the Top Executive Summary, p. 2), RTT was designed to support what was good in the field. Unlike NCLB (2001), RTT (2009) was a bottom- up design that was created to enable states to take the lead in reforming education.

2.1.3 Reading First (U.S. Department of Education, 2009)

Reading First was a formulary grant provided by the United States government, aimed at "putting proven methods of early reading instruction in classrooms", as the title stated (U.S. Department of Education, 2009). Through Reading First, "states and districts

receive support to apply scientifically based reading research—and the proven

instructional and assessment tools consistent with this research—to ensure that all

children learn to read well by the end of third grade " (U.S. Department of Education,

2009). Reading First (U.S. Department of Education, 2009) was designed as a nation-

wide research project to demonstrate the affects of scientifically support reading

instruction procedures.

An advisory committee was formed to study the impact of the Reading First grant

and report to the Department of Education the results of the funding provided. The

response of the Committee to the first report illustrated the difficulties of the Reading

First grant program and the study impacts, as the first full paragraph states the study was

flawed in its assignment of schools to study groups:

> The most critical concern had to do with the basic design of the study ...
>
> legislation called for a study in which schools would be randomly assigned to
>
> Reading First and non-Reading First treatments, random assignment was not
>
> employed...the evaluation only included schools that were in districts that had
>
> received Reading First funding ... comparisons were made between schools that
>
> were awarded Reading First grants and those that were not awarded Reading First
>
> grants. Districts made the decision regarding which schools would receive
>
> funding and this was not done randomly (Mitchell, Brady, Cutting, Carlo,
>
> Gutierrez, Lesaux, Lloyd, Morrison, Palincsar, Scanlon, & Vellutino, 2008, p. i).
>
> Additional concerns about the committee's letter included problems with sample

(only 2% of schools receiving funding were represented), issues with limited variables,

and the overreliance of Congress on the Reading first interim study report to determine if the program was working or not (Mitchell, et al., 2008). The final report of the Reading First committee indicated the following:

- Reading First did not improve students' reading comprehension.

- Reading First increased total class time spent on the five essential components of reading instruction promoted by the program.

- Reading First increased highly explicit instruction in grades one and two and increased high quality student practice in grade two. The program increased the percentage of class observational intervals spent on the five dimensions of reading instruction that involve highly explicit instruction. The program also increased the percentage of class observational intervals spent on the five dimensions of reading instruction that involve high quality student practice in grade two. There was virtually no observed change in grade one.

- Reading First had mixed effects on student engagement with print. (U.S. Department of Education, 2008a)

The final report of Reading First (U.S. Department of Education, 2009) indicated students in any of the grades studied did not increase their ability to comprehend, but increased skills in phonics in the first grade (U.S. Department of Education, 2008b). With reflection on the considerable flaws in the study, one thing is clear: when the reading instruction of the schools that were funded was studied, increasing direct instruction of phonics did not impact the reading comprehension of students (U.S. Department of Education, 2008b).

Both NCLB (2001) and Reading First (U. S. Department of Education, 2009) included students with special needs. In NCLB (2001) students were addressed through differentiating between students who were considered unable to participate in testing, the students whose disabilities were so severe they were unable to access the general education curriculum. In Reading First (U.S. Department of Education, 2009) students who are unable to participate at the level of other students are given remediation to improve their scores to the best of their abilities, as close to grade level as possible. However, neither program specifically delineates how students can or should be provided with instruction. Students with special needs were not always included in schools in general. Including them in current law demonstrated how far the United States has come in its treatment of children with differences.

2.1.4 Students with special needs join in the fray

Special Education as a formal entity began with the Education for all Handicapped Children Act, Public Law (PL) 94-142 in 1975. In this act public schools receiving federal funds were required to educate, evaluate, and create educational plans for students with physical and mental disabilities, in concert with their parents. It was required that that their education emulate, as closely as possible, the education provided to typically developing students. This law has been amended and reauthorized several times with its current manifestation the Individuals with Disabilities Education Improvement Act, Public Law 108-446 of 2004. The amendments and reauthorizations included 1986 when services were added for children from birth; 1986, 1990 and 1997 which all added and amended transition services for students at the age of 14; and also in

1990, changed the name of the Act to the Individuals with Disabilities Education Act

(U.S. Department of Education, 2007), according to IDEA Partnership at the National

Association of State Directors of Special Education (2010) [i]

President Bush signed the Individuals with Disabilities Education Improvement

Act (Public Law 108- 446: IDEIA 2004) on December 3, 2004. This law

promotes accountability for results, enhances parent involvement, uses proven

practices and materials, provides more flexibility, and reduces paperwork burdens

for teachers, states and local school districts. Many sections of the new law took

effect on July 1, 2005. The regulations took effect on October 13, 2006.

Prior to the signing of PL-94-142 (1975), children with disabilities were educated,

if at all, at home, in "schools" created in church basements or other facilities, in private

schools for the disabled, or through programs created by varied institutions where

individuals with differences were often sent. Now, children with special needs are

entitled to a free, appropriate, public education (FAPE, a main component of IDEIA).

They joined the public schools when the so-called reading wars were being fought over

what reading was, what children needed to be taught, and how it should be taught.

Students included in special education are the most tested of all students, as they

are required by law to be retested every three years to determine continued eligibility for

special education services (IDEIA, 2004). They are also required to participate in testing

mandated under NCLB (2001). In addition, another set of tests are imposed upon all

students receiving intervention in reading instruction (National Center on Response to

Intervention, (NCRTI), 2010). Response to Intervention (RTI) was part of the

reauthorization of NCLB (2001). According to NCRTI, RTI "integrates assessment and intervention within a multi-level prevention system to maximize student achievement and to reduce behavioral problems". Using testing scores, "schools use data to identify students at risk for poor learning outcomes, monitor student progress, provide evidence-based interventions and adjust the intensity and nature of those interventions depending on a student's responsiveness, and identify students with learning disabilities or other disabilities" (NCRTI, 2010). RTI mandates required schools to test students three times a year to determine if interventions are improving students' abilities enough to meet state standards.

Under NCLB (2001) students with disabilities had more options as well as more testing. NCLB (2001) allowed all students in underperforming schools to change schools, and this includes students with disabilities. Also, it required 95% of students to take state assessments which limited the number of students taking alternate assessments, and increased the number of students included in regular education (National Council on Disability, 2008).

NCLB (2001) included additional mandates that impact students in special education. There are 5 areas in which NCLB impacted special education. These included (a) assessment, as above; (b) accountability, (c) sanctions (school choice and supplemental services for students in low achieving schools), (d) teacher quality, and (e) paraeducator quality (Ralabate & Foley, 2003).

2.1.5 Students with special needs, NCLB, and reading

Students with special needs often do not learn in the same ways as their peers. NCLB (2001) required students to be able to read by the end of grade 3. It is often at this juncture students were determined to have a need for special education services. With the NCLB requirements specifying the grade at which students should read, and the state standards and standardized tests that were created in response, students were identified earlier as having difficulties. Students with difficulties that were already past the third grade had a more negative consequence. These students struggled to pass benchmark exams, and teachers raced to help them gain skills while attempting to continue to help them progress in the next set of skills needed to pass the exams.

Increased requirements for teachers of students with disabilities meant teachers often had to return to school for additional certification. Fewer teachers actually in classrooms meant larger case loads, and less attention per student. The requirement for increased paraeducator qualifications also reduced student support as paraeducators had to update their education or leave the field. However, better qualified paraeducators also increased their professional standing and increased the importance and respect afforded them. For school districts, it also equated to demands to increase pay and benefits for both teachers and paraeducators (New Jersey School Board Association, 2003; New Hampshire School Administrators Association, 2004; Office of the Legislative Auditor, 2004). Various reevaluations of NCLB resulted in numerous communications from Congress and states as they struggled to determine what the law meant to them. At this writing, Congress was set to reauthorized NCLB in the 2010 legislative session. An

amendment was introduced in June 2010 to suspend the punitive portions of the NCLB until its reauthorization (HR 6239, 2010) but no permanent action has been taken at this time.

In terms of reading instruction specifically, the use of programs with scientifically based instruction sent schools in search of such curricular models. Usually, this equated to adoption standards to meet the terms of the new law, and occasionally adoption of a reading and writing curriculum that came with assurances of such scientifically based methods. The new texts, and new standards, required many changes in the classroom, especially in how teachers structured their time. Many of the new programs came with scripted instruction and specific texts, which reduced student exposure to the wide variety of literature teachers used in the past. This also limited time for remediation in the regular education classroom. Additional testing included in NCLB, and time spent preparing students to take tests also limited classroom time.

2.1.6 Summary of reading literature

There have been many studies on the various aspects of reading (Brown et al., 1994; Chall, 1983; Goodman & Goodman, 1992). There have been studies from varying positions in the so-called "Reading Wars" (Chall, 1983; Foorman et al., 1998; Moustafa & Maldonado-Colon, 1999; Price, 1998) and studies from the varying positions on how and what to teach students when providing reading instruction (Brown et al., 1994; Chall, 1983; Dahl, Scharer, Lawson, & Grogan, 1999; Foorman, Francis, Winikates, Mehtas, Schatschneider, & Fletcher, 1997; Graves & Dykstra, 1997; Irwin, 1991; Moustafa &

Maldonado-Colon, 1999; Ruddell et al., 1992). At this time, there were limited studies on the reading comprehension strategies and reasons for reading in students with ASD.

Six studies have evaluated reading in individuals with autism (Church, Alisanski, & Amanullah, 2000; Colasent & Griffith, 1998; Myles et al., 2002; Tager-Flusberg, 1985; Williams, Wright, Callaghan, & Coughlan, 2002; O'Connor & Klein, 2004). None of these studies examined what reading comprehension strategies students used or the reasons students read. Without some understanding of this phenomenon, teaching students with ASD to read is made more difficult. The study described in the remainder of this paper demonstrated strategies used by these students and the reasons they read. Further study can build an understanding of what needs to be taught, and why students with autism read, making selection of materials to meet those needs more effective and efficient. Individuals read with a purpose, and that purpose drives meaning (Smith, 1994). Helping students with ASD understand the purpose of assigned reading and strategies they might use will foster success in classroom and adult life reading endeavors.

2.2 Teaching students with ASD: Current trends

In the United States, the rise in numbers of individuals diagnosed with ASD has led to increased demand for services. The most common current trends impacting students with high functioning ASD in the classroom include the use of the following: Discrete trial training (DTT), TEACCH, Incidental teaching, Pivotal response training, and Verbal behavior training (Birkman & Stephens, 2009; National Autism Center, 2009).

The afore-mentioned trends are often employed when working with students with ASD and even have been the focus of law suits. Families, believing the school had not provided the best opportunities for their students, had undertaken legal action in the effort to require schools to use a particular instructional method. According to Iovannone, Dunlap, Huber, and Kinkaid (2003), the following are "six essential themes or components to be included in effective education programs for students with ASD: 1. individualized supports and services for students and families, 2.systematic instruction, 3. comprehensible and/or structured environments, 4. specialized curriculum content, 5. a functional approach to problem behaviors, and 6. family involvement". A point Renna (2004) emphasized was that, "people with Autism that need our help either in large or small ways should not have to pay for it with their freedom, dignity, and loss of control over their lives". Through the application of best practices and respect for humanity educators and researchers can impact students' lives in the most positive, appropriate ways that allow them the most independence and opportunities for fulfilling lives.

A national panel from the National Autism Center undertook a project they called the National Standards project. From this came the National Standards Report (National Autism Center, 2009). This report evaluated studies from 1957 to 2007 to determine what practices had scientific evidence supporting their efficacy.

The panel created a system to rank the quality and consistency of the studies evaluated, as well as the quantity. To be rated as established, the studies must result in a score of 3,4, or 5 on a scale created by evaluating the variables of the studies on the practice. The panel called them "five critical dimensions of experimental rigor" and they

include {a} research design, {b} measurement of the dependent variable, {c}

measurement of the independent variable or procedural fidelity, {d} participant

ascertainment, and {e} generalization" (National Autism Center, 2009, p. 16). The scores

are then combined, and one score assigned. The following sections are descriptions of

the current trends in public schools in the education of students with ASD. Included are

the ratings from the National Standards Report (National Autism Center, 2009).

2.2.1 Discrete trial training (DTT)

According to Wallin (2004):

A discrete trial is a single cycle of a behaviorally-based instruction routine. A

particular trial may be repeated several times in succession, several times a day, over

several days (or even longer) until the skill is mastered. There are four parts, and an

optional fifth, to a discrete trial:

- the *discriminative stimulus* (S^D)-- the instruction or environmental cue to which

  the teacher would like the child to respond

- the *prompting stimulus* (S^P)-- a prompt or cue from the teacher to help the child

  respond correctly (*optional*)

- the *response* (R)-- the skill or behavior that is the target of the instruction, or a

  portion thereof

- the *reinforcing stimulus* (S^R)-- a reward designed to motivate the child to respond

  and respond correctly

- the *inter-trial interval* (^{ITI})-- a brief pause between consecutive trials

Gezzi (2007) provided a similar breakdown, with a chart that demonstrated a trial of DTT including placement of the child and exact responses expected of child and teacher. DTT has often been confused with Applied Behavioral Analysis (ABA) (Lovaas, 1987; Gezzi, 2007; Wallin, 2004). ABA differs in that ABA is a science that uses DTT as part of the program, called the Lovaas method after its creator, Ivar Lovaas .

DTT has a number of advantages and disadvantages for children with autism and teachers and schools alike. Included in the advantages for students is that DTT is predictable, scheduled instruction which matches the students' needs for a predictable, routine environment (Smith, 2001). It also avoided the theory of mind conundrum for students with ASD, as the skill is taught explicitly without the need for environmental cues. DTT begins with simple, concrete instructions which help students with receptive and expressive language difficulties (Wallin, 2004; Birkman & Stephens, 2009; Smith, 2001) However, DTT also has disadvantages in that this predictability can lead to prompt dependence, inability to generalize a skill, and lack of ability to use the skill taught without exact replication of the instructional sequence used, also known as lack of spontaneous skill use even if the situation for which the skill is taught is the same (Smith, 2001; Goldstein, 2002; Ogletree & Oren, 1998). According to the National Standards Report (National Autism Center, 2009), DTT is considered an established practice, which means it is well supported by evidence to be effective. The report also stated practices such as DTT are useful in increasing skills in academics, communication, learning readiness, responsibility, interpersonal, play and self regulation domains; DTT is rated as useful in ages 0-21, and is stated to decrease problem behaviors, restricted repetitive

nonfunctional behaviors, and sensory/emotional regulatory behaviors (National Autism Center, p. 45).

2.2.2 Treatment and education of autistic and related communication handicapped children (TEACCH)

The TEACCH program was initiated in Chapel Hill, North Carolina at the University of North Carolina as a method to include families and professionals in collaboration to educate students with autism. The program began in 1964 and continued to provide clinical support to individuals with ASD throughout the lifespan, and continues to contribute to the field of research as well (Mesibov, & Shea, 2010). The TEACCH program, "aims to improve both social interaction and communication by means of a specially created environment in which the child with Autism can function and through a specially adapted teaching approach" (Tutt, Powell, & Thornton, 2006). The specialized teaching approach the authors referred to included individual work stations for each student and specific areas of the classroom in which each activity occurred. Minimal distractions, visuals for schedules and communication, and frequent assessment with clear understanding of the teacher of what needs to be taught next are all part of the program's practices. Additionally the importance of school and home communication and cooperation is stressed with the parent being seen as the expert who knows the child, and the teacher as the expert in the instruction of the child. Teacher and family work together to support the child's learning and interests and strengths are focused on rather than deficits (Mesibov, & Shea, 2010).

