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Students' and Teachers' Perceptions of the Strengths of Students with Mild Autism Using Gardner's Theory of Multiple Intelligences

Markthomas Tye McKeehan

STUDENTS' AND TEACHERS' PERCEPTIONS OF THE STRENGTHS OF
STUDENTS WITH MILD AUTISM
USING GARDNER'S THEORY OF MULTIPLE INTELLIGENCES

DISSERTATION

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by

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ABSTRACT

Much research has been conducted relating Howard Gardner's multiple intelligences theory to the gifted student; however, little research has been performed in the area of multiple intelligences of students with autism. The focus of this study was to explore the use of multiple intelligences theory as defined by the work of Howard Gardner as an augmentative method of examining the abilities or strengths of students with mild autism.

The study included 39 student participants at five public schools with eight teachers participating. The data collected from short surveys of students' strengths as well as teachers' perspectives of the students' strengths, an assessment instrument of the multiple intelligences, and student school work looked at the wholeness and integrity of the identification of these perceived strengths or abilities.

It was expected that students with mild autism would exhibit many abilities beyond the areas of linguistic and logical intelligences, which are the traditional focus of educational institutions. The study found that students were varied in their identified strengths; however, the musical and spatial intelligences were more often identified as being dominantly perceived. The teachers participating in the study were significantly accurate in perceiving the same strengths in the student that the student identified. Clearly there will be a need for greater attention to be placed on the abilities, strengths and talents of students who have been labeled with any disability. Perhaps one day the labels will be changed to reflect the abilities of these students rather than the deficits.

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CHAPTER I

INTRODUCTION

There are different kinds of gifts, but the same Spirit. There are different kinds of service, but the same Lord. There are different kinds of working, but the same God works all of them in all men. All these are the work of one and the same Spirit, and he gives them to each one, just as he determines (Holy Bible NIV: 1 Cor. 12).

Saint Paul touches on the concept of differences in individuals in his letter to the Church at Corinth and expresses a need for individual gifts to be acknowledged and celebrated. Educators continue to see the need for recognizing the strengths of the individual in the classroom for students to achieve success through more appropriate instruction and assessment. The academic and social skills of students do not develop at the same time nor in the same manner but instead arise in different and complex ways (Fischer & Rose, 2001). According to Hoerr (2003a), by recognizing that students have different arrays of strengths, we benefit ourselves as educators as well as our students on an individual and group level.

Research in the areas of special education and methods of assessing the strengths of special education students have been well documented (e.g., Berdine & Meyer, 1987; Salvia & Ysseldke, 1995; Thomas & Grimes, 1990). Additionally, there is information on theories of intelligence as a definition of a student's strength (e.g., Armstrong, 1994; Gardner, 1993; Sternberg, 1996). Historically, Charles Darwin not only researched the evolution of species, but he also studied the development of intellectual traits. Much of

the research that took place during Darwin's era was on the intelligence of different types of animals; however, it was Darwin's cousin, Francis Galton, who first established a laboratory to research and explore the differences in intellectual traits of humans (Sternberg). Alfred Binet and Theodore Simon in 1916 created one of the first intelligence tests to assess the achievement of children in French schools. Other intelligence tests and theories surfaced over the years, including popular theories and observations made by William Stem, Lewis Terman, J. P. Guilford, and Jean Piaget (Gardner, 1999).

One theory regarding intelligence was created by Howard Gardner (1983). He identified seven types of multiple intelligences (MI). Gardner has continued to explore other intelligences such as the culinary arts and mechanical (Gardner, 2000). He has suggested that individuals are “intelligent” in ways other than verbal/linguistic and logical/mathematical, which traditionally are most often identified with intelligence and predominant in educational assessments (Gardner, 1983). Gardner also suggested means for assessment other than traditional testing methods. His theory was originally intended for psychologists but has been embraced by educators for its application in curriculum and instruction.

More recently, there has been research and articles, particularly as it is used in instruction and assessment (Armstrong, 1994; Ellison, 1992; Gardner, 1994; Hoerr, 2000; Sternberg, 1994). Multiple intelligences theory can serve the field of curriculum and instruction as a guide and underlying philosophy. Using multiple intelligences as an organizing framework allows educators to cross all subject areas, teaching styles, and instructional materials to reach those with different interests, learning styles, and abilities.

This study investigated Gardner's theory of multiple intelligences and its relationship to abilities or strengths displayed by students with mild autism who receive special education services in the public school system and have an Individualized Education Plan (IEP) in place for accommodations. Since the passage of Public Law 94-142 in 1975, students who have struggled in the classroom have been referred for possible services through special education. In order to receive these services, students must be labeled and placed into categories defined by the law. Most of these categories use an Intelligence Quotient (IQ) score, among other criteria, as a determining factor of eligibility. IQ tests are strongly based on linguistic and mathematical skills. Gardner (1983, 1999) contends that while these skills are, indeed, a part of intelligence, students often exhibit skills or talents in other areas that do not fall under these two skills.

The word 'autism' is a Greek compound word from 'aut', which means 'self', and 'ism', which implies an 'orientation or state' (Trevathan, Aitken, Papoudi and Roberts, 1996). Autism, therefore, could be described as the condition of an individual who is unusually absorbed in him or herself (Reber, 1985). Other characteristics often associated with autism include a child's engagement in repetitive activities, stereotypical movements (i.e., hand flapping, head banging), resistance to change, and unusual reactions to sensory input (Powell & Jordan, 1993).

Anywhere from two to six per 1,000 people are diagnosed with the disorder. The Autism Society of America (2005) reports about 1 in 250 are diagnosed with a form of autism, which represents an estimated total of 1.5 million children and adults. The organization estimates that every day, fifty families in America discover that their child has autism with many more children having some symptom of autism.

Autism is recognized as a syndrome and is one of five disorders that share varying degrees of impairments across the domains of social, communication, and behavioral variability. Because each of these disorders share varying degrees of impairment across the three domains, they are considered to fall within the spectrum of disorders known as pervasive developmental disorders (PDD).

Children with autism lack the desire for social contact, and the attention and approval of others are not important factors to them. Autism is also widely recognized as a lifelong neuro-developmental disorder that affects how the brain functions (Minshew, 1996), and it is likely that both genetics and environment are factors that affect the presentation of autism in children (Bailey, Phillips, & Rutter 1996). Gardner has found similar connections between autism and neuro-developmental delays (Gardner, 1999). Although defined and diagnosed through behavioral characteristics, it is not considered a behavioral, emotional, conduct, or a mental disorder, and it cannot be diagnosed by medical tests (Schopler & Mesibov, 1988).

Background

The purpose of this study was to examine strengths displayed by students who have been placed in special education under the mild forms of the autism spectrum disorder. These strengths were compared to the different types of intelligences (Gardner, 1983; 1999).

Critics of special education have maintained that it has been focused on the remediation of weaknesses of students rather than placing emphasis on their abilities or strengths (Armstrong, 2000a; 2000b; Miller, 1993). When initially passed in 1975, the Education of All Handicapped Children Act (EAHCA) was largely intended to insure that

students with all disabilities were not denied a free and appropriate public education. The appropriate intervention for these students was the provision of special accommodations such as access ramps, Braille, and sign language interpreters to make public education accessible. These accommodations addressed students' weaknesses, but appropriately so. However, data indicates that approximately 90% of students now served in special education have been classified as having relatively mild disabilities, mostly in cognitive/learning areas (Armstrong, 2001). Some would argue that this population would be better served with a prevention or intervention model in the general education classroom rather than the application of an accommodation strategy so prevalent in special education (Horn & Tynan, 2001). There is a strong trend toward more inclusion of students with disabilities into the general education setting through the No Child Left Behind Act (2001) as well as the reauthorizations of the Individuals with Disabilities Education Act (1997, 2004), which recognized autism as a category for such attention.

Rationale for Study

For the past ten years, autism has been becoming a more commonly identified developmental disability (Fombonne, 2003). Children with autism generally exhibit deficits in social interaction, have problems with communication skills, and have difficulties with repetitive behaviors and interests (APA, 1994). For children, such interventions often occur in the school setting. For proper interventions, the students need to be motivated to learn which can occur when their own personal interests and strengths are recognized and utilized in instruction (Gardner, 2000).

Over the past several years, there has been a dramatic increase in children diagnosed with autism worldwide. In the 1960's and 1970's, epidemiological studies

reported four cases out of 10,000 births of autism. In the 1980's this increased to 16 cases per 10,000 and in 1990 it increased to 31 cases in 10,000 (Filipek, Accardo, & Baranek, 1999). In 2004, the research continues to show an increase in that number with up to 67 cases per 10,000. The California State Department of Developmental Services found that between 1988 and 1998, there was a 610 percent increase in diagnoses of autism (Croen, Grether, Hoogstrate, & Selvin, 2002). It is estimated that there are as many as 1,500,000 individuals in the United States with autism.

Changes in awareness of the disorder, better diagnostic tools, and broader diagnostic criteria could be the reason for the rise in autism being diagnosed. A study in California reported an increase in reports of children with autism while there was a decrease in a diagnosis of mental retardation.