In terms of efficacy, TEACCH is a multi-modal system, and its practices fall across several of the National Standards Report's (National Autism Center, 2009) categories. These include schedules, which were reported to be an established practice for students 3-14, which impacted self-regulation (p. 49). TEACCH's guiding principal is students with ASD are more successful when a structured, scheduled approach is used, and they incorporate schedules throughout the program as a way of reducing anxiety and allowing the individual to know what will happen throughout their day (TEACCH staff, 2010).

TEACCH was listed as an emerging treatment, according to the National Autism Center (2009), as the number of studies on the program's efficacy were limited. This did not allow for enough evidence to meet the higher standard or established. According to the report, the principles of TEACCH , " assume modifications in the environment, materials, and presentation of information can make thinking, learning and understanding easier for people with ASD if they are adapted to individual learning styles of autism and individual learning characteristics" (p. 68). In this section of the report, TEACCH is targeted at communication, higher cognitive functions, interpersonal skills, learning readiness. motor skills, and personal responsibility. The report states that TEACCH is aimed at ages 0-18 (National Autism Center, 2009, p. 68).

2.2.3 Incidental teaching

Incidental teaching is a process through which children initiate a teaching episode by indicating in some way (initiating for a toy, activity, or attention or for older children or more typically developing children, some form of commenting about an item, asking a

question, or showing an accomplishment to the teacher). For children with difficulties in initiating, a teacher may provide more opportunity by using especially attractive toys, may interact with a toy the child has a known preference for, may request a play turn, or may set up the environment so that initiation is required for access (items visible but unreachable, for example). Once an initiation is established, teachers build on this prompting in a level appropriate to the child, for an elaboration on the initiation. For example, teachers may prompt by asking if the student wants the toy to increase language responses. If the child does not respond appropriately, increases in prompts occur until the appropriate response is gained. Once a play session has occurred, the teacher again waits for an initiation to occur to provide an incident for teaching (McGee, Krantz, & McClannahan, 1986; McGee, Morrier, & Daly, 1999; Miranda-Linné & Melin, 1993).

The National Standards Report (National Autism Center, 2009) included incidental teaching as a naturalistic teaching strategy. They rate it as an established practice, and state in increases communication, interpersonal, learning readiness or play (as the trend is applied), for students from 0-9 years of age (p. 48).

2.2.4 Pivotal response training

Pivotal response training, initially conceived by Koegel, O'Dell, and Koegel in 1987, is a combination of discrete trial training and applied behavior analysis (ABA) techniques. According to Koegel and Schreibman (2009), Pivotal Response Training (PRT) is based on the principles of applied behavior analysis (ABA). Clear instructions that are appropriate to the task are provided. The tasks are interspersed with maintenance tasks, or tasks the child is able to complete already. They are child-selected in that the

tasks are things the child is interested in doing, and is followed by a consequence, which is dependent on the response. An example provided would be a child is playing outside, is given an instruction "go put on your red sweater", the child goes and puts on the red sweater, and the consequence is the child is allowed to continue playing outside (Koegel, Schreffirnan, Good, Cerniglia, Murphy, & Koegel, n.d.) .

This practice was listed as "targeting "pivotal" behavioral areas- such as motivation to engage in social communication, self-initiation, self-management, and responsiveness to multiple cues, with the development of these areas having the goals of very wide spread and fluently integrated collateral improvements" (National Autism Center, 2009, p. 49). It is as considered an established practice, and is stated to target ages 3-9 (National Autism Center, 2009).

2.2.5 Verbal response training

Verbal response training is used as a part of Applied Behavior Analysis. This training is based on Skinner's (1957) work on verbal behavior, and is based on the idea of operant conditioning. A child is reinforced by a response from their vocal output through the response of the listener. This follows the concept of the mand or direction provided by the child in verbal form, (Skinner, 1957), and is a direct reaction to what the child utters, i.e., the child says "down" and is put down; the child says "more" and is given more of whatever they have. In other words, the response is the expression of the child (Sundberg & Micheal, 2001).

Another concept Sundberg and Micheal (2001) used from the original Skinner (1957) work was the concept of the tact, which is naming- a child may be able to name

something, but does not use their language to control the environment as they do when using a mand. The same word can be both a mand and a tact, but the use makes the difference. Proponents of verbal behavior training stated that to simply teach the child to name (teaching them tacts) does not mean they have language; using language to manipulate the environment also does not demonstrate increases in language; the ability to use language both to name and manipulate the environment is the true key (Autism Speaks, 2010; Cambridge Center for Behavioral Studies, 2010; Catina, n.d.). Kates-McElrath and Axelrod (2006) summarized the characteristics of verbal behavior training as including the following: Reinforcement and motivation occurring on variable reinforcement schedules, with teacher paired as conditioned reinforcer; naturalistic environment; area for reinforcement is area for work; a 1:1 pairing in a distraction free environment; most-to-least prompting with progressive time delay, with stimulus control transfer trials; use of previously learned vocalizations to elicit new ones; early emphasis on mand training, echoics to establish vocal imitation for use of a mand; use of sign language for alternative communication; and collection of an AM-school based probe for data collection and a PM- home based probe to determine the student's carryover of instruction and generalization.

This trend would fall under the category of naturalistic teaching strategy in the National Standards Report (National Autism Center, 2009), as it uses, "primarily child-directed interactions to teach functional skills in the natural environment" (p. 48). As such, it is considered an established treatment, targeted at interpersonal, communication, learning readiness, and play skills (National Autism Center, 2009).

All of these practices are used in teaching students with ASD in various settings including public schools. Their use has created an impact on the public schools, as districts, families, and those studying and/or promoting the use of one practice over another vie for the limited resources available. Determining what works for what student, in a fair, consistent, and data-supported manner (especially in data relevant to the student in question) is imperative to providing the best outcomes possible.

2.2.6 Effect on instruction in secondary public school classrooms

Impacts of these instructional trends across schools in general have been significant. Families and schools work together, or struggle against one another, in an effort to find the program, method, or practice that best affords their students with the opportunities to succeed. Schools are often concerned with cost-effectiveness and ability of current staff to provide programs requested, while families are concerned with the desire to overcome the limitations ASD impose on their children. Philosophies on learning, marketing by groups aimed at families, and current politics and funding related to schools all plays a part in the programming selected to educate students. The previously listed current trends are supported by scientifically based data collection supported research. However, there is no one-size fits all program or method that works with all students due to the unique nature of ASD themselves. The effects on instruction in the secondary school for all of these trends is there is a divide between what works, what works for a particular student, and the ability of the school and staff to provide the specific instructional trend of choice.

Several of the current trends mentioned involve intensive amounts of intervention, including high staff to student ratios or intensive time and resource commitments from schools. Fombonne (2005) documented that it is unknown if every child with ASD would benefit from intensive intervention. He observed the studies of intensive intervention focused on treating those with more severe Autistic disorder. Whether children with less-severe ASD need or benefit from intensive intervention is not known, and should be studied since most children with ASD are within the less intensive side of the spectrum.

Tincani stated, "despite need, the dynamic nature of public schools complicates the process of selecting and delivering evidence-based instruction to students with ASD (2007, p. 47)." Jacobson and Mulick (2000) discussed the myriad of concerns related to selection of instructional methods. In a research workshop they found the following concerns: (a) systems delivery models and issues (e.g., teacher or therapist training); (b) how best to integrate treatments; (c) providing treatment to those with limited monetary resources; (d) cost and cost/benefit analyses; (e) how to educate adult psychiatrists (as well as other practitioners and personnel) regarding ASD; and (f) gaps between research and practice.

Similar concerns were voiced by Shattuck and Grosse (2007) who evaluated cost factors and determined that it costs, on average, an additional $12,243 per year for each child placed in an autism category to educate for one year. The factors analyzed included the diversity of students with autism, the lack of concrete evidentiary proof of some educational programs, and the need to conclusively identify students as being on the

autism spectrum. Shattuck and Grosse (2007) concluded, "The growing number of children diagnosed with an ASD and the efforts of well-organized advocacy groups have increased pressure on policy makers and service systems to improve and expand diagnostic and treatment services. Such changes face many obstacles..." (p. 134). While a number of policy experiments are under way to improve identification and intervention in real world settings, the ability to generalize conclusions from these experiments is limited by the lack of scientifically rigorous evaluations." These authors demonstrated the myriad of concerns faced by public education in a time of dire financial straits when educating students with autism.

Parental preference in terms of methodology has often been at odds in the courts. However, according to Etscheidt (2003) the selection of methodology has been left up to schools. In the legal proceedings Etscheidt evaluated, schools must show that the Individualized Education Plan (IEP) is based on calculated expectation for benefit using a method that is also reasonably calculated to show benefit. Comparisons to parent selected methods were rejected, as were objections that the parent selected method might yield more benefit than that of the school.

Another concern impacting students and families is the long term effects of selected methodologies, and, in concert, the rejection of others. Every parent has had times they wish they would have done something differently; however, when your child has a significant life pervasive disability, the stakes are magnified. Each methodology claimed its methods superior to others, yet there is no defined method proven to work with all children. Information available to parents is packaged in attractive visuals with

incredible promises. Examples of such include The Autism society of America (http://www.autism-society.org/site/PageServer?pagename=life_treat); Autism treatment center of America (http://www.autismtreatmentcenter.org/) ; Child-Autism-Parent-Café.Com (http://www.child-autism-parent-cafe.com/index.html); Families for Early Autism Treatment (FEAT) (http://www.feat.org/); and a host of others. Typing "Autism treatment" in Google results in about 1,750,000 options in .18 seconds. As a parent, already dealing with the daily concerns of caring for a child with ASD, the array can be overwhelming. Should the family align with a professional, or support group, or other trusted family member that says methodology A is superior, there is often great attachment to methodology A and much in the way of family resources become committed to obtain services in methodology A for their child. Often, a methodology has the backing of science, or the scientific data is uncertain. In this instance, families must choose. The implications ranged from health consequences (Rutter, 2005; Hviid, Stellfeld, Wohlfahrt, & Melbye, 2003) to missing skills, increasing of negative behaviors when students needs are not addressed by instruction, increased negative perceptions of the student by others in the community, and increases in stress on already stressed families.

Students may also face reduction in their future independence because of missing skills. For children with higher functioning autism, lack of some skills may cause incidents with negative situations including personal injury, running afoul of the law, loneliness, and possible depression with is concurrent physical and psychological manifestations. Lee, Simpson, and Shogren (2007), stated, "Many professionals and

parents enthusiastically support and consume unverified or limited-utility interventions due to the mystifying nature of children with autism and the desperate search for mechanisms to restore them to health or to capture what is thought to be unharnessed potential (p. 2)." For students who do not receive adequate and appropriate intervention with verified interventions that meet the needs of the individual, the future would be very limited.

2.3 What is theory of mind?

Theory of mind is a concept that began in the area of psychology and philosophy and was quickly adopted by child developmentalists to explain the ability of the human mind to "imputes mental states to himself and others. A system of inferences of this kind is properly viewed as a theory because such states are not directly observable and the system can be used to make predictions about the behaviour [sic] of others (Premack & Woodruff, 1978, p. 515)." Theory of mind is the ability to understand that others may hold ideas, beliefs, and mental states (Brownlow & O'Dell, 2009). The first study used to determine when children developed a theory of mind was the famous Sally-Anne false belief test (Baron-Cohen, Leslie, & Frith, 1985). In this test two dolls, one with a basket and one with a box, are presented to the child. The first doll is removed. The item in the first dolls basket is placed in the box. The first doll is then returned, and the child is asked where the doll would look for the item. For children with a theory of mind the answer is in the basket, as the child understands the idea others can have different knowledge, ideas, and thoughts than they have.

2.3.1 Development of TOM in neurotypical children.

Children with ASD do not develop a theory of mind in the same way typically developing children or even children with other differences do. Most children develop a theory of mind between the ages of three of five; the skills connected with theory of mind include peer social status (Watson, Nixon, Wilson, & Capage, 1999; Brown, Donelan-McCall, & Dunn, 1996), joint planning in pretend play (Astington & Jenkins, 1995) and sensitivity to teacher criticism (Cutting & Dunn, 2002). Language-based understandings such as idioms required children to be 6 or 7, and these children were only able to understand normally decomposable idioms. Normally decomposable idioms are expressions having portions that are applicable literally, as "lay down the law" More complex idioms, where parts of the phrase were metaphors or where the phrase could not be understood except as a whole were above these children's abilities to comprehend (Caillies & Le Sourn-Bissaoui, 2008).

According to Flynn (2006), language development is critical to theory of mind development. Theory of mind progresses from desires, knowledge and beliefs with the understanding of false beliefs coming after beliefs, and the understanding of lack of knowledge came before false belief (Flynn, 2006). This demonstrated why it is difficult for children to understand more complex idioms at younger ages.

Theory of mind has been called mindreading (Baron-Cohen, 1995), and the Intentional stance (Dennett, 1989). Using theory of mind, we decide the communicative intent of individuals through their body language, position, and actions that may or may not accompany discourse. We apply intentionality to things such as gesture, expression,

and prior knowledge to determine how we will respond to others. As Baron-Cohen (1995) said, " In the heat of a social situation, it pays to be able to come up with a sensible interpretation of the causes of actions quickly if one is to survive to socialize for another day (p. 4)". When children are developing their theory of mind, they learn through observation the behaviors of others. As they mature, and their language increases, they are able to apply intentionality to behavior through the use of their prior knowledge (when I cried because you took the truck, you hit me with it), and respond appropriately (I will not cry, I will grab it back, both to avoid getting hit and to regain possession of the truck). A behaviorist could try to explain it through a reinforcement schedule (the behavior is changed due to a lack of satisfaction in the result), or through routine scripting; however, neither works to explain the change in social reaction (see Baron-Cohen, 1995, p. 4 for a similar explanation). The ability to understand and react appropriately requires the ability to apply intentional states, feelings, and desires to others. This ability is theory of mind.

2.3.2 Children with ASD and TOM

Children with ASD develop language in different ways from each other and from neurotypical children. Higher functioning children with Autism are often hyperlexic, that is, have an extensive vocabulary without comprehension of what many of the words they use actually mean. Newman, Macomber, Naples, Babitz, Volkmar, and Grigorenko (2007) evaluated children with ASD and hyperlexia, and found their ability to word call did not match their abilities in comprehension, as did Gira (2010), Gately (2008), and Nation, Clarke, Wright, and Williams (2006). This hyperlexia often causes other

individuals to assume a higher level of comprehension to individuals with Autism then

they actually possess. It makes it difficult to understand why the individuals might have

difficulties communicating and interacting with others. Much of this relates to both

language development (increased word calling not related to comprehension) and theory

of mind development (inability to assign intentionality, desires, or feelings other than

those experienced by themselves).

> To better illustrate theory of mind, Hobson (1993b) explained his theory as,
>
> "What does it mean to have the human form of social life? Clearly it means more
>
> than to have the structures of group organization that are manifest in the societies
>
> of animals such as bees or wolves. One way to describe the situation is to say that
>
> adult human beings are social by virtue of their status as persons who conceive
>
> themselves and others to be persons with special properties and special value.
>
> Amongst the most important of these properties are those connected with the fact
>
> that people understand each other to have 'minds' (p. 227).

He further stated that to understand human social understanding, we have to begin with

emotional communication at the forefront of our considerations (Hobson, 1993b). This

was illustrated in the example of the false belief test (Baron-Cohen, Leslie, & Frith,

1985), and in the example of applying intentionality discussed in the previous section.