There is little research relating the idea of multiple intelligences (MI) and special education with regards to working with students with autism in the classroom. Students with mild autism are considered higher functioning and can possess many abilities that may not be emphasized by the general curriculum. While this applies to many students regardless of disability, this study addresses an area in which very little, if any, research has been conducted.

The Problem

In the process of diagnosis and the remediation of disabilities as defined by what the students cannot do in relation to either a set of norms or to other students of the same age, there has been insufficient attention to what children who have been labeled with mild forms of autism actually do better or with greater strength than their peers. The information provided from such psycho-educational testing often confuses the educator

as it does not give specific, concrete information on the abilities of the special education student but merely defines the deficits of the student. Poplin (1984) comments upon this neglect in relation to those with learning disabilities:

The horrifying truth is that in the four years I have been editor of *Learning Disability Quarterly*, only one article has been submitted that sought to elaborate on the talents of the learning disabled. This is a devastating commentary on a field that is supposed to be dedicated to the education of students with average and above average intelligence . . . Why do we not know if our students are talented in art, music, dance, athletics, mechanical repair, computer programming, or are creative in other non-traditional ways? It is not for lack of assessment instruments. It is because, like regular educators, we care only about competence in its most traditional and bookish sense – reading, writing, spelling, science, social studies, and math in basal texts and worksheets. (LDQ, p. 133)

Mehen, Hertweck, and Meihls (1986) observed the way school psychologists use a “test-until-find” procedure in diagnosing disabilities related to learning. In this procedure, assessments are administered to children until they locate a suspected “disability” at which time they stop testing and give the child a label. If they do not locate a disability after two or three tests, according to Mehen, Hertweck, and Meihls (1986), they administer up to 15 or 20 other tests until they either find a “disability” or exhaust their entire testing battery. This assessment procedure would increase the probability of discovering disabilities in children and minimizes the chances of revealing normality and of recognizing superior skills and abilities (Mehen, Hertweck, and Meihls).

Other researchers have criticized the field of special education in part for focusing too much attention on the disability, deficit, and disadvantage and not enough on a child's "natural rhythms of growth" or innate learning styles (Armstrong, 1987; Burke, 1999; Dixon, 1982; Dobbs, 2001; Eisner, 2000; Granger & Granger, 1986). Clearly, there is a need for greater attention to be placed on examining the strengths, talents, interests and abilities of children who have been labeled with a disability.

Purpose of the Study

Multiple intelligences theory suggests that intelligences are situational. One subtype of intelligence, as described by Gardner, may be stronger than another based on the situation or activity the person is engaged in.

This study examined the perceived strengths of the student with mild forms of autism, including Asperger Syndrome. The study intended to examine the correlations between students' perception and teachers' perception of the students' strengths or abilities. At the heart of the study is a growth paradigm that focused on what the student perceives him/herself as being capable of doing or performing, rather than the deficit paradigm of what the student is incapable of doing or performing. The emphasis of using such a paradigm was to focus on the strengths and abilities rather than the deficits or weaknesses of students with mild autism.

Data collection was done through the use of short surveys of students' strengths for teachers and students, an assessment instrument for students, and school work review in an attempt to get the best sense of the students' talents and strengths. The study was done without comparing participants' abilities to other students nor measuring their strengths against any prescribed set of norms. The information gathered was quantitative

and with a small qualitative component. The study attempted to discover if there are general trends regarding the nature of the intelligence of students with autism.

This dissertation took as its central purpose the examination of this neglected aspect of the field of special education by exploring the strengths of children who had been labeled as having mild autism. After thoroughly reviewing the literature related to what has already been learned about strengths and abilities in the lives of students labeled as special education students, in general, and those with autism, in particular, this study focused on the talents, skills, and abilities of students with mild disabilities and, through work samples, surveys and an assessment instrument attempted to gain a better sense of the characteristics of those abilities. The study also examined how the teachers of these students view their students' strengths and how teachers' perceptions relate to the student's own awareness of their abilities and strengths, as well as how these perceptions correlate with the assessment of students' multiple intelligences.

The study was concerned with gaining an over-all sense of the range of abilities in a sample of students with mild autism and, as such, was exploratory in nature, paving the way for future studies to go into more depth on how these specific talents or abilities can be better utilized in the educational setting for academic planning and interventions.

Theoretical Framework

The underlying theoretical model used to guide the data to be collected in this dissertation was Gardner's (1983) theory of multiple intelligences. Gardner hypothesized seven basic intelligences originally which exist to varying degrees in all human beings. Each intelligence has its own autonomous neurological organization, its own evolutionary and developmental history, and its own cultural and personal manifestations.

Gardner developed this model out of his observations in neuropsychology, anthropology, psychometrics, experimental and developmental psychology, a study of the biographies of exceptional individuals and through several other areas of inquiry.

Possessing all of the intelligences, some intelligences emerge in individuals more dominantly than others based on what an individual values in his or her culture and environment. Intelligence is multifaceted and fluctuates with the individual and the environment (Armstrong, 2000). It is the role of educators to address dominant intelligences in students while building up weaker areas in order to maintain a more balanced, well-rounded educational process.

Because it is grounded in neuropsychology and developmental psychology, it also promises to provide insight on some of the reasons behind the observed strengths of the students in this study. A more detailed description of Gardner's model will be presented in the review of the literature in Chapter 2.

Questions Addressed in the Study

As previously noted, the examination of strengths in children with disabilities has tended to be neglected in the research with very little research being done on children with autism. Hence, the primary question of the study was: "What are the strengths of students with mild autism, including Asperger Syndrome, from a multiple intelligences perspective?" Once data concerning the strengths of the children was gathered, two further questions become important: "How do the assessed students' strengths relate to students own perceptions of their strengths?", and "How do the students' perceived strengths relate to teachers' perceptions of the students' strengths?" The latter question is important as it is the teachers who direct and guide these students' learning.

Gardner has pointed out that our culture values mainly linguistic and logical-mathematical intelligences (Scherer, 1999). Cross-cultural research shows that humans develop different competencies when their cultures value different intelligences. It is our Western and test biases in the American culture that emphasizes language and logic (Gardner, 1983). These appear to be the weakest intelligences of children identified as special education students through referral to special programs for deficient performances in writing, reading, spelling and mathematics. However, it has been suggested that the dyslexic child, for example, in our linguistic and logical-mathematical culture might flourish in a spatial or bodily-kinesthetic culture (Campbell, 1992). The question of the dominant intelligences of the autistic child is yet to be researched and answered completely.

A brief review of the literature shows that the “learning disabled” child may possess strengths in the area of spatial intelligence (Bannatyne, 1971; Dixon, 1982; Fleming, 1984; Vitale, 1982). Bannatyne writes that large numbers of dyslexic boys have intellectual abilities of a spatial nature, which are not being recognized nor cultivated for in the traditional school curriculum. However, no studies were found which focused on these types of intelligences in children with autism. Since the culture also neglects musical, bodily kinesthetic, and interpersonal intelligences (Gardner, 1983), there may in fact be a wealth of diagnostic information relative to the abilities and strengths of the autistic student in these areas as well.

Null Hypotheses

The research questions addressed in this study attempted to answer these questions in examining the abilities and strengths of students with autism through several methods of assessment. The study was tested by the following null hypotheses:

H₀1. The dominant intelligences of students with mild forms of autism will not exhibit weaknesses in linguistic and/or logical-mathematical areas.

H₀2. The dominant intelligences of students with mild forms of autism will not exhibit strengths in spatial and/or bodily-kinesthetic areas.

H₀3. There will be no significant correlation between the students' perception of their strengths and the assessment instrument.

H₀4. There will be no significant correlation between students' perception and teacher's perception of student strengths.

To compliment the quantitative information, qualitative data was collected through students' work samples from a small percentage of the participants.

Importance of the Study

Educational philosophy and common core beliefs and values affect curriculum (Ornstein & Hunkins, 1998). Teachers need to recognize these differences and teach to a broader range of talents and skills (Armstrong, 2000). Educators who address the diversity of students through differentiation of instruction using the multiple intelligences approach allow for multiplicity or a variety of learner needs. While research has been done connecting MI to giftedness and the student with learning disabilities, little research has been done in the area of autism. One study was uncovered during the initial research that linked MI theory to students with learning disabilities. Armstrong looked at the strengths of elementary aged children. His study found weaknesses of these students in

the linguistic and logical areas and nothing significant in the other areas of intelligences to generalize to all students with learning disabilities (Armstrong, 1987). This study was based on Armstrong's study with a focus on students in elementary and middle school grades who have mild autism, including Asperger Syndrome. This study adapted Armstrong's survey and had teachers and students complete the survey for any correlations. Primarily this study took the ideas of Armstrong's dissertation research and applied them to the student with mild autism, as well as expanding his ideas to include students and teachers in completion of the survey instruments.

In the past, special education has looked at these strengths as "learning styles" rather than intelligences (Gronlund, 2003). Teachers tend to teach to their own strengths and often find it difficult to teach those who are not as strong in a specific area (Gardner, 1999). By reflecting on the intelligences Gardner has identified, teachers could become more aware of their own intelligence strengths and how this affects their teaching style. By broadening their idea of what might be called strength, or intelligence, teachers could begin to utilize more ways to present material to students, as well as ways for students to demonstrate their knowledge for assessment. By addressing these strengths in this new way, teachers might better serve students who have been resistant to school or unsuccessful in the past, and show them that they are, in their own way, intelligent (Gronlund, 2003).