Without a theory of mind, one could not state there might be another understanding by

someone else, or that someone else intended to deceive us by their actions. This is what

children with ASD face, to varying degrees, on a daily basis. They cannot understand the

intentions or ideation of others. Hobson (1990) also claimed that children with ASD

difficulties with roles in conversation results from the inability of the child with ASD to understand the common experiences between the self and others and differences in others perspectives and attitudes.

Happe' (1995) reviewed the data of studies done at the MRC Cognitive Development Unit and determined children with ASD required a high level of verbal ability in order pass false belief tests. She determined these children had to be significantly older than typical children to pass a false belief test. Typical children passed the test between 4 and 5 years of age, while those with ASD were between 10 and 11 years of age to pass the same test (Happe', 1995).

Temple Grandin, an author and an individual with ASD has succeeded in the neurotypical world and has written about social understandings. She stated, "Fitting into society in ways that foster positive social interaction is a series of doors, each with a key of its own (Grandin & Barron, 2005 p. 378)". She further elaborated that there is no magic key, but through experience and teaching, individuals with ASD can begin to learn to interact appropriately in social situations. Her way of assessing social situations, she wrote, was to access a series of pictures in her head, pictures of positive and negative social situations learned over time, and matching the appropriate picture to the situation in which she finds herself (Grandin & Barron, 2005). Individuals without ASD are able to apply a mental state to others (i.e., they feel, they believe, they think) to explain their actions, and then to select our response.

Since children with ASD do not develop their ability to apply a theory of mind at the same rate or in the same way as neurotypically developed children, the impact limits

them in several ways. First and foremost, children with ASD do not interact in the same ways other children do socially. They seem unable to interact in the socio-emotional events of a typical day, often pulling away from individuals or groups to play alone. Their inability to assign mental states to others also limits imagination, and they cannot apply imaginative thoughts or ideas to inanimate objects such as cars, stuffed animals, etc.. This results in limited, stereotypical play that is often solitary. Hobson, Lee, and Hobson (2009) discussed the nature of the inability of the individual with autism to perceive something-as-something else, the disconnecting of what an object is versus what it could be, and the individual with autism often does not have this insight (Lillard, 1993; Jarrold, 2003; Leslie, 1987).

2.3.3 Lack of TOM and the "typical" child with ASD

Just as every neurotypically developing child is an individual, so are children with ASD. Children with ASD do have some common characteristics, including difficulty with theory of mind in the "typical" child with ASD. The impacts of the lack of a developed theory of mind on the "typical" child with ASD are multiple. For this child, understanding of the individuals around him will be a mystery. Connecting with others will be difficult except on the child's terms; in other words, to connect you must enter his world. It will be up to the play partner or communication partner to initiate with the child, except for needs the child will express. In Wolfberg's (1999) work, children with ASD were paired with typical children in a playgroup. The children were observed for two months, and then Wolfberg began training the typical children to notice and extend efforts to include the children with ASD in their play. Throughout the work, the typical

children have difficulty including the children with ASD. Wolfberg noted the children with ASD do not know how to engage the typical children. Without the ability to assign meaning, desires, emotions, and knowledge to their peers' behavior, the children with ASD do not know how to enter a play scenario, and cannot sustain play unless given overt instruction in what to do next. The typical children did not have this difficulty; however, they did not understand that the children with ASD could not continue without direct instruction, until Wolfberg directed the adults how to bring them into the play.

Over time, something of a TOM may develop, but complications with other areas will overlap. Most children on the spectrum will have a difficult time initiating, maintaining, and developing relationships with others, communicating with others in an other than needs-based (and from the individual with ASD's view) way. This will limit the social interactions and social relationships of the child with any form of this difference. It leads to an world driven solely by the person with ASD themselves, as others needs cannot be a priority, as the child (adolescent, or adult) does not understand others have needs, except that they might have exactly his needs, and the geocentricism often seen in infants perpetuates in the typical child with ASD. This child will be able to be taught routines, including play routines; the child may also learn to "wait" as others needs are put before his by caregivers and teachers; however, the prioritizing of those needs will not be able to be understood, as the child without a TOM cannot mentally project that another would have different, or more pressing, needs than his. Pretend play will be difficult, as for the child on the spectrum and without a TOM, each thing is a thing unto itself, and nothing can represent something else. For this child, pictures of

items are not items; in a picture based communication system, a picture of a favorite toy is a way to get to that toy, but does not represent the toy.

2.3.4 TOM and the child with high functioning ASD (HFASD)

For the child with ASD who is also in the high average or above average range in IQ score the lack of TOM means something much more important. These students are often very aware others are not thinking, feeling, or may not have the same knowledge as they do. However, they are often unable to determine what the other person's state of mind is. Frequently, the child with ASD acts on their thoughts/understandings, and finds themselves a social pariah, or corrected by others. Luke Jackson, a young man with HFASD, wrote, "I am a loner, and don't mind at all that I am on my own, But it is nice to have a friend too. If you do have one, then try hard to keep them. I have spent years never talking to anyone...(2002, p. 40).

In determining what went wrong in a situation, a person with an established TOM can consider the feelings, thoughts, or knowledge of others, but unless this is made known to the child with ASD, it is a circuitous route that may or may not lead to an understanding of what went wrong. In adolescence this is particularly disturbing, the child with ASD "just doesn't get" his peers behaviors. Why is it OK to talk about a subject with one group and not another? Why are rules, important at home and at school, ok to break when with peers, but not ok to break (or divulge breaking of) when with parents or teachers? It can be very confusing and frustrating. Social isolation, depression, acting out, and self-abuse can be one result. Incarceration, school suspension, loss of employment, and lost opportunities for success can be other results of

not understanding how others think. This lack of understanding can be called the hidden curriculum (Myles, Trautman, & Schelvan, 2004). "Social intuition is the lifeline that saves most of us on a daily basis from an array of potentially disastrous social situations. It also helps us navigate situations that could be physically or mentally harmful (p.3)".

Several authors (Prince-Hughes, 2002; Williams, 1992, 2004; Mukhopadhyay, 2000) have written about these consequences of not understanding the mental states of others. Uta Frith, well known as a researcher and author, and the first to translate the work of Hans Asperger, discussed what it means to be a person with autism and, as she called it, a lack of mentalizing:

> There is no getting round the fact that there are costs associated with educational treatments of individuals with neurological conditions. ...The costs I wish to highlight are cognitive costs to be contributed by the individual ...Imagine having to figure out consciously what another person might think, know, and believe as you are talking to them! The effort involved is considerable, and means there is no spare capacity to deal with sudden stress. The whole edifice of learned social rules can break down if something out of the ordinary happens (Frith, 2003, p.222)

In addition to the cognitive energy a person with autism must extend (and it would be continuous to "remain" in the neurotypical world) to connect with others, the person with Autism must face a world that makes assumptions based on its theory of mind. Often, if a peer knows another has ASD, there are stereotypes the general population has about people on the spectrum, from the aloof savant to the aggressive,

spinning individual with severe cognitive impairments. Neither of these is the portrait of everyone with an ASD, but preconceived notions may cause individuals to expect either from an individual with ASD. This can make it difficult to interact, challenging the social norms you have been trained to expect. If the peer does not know about ASD, the person with an ASD can appear strange in the way they interact, speak, move, or dress; the person who does not have a theory of mind does not understand what others believe to be appropriate ways of doing any of the above.

Another example cites how not understanding the TOM of another can be devastating for more than the person with HFASD:

> I just found out that one of my few friends ever in my life, didn't stop talking to me because she just had been using me for my money and help, but because she was cutting off contact with everyone, before taking her life on the 29th of September, last year. I feel ashamed of having thought that she used me when she really was just doing so poorly - I knew how badly she was doing, yet I allowed my cynicism to conjure up untrue things about her, just because it "added up" to being "possible". I have recently started thinking that cynicism is the way to go in life, but here is proof that I was wrong. Rest in peace, Christèle. I know you are in a better place, now, and I refuse to believe anything else but that you soon will get the happiness you deserve. ...Reading her old SMS'es to me feels so weird, now. :/ (Velociraptor, 2011).

This passage illustrates the difficulties being unable to "read the mind" of others can create in the life of a person with HFASD.

Buron (2007) created a book to help individuals with the inability to understand this form of communication. He created a five level emotional system to help individuals recognize their own behaviors, and also a five level system to help them understand social communication and rules of others. Buron told individuals with social communication deficits (deficits in theory of mind) that their behaviors may be considered rude, or could actually be considered a crime. An example he gives is when a young child looking too long it is staring (and rude) but an adolescent may be considered leering and could be in serious trouble, including with the law if the person they are looking at feels threatened.

Another area in which a lack of a theory of mind impacts individuals with HFASD throughout the lifespan is in communicating with others in conversation. Conversation includes speaking, but relies on body language to present to the speaker that the listener is listening and interested, or as Byers (1977) called it, "multiple levels of behavioral and biological synchronicity (p. 138)". People with HFASD have difficulty remaining in conversations in a sustained and meaningful way, and often lecture or pontificate on a subject long after the listener has disengaged (Tager-Flusberg, 1992, 1996, 1999).

In summary, because of the difficulties imposed by the lack of TOM, individuals with HFASD suffer throughout the lifespan. As children they are reprimanded, lack friends, and are often isolated. As adolescents, they are ridiculed, made the focus of practical jokes, and can find themselves afoul of the law, or physically and/or emotionally hurt. As adults, their pedantic speeches on topics of their interests again

isolate them. TOM is far reaching as it impacts social, emotional, and physical well being of individuals who have difficulty with it.

2.3.5 Non-verbal communication, TOM, and reading.

Non-verbal communication plays a significant role in our everyday communication, including determining what others may or may not think, feel, know, or want. According to Wood (2011), non-verbal communication included paralanguage (vocal qualities), kinesics (movement of face and body), haptics (touch), physical appearance, proxemics (space), environmental factors, olfactics (smell), chronemics (perception and use of time), artifacts, and silence. Individuals with ASD, as demonstrated previously, have difficulty with all of these, varying in intensity for each in individuals (based on the defining characteristics of the diagnosis of ASD). This lack of understanding of non-verbal language, and difficulties described with verbal language directly impacts theory of mind- if you do not understand what is said, and what is not said, understanding another's ideas, feelings, beliefs, or viewpoints would be impossible. Since non-verbal language is often employed in literature (i.e., proxemics indicating relationships, appearance demonstrated through literary description), students with ASD are unable to use non-verbal language to assist in understanding what they read. Smith, Montagne, Perrett, Gill, and Gallagher (2010), "the participants with ASD were less accurate than controls at recognising [sic] emotional expressions of anger, disgust and surprise at low intensities as compared to controls (p. 2780). Other authors have stated similarly that individuals with ASD have difficulty with emotions such as shame and embarrassment (Heerey, Keltner, & Capps, 2003). Proxemics and kinesics have also been

stated to be problematic to those with ASD, and Pernon, Pry, and Baghdadli (2007) demonstrated, "that some perceptions may trigger strong emotional reactions in many cases. The mechanism controlling their affect does not function properly; the emotional 'thermostat' is too sensitive, and its sensitivity threshold is too low (p 580)." Not coping well with, or understanding appropriately, the non-verbal communication of others simply serves to further restrict the comprehensive abilities of the individual with ASD; therefore, additional ways to comprehend are essential to assist these students in understanding what they read, and how others are communicating.

CHAPTER 3

Methodology

In Chapter 2 the literature relevant to this study was discussed, including best practices for instructing students with ASD to read. In this chapter, the methodological considerations will be considered. Additionally, the research paradigm, design, and participants will be reviewed. Concerns related to the study are included in this chapter such as credibility, transferability, confirmability, and ethics will be considered and demonstrated.

The selection of a comparative multiple–case study design was utilized in order to present the perspectives of the individuals rather than those of the author, as in Campbell and Ahrens (1998). As they stated, "A case study involves collecting in-depth observations in a limited number of cases-to focus on fewer "subjects" but more "variables" within each subject (p. 541)." In this study, a combination of observation and interview was used to obtain information, as well as a review of educational records of each participant.

3.1 Research paradigm

This study was designed to examine the reading comprehension strategies of students with ASD. Specifically, it was designed to determine (a) what strategies students used (Kozminsky & Kozminsky, 2001), (b) what strategies they were aware of (Marcell, DeCleen, & Juettner, 2010), and for what purposes students read (Irwin, 1991). Knowing what strategies students were aware of might allow for provision of additional instruction in strategies to support increased comprehension. Knowing what strategies students were

aware of would enable teachers to connect their current knowledge with knowledge they had some, but not all, of the information to use. Knowing what purposes students read would allow for expansion of their understanding of the purposes for reading different types of text. This would therefore expand their abilities to comprehend in a wider range of literature.

The use of a qualitative research design for this study was determined to be the best approach for several reasons. Qualitative researchers are able to "approach the inherent complexity of social interaction and to do justice to that complexity, to respect it in its own right" (Glesne & Peshkin , 1992, p. 7). Bernard stated, "For social scientist whose work is in the humanistic, phenomenological tradition, quantification is inappropriate (p. 21). Based on these concepts, it was determined that qualitative research was the best way to demonstrate the complexity of the issue of reading comprehension in students with ASD. The use of a qualitative research design allowed illustration of the difficulties experienced by students with ASD in reading comprehension and the value of increasing comprehension skills for said individuals.

Since an understanding of the phenomenon of reading comprehension in the subjects of the study was the goal, a qualitative approach was deemed most effective, as also supported by the work of Reid, Robinson, and Bunsen (1995). They noted the information obtained directly through students and families, using qualitative methods, brought "a new dimension to our understanding of the impact and implications of our interventions in special education" (p. 134). Expanding the understanding of

interventions provided during this study was crucial in knowing the benefit experienced by the students.

3.2 Social constructivist perspective

From a methodological perspective, this study was based on a social-constructivist perspective, "the focus here is not on the meaning-making activity of the individual mind but on the collective generation of meaning as shaped by conventions of language and other social processes" (Schwandt, 1998, p. 221). This perspective was selected due to (a) the social understandings (theory of mind)(Hobson, 1993a) needed to fully comprehend what is read, and (b), the perspective of the investigators that knowledge must be built on prior knowledge, as demonstrated by the determination of the strategies and knowledge the students had prior to providing instruction.

3.3 Research design

The qualitative research design chosen for this study was the ethnographic case study method. An ethnography was selected as it, "places researchers in the midst of whatever it is they study" (Berg, 1998, p. 120), and a case study method because, "Case study methods involve systematically gathering enough information about a particular person, social setting, or group to permit the researcher to effectively understand how it operates or functions" (Berg, 1998, p. 212). The combining of these models allows for a more complete picture of what is happening, and for collection of the types of data that may support each other in determining influences on success or failure. The use of a case study is appropriate when the following applies: (a) The intent is to describe or explain why changes are happening in real-life interventions over time; (b) the aim is not focused

on control of multiple variables; and (c) multiple perspectives and sources of information

will be used to document changes and answer questions (Yin, 1984). All of the above

applied in this situation; therefore the case study was selected.

Ethnography utilized the case study as one of its primary methods of study and

uses three different kinds of data, interviews, observation, and documents (Genzuk,

2003). The determination of strategy use, purpose for reading, and strategy awareness

was better supported through the use of three different types of data to support conclusion

drawn. Ethnography, "generates new analytic insights by engaging in interactive, team

exploration of often subtle arenas of human difference and similarity"

(Genzuk, 2003, p. 1). By using an ethnographic approach, interaction with the subjects in

the study provided the opportunity to evaluate the comprehension of students for whom

subtleties of language is a challenge. The student participants in the study are discussed

in the next section.