The identification of strengths in children with autism may represent an important influence in helping these children become better learners. Studies in the past suggested that teachers are less accepting of children with "labels" (Foster, Schmidt, & Sabatino, 1976; Garrett & Crump, 1980); parents tend to regard them more negatively in terms of

their capabilities and prospects for the future; and peers are more likely to engage in rejecting and competitive behaviors toward them (Bryan, 1976). Rosenthal and Jacobsen's (1968) study of the "interpersonal expectancy effect" suggests that teacher and parent expectations of children's learning abilities can have a significant influence upon their actual learning performance. This self-fulfilling prophecy, coupled with the research studies mentioned above, support the view that, by focusing attention upon learning failure, we may actually be helping to create a downward spiral of student frustration, leading to teacher, parent, and peer criticism, and subsequent increased failure in learning, which in turn can lead to more criticism, negative expectations and failure.

In addition, the identification of strengths could lead parents and teachers to identify specific modalities through which areas of need could be taught. A child weak in a certain linguistic area might be strong in spatial intelligence. This information could be used by teachers to develop techniques for teaching reading to the autistic child that would focus on the use of spatial intelligence using art or visual imagery (Wing, 2001).

Definition of Terms

The following is a list of terms found in this dissertation that could cause some confusion. Further, the list defines certain words that could have more than one meaning.

Accommodations - to make adjustments according to the individual needs of the students (Eberstadt, 1999).

At-risk children - Children who are in danger of failing to gain the skills needed to succeed in school (Johnson & Jackson-Johnson, 1988).

Asperger Syndrome - Relatively strong verbal skills, but trouble reading social situations and sharing enjoyment, obsessive interests (Powell & Jordan, 2000).

Autism - Severe language problems, lack of interest in others, repetitive behaviors, resistance to change, irrational routines (Powell & Jordan, 2000).

Criterion-Referenced Assessments - Use of measures that evaluate students on the basis of a set of given skills (Cangelosi, 1990).

Dyscalcula - Problems or dysfunction with the ability to use numbers and perform mathematical operations (Lazear, 1999).

Dysgraphia - Problems or dysfunction with ability to write, either forming letters or writing coherent words or sentences (Lazear, 1999).

Dyslexia - Problems or dysfunction with the ability to read; either gathering meaning from groups of words (sentences) or the ability to decipher individual words (Lazear, 1999).

Growth Paradigm - A way of looking at a body of knowledge that emphasizes abilities and strengths over deficits and weaknesses (Stiggins, 1994).

Internalization - The taking in of knowledge from social contexts in which it is observed to use for oneself (Wolfe & Brandt, 1998).

Learning styles - the unique mode of how one learns based on cognitive functions of perception (how the information is absorbed) and judgment (how the information is processed) (Silver, Strong, & Perini, 2000).

Logical/mathematical intelligence: relates to reason and math.

Motor Cortex - Section of the brain thought to be associated with bodily-kinesthetic intelligence (Wolfe & Brandt, 1998).

Multisensory - Use of the different senses, including, but not limited to, drawing, singing, acting, retelling, writing (Henry, 2000).

Paradigm - A model; a way of looking at a body of knowledge (Weber, 1992).

Pervasive Development Delay - usually used to refer to persons who do not fall in the “autistic’ category according to medical diagnosis, but are considered to be on the high functioning level of the spectrum (DMS-IV, 1994).

Strengths - Areas of ability, mastery, or competence; not necessarily giftedness, as they relate to the child only. Strengths are not measured against other children or prescribed norms (Gardner, 1999).

Savant Syndrome - Term used to describe individuals suffering from severe autism but who have one highly developed intelligence. Replaces the term idiot savant (Burke, 1999).

Scaffolding - Competent assistance or support, usually provided through mediation of the environment by a parent or teacher, by which cognitive, socioemotional, and behavioral forms of development occur (Vygotsky, 1978).

Typical Child - A child developing normal cognitive abilities within the approximate age range described by cognitive psychologists. The absence of a developmental delay or disability (Burke, 1999).

Summary

This chapter has presented a statement of the problem to be studied by suggesting that strengths in students with autism have been neglected as an area of research and proposing that these strengths be studied in a formal way. Data was collected through surveys, an assessment instrument, and documentation review, giving a specific theoretical framework within which the collected data was interpreted. The study answered specific questions that explored the relationship of the data collected on the

students' and the teachers' perceptions and defined important terms used in this study. Chapter 2 explores what has already been discovered thus far in the literature about the gifts, talents and abilities of children labeled with exceptionalities; the next chapter further explores the multiple intelligences and the proper assessment of such abilities.

CHAPTER II

LITERATURE REVIEW

There has been research conducted by educators and psychologists in a quest to better understand the nature of intelligence and how to accurately identify and measure it. Although there is documentation in the literature and research regarding human intelligence theories and measurement, it has only been in the past twenty-five years that multiple intelligences (MI) theory was introduced by Howard Gardner. This chapter provides a literature review of topics including theories of intelligence, the theory of multiple intelligences and criteria including assessment, teacher perceptions, possible future multiple intelligences, and implications for instruction, as well as literature on special education and the autism spectrum.

Definitions of Eligibility Criteria for Special Education Categories

Labeling students means that some standard, or definition, must be set so that students can be identified as fitting that label. Under P.L. 94-142, the disabilities of a student considered to fall under these categories are defined. However, the eligibility criteria for placement in special education can differ greatly from state to state. For most categories, it is the Intelligence Quotient (IQ) that sets that standard.

The emphasis for eligibility is on the ability to perform linguistic or logical-mathematical based tasks. However, the basis for labeling these students falls into only two of the eight categories of intelligence Howard Gardner has defined. Although the criteria states that issues such as environment, cultural differences, and socio-economic status must be ruled out to determine true eligibility in any disability category, in practice this is not the case.

In past attempts at including special education students in general education, guidelines often seemed ambiguous, as did the terminology defining inclusion (Armstrong, 2001).

This clearly seems to call for more inclusion in the regular education curriculum for special education students. Since these identified special education students have demonstrated difficulties within a general education setting in the past, new methods of teaching them must be explored in order to provide them with an opportunity to access the general curriculum. This can be accomplished by identifying the strengths in the student and addressing curriculum and instruction appropriately.

Regular education must prepare to meet the increasing needs of students who do not fit into the norm. They also contend that this seemed a better way to categorize students, "...fathoming their scholastic foibles, and helping them absorb information" (p.275).

History of Intelligence Defined

Galton used subjects in Britain to present evidence that intellectual ability was genetic. Thus began the controversy of intelligence and heredity. Galton attempted to define intelligence in terms of behavior. Hence, his work did not translate into specific

measures of intelligence, but did introduce the idea of intelligence testing (Herrnstein & Murray, 1994; Winzer, 1993).

Like Galton before him, he believed that individual differences consist of deviations from a population average. He developed questions that attempted to measure intelligence by measuring a person's ability to identify patterns, reason, and draw analogies. This was the basis for the Intelligence Quotient (IQ) Test (Winzer, 1993). Along with his assistant, Theodore Simon, Binet sought to create a single measure in which samples of different areas of mental ability could be merged in order to provide a rough but serviceable method of assessing general intelligence.

The IQ test became Americanized during the 1920's and 1930's.. Terman standardized the scale on what he believed to be a typical American sample of 2,300 Caucasian children in California. Yerkes, as president of the American Psychological Association, offered the services of that body in testing of draftees prior to World War I to assess their capabilities. He was able to acquire data on 81,000 native born whites, 12,000 foreign born whites, and 23,000 native born blacks (Winzer, 1993). Since there were specific instructions and norms were determined, test takers could be examined under uniform conditions and their scores could be compared.

The behaviorist movement under theorists such as B.F. Skinner led to more controversy on the idea of IQ and heredity. To those who held the behaviorist view, human potential was shaped by environment that could produce human deficiencies in intelligence, parenting, or social behavior, or work behavior. The behaviorist theory further states that the causes of these deficiencies could be fixed by addressing public

policies such as redistribution of wealth, better education, better housing and medical care (Herrnstein & Murray, 1994).

Others have spoken out indicating that the average IQ of various socioeconomic and ethnic groups differs according to data available. These included Arthur Jensen, William Shockley, and Richard Herrnstein. Despite this controversy, standardized intelligence and achievement testing remain an integral part of our educational system (Herrnstein & Murray, 1994; Winzer, 2000).

The Theory of Multiple Intelligences

Although Binet is considered one of the pioneers of intelligence testing, his theories and research have been challenged. Guilford (1967) noted that Binet did not regard intelligence and scholastic ability as being the same thing. Binet stated that scholastic ability depends also upon other traits.

In 1923, Spearman introduced "g" to signify a general factor of intelligence (Gardner, 1999a). Wechsler (1944) wrote "Professor Spearman has shown that a common factor not only has to be assumed in any attempt to measure general intelligence by means of tests, but has demonstrated that its presence can always be revealed through appropriate statistical procedures" (p. 7). The theories of Binet and Spearman viewed intelligence as a single entity; however, different concepts regarding intelligence began to emerge in the 1930s.