3.4 The participants

The participants were middle school age males with a diagnosis of ASD. The

students were selected based on the following criteria: (a) each had a demonstrated

(educational and medical) diagnosis of ASD, (b) each were considered high functioning

based on IQ scores and (c) each had difficulty in reading comprehension at grade level

based on school- based testing. The students were referred to as Eric, Dustin, and

Richard.

Eric was 14 years old at the time of the study. He was the oldest of three children.

His family consisted of his mother, father, and two brothers. Eric's parents were both

college educated; both parents worked. Both parents thought the father might also have an ASD and were pursuing a diagnosis. One brother was diagnosed with a learning disability and attention deficit disorder. His parents were married to each other and were dedicated to their children's education. His other brother was part of the gifted program at the same school Eric attended, but was often out of school for fighting. Eric attended a school of approximately 600 students and 35 teachers, which included grades 6, 7, and 8.

The school was located in a small town in a northern state. Initially, Eric was diagnosed with learning disabilities in the area of reading and math. He was then transferred to the Intensive Resource program and a diagnosis of ASD was determined. He received special education services in a self-contained classroom. Eric ate lunch in the special education classroom, as the noise in the cafeteria was overwhelming per his report.

Dustin was 14 at the time of the study. He was the older of two children. He lived with both parents; his mother holds a college degree, and his father graduated from trade school. Both parents were employed outside of the home. Dustin was the only person with a disability in the home. Diagnosed with autism at the age of 3, in second grade his diagnosis was changed to Asperger's syndrome. He was provided with special education services throughout his school years, and attended general education for classes for drama, study hall, band, science, and social studies. For reading and math he attended a special education program. He also received tutoring once a week after school in math and had a support person in general education.

Richard was 14, the oldest of four children living with their mother and father. Richard's mother and father both worked outside of the home. His father had some college education, and his mother had post-secondary training as a secretary. No other member of the family had any disability label. His family was of Hispanic descent, and they believed in a traditional, father-led home. Richard was diagnosed at the age of 3 with autism and was provided with special education services in a number of schools. He was included in general education for ROTC, science, history, and gym. For English, math, and social skills he was part of a self-contained special education class. Richard attended lunch with the rest of the school but isolated himself as often as the lunch aides would allow; however, they were tasked with seating him with lunch friends at least three days a week.

All three of the participants selected were males of the same age, of multi-child families in which each was the first in birth order. Each had both parents in the home, and in each instance both parents worked outside of the home. Each student's family consisted of at least one parent with some college education. All three came from middle class backgrounds. These similarities in familial conditions demonstrate the students' homogeneous nature in terms of background, which helps control for influence such as poverty, children of single parents, and other socio-economic factors that might exert influence on the students' performance. In each instance, the student in the study was the only person in the immediate family diagnosed with ASD; however, in Eric's case, his father was being considered at the time of the study, and was later diagnosed with ASD as well.

3.5 Selection of the case

The focus of the study was to examine the reading comprehension strategies of students with ASD. Students selected had diagnosis of ASD; all were male to control for possible differences resulting from gender. All students selected were also diagnosed with difficulties in reading comprehension, but did not have difficulties in reading words or fluency. Participants were selected because they had normal or above normal IQ scores on standard measures of intelligence. Finally, all the students selected for the study were enrolled in a special education reading class and had Individualized Education Plans (IEPs). This meant their instructional materials could be selected based on their instructional needs, not a predetermined, required curriculum.

3.6 Entry and reciprocity

Consideration was given to selection of the site for the study. One of the factors in this consideration was the location of the students in order to gain access to them for testing and instruction. Another factor was the support of the school districts involved and the families. The researcher was the teacher of the classroom in which two of the students were enrolled; one student came from another school and district. The introduction of the No Child Left Behind Act (2001) also motivated the school districts and researchers to enroll the students in the project to improve their potential scores in state and federally mandated test scores.

To obtain consent to conduct the study, it was necessary to gain permission of the (a) school district, (b) school principal, (c) parents, and (d) students involved. Permission from the school district and principal required securing approval from the Department of

Research and Accountability of the school districts involved, by providing (a) a completed internal application to conduct research, (b) evidence of University Internal Review Board support (University of Alaska Fairbanks Institutional Review Board assurance number 01-64), and (c) parent and student permission forms (see Appendices B and C). The parent(s) and students in the study completed signed permission forms consenting to their participation in the study. All parent(s) and students were informed of the purpose and procedures of the ethnographic case study methodology, and written permission was obtained from both parent(s) and student.

Reciprocity, or "responding to communities in a way that goes back and forth" (Dance, Gutiérrez, & Hermes, 2010, p. 332) is important in ethnographic social constructivist research as, "... the goal is not just to document respondents' perspectives and practices, but to also use research collaboratively as a means to help respondents understand and make changes to their environments" (Dance, Gutiérrez, & Hermes, 2010, p. 332.). Reciprocity in this case took the form of advancing students and parents understanding of their reading comprehension skills set, and advancing student knowledge of new skills. In terms of the school district, reciprocity consisted of provision of detailed reports of student progress and opportunities to increase student testing scores.

Since the investigator was previously involved in the instruction and assessment of the students in the study, the data collected were used to further support additional instruction, assessment, and learning activities for the students. As well, families were invited to question and consult with the investigators as to the results of assessments and

instruction, and reports were submitted to families concerning which strategies their students were using, and results of assessments were shared as well.

After data collection, the investigator met with parents and students to discuss finding and make suggestions based on specific parental and student concerns. At the request of one family, further recommendations for their student's future reading success was provided. To protect confidentiality of the other participants, however, each family was met with individually, and names of other participants were not used, nor were comparisons of student scores to other participants provided.

3.7 Data collection

3.7.1 Instrument

The Qualitative Reading Inventory, Third Edition (QRI-III) (2000) was administered by the investigator most familiar with the student to determine base line results, and a second administration was conducted to determine any resulting improvement in reading comprehension. A record review was conducted prior to selection of the students for the study to determine that the scores of the students were similar, and that they met the criteria for selection. The QRI-III (2000) was selected because it was designed as an informal inventory of reading skills and abilities; its design was well suited for administration to students quickly and efficiently; and the availability of several different stories in each grade level allowed for resting without the confounding of retesting a student in a fairly short period of time with the same test. With its multiple story per grade level format, this assessment provided opportunity to find a selection that was engaging in its topic to the student as well. Additionally the test

allowed for evaluation of students' comprehension in the area of expository and narrative text.

3.8 The Qualitative Reading Inventory III (3rd Ed.) (QRI-III) (Leslie, & Caldwell, 2000)

The Qualitative Reading Inventory (QRI) (3rd edition) (QRI-III) (Leslie, & Caldwell, 2000) was designed to be administered by classroom teachers or others with minimal training unlike many other testing products. It consists of passages that are written based on grade level. The passages have questions that determine the student's prior knowledge about a subject, their comprehension of the passage, and their ability to predict based on what they already know. For all grade levels, a miscue analysis is conducted as part of the test. Each grade level comes with multiple stories so test-retest confounding is limited, and students can demonstrate (in the passages intended for the higher ability levels) their understanding of a variety of topics, to help in the avoidance of bias because of lack of exposure to a particular subject matter. The stories are written on a variety of topics and include literature, science, and social studies topics to include many different cultural references. This helps avoid cultural bias as well.

This assessment also provides opportunity for the student to utilize look-backs (a chance to look back at what was read) and think- alouds, where the student is encouraged to use thinking and speaking aloud to determine answers they may have difficulty recalling. The look backs allow the examiner to know that the student comprehended the text when read, but just had difficulty recalling a specific answer. By demonstrating the ability to return to the area of the text where the answer is located, the student

demonstrates they understood what was read at the time it was read. It differentiates between memory and comprehension. The think- alouds are offered at the high school level of the assessment, and allow the examiner to determine how the student is processing as they read. Based on the quality of the information the student provides by the think-aloud process, the examiner can know which comprehension strategy the student is employing.

At each level, the QRI-III (Leslie, & Caldwell, 2000) has expository and narrative passages to support and determine student strengths. This informal assessment evaluates the student's abilities in fluency, word identification (a word list that becomes increasingly more difficult to determine simply through phonetic understanding is part of the examination), and reading comprehension. Comprehension is evaluated on factual material, and also on inferential material as is appropriate to the grade level or age of the student being tested. One drawback of this version of the test is that middle school and high school reading levels are not differentiated into grade levels; however, since reading instruction is not provided at most middle or high schools, the progressively more difficult passages give a good knowledge of ability level for most students. Through this assessment it is possible to create running records that demonstrate over time increases in fluency, and increases in students' word identification abilities as well. Through the running record included with this exam, it is possible to deter mine *how* students are interpreting what they read, based on the errors they make, the self corrections they make, words they skip, and how they progress through each passage. Finally, questions

asked after the reading passage is read are both implicit and explicit allowing the evaluator to consider the students' levels of understanding of the reading passage.

3.8.1 Understanding the levels of the QRI-III (Leslie, & Caldwell, 2000).

The QRI-III (Leslie, & Caldwell, 2000) was developed to allow the examiner to place the student in one of three levels of ability for each passage read. These are Independent, Instructional, and Frustration, and are determined by numerical score. The manual explained the levels as being the level at which the student can read successfully without assistance, with fluency, and free from finger pointing or signs of stress. Accuracy in word reading should be 96% or higher to be scored as independent, and comprehension should result in a score of 90% or higher (Leslie, & Caldwell, 2000).

The Instructional level is where the student will need assistance from the instructor to read the passage, including help with unfamiliar concepts. The student should read with rhythm and expression and not demonstrate undue stress while reading. Miscue analysis should result in 95% accuracy when counting non-meaning changing errors or substitutions. Questions should be answered at a rate of 70% accuracy or better to be considered at the student's instructional level (Leslie, & Caldwell, 2000).

Frustration level passages will be demonstrated by the student's inability to read the material with accuracy, fluency, or comprehension. The student demonstrates stress while attempting these passages, and accuracy in single word identification is less than 90%, with a post reading question answering ability at less than 70% (Leslie, & Caldwell, 2000).

Previous testing administered to the students was reviewed from the student's

special education file. Student scores on the Woodcock Johnson Tests of

Achievement-III (Woodcock, Mather, & McGrew, 2001) were compared. This data was

reviewed to determine (a) that students in the study met the requirement of the study that

they were not at expected level of ability in reading comprehension and (b) because

collection of data of a historical nature, "provides access to a broader understanding of

human behavior" (Berg, 1998, p. 199). By reviewing the past scores, it was possible to

determine if reading comprehension scores demonstrated at approximately what point in

their school careers the students began to have difficulty with reading and reading

comprehension.

3.9 Procedure

The students were administered the QRI-III (Leslie, & Caldwell, 2000) in an

individual situation. This is the normal configuration for administering the exam to a

typical student, according to the instructions. It was the first time the students had been

given this assessment. Each student was asked to read a word list that increased with

difficulty as they went down the list. The list, provided as part of the QRI-III's (Leslie,

and Caldwell, 2000) testing materials, is divided on the examiner's copy into grade level

equivalents to allow for matching to possible starting points in testing additional

components of reading. The students read until the end of each list, and then a quick

numerical score determined. Based on the score of the list read (independent,

instructional, or frustration) the students were stopped or were asked to continue reading.

Based on the highest grade level of independent scoring on the word list, and the

estimation on reading level on the student's individual education plan, a passage was selected for reading that was expected to be successful in fluency, rate, and comprehension.

Initial success was desired to increase the student's willingness to participate in the test. As the students read, a running record of their miscues was kept, and dependent on the test level, questions were asked prior to the reading to determine students' prior knowledge of the subject matter of the readings. The students were also asked to predict what they thought the stories were about. Finally, the students were asked questions to determine their comprehension of what they had read.

Passages were then selected at the next level to continue until the student was no longer able to pass the evaluation at the independent level. The test was stopped when the students reached instructional level overall to prevent loss of interest in the project. As well, these students were very aware that they were not at grade level in their abilities, and reading often frustrated them. Therefore, this was project was offered to the students as a way to help them use what they already knew to get better at what was difficult for them.

Testing was completed in the special education classroom, where other students were working with paraprofessionals and teachers in one to one settings and small groups. This provided more normalization for the testing, as this was the setting the students were used to working in during this period of time. Two of the three students expressed their comfort in the special education classroom rather than the regular

education English class, "because we aren't dummies here (personal communication from Eric).

Once testing was completed, and results examined, three strategies were selected for instruction. The students were instructed for a period of 45 minutes, for an average of five periods a week, for seven months (two semesters). As the students demonstrated success in using the strategies on a consistent basis (as evidenced by their independent use of the strategy in an appropriate manner during in class reading), another strategy was introduced. At the conclusion of instruction in the three strategies the students were retested using the QRI-III to determine if there was an additional gain in skill overall.

The strategies taught were selected because they were based on what the students already knew how to do (imagery, think in picture form); because the students were required to have the skill for the state-mandated tests (story grammar); and because the students could use what they already knew (the first two strategies) to learn and use the third, summarizing. This skill was also required of students taking state mandated tests. All three strategies supported a social constructivist paradigm, as students made meaning in a small group (social) setting, building on prior knowledge and each other's knowledge (constructivism). The strategies were taught using a combination of naturalistic teaching, pivotal response training, and verbal response training. The National Autism Center (2009) has stated these are among the most effective for teaching children with ASD. These were also methods that had proven effective for these particular students in the past.

Information from informal interview was collected during testing, and during class work and instruction. A series of anecdotal notes, short personal journals of the researcher, and notes for the progress reports of the students were used to collect student opinions, thoughts, and ideas. Additionally, notes from other teachers provided notes of progress noted. Finally, information from paraprofessionals supporting the students was noted in the results as the students used the strategies in the English/reading and social studies classes. These types of notes are field notes, and are the way ethnographers make permanent what can easily disappear- comments, actions, activities, and events (Bernard, 2000).

3.10 Establishing and maintaining rapport

All students taking part in the study were familiar with the investigator administering the QRI III (Leslie, & Caldwell, 2000), and two were familiar with the investigator as instructor. Usual classroom practices were adhered to supporting the students' needs for familiarity in routine. The administration of the testing, instruction in the methods, and administration of the second testing were provided in a predictable manner so students knew what was occurring that day, and the next. Observations, notes, and other data collected were familiar to the students as practices conducted as part of normal classroom procedures, so students felt at ease in the setting.

Permission was sought from each participant on a one-to-one basis, and the project explained so they could understand what they would be asked to do. As well, students were encouraged to ask questions, and given opportunity to withdraw at any time without penalty.

3.11 Data sources

Naturalistic observation techniques were employed by using participant observation strategy. Since reading comprehension was the subject of this investigation, it was necessary to determine how the students read; what they perceived about reading in general; and how they applied the skills they had to understand what was being read. Therefore, participating in a reading class with the students provided ample opportunity to observe students reading and engaging in conversations about print that informed the research.

As the participant observer, it was necessary to ensure the researcher had an *Insider* perspective, that is, students, staff, and family felt the researcher was part of the educational team in order to ensure trust. In an educational setting, adolescents with ASD have already faced many times when they did not feel supported due to their inability to comprehend theory of mind in others (see previous discussion of theory of mind). By being an inherent part of the classroom in which the student already had a routine, knew the researcher, and understood the practices of instruction commonly engaged in within the classroom, there was a greater chance of obtaining authentic data. Both Richard and Eric repeatedly expressed their comfort level in the special education classroom, because they did not have to worry about knowing how others felt about them, that they were accepted as they were (personal communication). This lends to credibility of the research as well (Reid, Robinson, & Bunsen, 1995).