In the early 1930s, Thurstone proposed seven separate mental abilities, which differed from previous concepts of one primary intelligence. Based on his findings, he created an assessment to measure intelligence in an authentic manner (Thurstone, 1938).

Guilford (1967), a professor at the University of Chicago, concluded that more than 150 factors of intellect existed. Researchers continued to create a definition for intelligence. He created the Wechsler Adult Intelligence Scale (WAIS), which measured different mental abilities in subtests and provided researchers with an alternate means of measuring IQ scores.

Gardner (1983) wrote that it was Piaget in 1972 who defined intelligence as the superior form of equilibrium of cognitive structuring used for adaptation to the physical and social environment. Piaget identified two means of adapting to environment that he labeled accommodation and assimilation which were based on a cognitive theory of psychology.

Psychologists and educators were interested in the way the mind worked and how intelligence was measured and identified. Researchers continued to explore intelligence patterns and identification.

While psychologists and educators explored how to measure intelligence, they also researched learning styles and ways in which individuals obtain information and grasp concepts. In the early 1920s, Carl Jung was one of the pioneers who explored research on learning styles (Mitchell & Baird, 1986). A theory was introduced by Isabel Myers and Katherine Briggs, who created an assessment based on Jung's theory.

Howard Gardner continued the trend of exploring learning styles and the measurement of intelligence when he introduced MI theory in 1983.

As he began to question the conventional thoughts of developmental psychology, Gardner (1990) asked himself what optimal human development was. He became convinced that intelligence also involved skills and abilities seen in painters, writers,

musicians, dancers, and other artists. He was comfortable in regarding the capacities of those in the arts as fully cognitive.

Children are not necessarily introverted and shy, but they may have a strong need to seek solitude for reflection. In exhibiting intrapersonal intelligence, people show a capacity for mobilizing their own resources, completing long-term projects with little or no supervision, and for working on their own. In general, this intelligence might be defined as access to one's emotional life for understanding oneself and others. Examples of persons who evidence this intelligence could include Bill Cosby, Anne Frank, and Eleanor Roosevelt (Armstrong, 2000a; 2000b; Gardner, 1999).

They would rather be out in the fields or woods hiking or collecting rocks or flowers than being cooped up in school doing their paper and pencil homework. On the other hand, if the schoolwork involves studying lizards, butterflies, dinosaurs, stars, or other living systems or natural formations, their motivation is likely to show interest. Examples of persons who evidence this intelligence include Charles Darwin, Jane Goodall, and John Muir (Armstrong, 2000a; 2000b; Gardner, 1999).

MI and At-Risk Population

The criteria for determining eligibility for placement in special education categories and, thus, labeling students is still based on the concept of intelligence from Binet, Terman, and Yerkes (Gardner, 1999). This concept is heavily weighted with verbal, numerical, and logical tasks (Hoerr, 2003a). Gardner has presented the possibility that intelligence involves more than these few types of tasks. However, school curriculum still is centered on standardized test scores which are composed of only the

first two of Gardner's defined intelligences – linguistic and logical-mathematical. These scores are used to measure the success of students, teachers, and schools.

Although Gardner (1983) originally introduced Multiple Intelligences Theory to psychologists, the impact from his book *Frames of the Mind* (1983) is experienced by educators as well. This impact correlated with a need to improve classroom instruction after the release of the report of the same year, *A Nation at Risk* (NCEE, 1983), which documented the failings of the educational system in the United States. In his book, Gardner was not suggesting a particular curriculum or a method of instruction. Rather, he suggested that other intelligences be assessed in an appropriate manner. Gardner's Project Zero, a research think-tank that operates out of Harvard University Graduate School of Education, has provided extensive research on multiple intelligences and has provided schools with resources for exploring the multiple intelligences of their students (Gardner, 1995). Schools and educators that implement a multiple intelligences approach to education do not necessarily have a formal association with Project Zero nor Howard Gardner, but utilize aspects of his theory that are applicable to their particular situations. While many educators have been introduced to MI Theory through workshops, reading materials, and observations, there may be educators who have not been formally instructed in MI Theory. Gardner has not endorsed any school that implements a multiple intelligences approach to classroom education.

Gardner does not provide educators with a set curriculum or lesson plans for implementing multiple intelligence instruction. He contends that it lies with each teacher to determine the means by which a lesson will be taught and in identifying the strengths

of each student (Gardner, 1983). Many decisions regarding instruction are at the discretion of the teacher.

Another consideration is that the manner in which information is presented to students may be influenced by the dominant intelligence of the teacher. For example, if a second grade teacher's dominant intelligence is musical, it seems likely that many of the lessons presented will incorporate music. In contrast, another type of intelligence might not be highlighted in the classroom if it is not the dominant intelligence of the teacher (Gardner, 1991).

Therefore, teachers need to try to “differentiate” their instruction by tailoring it to individual learning styles or abilities with a variety of approaches. Areas where teachers can differentiate instruction are in content, process, and product. They can differentiate instruction by examining students' readiness, interests, and learning profiles (Tomlinson). Gardner’s MI Theory can assist a teacher in identifying their own styles as well as the learning styles and strengths of their students.

Gardner's MI theory attracted many supporters in research and education who outlined different approaches that teachers could use for incorporating MI in the classroom to help students construct knowledge (Armstrong, 2001; Black, 1994; Laezer 1999). Teachers were encouraged to use the intelligences as "entry points" (Campbell, 1997; Steinberger, 1994) into the curriculum; these “entry points” would enable students to understand new information and improve the problem solving abilities based on their acquisition of this new information. Although researchers such as Armstrong and Checkley (1997) provide valuable approaches for using Gardner's theory as entry points into the curriculum, most of their suggestions involve how teachers should design

curriculum to tap various intelligences and find entry points for their students. For example, an MI checklist used by teachers (Armstrong, 2001) was the typical way of determining their students' multiple intelligences. This teacher-directed method is not consistent with the original aims of MI theory because it excludes students' experiences, of which educators may not even be aware, and does not allow students to contribute their own thoughts and expressions of other interests to the assessment. Likewise, students may have preconceptions and misconceptions as to what kinds of activities and behavior are included in the various categories of intelligence or may not fully understand the concept of a dominant intelligence. Since the learner is central to the educational process (Hedegaard, 1990), it is logical that students should be consulted and allowed to develop their own awareness of their own multiple intelligences.

This study is a modification of the research done by Thomas Armstrong in 1987. The current study focused on elementary and middle school aged students with mild autism, as there is little research on multiple intelligences and children with autism. Armstrong's survey was aimed solely at the parents/guardians of students with learning disabilities. Teachers and students were not included in Armstrong's study as they were in the present study. Armstrong (1987) found in his study of 48 participants that the students were less dominant in the logical and linguistic intelligences and high in the spatial and kinesthetic intelligences. His findings were based on the parents' perceptions of their own children's strengths.

Armstrong has, since his dissertation, written several books on multiple intelligences in the classroom that provide user-friendly information to teachers, which

they can use directly in their classroom teaching. However, the books he has written are not specific to a particular group of students, such as those in special education.

There is a need to provide teachers with information on the strengths and talents of special education students that can be used directly in the construction of Individual Education Plans (IEPs) or other instructional objectives and interventions. Multiple intelligences theory can be used to augment current assessment batteries given to special education students to construct more of a picture of the strengths, as well as weaknesses, of the child with special needs.

Autism

In 1943, child psychiatrist Leo Kanner provided an account of what he labeled “autistic disturbances of affective contact.” He described a group of students who, while very similar to each other, were qualitatively different from children who had been described with different clinical diagnoses. Kanner’s study provided the first glimpse of what we now refer to as autism (Kanner, 1943).

The word ‘autism’ is a Greek compound word from ‘aut’, which means ‘self’, and ‘ism’, which implies an ‘orientation or state’ (Trevarthen, Aitken, Papoudi and Robarts, 1996). Autism, therefore, could be described as the condition of an individual who is unusually absorbed in him or herself (Reber, 1985). Other characteristics often associated with autism include a child’s engagement in repetitive activities, stereotypical movements (i.e., hand flapping, head banging), resistance to change, and unusual reactions to sensory input (Powell & Jordan, 1993).

According to the Centers for Disease Control and Prevention (2005), anywhere from two to six per 1,000 people are diagnosed with the disorder. The Autism Society of

America (2005) reports about 1 in 250 are diagnosed with a form of autism, which represents an estimated total of 1.5 million children and adults. The organization estimates that every day, fifty families in America discover that their child has autism with many more children having some symptom of autism.

Autism is recognized as a syndrome and is one of five disorders that share varying degrees of impairments across the domains of social, communication, and behavioral variability. Because each of these disorders share varying degrees of impairment across the three domains, they are considered to fall within the spectrum of disorders known as pervasive developmental disorders (PDD).

Children with autism lack the desire for social contact, and the attention and approval of others are not important factors to them. Autism is also widely recognized as a lifelong neuro-developmental disorder that affects how the brain functions (Minshew, 1996), and it is likely that both genetics and environment are factors that affect the presentation of autism in children (Bailey, Phillips, & Rutter 1996). Gardner has found similar connections between autism and neuro-developmental delays (Gardner, 1999). Although defined and diagnosed through behavioral characteristics, it is not considered a behavioral, emotional, conduct, or a mental disorder, and it cannot be diagnosed by medical tests (Schopler & Mesibov, 1988).