Due to the characteristics of students diagnosed with ASD, it was necessary to use caution in interpretation of what was stated by the students in the study. Students

with ASD, due to the nature of their language impairments, often sound as though they have a better command of their reading than they actually do (Nation, Clarke, Wright, & Williams, 2006; Gira, 2010). By being in a position of familiarity with the student, it was possible to evaluate the student's non-verbal signs as well as those communicated verbally that indicated comprehension.

3.11.1 Testing data

Pre- and post test data were collected using the QRI-III (Leslie, & Caldwell, 2000). These scores were divided into word calling abilities, and scores in comprehension. This division illustrated the students dichotomous scores in word reading, and their ability to understand when reading text (Gira, 2010; Gately, 2008; Frith, 2003) .

3.11.2 Interview

Students were interviewed to determine their stated knowledge of reading comprehension strategies, and what they did to help them when reading. Two of the students completed extensive writings or drawings concerning their feelings about academics and school. Using artifacts and informal interviews with students with developmental delays allows the students to maintain a sense of control over their responses, so they are more forthcoming than if they have to give a particular answer. In conversational settings the students were more able to think about what they wanted to say, and were able to express themselves in a more relaxed manner. Sullivan (2002) stated, "In the classroom, teachers by the very nature of their position have power-over students and are left to decide how they use or exert their power" (para. 4). By using an

informal, conversational style students are not subjugated, but become equal participants

in the conversation.

3.11.3 School record review

Student records were reviewed, and their scores on tests of reading were

compared prior to including the students in the study. Specifically, the scores on the

Woodcock Johnson-III (Woodcock, Mather, & McGrew, 2001) were evaluated, and also

general intelligence scores were examined. Yin (1984) cites the use of documents as a

source of data to triangulate with other data in support of the research questions. This

data also ensured the student met the considerations for inclusion in the study.

3.12 Data analysis

Data was divided into smaller subcategories, and then compared to allow

decisions in instruction to be made. As well, it ensures the theory is grounded in the data

(Rubin & Rubin, 2005). According to Lincoln and Guba (1985) the following reflected

the assumptions of a qualitative study: (a) confirmability, (b) credibility,

(c) transferability, and (d) dependability. These qualities demonstrate the value of the

study, or its rigor as related to the qualities of quantitative rigor. These assumptions must

be valid for the qualitative work to have value. Kinchloe and McLaren (1998) claimed

trustworthiness as required in good qualitative research as well. The following identifies

these areas of concern in this study.

3.12.1 Confirmability.

Reid, Robinson, and Bunsen (1995) defined confirmability as, "actively and

continually searching for bias and making it visible for inspection" (p. 135). Lincoln and

Guba (1985) pointed to the use of triangulation as one source of demonstrating confirmability. Denzin (1978) supported triangulation as critical in making one's bias less impacting, as the multiple sources of data provide multiple confirmations of research conclusions. The researcher being aware of, and making evident, their bias in the study makes the bias transparent. This allows the individual evaluating the study to determine if it is bias or a true result. Being aware of and taking steps to ameliorate bias strengthens conclusions of a study.

The bias inherent in this researcher's approach included support for the social constructivist paradigm. To avoid over reliance on this paradigm as the driving force of the effectiveness of the instruction, other sources were used to evaluate the students' responses to the comprehension questions in the QRI-III (Leslie, & Caldwell, 2000). This ensured the rater was reliable in assigning points for correct answers. In this manner, inflation of scores was avoided, and confidence that the students were successful was assured. As well, other factors for the increase in skills were considered including outside instructional support (there was no other instruction except that obtained in the study setting), and maturation (the students had not shown this kind of gain in any of their school records).

3.12.2 Credibility.

Bernard (2000) suggested credibility is based in good methods and good sampling. In this study, the use of multiple data sources, triangulation of data, student voice, and basing the study in a design that supports the methods used assures credibility of the work. Credibility is a parallel of validity in quantitative work, as it is the assurance

you made the right choices in selecting the participants and methods. Lincoln and Guba (1985) stressed the length of time, persistence, and triangulation of multiple forms of data all support credibility in the study.

3.12.3 Transferability.

Transferability is the qualitative research version of external validity in a quantitative study (Trochim, 2006). The degree to which a finding in a qualitative study can be transferred to a similar setting or situation defines its generalizeability. Clear, in-depth description, so the settings and situations can be compared, extends the transferability of a study. In order to transfer what has been discovered in this study with the highest degree of certainty, one would have to have a very similar setting, situation, and composition of group.

3.12.4 Dependability.

Dependability is the requirement of the qualitative researcher to account for changes within the setting of the study (Trochim, 2006). This accountability should display why the researcher selected a particular approach, in this instance the ethnographic case study. To account for the attitudes, knowledge, and understandings of these young men, the ethnographic case study allows for a fuller appreciation of the varied factors impacting what they think, know, and are able to use in comprehending.

3.12.5 Trustworthiness.

Kinchloe and McLaren (1998) defined trustworthiness as, "credibility of portrayals of constructed realities (p. 288). In other words, the research is trustworthy if those who constructed the realities can understand those realities as plausible. As a

simplistic example, if I research oranges, and I state they are blue in color, this reality

would not be plausible in my experiences; therefore my research would not be

trustworthy. To ensure the study was trustworthy, the demographics, interviews, and

testing results were presented to paraprofessionals in the classroom and they were asked

to confirm the credibility of the study results as portrayed. As well, students were

questioned and their skills evaluated in reading in other settings such as reading assigned

in their regular education classrooms, which was reviewed in the special education

classroom. These were random and spontaneous checks occurring throughout the school

year. Finally, the demographics and descriptions of two of the students were used to

create part of the student's Individualized Education Plan, specifically in the Present

Levels of Educational Performance, which was then reviewed with and confirmed with

the families.

3.12.6 Ethics

"There is no value free science"; so stated Bernard (2000) in his discussion of

ethics. Ethics, in this study, includes the following: (a) obtained informed consent,

(b) ensured privacy of participants, (c) conducted the study in a manner that elevated

student capabilities rather than highlighting deficits, and (d) supported best practices in

educating a fragile subset of our society.

In obtaining informed consent it was essential to ensure the students, who have

difficulty with language (receptive and expressive), clearly knew what we were going to

undertake, what the results could be, and that they could, at any time and completely

without penalty, remove themselves from the study. This was made certain by careful discussion, with families and as teacher/student in a non-threatening environment.

Ensuring privacy was managed in this study by limiting information about the location, makeup, and situation in which the study took place, which required finessing to allow for enough information to allow for some transferability. It also was undertaken through the use of pseudonyms for the students involved, and eliminating the families names altogether, referring to them as mother, father, brother etc. Finally, engaging in the securing of documents related to the study was carefully done, to limit distribution and access.

Elevation of student capabilities was made possible by beginning with the known. Students were first evaluated for what reading strategies they knew before bringing them to the unknown. All three were pleased to know they had some working knowledge of reading comprehension strategies. As well, empowering students to break through their difficulties in reading by enhancing their abilities, rather than providing an intervention or remediation allowed for a positive position.

Use of best practices was conducted in the evaluation of methods of instruction, use of scientifically based and research supported strategies, and developmentally appropriate practices (National Autism Center, 2009). Students were given strategies that built on prior knowledge (Piaget, 1954). Instruction was provided in a manner consistent with research supporting its use (National Autism Center, 2009). Developmentally appropriate practices were used (Pernon, Pry, & Baghdalli, 2007; Frith, 2003; National Autism Center, 2009).

Every effort was made to ensure this study met the rigorous requirements presented by qualitative research methodology (Lincoln & Guba, 1985). By using best practice, multiple data sources, ensuring ethical treatment of subjects, and making credible and trustworthy decisions based on the data, this study demonstrated the factors that make it valid and reliable.

CHAPTER 4

Findings

The purpose of this study and the primary research questions were designed to

systematically examine (a) reading comprehension strategy use, (b) the awareness of

other strategies students might use if they had more knowledge of them, and (c) the

purpose for reading in students with ASD. This chapter contains a rich and detailed

description of the data obtained through an ethnographic case study of three students with

ASD in a special education classroom.

This chapter is organized into three sections. Each is further delineated into

subsections providing a full account of data collected. The first section contains the

information on the demographics of the group studied. This includes the pre-test results

of the QRI-III (Leslie, & Caldwell, 2000) administered to each student, and the records

review results. The second section describes personal communications, drawings, and

other artifacts including informal interviews conducted with the students. Finally, a

summation of the previous information is providing demonstrating final results of the

study including results of the post-test QRI-III (Leslie, & Caldwell, 2000) scores.

4.1 Demographics

Demographics provide the information that described and explained the unique

and common aspects of those involved in this study. By examining the demographics

connected with these students, an understanding of who they are becomes clearer. Since

reading comprehension is a language based discipline, and language is culturally

mediated, understanding something of the students' culture was important. By creating a

picture of the students, it was easier to understand how they are similar, and how their

responses to intervention might be similar as well. Demographics provided context for understanding why the students might respond the way they did in the study (Axinn, Fricke, & Thornton, 1991).

4.2 Culture, ASD, school, and home

Culture is defined as, "the customary beliefs, social forms, and material traits of a racial, religious, or social group; *also* : the characteristic features of everyday existence (as diversions or a way of life} shared by people in a place or time" (Merriam-Webster Online, 2011). Bruner (1990) defined it as, "The symbolic systems that individuals used in constructing meaning...[that] constituted a very special kind of communal tool kit whose tools, once used, made the user a reflection of the community" (p. 11) Disability culture would then be defined as the everyday features of existence shared by individuals with common characteristics. In terms of ASD, it would include all of the manifestations of ASD that an individual must have to be diagnosed with this disability. This culture dictates how the person will respond to the environment in which he finds himself (Davidson, 2008; Ochs, Kremer-Sadlik, Sirota, & Solomon, 2004). It also directs how students with ASD can gain from instruction in a classroom. Because of the issues with expressive and receptive language, it was necessary to provide multiple opportunities that varied in the sense needed to interact when instructing the student. Use of visual models, touch, smell, and varying how questions and instructions were provided were necessary to ensure the student could complete what was asked of them, and learn the strategy being presented.

Culture of school affected the students in a variety of ways. For example, "When teachers have high expectations for their students, the students tend to deliver (Lucas, Henze, & Donato, 1990). The antithesis of this is also true (Ford, 1992). One impact was the size of the classroom. When in a larger class (i.e. in the regular education setting, which included 24-30 students) the students with ASD were often overwhelmed with noise, or were unable to focus on what was important in the instruction (Ruble & Robson, 2007). Providing instruction in the smaller group setting of the self-contained classroom allowed focus, increased social interaction, and allowed the students to feel safe because the noise levels were more controlled. It also allowed multiple forms of access (through multiple senses beyond expressive or receptive language alone) to understanding what the student was learning.

Culture of home defined much in the way the student interacted across the board. Dyches, Wilder, Sudweeks, Obiakor, and Algozzine (2004) illustrated, "various cultures may appraise the stressor of autism differently, and these appraisals may be considered to be negative or positive" (p. 219). Students with ASD are, first and foremost, children. The family dynamics that shape other family members also shape children with ASD. How the family responded to the child as an individual and as a person with ASD was evident in their interactions in the classroom as well. Expectations for learning and behavior (Wilder, Dyches, Obiakor, & Algozzine, 2007), the opinions and ideation the family had of the ideal school setting for their child, estimations of ability and disability, all played out in the classroom on a daily basis. Cultural expectations of disability also

played a role in how students interacted in the classroom. The individual impact of these cultural situations for each participant is delineated below.

4.2.1 Eric.

Eric's diagnosis of ASD came at a much later age (14) than the other two boys in the study. Consequently, his family saw his struggle in school as simply that he had a hard time with reading and math (personal communication, Eric's mother). While he had a number of habits and characteristics that were different than other children, he was seen, and accepted, as simply Eric. Consideration of the culture of ASD was not an issue in the home or in school, as he was seen as a student with a learning disability and a family with challenges.

At home, Eric's brothers were twins; both were born with typical difficulties of twins (early birth, low birth weight, slow to progress in early milestones, per Eric's mother). Therefore, much attention went to the younger children, leaving Eric to engage in the behaviors that would mark him as on the spectrum unnoted. As well, Eric's father had some similar behaviors, so his were considered natural. The culture of home was one that accepted and embraced Eric just as he was, and the stressors placed on the family were those connected with his lack of progress in academics.

In school, Eric was not progressing in academics. As he went from the elementary to middle grades, the culture of school became one of stress, and he did all he could to avoid the activities that were difficult. Increased agitation, anger, and aggression were seen as the unaddressed characteristics of his ASD impacted his learning, social settings, and ability to cope in the regular education setting without appropriate supports. For

Eric, school was a place where shutting down was the only relief, so he relied on it frequently.

4.2.2 Dustin.

Dustin was diagnosed with autism at the age of 3. The characteristics that identified him as a child with an ASD were readily apparent early on. Dustin often dealt with issues related to his ASD including obsession. His trigger topic (topic that caused him to hyper focus and often led to behaviors that led to trouble in school and home) was the Titanic. His interest of obsession at the time of the study was medieval events, paraphernalia, stories, landmarks and situations.

The culture of home focused on Dustin as a person with ASD over Dustin as a person. Dustin's mother was a diligent advocate, which caused many in the community to be somewhat fearful of her (teacher report).

In school, Dustin was the first (and only) student the school had encountered with ASD. The culture in the school was aimed at teaching middle class, rural students who were more similar than different. Teachers and students alike did not understand ASD, and Dustin's mother's intense advocacy placed him in the spotlight often. School was stressful to Dustin because he knew he was different.

4.2.3 Richard.

Richard's ASD was also diagnosed early, at the age of 3. His lack of reciprocal language was noted in his file as the characteristic that caused his preschool teachers to suggest an evaluation. The most significant feature of his ASD besides lack of reciprocal

conversation was his insistence on sameness. Richard required the same kind of socks every day. He wore the same brand of sneakers, and had a specific menu he would eat.

At home, Richard's insistence on sameness in clothing, food, and routine was difficult for the family. As a military family they moved 7 times since Richard began preschool at age 3. Finding the same clothes, creating the same menus, and creating the routine he craved could prove difficult and placed a lot of stress on his mother, per her report. As well, Richard's family held a great many traditional Hispanic (Puerto Rican) beliefs, routines, and cultural habits. Often, Richard's need for sameness would conflict with his father's need to determine the family's activities. This caused a great deal of distress for his father, per his report. Finally, Richard's communication style often caused conflict as either parent or his sisters took his flat affect as sarcasm. This was especially difficult for his father when the communication was directed at Richard's mother- his father often took his tone (or lack thereof) to be defiance, disrespect, or "attitude". With a limited understanding of Richard's ASD, he often reacted negatively (personal communication from Richard, Richard's mother, and Richard's father).

School also caused Richard distress when the situation required a social interaction or group effort. Academics (reading) did not come easily to him, and this caused him to shut down. School also placed a high value on physical abilities (on the playground, or in middle school in gym classes). Richard did not have typical abilities of a student his age. He often used odd gestures, and spoke, moved, and reacted in a pedantic, slow way. This often caused other students to avoid him. These cultural

aspects of ASD, home and school caused considerable impact on the students in this study.