Kanner (1943) first described the syndrome of autism while he was a professor of Child Psychiatry at Johns Hopkins School of Medicine, and the term autism has since been used over the years to identify many different levels of abnormal function. Autistic infantile psychosis (Mahler, 1952), “childhood schizophrenia” (Wolff and Chess, 1964), “autism” (Tustin, 1981), “autistic disorder” (DSM-III-R, 1987) are some of the synonyms

of the syndrome that was first described by Kanner as “early infantile autism”. The main behavioral characteristics of a child with autism are: (a) inability to establish social relatedness, (b) failure to use language normally for the purpose of communication, (c) obsessive desire(s) for the maintenance of sameness, (d) fascination(s) for objects, and (e) good cognitive potentialities.

The DSM-IV (APA, 1994) incorporates the notion of a triad of impairments that are known to be characteristic of individuals with autism. Delays in three areas, communication, behavior, and social skills, affect their ability for successful social relatedness to other persons, their expressive and receptive communication skills, and the depth of their imagination. This triad (Wing & Gould, 1979) of behavioral failings in social skills, language and cognitive flexibility reflects a historical preoccupation with measurable disorders that are important in the development and education of school age children (Trevorthen et al., 1996). However, according to these authors, the triad model described by Wing and Gould does not take into account recently gained insight into the innate motivating processes of the infant and preschool child that regulate mental development and interpersonal contacts. They claim that these aspects of the intrinsic motivation for behavior are more fundamental, equally amenable to systematic assessment, and a better indicator for the development of an integrated program of treatments (Trevorthen et al.). However, often when their innate interests or what would motivate them is discouraged or not recognized, their motivation declines and they experience failure that is within themselves and their own understanding of what they are capable of.

It is known that autism is a defect in psychological development that directly affects the way the expressions and actions of other persons are perceived (Trevarthen et al., 1996). This is associated with problems in expressive communication, in understanding other persons' thoughts, and in comprehending the ordinary use of language and the meanings others give by convention to actions and objects.

Defined as a syndrome means that affected individuals with Autism Spectrum Disorder (ASD) will not have all of the associated signs and symptoms (Siegel, 1996). The fact that autism and PDD are classified as developmental disorders means they are conditions a child is born with or born with a potential for developing and is the result of an abnormality in the structure and the functioning of the brain (Siegel). As suggested by Bailey and others (1996), there is no single cause for autism; rather, it appears to stem from a variety of sources. These sources include pre- and postnatal problems, genetics, and possible infectious, metabolic and environmental causes, including inherited susceptibility precipitated by environmental toxins and/or pathogens.

The cognitive level of children with autism is directly associated with the severity of their autistic symptoms or behaviors. This often makes it difficult to differentiate between autism, mental retardation, and expressive or receptive language impairments. Approximately 75% of persons with autism are reported to function within the mentally disabled range as described in Chapter One of this study (American Psychiatric Association, 1994), which makes the process of differentiating between the two disorders (autism and mental retardation) difficult. However, children with mental retardation only exhibit delays in social interaction, communication, and behavior variability that are consistent with their developmental level and are not consistent with

the impairments seen in children with autism. Similarly, children with significant problems associated with expressive and receptive language delays will not exhibit the impairments associated with social interaction and communication as those observed in children with autism.

Students with autism are similar in that they share a triad (Wing & Gould, 1996) of impairments associated with the disorder. However, they are also dissimilar in that they are individuals with difficulties that make participation in the socialization process even more individualistic in their development than typically developing students (Jordan & Powell, 1995; Powell & Jordan, 1993). Researchers Powell and Jordan (2000), in reference to teaching student with ASD, explain:

Educators need to recognize that autism is a developmental disorder. Any fundamental disabilities will not just have an effect on the development areas associated with the difficulties that result from the disorder, but on every aspect of development (Grandin, 1995). The results will not just be in terms of deficits, but rather a different way of understanding and learning. The differences in general cognitive abilities among students with autism and the degree of language abilities have notable implications on the development of the student. These differences need to be accounted for in respect to the individual aspects of each student's development and their abilities and strengths (Williams, 1994).

There are four implications of autism thinking that have profound effects on educational settings. These include (a) the way individuals with autism perceive information, (b) the way in which the world is experienced, (c) difficulty in experiencing events with personal relevance, and (d) the role of emotion as a context in which these

processes take place. The writings of individuals with ASD (Grandin, 1995; Williams 1994) make it clear that stimuli from the environment are not perceived in the same manner as it is for typically developing children. This happens due partially to the abnormalities in interpreting sensory information and partially because of the failure of continuous, appropriate socialization in providing for specific social and cultural meaning for what is being perceived.

Based on these implications of processing, there will be subsequent difficulties for students with autism when learning about the world that will be intensified if the learning takes place within an educational environment constructed in the traditional model. The varying levels of cognitive abilities and the differing language abilities that interact with the autism disorder will be factors that weigh heavily on the curriculum needs and individualized instruction necessary for each student to ensure their educational success. Today's tendency towards the fast paced, predominantly social attempt at instructional delivery, typical of mainstream and general education classrooms, are not appropriate for students with autism. The student will experience difficulty with implied rather than asserted information, when visuals are not available to back up oral information, when task purpose is not made clear at the beginning of an activity, and the importance is not redefined or reflected upon at completion (Powell & Jordan, 2000).

Students with ASD function at a considerably higher level when presented with multi-sensory experiences that validate the student's present capabilities. This kind of approach depends on feedback from the parents and the teacher based on careful observations of the students. This approach allows students to use the materials or

activities they like, making it easier to create a successful environment for all students (Powell & Jordan, 2000).

For students with ASD, not having the ability to relate to and communicate with peers and teachers can be an extremely frustrating situation, especially when students are expected to answer teacher-directed questions in a large classroom setting (Grandin, 1996). While some students with ASD may feel comfortable responding verbally, most do not and almost all have difficulty doing so in a limited amount of time. The result of this situation for these students becomes withdrawal from group situations, complete shut down, and a decline in self-esteem. In extreme cases, a student may even react with a tantrum (Bondy & Frost, 2001). This type of experience is known as a paralyzing experience (Feldman, 1980).

One of the major differences between children with autism and those who are typically developing is the way they process information. Those with autism think in pictures (Grandin, 1995), so for them, the processing time can be considerably longer, particularly when not presented in more visual forms. The information received must be converted to photographs or pictures and processed before a logical response can occur though many do not have the necessary language skills to give a comprehensible answer. Therefore, it is important that teachers begin to focus on the strengths, the skills and the various learning and comprehension styles of the children as individuals rather than try to mold them into a way of learning that is frustrating and ends up being unsuccessful for them. It would be far more productive for teachers to create crystallizing rather than paralyzing experiences for all students (Gunstone & Mitchell, 1998).

By changing their approach to teaching, while maintaining high expectations for students with special needs, teachers are often not only successful in decreasing unacceptable behaviors, but also successful with increasing student participation and acceptance among peers, which in turn results in increasing self confidence. This is known as a crystallizing experience, or a turning point in a student's development of their abilities and talents (Feldman, 1980). Allowing for individuality is a practice teachers need to incorporate into their daily lessons to ensure the social and emotional, as well as intellectual development, of all the students in their class.

Students with autism are considered students with special needs, but often they have related conditions, such as Attention Deficit Disorder, learning disabilities, speech impairments, or expressive and receptive language disorders that interfere with language processing and responding. Differentiating curricula becomes a crucial way to address policies such as IDEA and ensure a greater chance for the student's success in the regular education classroom.

Implications for Using MI Interventions with Children with Autism

Teachers should understand that certain interventions can be more appropriate for the student with mild autism which will take into account the stress and anxiety of social situations. These can include: watching for facial gestures, focusing attention on other students, interpreting nonliteral language which may confuse them, seeking to understand true intentions and being aware of hidden curriculum (Barnhill, 2001). With the wide range of strengths and weaknesses of students with autism (Wing, 1997), to best understand intrinsic motivation and innate interests, a method such as the multiple intelligences needs to be utilized to best device appropriate curriculum (Gardner, 1983).

Fisher (1997) found MI theory heightened student progress in an indirect way and aided in identifying students' needs in classroom environments. Fisher stated that MI theory allowed teachers to create classroom environments that allow all types of students to learn. Since Gardner's original research done in the early 1980's, additional learning and research has taken place at Harvard University with a research project entitled Project Zero. Originally one of the main goals of Project Zero was to research development of creative and artistic capabilities (Ferne, 1992). However, the group went on to provide interested parties with applications of MI theory (Guskey, 2001). Research has been done at schools in Massachusetts using teachers, administration, curriculum, and students that represent a diverse population. As MI Theory became better known throughout educational institutions, Gardner (1999a) wrote, "I am pleased that the educational researcher Mindy Kornhaber and her colleagues at Harvard's Project Zero have undertaken the SUIVUT (Schools Using Multiple Intelligences Theory) project. Therefore, suggestions for implications that have come from Project Zero have been researched and implemented in educational institutions, which have explored instructional methods using MI Theory.

Gardner does not suggest a curriculum or method of instruction for a school using MI theory to develop instructional techniques. Therefore, teacher input and creativity are critical components of the Multiple Intelligence School.