4.3 Personal/familial/school characteristics

As described previously, this study was undertaken with three participants. All were teenage males with ASD. Each was served in a special education classroom for all or part of the day. Below is a table comparing Eric, Dustin, and Richard.

Table 4.1 Student demographic comparisons

Student	Age at time of study	Age at diagnosis of ASD	Family size	Number of people in family w/disability label	Level of Education: mother	Level of Education: father	Size of school (approximate)
Eric	14	14	5	2	College degree	College degree	600 students/ 35 teachers
Dustin	14	3	4	1	College degree	Trade school	500 students (district wide)70 teachers (district wide)
Richard	14	3	6	1	Trade school	Some college	600 students/35 teachers

As is evident, the young men had much in common. They were the same age at the time of the study, and two of the three received diagnosis of ASD as preschoolers. Their families are approximately the same size, and two of the three are the only individuals with disability labels in their homes. All three have parents with at least some level of college education, and two of the three attend schools of the same size. For all three at the time of the study, they were the only person diagnosed with ASD in the home. Eric had one brother with a disability (learning disability) in the home, and his

parents were in the process of getting his father evaluated for an ASD. In examining their scores on the reading evaluation, many similarities stood out as well.

The U.S. Census Bureau (2010) definition of rural was used to provide a standardized definition for any area containing less that 2500 people. Eric's school was located in a rural town, with a population of 2200. The town is served by three schools, an elementary, middle, and high school. The middle and high schools also service a nearby area. Work activities for the residents consist of construction, public administration, education related, and health care. The town is 75% white, but also contains a large population of people claiming two or more races. Eric lived in a single family home.

Dustin attended a semi-rural school, as the town population just meets the definition of an urban center. The U.S. Census Bureau, (2010) referred to an urban center as one which contained more than 2500 but less than 50,000 people. Dustin's town had approximately 2500 people. The entire district consisted of approximately 900 students in three buildings, an elementary, intermediate, and high school. Most of the people in town work construction, drive trucks, or work in health care and social services. The nearest large town is 35 miles away. Racially, the town is approximately 75% black, 15% white, and the remaining population other races. Dustin lived in a single family home.

Richard's school was in an area considered rural. It was located in a small town adjacent to the military base on which he lived. Base population was listed as 5400 people, qualifying it as an urban center (U.S. Census Bureau, 2010). The base was self-

contained, in that most residents lived, worked, and shopped on the base, although they also frequented a much larger base approximately an hour's drive away. Students living on the base attended elementary schools on the institution and there was one Junior/Senior high school. Many students chose to attended middle and high school in the local district schools and were bused approximately a half hour from the base. Residents worked in administration, health care and social assistance, and retail. There were two elementary schools operated there, with approximately 600 students attending, and the junior/senior high had approximately 550 students. The base was 90% white in racial terms. Richard lived in base housing, which was a six family townhouse style unit.

All three students had similar nuclear families, but came from different environments in terms of home area. All three professed interests in computers. Eric enjoyed drawing, music, and what he called "bling", or large, sparkly jewelry consisting of chains and his first initial, similar to those worn by rap and hip hop artists. Dustin was interested in history, trains, and medieval activities including jousting and Stonehenge. Richard enjoyed planes, taking things apart to see how they worked, and animals. He wanted a dog but his sister was allergic, a fact he bemoaned often. These individuals, like most with ASD, presented a varied picture. However, their ASD diagnosis is demonstrated in their persistent and intense level of interest in specific things, and in their academics. The scores on the QRI-III (Leslie, & Caldwell, 2000) and other testing demonstrate how ASD affected them academically. The connection between the demographics, the test scores, the diagnosis of ASD, and their records review

demonstrated the students were able to increase their reading comprehension through direct instruction of reading comprehension strategies.

4.4 The results of the initial QRI-III (Leslie & Caldwell, 2000)

4.4.1 Word calling abilities.

Scores on the QRI-III (Leslie & Caldwell, 2000) consisted of three parts: word calling ability, miscue/fluency rate, and comprehension. The first portion administered was the word calling test; scores of each student are listed in table 4.2.

Table 4.2 Word calling scores

	Identified automatically/grade	Identified	Percentage/instructional level
Eric	14/20 sixth grade	18/20	90%/independent
Dustin	18/20 high school	20/20	90%/ independent
Richard	17/20 sixth grade	17/20	85%/instructional

As is shown by table 4.2, both Eric and Richard were most successful in word calling abilities at the sixth grade level; both students, based on chronological age, would be expected to read words at the eighth grade level. Dustin performed at the high school level although chronological age also places him at the eighth grade.

4.4.2 Miscue/fluency rate

The first section encountered after the word calling test was a set of questions concerning background knowledge of the topic in the passage to be read. Next, a prediction was asked for on what the story is about, based on the activated prior knowledge. The student was scored as familiar or unfamiliar with the information. Eric

was not familiar with his topic (Christopher Columbus); Dustin was unfamiliar with the same topic. However, Dustin was tested on other, higher material, and demonstrated familiarity with science related information such as computers and stars. Richard was familiar with the topic in his reading, which was Martin Luther King. Background knowledge plays a large part in making sense of what we read (Irwin, 1991). Taylor (1979) found poor readers were more successful comprehending familiar passages and found the scores on prior knowledge questions predicted scores on other types of test questions, as did Johnston and Pearson (1982). The concept questions were followed by a test of fluency and accuracy in reading aloud.

Fluency was determined by the number of words read correctly in a passage for a specific duration, in this case, words per minute. Words per minute was determined by counting the number of words in the passage, multiplying it by 60 seconds, and dividing by the number of seconds it took to read the passage. Miscues were noted and accuracy (number of miscues made) and acceptability (number of meaning changing miscues from all miscues) were determined. Table 4.3 demonstrated the results of these tests, based on the highest level accomplished.

Table 4.3 Fluency rates

Student	Fluency rate	Total accuracy	Total acceptability
Eric	98.5 w.p.m.	29 (Instructional)	18(frustration)
Dustin	No score available	No score available	No score available
Richard	118.8 w.p.m.	7 (Independent)	7(Independent)

Both Eric and Richard read at an acceptable rate, but Eric had multiple miscues at the fifth grade level passage. Richard demonstrated independence at the fifth grade level, but was not asked to read at the sixth grade level because he evidence behaviors indicating frustration in reading the word list for that grade level. A miscue analysis was omitted for Dustin. The next section of the test included areas to determine the students' understanding of what they read by retelling and questions directed at explicit and implicit understanding.

First, students were asked to retell the story. This portion of the test determines how much direct memory the students were able to use. This information was not scored, but demonstrated if the child is having difficulty with short term recall or does not have good story retelling skills (per typical test protocol). Next, students were asked to answer a number of questions that called for both implicit and explicit understanding.

This section was scored for both types of questions, so the student was able to demonstrate success with either or both. Table 4.4 indicated the student's success in completing these tasks.

Table 4.4 Results of comprehension section

Student	Implicit	Explicit	Result
Eric	0/4	1/4	Frustration
Dustin	3/4	3/4	Instructional
Richard	1/4	2/4	Frustration

Both Eric and Richard were at frustration levels with this passage; Dustin was at Instructional, so he was asked to read another passage. The Christopher Columbus passage was considered narrative, which was an easier text to understand for most children (Williams, 2000). On an expository text, on a subject he had a great deal of background knowledge (Computers), Dustin scored 0/4 on implicit, and 3/4 on the explicit questions. This would place him at the frustration level of this sixth grade, expository text.

4.5 Records review

Students are provided with a variety of tests to evaluate their cognitive, social, and emotional abilities when a disability determination is being made. A three-year reevaluation is conducted for students receiving special education services, to determine if they continue to qualify for said services (IDEIA, 2004). Both Eric and Dustin were evaluated with the Wechsler Intelligence Scale for Children (WISC) –III (Wechsler, 1991). The boys were also evaluated with the Woodcock-Johnson III Tests of Achievement (WJ-III) (Woodcock, Mather, & McGrew, 2001).

Eric's scores on the WISC and WJ-III present an intriguing picture; his score on the Broad Reading section of the WJ-III was 1.25 standard deviations above the mean. In other words, he read, according to the test, 1.25 score equivalents above his classmates. In the WISC, however, the picture became clearer. The WISC scores were divided into sections, and in the vocabulary he scored in the average range, while in the comprehension he scored in the below average range. Eric's full scale IQ score was a 79, which is in the borderline range.

Dustin's scores for the WJ-III indicated his letter/word identification was advanced, but his comprehension score was average proficiency. In terms of grade equivalents, his word identification was 15-9 (as if he were in his third year of college) and his comprehension only at the 7-7 (7th grade, seventh month). The WISC scores listed his vocabulary score (raw score of the subsection vocabulary, which measured language development, fluency, and word knowledge) as an 8. The mean (average) score was a 10; therefore he was within the "typical" range for this score for his age. However, the score for comprehension was only a 4 (mean was 10); therefore he was below 50% of the mean in comprehension, which measured social and practical judgment and common sense, or in other words, the ability to make meaning of language. Dustin's full scale IQ was a 73, which was in the borderline range.

Richard's scores on the WJ-III demonstrated a letter/word identification score of 9.3 (9th grade, third month). His comprehension, however, was 5.8 (5th grade, 8th month). In the WISC, Richard scored a 7 in vocabulary, and a 4 in comprehension. Overall, his full scale IQ was a 78. These scores indicated a higher word calling ability paired with lower comprehension ability and a low average IQ.

What these scores meant overall was that the boys had a discrepancy between their ability and their achievement. This alone would have demonstrated a need for services; however, their additional diagnosis of ASD included them under the category of Autism, and entitled them to special education services in the public school systems in which they attended. For the sake of the study, it indicated what the QRI-III (Leslie, & Caldwell, 2000) also told us, that these individuals had difficulty comprehending at the

same level as their word calling ability. These scores and information provided by students themselves in interviews and artifacts, demonstrated their use of strategies; awareness of the existence of other strategies; and purpose for reading.

4.5.1 Confirmability, credibility, transferability, dependability, trustworthiness, ethics

Using the test scores of all three tests, the student's baseline abilities can be confirmed. The test scores can be triangulated to demonstrate the similarities in the students' academic backgrounds. Credibility is demonstrated through the record review and testing as well- the evidence illustrates the student's abilities in reading. The scores lent credibility to the idea the students needed instruction in strategy use; in addition it is also supported by demonstration of the discrepancy between ability and achievement, criteria required to provide special education support in the public schools.

Transferability was also demonstrated, as other researchers can compare these students' scores to other subjects in other situations. By reviewing the records and confirming a diagnosis of ASD, this allowed transferability to similarly diagnosed student populations. Transferability also supports dependability, as if you can consider transferring these results to another set of children, you must assume replicability.

Dependability of the study begins with the baseline scores of the students, showing strength in vocabulary over comprehension. Increased scores on the QRI-III (Leslie, & Caldwell, 2000) support this dependability, as students increased comprehension.

Trustworthiness is evidenced in that the reader can see the comparison of like students, and compare initial and final scores to determine if they support the conclusions

drawn. The record review also showed each student had been diagnosed with ASD, a criteria for inclusion in the study. This lends trustworthiness that the students were similar in terms of their abilities based on the definition of ASD. Finally, ethics are considered as the need for instruction is supported by the scores, assuring students have multiple opportunities to demonstrate, in differing ways, their strengths

4.6 Informal interviews and artifacts

Throughout the study, informal conversations, and an informal interview took place as well as collection of drawings the boys produced. Both Eric and Dustin had an intense interest in drawing, and Dustin liked to write in a journal-like style. Richard was not interested in either but enjoyed expressing himself in large verbal diatribes on whatever topic caught his interest. This section is divided by student, and contains further information on each student's personality, personal style of interaction, likes, and strengths. It also includes information on the students' beliefs, interests, and fears, all of which impact comprehension when reading, as comprehension is socially constructed based on prior knowledge and social influences.

4.6.1 Eric.

Eric was a bright, funny young man who enjoyed hip-hop and "gangsta" rap. He also enjoyed drawing and stated he would like to design video games or be an artist. Initially determined to have a learning disability, Eric was noted to have possible characteristics of ASD by a teacher, and evaluated by the school psychologist. His family had his doctor evaluate him, and he was diagnosed with ASD.

When approached to be a part of this study, Eric's first response was a firm and loud "NO!". When asked by his father why he did not want to participate, he stated reading was difficult, and made him feel like a wimp. When the study was explained to him, he then agreed to participate, but stated, "If I feel like a wimp, I will quit" (personal communication). Assured of his right to do so at any time, he consented. Eric was asked why he read. He said because the teacher made him, because he wanted to know something, and because Anime' and Mange books were cool. Anime' and Manga are a form of comic-book, first created in Japan (Japan Zone, 1991). I asked him to draw how his brain worked. I explained I needed to know what he knew about reading and making sense of what he read, so I needed to know how his brain worked. He completed the Illustration 4.1, which he further explained was how anger and excitement looked.

Illustration 4.1 How anger and excitement looked to Eric

He also drew Illustration 4.2 on the page indicating how his brain is "mostly on

shutdown. As boring as it looks I mostly enjoy this feeling" (personal communication).

Illustration 4.2 Eric's brain
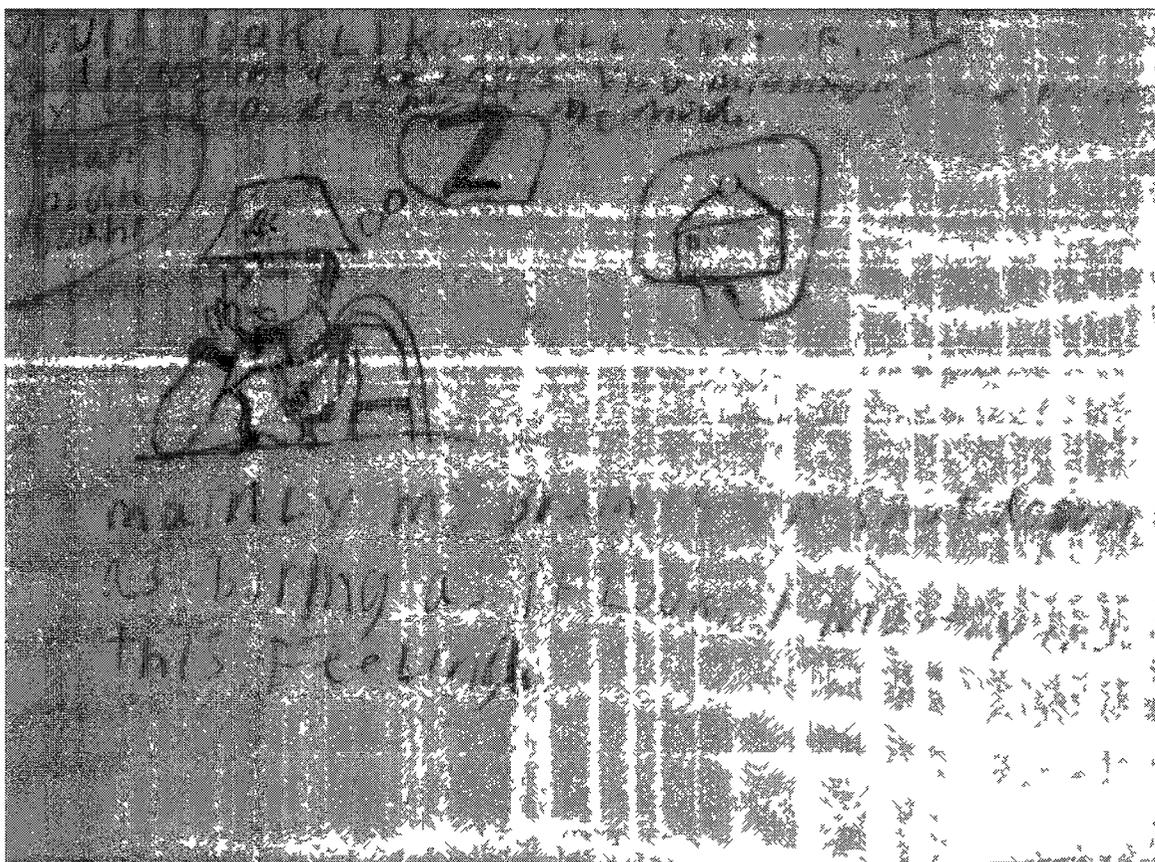
When asked why he enjoyed it, he stated school, "got too confusing and frustrating"

(personal communication) In response to the question what happened when he read

something that was hard for him, he said he would read it until he got stuck, then either

quit or get mad. What if it was a computer manual or something he liked, I furthered? He

then said he would try to reread it, or ask someone he trusted for help. I asked him if he

knew any other strategies to understand what he read, and he listed make a summary and

look for it in the book. When I asked him to clarify, he said, "you know, the book you're reading, you look back in it and see if you missed it". This investigator took this to mean a look-back strategy.

4.6.2 Dustin.

Dustin enjoyed drawing, but also enjoyed writing in a journal-like format. His drawings were of things he was interested in, such as Stonehenge, knights, and shields from the medieval period. In his journal he expressed his opinion about everything from men and women's roles (i.e. "Men aren't good cooks. Very True! 1Reason: Because Men are built for strength, not cooking we can't cook! We suck! (journal communication)), to what it takes to be a good neighbor (be friendly joke a lot be best buddies at school (journal communication)). Dustin's journal topics were often teacher prompted based on what was happening in his classes or life at the time of the writing. Both he and Eric were asked to identify how they thought, and since both favored drawing they were asked to draw how their brains worked. He identified his control center and various storage areas. It is Illustration 4.3.

Dustin responded to an informal interview on his reading habits and abilities. Asked about his preferred reading material, he said he liked to read supernatural books, history, and train books. When asked what he did when he found himself unable to understand what he was reading, he replied, "helps if I reread it, but some parts of the story may appear later" (personal communication). He also declared he might skip the area of confusion and keep reading, because he might understand it later (personal communication). Dustin's stated purpose for reading was reading for fun.

Illustration 4.3 Dustin's brain
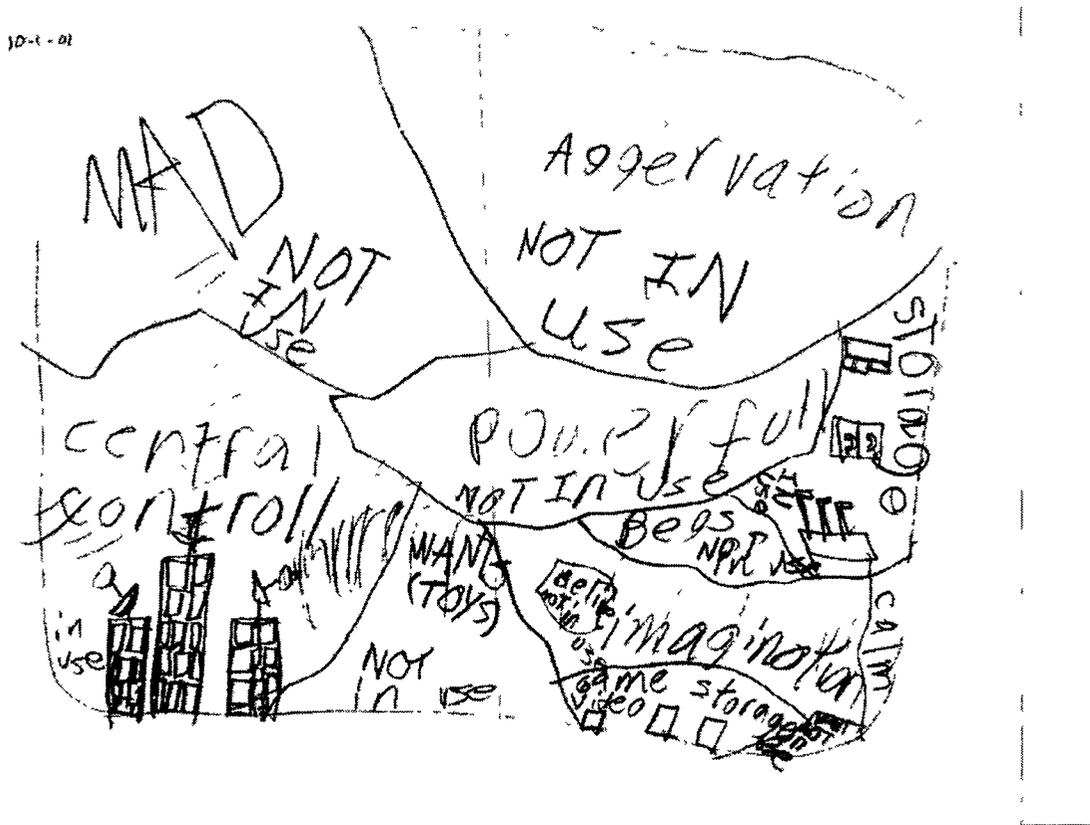
4.6.3 Richard.

Richard chose to express himself verbally. He also occasionally wrote short

sentences on pieces of construction paper in response to conversation or other

communication. If a topic interested him, he would hold extended diatribes that sounded

like lectures. Often he would stand and deliver these statements, and hold a finger

extended from a closed fist, as if using a pointer, raising and lowering it with the

beginning and ending of his sentences.

Richard would frequently be seen carrying library books around, and I asked him

what he liked to read. His favorites included Stephen King and other horror writers;

however, he never took the books home. When asked why he stated his mother was Catholic and he was afraid she would say he was reading devil worship. When asked if she had ever made such a statement, he replied she had not but that he knew she would because things happened in those books that were like devils making things happen.

Richard also liked to read the newspaper, but only the classified section and the comics. When asked what made those parts the best he said he understood them and no one tried to trick him in those parts. He also liked knowing what people were selling in case he needed something sometime. He was asked what he would do if required to read another section he would seek out someone to ask questions of before he began, "in case I get stuck and we have to get this done," he said, using a lift in his voice in "have to" to indicate his annoyance. I asked him why he was angry, and he said it was because I was making him read things that were boring.

I asked Richard why the newspaper was boring. He thought about it, and wrote "people trick you" on a piece of paper which he then held up for me to see. I said I did not understand what he meant, so he then began to lecture on "people tricking people in stuff they write". One of the key ideas he expressed was that words do not always mean what he thought they should, and he would get confused. I wrote on a piece of paper, "What do you do then?" and presented it to Richard. After rolling his eyes, he stopped talking, sighed, and said, "Well what do you think, I have to start over with that sentence, or go back three or four and it takes too long".

I then asked if he knew any other ways to fix things when he was reading and did not understand. He thought about it, and he said the English teacher in his old school

always wanted him to "summary" but he did not know how to do that. After a minute, he

added that he knew he could ask for help. Finally, I asked him why he read. "You make

me sometimes, but sometimes I like it, like the Stephen King. And sometimes I have to

because I need to know something, like the list my dad leaves on Saturday for me to do,"

he replied.

The students had been asked similar questions, but for each boy the questions

were adapted in language and in how the response was expected. These alterations were

made to match the student's preferred method of response and their strengths in language.

Their answers and drawings support the information obtained through more formal

testing, and in the informal reading inventory. The entire process lasted seven weeks. A

summation of this information, including the results of the post-instruction QRI-III

(Leslie, & Caldwell, 2000) scores is listed in table 4.5 and table 4.6.

Table 4.5 Strategies, reasons for reading, strategy heard of, and why they read

Student	Strategy known	Reason for reading	Strategy heard of / did not know how to use	What they liked to read
Eric	Rereading	Information Fun	Summary	Anime and Mange (Japanese comics)
Dustin	Rereading Reading on	Information Fun	None stated	Medieval history/stories
Richard	Rereading Look-backs	Information Fun	Summary	Stephen King/Horror fiction, Want ads in newspaper

4.7 Summary of Findings

A summation of the previous information demonstrated these students had

strengths in word calling or individual word reading, based on scores on the WJ-III

(Woodcock, Mather, and McGrew, 2001); the WISC (Wechsler, 1991); and the QRI-III

(Leslie, & Caldwell, 2000). The students stated, through discussion, illustration, and informal interview, that the reading comprehension skills they knew were rereading, and reading on until it made sense (or they had to go back). One of the three knew how to use look-backs as well. The only strategy the students were aware of, but did not know how to use, was summarizing.

The student's purposes for reading included reading for pleasure and reading for information. They did not always know why they read in school, except because the teacher made them. The books they read for pleasure involved areas they had intense interest in, such as Anime', medieval history, and horror fiction.

4.7.1 The strategies taught.

The first strategy selected was imaging; students with ASD often think in pictures (Grandin & Barron, 2005; Frith, 1991, 2003). The second strategy selected to be taught was analyzing stories for their story grammar components such as character, setting, and problems. This strategy was often one students are asked about on state and other assessments. Two of the students had heard of summarizing. It was the final of the strategies selected to be taught.

This order of strategies was selected as students could build on prior knowledge to understand the first strategy, and build on what they had learned for the next two. At the conclusion of the instruction, students were given the QRI-III (Leslie, & Caldwell, 2000) again to determine if their comprehension abilities had increased. Table 4.7 represented the results. Since word calling and fluency were not of focus, only the comprehension questions are listed. While important, the students' word calling ability

was superior to their comprehension in the initial test. Their results from the initial test continued to be superior to their comprehension abilities in the final test even though their comprehension improved, so repeating the word calling ability information would be of no value in this instance. Fluency was also not a factor in comprehension as the students read smoothly throughout the pre- and post- testing. As Smith (1994) stated, comprehension is impacted when students stumble over the words and must work on sounding out each one, losing the meaning in the text. This was not a consideration for these students at this time.

Table 4.6 Final comprehension section results

Student	Implicit	Explicit	Result
Eric	3/4 sixth	3/4 sixth	Instructional
Dustin	4/4 sixth	4/4 sixth	Independent
Richard	2/4 sixth	4/4 sixth	Instructional

Previously, Eric and Richard were at the fifth grade level and were Instructional and Frustration level, respectively. Dustin was reading the sixth grade level passage, and was at the Instructional level. In the case of both Eric and Richard, their first test scores were obtained for narrative passages; this passage is an expository piece, which is more challenging than the narrative piece. Dustin's piece was narrative for both the last graph and this one; he attempted an expository piece this time but chose to stop with the narrative piece this time.

4.8 Other Changes Noted

As evidenced by the score comparisons, Eric, Dustin, and Richard increased their abilities to comprehend when reading. The students gained one grade level in seven months time, the largest gain evident in their files. The students also gained in communication skills as they were able to apply their reading skills in understanding verbal communication. This was evidenced in several settings, reading class, social skills class, and ROTC.

These advanced levels, while not on grade level for the young men, increased their personal pride in their work. This was demonstrated by increased on time completion of assignments, and increased neatness in writing and other work products. Eric claimed school was "not so bad". He could list two friends, "and they aren't in here, but I like here, just it's nice to have normies for friends" (personal communication) (referring to the self-contained classroom). The students knew they could learn; therefore they were less inclined to revert to previous behaviors that interrupted learning-theirs and others. When faced with difficulty in reading the students actively attempted to apply the strategies they had learned.

Two of the students, Eric and Richard, were enrolled in social skills classes in which role playing and videotaping were used as part of the instruction. Both boys were seen attempting to use the reading strategies as speak alouds to talk themselves through social situations. Eric would repeat to himself, "make a picture what does it look like" and Richard would list the characters, setting, and problem in video modeling. Eric

reported less "shut off" time because he stated he was able to understand more of what he was learning in class.

Both Eric and Richard were enrolled in an Air Force ROTC program in their schools, and the instructors reported increased on task behavior from both when working in manuals and texts in class. The Senior Airman in the class was heard to tell the boys on several occasions that they were "Outstanding" in inspection. They also reported more appropriate social interactions in the squadron, with less interruption of training time from both young men. In table 4.7, the ethnographic themes discovered in the study are displayed.

Table 4.7 Themes discovered in the study

Eric	Dustin	Richard
	Reading Comprehension Strategies	
Age at diagnosis: 14	Age at diagnosis:3	Age at diagnosis:3
Family: 5 people; one (brother) with disability besides Eric (dad also diagnosed later)	Family: 4 only member with disability	Family: 6 only member with disability
School: Rural Town: Rural	School: Rural Town: Rural	School: Rural Town: Rural
Strategy student knew: Rereading	Strategy student knew: Rereading, Reading on	Strategy student knew: Rereading
Strategy student was aware of : Summary	Strategy student was aware of: Summary	Strategy student was aware of : Summary
Culture of home: Eric was Eric/ stressors came from academics, not ASD	Culture of home: focus is on ASD over student	Culture of home: Student expected to follow directions of parents, needs for routine often ignored in favor of parental choice
Culture of ASD: Eric was not thought of as an individual with ASD: was seen as a unique individual	Culture of ASD: Dustin's ASD was the focus of his life from his family's perspective. He needed direction to avoid his trigger (Titanic) and often	Culture of ASD: Richard demonstrated many characteristics of ASD; however he was discouraged by his family to do so.

	was impacted by his ASD in social settings and school.	
Beginning reading level: 5th frustration level	Beginning reading level:6TH frustration	Beginning reading level: 5th frustration
Ending reading level: 6th Instructional	Ending reading level: 6th Independent	Ending reading level: 6th Instructional

This information was compiled from (a) personal notes, (b) anecdotal jottings made during instruction or other classroom activities, and (c) notes from others. Other teachers, such as the ROTC instructor, often sent progress notes, and wrote on student's behavior checklists as well. Phone calls and conversations during meetings with families, chats on busses to bi-weekly shopping trips, and information from students' interactions with paraprofessionals were sources for some of the information as well. This information was collected for this study, but also came from information compiled for students' IEPs and state mandated tests. According to Shaffif and Stebbins (1991), field notes such as these describe the setting and actions, and also the importance of what is happening in the setting (including dialogue) from the perspective of the participants.

In the next chapter the conclusion, a discussion of the impact of the study, limitations, and future research possibilities was discussed. These were discussed in relation to the data collection reported in chapter 4.

CHAPTER 5

Conclusions, Discussion, and Limitations of the Study

In the proceeding chapter, the results of the testing and interviews conducted were illustrated. This chapter discussed the conclusions drawn from the data presented, the implications of the study, and its limitations. Conclusions were based on the triangulation of the information on ASD; the results of the QRI-III (Leslie, & Caldwell, 2000); the WISC-III (Wechsler, 1991); the WJ-III (Woodcock, Mather, & McGrew, 2001) and the communications and artifacts of the students. It is also based on the methodology- social constructivism and ethnographic case-study, as previously described in this paper. Banning (2003) stated this approach as , "the development of procedures that focus on the mutual interdependence among theory, method, and findings – findings that provide insights into what interventions work to produce what outcomes with what persons in what settings or environments" (p. 1).