Tufts University sponsors a research program entitled Project Spectrum that studies the cognitive profiles (strengths and weaknesses) of classroom instructors. Teachers are given the freedom and opportunities to create a learning environment that they feel are most conducive for learning and in which they are most comfortable

teaching (Gardner, 1993). Project Spectrum recognizes the importance of identifying multiple intelligences of individual students and creating learning situations which teach to the diverse intelligences. This type of environment also allows teachers to explore creative teaching techniques. Janet McClaskey (1995) wrote that MI theory "humanizes the education of students by basing it on their individual capacity and style of learning, thus making for a student centered education" (p. 56).

Linda Campbell (1997) has done research on the implications of MI theory in the classroom and the effects of teacher attitudes towards MI theory instruction. Her research appears to support the idea that a teacher's dominant intelligence does affect instruction and that accommodations should be made to allow teachers to instruct students using the intelligence in which the teachers are dominant.

Campbell (1997) suggests teachers bring in experts or community volunteers for instruction using different intelligences in which they may not feel comfortable. In some secondary schools, multiple intelligence programs have complemented the interdisciplinary units.

After several pilot programs were researched and reviewed by Gardner (1989) and his associates, promising preliminary results were found. However, Gardner (1993) also acknowledged that the pool of participants was small and standardized tests which assess learning are not available for a MI theory of instruction; therefore, there is a need for further research and a need for assessment which is truly authentic.

Abmet Saban (2002) wrote about a school in Konya, Turkey, that embraces a model for instruction based on the MI Theory. Before the MI theory approach was

introduced to the students, the teachers took an inventory that identified their dominant multiple intelligences. Teachers identified their dominant multiple intelligence and were aware of the results of the other teachers' strengths; this process appeared to have created a sense of collaboration and mutuality within the school. Saban wrote, "Since adopting the multiple intelligence theory, our classroom teachers have learned to collaborate not only with one another, but also with specialists whose work is targeted toward specific intelligences" (p 73). Cobb (2002) found in the schools studied for his research that those which achieved high scores implemented a reading program which incorporated MI theory activities in all lessons.

Teacher Perception of Multiple Intelligences Theory

The current study used the Theory of Multiple Intelligences as a framework because teachers not only have differing perceptions of the influence of MI theory on instruction, they also have different levels of knowledge regarding MI theory. Reglin (1993) noted students must be acknowledged and appreciated for their gifts that are not as easily recognized as those who test well. The author wrote about what constitutes achievers in society and that students who possess intelligences, which are not recognized on standardized tests (such as musical or naturalistic intelligence) are labeled as underachievers. The labeling of students as underachievers or as not intelligent because they do not perform well on tests may cause frustration and anger in students, which will present itself in many ways (Johnson & Johnson, 1988).

A study was conducted by Guskin, Peng and Simon (1992) to discover the correlation between teacher perceptions of student ability. The study included 158 teachers with varying degrees of experience and education. The outcome of the research

indicated that teachers were aware of multiple intelligences based on their knowledge of the individual students. The study also found that the perception of teachers regarding student ability and giftedness guided the behavior and actions of the teachers.

Beane (1995) suggested that teachers collaborate with one another within and across disciplines regarding assessment practices, which will, in turn, enrich instructional practices. Beane also noted teachers who encouraged and promoted student assessment reflect on their own instructional techniques as well. Cobb (2002) found during her research that some teachers in Miami-Dade County elementary schools were not aware of MI theory strategies for instruction.

Owen-Wilson (1998) found that teachers who possess “intuitive artistry” are made to feel that their opinions and assessments of students are less valid when compared to other assessment measures which have been verified and are more traditional measures. This is a reason knowledge of different intelligences helps to validate many teachers' more qualitative or intuitive assessments of student performance.

This assumption places the emphasis for further learning on the workplace, rather than the university or college. Hoerr (2000) writes that as influential as the theory of multiple intelligences can be in changing how educators view students, a school is not likely to succeed at using multiple intelligences theory productively without a high degree of collegiality. Collegiality, sharing of ideas, and staff development should be addressed initially when introducing MI theory to schools. Different faculty members will have varying degrees of knowledge and materials which pertain to MI theory instruction, and one of the first steps would need to be identification and acknowledgement of levels of

understanding. Leeper (1996) found teachers need opportunities after training for peer coaching, planning time, and time to gather and research new ideas and materials to begin MI theory experiences. Scott (2001) stated that the multiple intelligence theory can be made consistent or inconsistent with a myriad of practices, goals and values. Individuals can add a piece of the puzzle to raise awareness and add information to the use of MI theory within their schools.

Armstrong (1994) felt that there was a need for teachers to identify their dominant multiple intelligence, and unless there is an experiential understanding of the theory and a personalization of content, educators are unlikely to be committed to using it with students. Picano (2000) found teachers differentiated the curriculum to integrate MI theory at times, and also noted it was more often that students used different intelligences or their own strengths or abilities to complete tasks. Self-knowledge of multiple intelligence strengths and weaknesses provide knowledge for growth and opportunities for both students and teachers.

Gardner (1999) felt very strongly that MI theory needed to be incorporated into classroom instruction. He stated that at the very time when IQ-style thinking has made unprecedented inroads into thinking about educational programs, the scientific base on which it was erected has almost completely failed. Gardner and those who have embraced the MI theory have encouraged faculty and administration to become familiar with the MI theory approach, while stressing it is not a curriculum, but rather an approach to education. Hoerr (2000) wrote that teachers and principals are finding that using MI theory not only increases the opportunities for students to learn, but also gives adults more ways to grow professionally and personally. Beltzman (1994) suggested educators

discover students' strengths to increase success and to create strategies and assessments which build on identified strengths. . We created an environment with motivating resources and let the children demonstrate their spectra of intelligences in as natural a fashion as possible" (p. 137). Much of what has been discussed for instruction and implementation is up to the discretion of the classroom teacher and his/her passion about MI theory.

Multiple Intelligences for Authentic Assessment

John Walters, a professor at Harvard University, wrote a paper about the applications of multiple intelligence research. Part of the paper concentrated on assessment methods for multiple intelligence instruction and different methods for authentic assessment.

Gardner and his associates created an environment they called the "Spectrum Classroom" where children would be comfortable with multiple materials and forms of assessment. Although the initial classroom was created for children aged four to seven, Gardner wrote about the research done at Project Spectrum and concluded it is possible to observe children at play (or at work) systematically and to arrive at a quantitative description of their intelligences.

Although research done by Frisbie and Waitman (1992) indicated that it is not necessary for teachers to obtain grades to continue instruction in a meaningful and successful way, this may be disputed by some individuals and educational institutions which require a written grade. For example, some colleges require the scores of standardized tests be submitted for entrance admission. Shalk (2002) suggested the

relationship between MI theory and standardized test achievement is weak and the influence of MI profiles as indicators of standardized test achievement is minimal.

Cangelosi (1990) conducted research which agreed with Guskey's findings that a single form of assessment was not available which met the universal needs of all learners and teachers. He further suggested schools create assessment tools that would authentically assess the learners, but found within single entity schools this continued to be a difficult task. Stiggins (1994) conducted research that found it difficult for teachers to assign a letter grade. The rubrics can be a less subjective assessment than traditional number or letter grades.

Teachers in today's society realize students' learning is not assessed solely with tests; rather students are given opportunities to interact with teachers and peers (Seeley, 1994). Black and William (1998) defined assessment as the information and support given as feedback to students and then used to modify the practices and instructional techniques. Teachers and students alike found this form of assessment more authentic than dependence solely on tests and traditional forms of assessment (Kovas, 1993). Student self-esteem plays an important part in education. Daniel Goleman (1995) wrote a book entitled *Emotional Intelligence* and addressed what he termed the "flow" in education.

As MI theory encourages a diversified approach to instruction, assessment of students exposed to the theory must also be diversified and authentic. Standard tests such as fill in the blank, multiple choice and true/false tests, may not authentically assess nor assess all students who are accustomed to expressing their understanding and learning using the multiple intelligences. Wiggins (1989) provided a definition for authentic

assessment as the tasks which reflect skills and knowledge in the "real world" outside of the classroom. Students given an opportunity to demonstrate their knowledge of learned materials in various tasks are provided performance-based assessment. Hoerr (2000) knows, as director of a school that bases its curriculum on the MI theory, that there will always be a place for standardized tests, but the use of authentic assessments and portfolios will increase. Students who create projects or present exhibitions can show that their understanding goes beyond rote recall. However, most forms of assessment that are available for educators today mainly assess the verbal-linguistic and logical/mathematical intelligences. In many cases, the classroom teacher is responsible for creating authentic forms of assessment that reflect MI theory instruction.

Supon (1999) wrote her dissertation about assessing MI theory using a rubric design. Supon recommended a rubric because, when teachers weave the multiple intelligences into a rubric design, they provide opportunities that can lead to challenging and rewarding means of assessing student performance. However, she also acknowledged teachers may feel inadequate with attempting the task of developing a teacher-created, multiple intelligence rubric because they are concerned about the time it will take as well as their lack of knowledge about the procedure for its development.

Portfolios for Assessment

Portfolios provide a form of assessment that compliments a school that uses an MI theory approach to instruction. Portfolios allow a glimpse into the students' work as lifelong learners because of the contents of the portfolio. Portfolios contain a diversified collection of students' works from different disciplines and represent the different

intelligences (Burke, 1992). Portfolios may contain journals, observations, videotapes, written samples, and checklists. Portfolios can be passed along as the student progresses through the grades and the materials included should be selected by both the teachers and students. Students often develop a sense of pride and ownership in portfolios and their contents. Although the research on portfolios and the role they play in assessment has not provided concrete results, Farr and Tone (1994) suggested that portfolios can provide a link in the evaluation of students and their work.

Since MI theory instruction implies a diversified approach to instruction, authentic assessment would also need to be diversified. Portfolio assessment provides students with the opportunity to exhibit their understanding with a vehicle of assessment for diversified instructional techniques. Students who receive instruction using a MI theory approach may have difficulty with a standardized test; however, if the student has a dominant linguistic or verbal intelligence, they may find success with a standardized test.

Eberstadt (1999) goes on in her article to question Gardner's theory herself. She states that the multiple intelligences, the four approaches to understanding, and the seven entry points that Gardner relates are too cumbersome for teachers to decipher. She also indicates that many of Gardner's ideas are not revolutionary or new, but have been addressed by others before him. She even believes that some of the tenets of Gardner have their intellectual genealogy provided by one of his critics, E.D. Hirsh. Her final criticism is that Gardner's theory seems to be focused on the elite, especially private schools.

Others have criticized Gardner's solution to education's problems of producing students who learn to think and act like disciplinary experts. This thinking represented a shift from thinking of thinking in general terms to thinking of thinking in domain-specific terms. Some saw this as fitting into the old authoritarian, hierarchical capitalism where the expertise of the specialist was highly valued. Others saw this as fitting well with the emphasis on creating workers who are flexible, efficient, innovative, self-controlled, and collaborative. With this emphasis on discipline-based knowledge, understanding has less to do with critique than with problem solving, and ethical issues of the relationship between knowledge and power are not easily addressed. The emphasis becomes one of adaptation, flexibility, speed, and innovation rather than how to challenge the substantive injustices in a society still steeped with deep inequalities (Gee, Hull, & Lankshear, 1996; Giroux, 1999).

By including "multiple entry points" (Gardner, 1991, 1999b), teachers will begin to incorporate many different types of information in introducing a concept or lesson. These might include works of art, music, dance, as well as literature. Many students placed in special education have had limited exposure to many of these forms of the arts. It then becomes questionable as to whether the teacher or the curriculum will drive the appreciation sought for from these students. Greene (1995) implores teachers to integrate art and aesthetic education into the pedagogy in such a way that it becomes "an education for a more informed and imaginative awareness; it should also be education in the kinds of critical transactions that empowers students to resist both elitism and objectivism, that allow them to read and to name, to write and rewrite their own lived worlds" (p. 147). The researcher believes that the arts can be incorporated to include diversity and

multicultural representation, and to encourage students to tap into their own proclivities in these areas to begin to have a voice in their educational experiences.

Another concern for incorporating multiple intelligences into special education is providing another avenue for labeling students. Currently, special education is struggling with over-representation of minority students in certain categories. It is questioned if multiple intelligences could just become another avenue for saying that these students all seem to display strengths in bodily-kinesthetic intelligence or musical intelligence, and thus, should set their sights on becoming professional athletes or entertainers.

Summary

The historical background of special education and the labeling of students has been explored. Most of these decisions for placement in special education rely heavily on the IQ test results that are designed to measure intelligence. The idea of intelligence was traced, and the difficulties with using the IQ in determining placement in special education were explored. Gardner's (1983, 1999) question was if intelligence is indeed singular, or if there are various, relatively independent intellectual facilities. This question was a central idea in Gardner's development in the theory of multiple intelligences (1983, 1999).

We must begin to see the needs of all students and begin to honor the differences that each one brings into our classrooms. Multiple entry points to learning is one possible way to begin this quest, though we must be able to identify the strengths of our students to know where to begin.

CHAPTER III

METHOD

Chapter Three discusses the research methods and design that were used in this study. In addition, the population used is identified and described. Further, a discussion of the development and creation of the survey as well as its administration is outlined. Procedures for collecting data including the surveys of students' strengths and assessment instrument, as well as the use of work samples from selected students, is explained. Finally, the chapter includes a rationale for using the chosen research design and possible implications of such a selection.

Research Design

The study looked at only one area of exceptionality – autism, not all the identified areas of exceptionality in special education. Further, students identified with mild

autism, including Asperger Syndrome, at the elementary and middle school level only were used as the sampling group.

Too much attention has been focused upon disabilities and deficits among children labeled “exceptional” and not enough attention has been given to their abilities and assets. In acknowledging this bias, a research factor which has been considered a powerful influence in even the most objective experimental studies is being pointed out – the interpersonal expectancy effect (Rosenthal & Jacobsen, 1968). Bogdan and Biklen (1998) suggest that potential bias and distortion is the price we must pay to gain understanding to complex social settings. Combs, Richards, and Richards (1976) note that human subjectivity plays an important role in the analysis of research data: “Data becomes truly significant only when subjected to the mediation or interpretation of human meaning” (p. 380).

The central purpose of this correlational study was to uncover general intellectual trends of students with mild autism, including Asperger Syndrome, using Gardner’s theory of multiple intelligences as the theoretical framework. The data collected from surveys of students’ strengths administered to students and teachers, an MI assessment instrument of the student’s intelligences, and documentation review looked at the wholeness and integrity of intelligence, not that which is measured by the “narrowness of standardized accountability” (Samples, 1992 p. 62). The research design – a correlational study, which is descriptive and quantitative in nature included a small qualitative component to compliment the quantitative data. Emphasis was placed on revealing the types of intellectual strengths, according to multiple intelligences theory, that students with autism possess.

This study was designed so that quantitative data with an additional small qualitative component were collected and interpreted through three different sources: surveys, an assessment instrument, and documentation (i.e. work samples). Each of these data collection tools touches one aspect of the truth of the subject of the study – the proposed existence and nature of strengths in children identified as being autistic. Each method alone may be inadequate in addressing the research questions, yet taken together they may constitute a more complete picture of the individual student. More importantly, these methods serve as different sources of data that can be compared to each other to help answer the study’s major questions. The student surveys and documentation, along with the teacher’s perspectives, and an assessment instrument (the TIMI) should allow this study to be considered “objectively subjective” (Erikson, 1986).

This study is a modification of the research done by Thomas Armstrong in 1987. Armstrong looked at the intellectual abilities of elementary aged students with learning disabilities using Gardner’s theory of multiple intelligences. This study focused on elementary and middle school aged students with mild autism, as there is little research on multiple intelligences and autistic children that has been conducted. Armstrong’s survey was aimed solely at the parents/guardians of students with learning disabilities. Teachers and students were not included in Armstrong’s study as they were in the present study. Also, parents did not complete a survey for this study.

Armstrong has, since his dissertation, written several books on multiple intelligences in the classroom that provide user-friendly information to teachers which they can use directly in their classroom teaching. However, the books he has written are not specific to a particular group of students, such as those in special education.

Sampling Procedures

The target population for this study was elementary and middle school students (grades 3-8), who had been identified as having mild forms of autism, including Asperger Syndrome. The students must have had an Individualized Education Plan in place to qualify for participation in this study.

Participants were selected from the Exceptional Student Education (ESE) population in a school district in Southwest Florida. In this school district, there are approximately 30 autistic classrooms with 8-10 students in each. Students in the ESE program are classified as “basic learners (moderate)” and “advanced learners (mild)” depending on the degree of autism on the spectrum. The district also has classrooms for the severe forms of autism. Some classrooms are labeled as “spectrum” classrooms where different levels are grouped together. Fewer students are labeled through the ESE process as having Asperger Syndrome though they do have students with this label based on medical diagnosis who are placed in general education classrooms.

The ESE staffing specialist, who supervises five schools that include students with mild autism and Asperger Syndrome, sent letters of consent to the parents of all children in grades three to eight who had been classified as having mild autism and/or Asperger Syndrome. The list of these children was available to the ESE staffing specialist, but the researcher did not have knowledge of their names, unless the parents contacted him. Only students whose parents contacted the researcher indicating their willingness to be part of the study, were asked for their agreement to participate in the study ($N=39$), by signing the assent form. The students were divided among 11 teachers, however 3 declined to complete the teacher survey due to not having long term or close

insight into the student's strengths. The participating students' teachers ($n=8$, all female) were asked for their willingness to complete a short multiple intelligence checklist for each student who participated in the study. If some teachers did not desire to complete the checklist, only the students' data was included and analyzed in the study, excluding the teachers' checklist information. Three teachers did not wish to participate in completing the survey. One of the five schools was selected to obtain a small sub-sample of children whose selected work samples were reviewed by the researcher.

Participant Demographics

Due to confidentiality issues surrounding participation in special education, pseudonyms were used for the schools, the county, and all participants. Located in a public school district in Southwest Florida, the five schools selected for the study were schools with autistic classrooms and under the direction of one ESE staffing specialist. The county has approximately 30 autism classrooms spread over 17 schools.