5.1 Conclusions based on the data

The initial results of all three assessments, the QRI-III (Leslie, & Caldwell, 2000), WISC-III (Wechsler, 1991) and the WJ-III (Woodcock, Mather, & McGrew, 2001), yielded obvious differences in the students' abilities in reading words and their ability to comprehend. This is a difference noted in many children with ASD (Frith, 1991, 2003; Myles, Higenfeld, Barnhill, Griswold, Hagiwara, & Simpson, 2002). The period of instruction covered seven months, October through May, and included a break of approximately three weeks in December. When the results of the QRI-III (Leslie, & Caldwell, 2000) were examined, all three students demonstrated progression.

5.1.1 Eric.

Eric started at the frustration level of comprehension on a fifth grade level passage; his post-instructional scores were at the instructional level of a sixth grade passage. Additionally, he was read a narrative passage in the pretest, but an expository (more difficult) passage in the post test. In summary, he increased his ability to comprehend one grade level and increased his ability to understand a more difficult passage as well.

5.1.2 Dustin.

Dustin scored at the instructional level on a fifth grade level passage prior to instruction in strategies. After instruction he scored at the independent level of a sixth grade passage. He increased his ability to comprehend by one grade level.

5.1.3 Richard.

Richard scored at the frustration level on a fifth grade level passage prior to instruction in strategies. After instruction he scored at the instructional level of a sixth grade passage. His post instructional passage was also expository, as was Eric's.

5.2 Summary of Conclusions

All three students increased their abilities after instruction in reading comprehension strategies. Based on their results (detailed in Table 5.1) it can be stated direct instruction in reading comprehension strategies can increase the reading

comprehension of students with ASD. Since this is a preliminary study, cautions and

limits will be discussed in the next section.

Table 5.1 Comparison of results

Student	QRI-III Admin 1 Implicit/Explicit		WISC-III	IQ	WJ-III	QRI-III Admin 2		Strategy known	Strategy student "heard of"	Reasons for reading
Eric	0/4	1/4 Fifth grade	Vocab avg comp below avg	79	+1.25 SD	3/4	3/4 Sixth grade	Rereading	Summary	Pleasure Find information
Dustin	1/4	3/4 Fifth grade	Voc avg comp below avg	73	Voc avg Comp below avg	4/4	4/4 Sixth grade	Rereading Continue reading	None stated	Pleasure Find information
Richard	3/4	2/4 Fifth grade	Voc avg Comp below avg	78	Voc avg Comp below avg	4/4	4/4 Sixth grade	Rereading	Summary	Pleasure

5.3 Discussion

Students with ASD function under a condition that could limit their independent

life functioning. Reading comprehension is skill all adults need to be able to conduct life

activities. Teaching students to comprehend allows them to learn advanced materials and

expand their options in terms of future courses to take while in school; possible additional

work or post school opportunities; and relieves anxiety in students within the school

setting.

When considering the theoretic basis of the study, constructivism, the students

were able to build on their previous knowledge. They were able to take the first strategy

taught and through direct instruction and teacher scaffolding incorporate the new strategies into their repertoire.

As in the definition of Autism (APA, 2000), individuals with ASD manifest maladaptive behaviors such as a demand for sameness in routine and intense, often obsessive interests. For the students in this study, these manifestations demonstrated themselves in occasional physical meltdowns; aggression toward others; interruption of learning time by verbal or physical outbursts; and shut-downs where the student was incapable of interacting in any way promoting learning. These incidents were the result in changes in other areas of the students lives (changes in home; arguments or upsets with others), internal (and unexplainable by the student to others) changes; or events in other areas of school such as the bus, the hall, lunchroom, or other classes.

Students also experienced issues within the classroom setting. Lack of interest in the reading for that day, or obsessive preoccupation with a physiological manifestation of ASD (i.e. agitation and resultant need of the student to rock, hand flap, spin, or other interruption to the students learning) could impact the student experiencing the manifestation and also impact others in the classroom. In that instance, no one learned. This makes teaching and learning difficult for students with ASD (Friedlander, 2009).

Another impact on the learning was obsession. At times the particular obsession of interest would overwhelm the student. In this case, the learning would literally progress minute by minute, as the student would need more 1:1 attention, and their attention could only be held for a short period of time. In this instance, the student would be able to pay attention to the obsession for completing a prescribed period of time, and

then access to the obsession was allowed for a period of time, as in an exchange. While not the most effective learning tool, it allowed the student to learn to control their obsession to some extent and also to gain something from the learning period.

Expressive and receptive language issues are a hallmark in ASD as demonstrated by communication issues students face (APA, 2000). In the literature a child is expected to be able to read at the fifth grade and sixth grade level, the language is complicated. There are idioms; homonyms; and attribution to characters that is not always direct, and must be inferred. As well, inference is a large part of reading at this level. Besides reading comprehension strategies, students often needed assistance with new vocabulary such as course specific terms.

Finally, students' inability to understand theory of mind often interfered with the learning process. When comprehending, it often takes the ability to understand how someone thinks or feels, and this was sometimes a stumbling block that the strategies could not overcome. Expressing themselves in the position of a character required both the ability to change places with the character, and the ability to use language in a manner difficult to those with ASD. Stumbling blocks displaying this were the inconsistent and often ignored pronouns in the text or in explaining what the student understood of the reading. The ineffective use of pronouns is one way children display limited understanding of theory of mind (Tager-Flusberg, 1996). However, in terms of strategy learning and use, the students in this study were successful, and gained a significant level of ability in a short duration.

5.3.1 Incidence vs. prevalence numbers.

The numbers of individuals with ASD was described as incidence and prevalence. By definition, incidence is the "rate of occurrence or influence" (Merriam-Webster Online, 2011). Prevalence was defined as, "the degree to which something is prevalent; *especially* : the percentage of a population that is affected with a particular disease at a given time" (Merriam-Webster Online, 2011). The difference in the two is rate vs. percentage. According to the Autism, PDD-NOS & Asperger's Fact Sheet (2009), "In using either to count individuals with ASD, the difference is in Autism's incidence rate, despite its advantages for assessing risk, is less useful in autism epidemiology, as the disorder starts long before it is diagnosed, and the gap between initiation and diagnosis is influenced by many factors unrelated to risk. Attention is focused mostly on whether prevalence is increasing with time". In other words, incidence is the risk for ASD; prevalence, according to numbers used by the Centers for Disease Control, (CDC) is a count and the current numbers they state, "Assuming the prevalence rate has been constant over the past two decades, we can estimate that about 730,000 individuals between the ages of 0 to 21 have an ASD" (2010).

The CDC derived its numbers from two programs it funds, the Autism and Developmental Disabilities Monitoring (ADDM) Network and the Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP) (CDC 2010). The ADDM used health and education records from reporting communities, which they placed at 8% of American 8 year olds, an age determined to be appropriate for including most children on the spectrum (CDC, 2011). The sites they monitored included Alabama, Arkansas,

Arizona, Colorado, Georgia, Florida, Maryland, Pennsylvania, New Jersey, North

Carolina, Utah, South Carolina, and Wisconsin (CDC, 2011). The MADDSP monitored

a number of disabilities in addition to ASD. It used the same data sources, but monitored

the prevalence of mental retardation, cerebral palsy, hearing loss, and vision impairment,

adding ASD in 1996 (CDC, 2010).

Educationally, it may make sense to use prevalence data, as more students have

been identified and are participating in the educational process by this age. Since this

study included students in the teen years, prevalence numbers were used.

In any study, it is important to discuss the limitations of the study. None is a one-

size-fits all, and there are limits in what one study can look at, include, and a

methodology must be selected to provide continuity. The next section discusses the

limitations of this study.

5.4 Limitations

This study had a small number of participants. A thick description was provided

so any comparison studies can be considered in light of the characteristics of the

particular students in this group. Comparison to any individual student in a group should

be made very carefully due to the individual nature of all learners. Yin and Gwaltney

(1982) said of the case study design, "each case study represents a complex, multivariate

situation" (p. 44). Therefore the generalizability of a case-study can be a difficult

achievement. Per Kennedy (1979), there was no reasonable number of case studies that

can allow for ease in generalizing, so thick description in this study allowed the reader to

determine if his or her situation could be compared.

Another limitation of this study could be considered the fact all the participants were male; however, this was also a positive. With no gender difference, there is no issue with differences in how females might learn differently from males. Also, in ASD, it was estimated that 1 in 4.5 individuals is female (Centers for Disease Control, 2009), so having 3 male students with this diagnosis is not a rare event; having a female student with ASD is more unusual. In one study, the ratio of males to females was 6.8 to 1; the study determined more females had ASD when there was a first or second degree maternal relation with ASD, and more females with ASD were born to families where either mother or father were of an advanced age (Itzchak & Zachor, 2010).

5.5 Suggestions for future research

As was previously stated, this was a preliminary study. Future research might include repeating this study for verification of results. Another area of interest might consider determining what other strategies might assist students in understanding what they read. Advances in understanding how students develop TOM, or how to help students to expand their ability to "mind read" would benefit students with ASD. Studies that include all female subjects and/or students in different age groups might yield an interesting comparison. Creating a teacher training program to use as a basis for the study, using different instructional approaches also might demonstrate more ways to assist students with ASD in comprehending. Any study that furthers the independence of individuals with ASD would be a welcome asset to the body of research available to help those furthering the positive life experiences of individuals with ASD

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Appendix A

Criteria for diagnosis of ASD (APA, 2000)

A. A total of six (or more) items from (1), (2), and (3) with at least two from (1) and one each from (2) and (3):

(1) qualitative impairment in social interaction, as manifested by at least two of the following:

    (a) manifested marked impairment in the use of multiple nonverbal behaviors, such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction

    (b) failure to develop peer relationships appropriate to developmental level

    (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)

    (d) lack of social or emotional reciprocity

(2) qualitative impairment in communication as manifested by at least one of the following:

    (a) delay in, or total lack of the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)

    (b) in individuals with adequate speech, marked , including impairment in the ability to initiate or sustain a conversation with others

    (c) stereotyped or repetitive use of language or idiosyncratic language

    (d) lack of varied, spontaneous make-believe play or socially imitative play appropriate for developmental level

(3) restricted, repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

    (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus

    (b) apparently inflexible adherence to specific, nonfunctional routines or rituals

    (c) stereotyped and repetitive motor mannerism(e.g., hand or finger flapping or twisting, or complex whole body movements)

    (d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years:

(1) social interaction,

(2) language as used in social communication, or

(3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's disorder or Childhood Disintegrative Disorder" (American Psychiatric Association, 2000)

High Functioning Autism: Also known as Asperger's Disorder, a subset of

Autism with the individual demonstrating the following characteristics:

A. A qualitative impairment in social interaction, as manifested by at least two of the following:
    (1) Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gave, facial expression, body postures, and gestures to regulate social interaction
    (2) Failure to develop peer relationships appropriate to developmental level
    (3) A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)
    (4) Lack of social or emotional reciprocity

B. Restricted repetitive and stereotyped patterns of behavior, interests, and activities as manifested by at least one of the following:

    (1) encompassing preoccupation with one or more stereotyped and restricted patters of interest that is abnormal either in intensity or focus
    (2) apparently inflexible adherence to specific, nonfunctional routines or rituals
    (3) stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole-body movements)
    (4) persistent preoccupation with parts of objects

C. The disturbance causes clinically significant impairment in social, occupational, or other areas of functioning.

D. There is no clinically significant delay in language (e.g., single words used by age 2 years, communicative phrases by age 3).

E. There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior, (other than in social interaction), and curiosity about the environment in childhood.

F. Criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia.

Appendix B

Human subjects application

HUMAN SUBJECTS APPLICATION

Title of proposal: Discovering Reading Strategy Use in Students with High-

Functioning Autism.

Principal Investigator: Dr. Teresa Bunsen, Ph D.

UAF Employee/Status: Associate Professor

Dept. address: Education UAF Ph: 6444 Home Ph: 456-2203

Will this study receive any direct or indirect Federal support

(including use of Federal Facilities). Yes ___ No X AGENCY: _____

Type of review requested: Exempt X Expedited _____ Full _____

Proposed start/completion date: May 15, 2002-December 2002

Number of subjects proposed: 4

Composition of study group (age, sex, race, disadvantaged etc.): Male students

diagnosed with autism; ages eleven to twenty one

Name, UAF address, phone of co-investigators and students:

June A. Cotter, MSEd. (Student) Dept. of Education 356-3698 (H)

Principal Investigator Assurance:

On behalf of my co-investigators, associated students, staff and myself, I agree: To perform the research according to the ethical principles of the Belmont Report*, requirements of 45CFR46*, and the Principles for the Conduct of Research in the Arctic*; to strictly adhere to the research protocol as it relates to human subjects, and to promptly report to the IRB any proposed change in the research activity, and to ensure that no changes will be made in the activity without obtaining prior IRB approval (except that a change may be made to eliminate apparent immediate hazards to the subject); to comply with any contingencies upon which approval may be granted; to promptly notify any member of the IRB verbally (with written confirmation) of unanticipated problems involving risk to subjects or others and of any other adverse circumstances affecting the subjects that arise from the research.

Principal Investigator: _____ /_____

IRB USE: Exempted _____ Expedited _____ Full Review _____

Contingencies for approval: _____

_____

Re-review frequency _____

Approved/Disapproved: _____ /_____

Signature (Chair)   IRB, Date

Appendix C

Permission form

PARENT CONSENT/STUDENT ASSENT FORM FOR PARTICIPATION IN HUMAN SUBJECTS IN RESEARCH UNIVERSITY OF ALASKA FAIRBANKS

Project Title: Investigating Reading in Students with Autism
Researchers: Teresa D. Bunsen, School of Education
June Ann Cotter

If you agree to allow your student with autism to participate, he/she will be videotaped while working with reading activities in the classroom setting. All other participants will be students with a diagnosis of autism. Your student will be asked to answer comprehension questions and to tell of strategies used while reading. Your student will also be asked to retell the story and tell information about the story read. The total time for your student's participation will be approximately forty (40) hours over a period of seven months. As well as videotape, a record review of special and general education records, administration of a reading comprehension evaluation, and collection of student-created artifacts (writings, drawings, and other items created by the student) will be conducted to evaluate reading comprehension strategy use and abilities. Artifacts will be returned after completion of the study.

The researchers will examine the tapes, testing, artifacts, and record review. Portions of tapes may be used, as training aides for staff members/university students, remaining tape will be destroyed after review. Your student's responses will be recorded by number only and your student's name will not be included with the data. With the exceptions of the researchers involved in this study, no one will be allowed to identify individual responses by name or location. Responses will be identified by code only and will be reported in a professional journal article as well as a research dissertation for the University of Alaska Fairbanks. Individual responses will be coded to prevent identification as belonging to any individual participant.

Risks to your student are minimal. It is hoped that this study will expand the knowledge of reading comprehension in individuals with autism. Reading is essential for independence in society.

AUTHORIZATION: Your signature below indicates that you have read the above and understand the nature of this study and agree to allow your student to participate. You understand that by allowing your student to participate in this study you have not waived any legal or human rights. You understand that he or she has the RIGHT TO REFUSE TO PARTICIPATE and that the RIGHT TO WITHDRAW FROM PARTICIPATION AT ANY TIME during the study will be respected.

If you have any concerns for about your student's selection for this study or how he/she was treated, please contact the Suzy Pence, research committee coordinator in the Office of Research Integrity at UAF at 474-7800 or s.pence@uaf.edu.

Parent/Guardian's Signature   Date

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Student's signature   Date

Researcher's Signature   Date

Researcher's Signature   Date

CC: Participant
Parent/Guardian
Special Education District Office

*Student Assent: If you sign this form below, this means you understand the study and agree to participate.

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