The ESE staffing specialist sent invitation letters to participate in the study to 68 families who had students labeled as mildly autistic or Asperger Syndrome at these five schools. Thirty-nine parents responded to the researcher with interest in participating. The researcher arranged to meet with each parent and their child to further detail the study and to get consent and assent forms signed. The teachers of these students were then contacted by the researcher in order to describe the study and to request appropriate times for the data to be gathered.

There were 8 teachers participating in the study ($n=8$, all female). Teacher A had the following students in a self-contained classroom: two males in third grade, nine years old with mild autism, one female in third grade, eight years old with mild autism, one male in fourth grade, nine years old with mild autism, and one female student in fourth grade, nine years old with Asperger Syndrome – this student does attend some general education classes during the day.

Teacher B had the following students in a self-contained classroom: one male in fifth grade, eleven years old with mild autism, one male student in fifth grade, ten years old with mild autism, and one female student in fifth grade, ten years old with Asperger Syndrome.

Teacher C had the following students in a self-contained classroom: one female in third grade, nine years old with mild autism, one male student in third grade, nine years old with mild autism, one female student in fourth grade, ten years old with mild autism, one male student in fifth grade, eleven years old with mild autism, one female student in fifth grade, eleven years old with mild autism, and one male student in fifth grade, eleven years old with Asperger Syndrome – this student did attend general education classes during the day.

Teacher D had the following students: one male student in sixth grade, thirteen years old with mild autism and one female student in seventh grade, fourteen years old with Aspergers Syndrome – both of these students attended general education courses during the day.

Teacher E had the following students in a self-contained classroom: Two male students in third grade, eight years old with mild autism, one male student in third grade,

nine years old with mild autism, one female student in fourth grade, ten years old with mild autism, and one male student in fourth grade, nine years old with mild autism.

Teacher F had the following students in a self-contained classroom: one female student in fifth grade, eleven years old with mild autism, one female student in fifth grade, ten years old with Aspergers Syndrome who attends some general education courses, and one male student in fifth grade, eleven years old with Asperger Syndrome.

Teacher G had the following students in a self-contained classroom: one female student in third grade, eight years old with mild autism, two female students in fourth grade, nine years old with mild autism, one male student in fourth grade, ten years old with Asperger Syndrome and one female student in fifth grade, twelve years old with mild autism.

Teacher H had the following students in a self-contained classroom: one male student in sixth grade, twelve years old with mild autism and one male student in sixth grade, thirteen years old with mild autism.

Teacher I had the following student who attended general education classes: one female student in seventh grade, fourteen years old with mild autism.

Teacher J had the following student who attended general education classes: one male student in eighth grade, fourteen years old with mild autism.

Teacher K had the following students in a self-contained classroom: two male student in third grade, eight years old with mild autism, one female student in fourth grade, nine years old with mild autism, one female student in fourth grade, nine years old with mild autism, one female student in fifth grade, eleven years old with mild autism, and one male student in fifth grade, eleven years old with mild autism.

Thirty-nine individuals with mild autism participated in the study through convenience sampling. Twenty-two (56.4%) were male and 17 (43.6%) were female. The average age of the participants was 10.15 years (SD = 1.76). The frequencies and percentages for the participants' school and grade are listed in Table 1.

TABLE 1

Characteristics of Student Participants (N = 39)

Characteristic	<u>n</u>	<u>%</u>
Participation by School		
PS-1	8	20.5
PS-2	8	20.5
PS-3	8	20.5
PS-4	9	23.1
PS-5	6	15.4
Participation by Grade		
3	11	28.2
4	10	25.6
5	12	30.8
6	3	7.7
7	2	5.1

Instruments

Surveys of Student Strengths

This study explored the nature of intelligence of autistic students primarily through the use of surveys. Students and teachers were each given a separate survey to complete.

The survey used Armstrong's survey that was written for parents and, with few wording changes, related it to elementary and middle school aged children with autism making it easier to understand; however the topic of each question was not changed. The structure of the survey was also adapted for ease by the researcher in administering since the student would not be reading the items for him/herself. Rather than attempt to change every item on the survey, the researcher would explain what the statement meant if the student showed signs of not fully understanding. The survey was administered orally to each student by the researcher. The special education teachers were given their survey at school to return to the researcher. The original directions of Armstrong's survey were also adapted to meet the procedures of this study.

The surveys consisted of eighty items that looked at the intellectual strengths of the students in all of the eight intelligences as discussed by Gardner's theory (see Appendix B (Student Version) and Appendix C (Teacher Version)). These versions are very similar to the original ones developed by Armstrong. The survey takes the form of a checklist where the student would respond and the researcher would place an "X" next to the statement that applies to the student. Each survey (student and teacher) was slightly

different in presentation but measured the same intelligences. Ten items represent each of the eight intelligences (for a total of eighty items). When scored, the questions produce a profile of the relative perceived strengths of the students in each of the eight intelligences. Armstrong's original study did not include the naturalistic intelligence.

The survey was given individually to the student. It was not the purpose of the study to see how well the student could complete the survey independently. Of primary concern was the information gained from the completion of the survey. Therefore, giving student assistance in completing the survey to ensure understanding of the characteristic statement was of little consequence. The researcher only would have to repeat an item to ensure the student understood. Instructions were repeated throughout the survey that the student was to select items that was most like themselves.

Data Collection Procedures

Students whose parents signed the consent forms and who signed the assent form were individually administered the Teele Multiple Intelligences Inventory (TIMI) and the short multiple intelligences checklist. The TIMI takes less than ten minutes to administer and the short checklist takes about 10 minutes. The researcher met individually with each child once for about 20 minutes to administer both instruments. The TIMI assesses the dominant intelligences of the respondents; it includes books with pictures and students have to select pictures representing an activity are used to categorize the dominant intelligence(s) of the respondents. The second instrument, the multiple intelligence checklist (survey), consists of a list of things or activities that the child may do at school or at home; the child has to listen to the researcher reading each activity and has to indicate which statement or activity he/she agrees with or which is similar to the way

he/she thinks. In addition to the administration of instruments, for a sub-sample of the participants (only students from one school, $n= 5$), the investigator asked students to select from their existing schoolwork portfolios in order to select the works that they liked most, as well as the works that demonstrate their strengths or abilities (5- 10 minutes activity). Teachers were asked to complete the multiple intelligence survey-teacher version for each student in their classroom who participated in this study. The surveys were left with the teachers with an envelope for them to return to the researcher upon completion. No school records were examined in this study.

Documentation

The qualitative component of the study involved collecting existing personal documents including artwork, oral language samples, and writings or other schoolwork. Five students from one school in the study were asked to select work samples from their existing portfolios and explain work that they felt demonstrated their strengths. Allport (1942) noted the usefulness of personal documents in research. He commented that the main fault with psychological science seems to be its willingness to leave out personal life documentation when making factual conclusions. Bogdan and Biklen (1998) pointed out that we can gain a perspective of how one sees him/herself through their own selection and presentation of documentation or work. Further, they point out that personal documents permit the researcher to study facets of people, events, and settings that are not directly observable (p. 6). Personal documents are subject to limitations. Documents are subject to different evaluations by different observers. The best safeguard against the misuse of personal documentation in describing the strengths of children identified as having disabilities is to take care not to input to the documents more than is

actually there, by relating the documents to the criteria established for Gardner's intelligences and by cross-checking the documents with other data sources.

Analysis of the Data

The collected data was examined to determine if there were any general patterns to the intellectual abilities or perceived strengths of autistic students using Gardner's Multiple Intelligence theory as the filter. The data was looked at from an overall perspective as well as from the creation of individual profiles of the students in the study. Comparisons among a student's responses as well as between the responses given by special education teachers were examined.

For analysis, frequencies and percentages were investigated for the surveys responses from students and teachers and for the assessment instrument responses by students. These were analyzed for ranking of the intelligences and to determine dominant intelligences as perceived by students and teachers. Spearman correlations were calculated to determine if there was a relationship between the assessment instrument responses and those from the survey. As well, a bivariate Spearman correlation was conducted between the eight teacher survey and eight student survey variables. A Pearson correlation analysis was conducted on the student survey and teacher survey responses by number of responses per intelligence to compare with results from the Spearman correlations which were based on ranking order of intelligences.

Summary

Surveys, the assessment instrument, and document review (student work samples), although labor intensive, provided a broad spectrum of the intellectual abilities, talents and strengths of the autistic students in this study. If students with autism are to

succeed at school, means other than traditional assessments (IQ tests) of their abilities must be explored. It was not the intent of this study to supplant any of the current assessment tools or strategies. Rather it was an attempt to provide another venue to inspect for those students who are not finding success at school in the linguistic or mathematical arenas.

CHAPTER IV

RESULTS

The primary question of the study was: “What are the strengths of students with mild autism, including Asperger Syndrome, from a multiple intelligences prospective?” This question can be answered by the bar graph in Figure One below, which showed Spatial, Logical and Musical as the dominant intelligences from the student participant responses.

The sub-question of the study was: “How do the assessed students’ strengths relate to students’ own perceptions of their strengths?” The TIMI is the assessment instrument used to determine student dominant intelligence traits, and the Student Survey is the instrument for examining a student’s own perception of his/her strengths.

Findings of Study

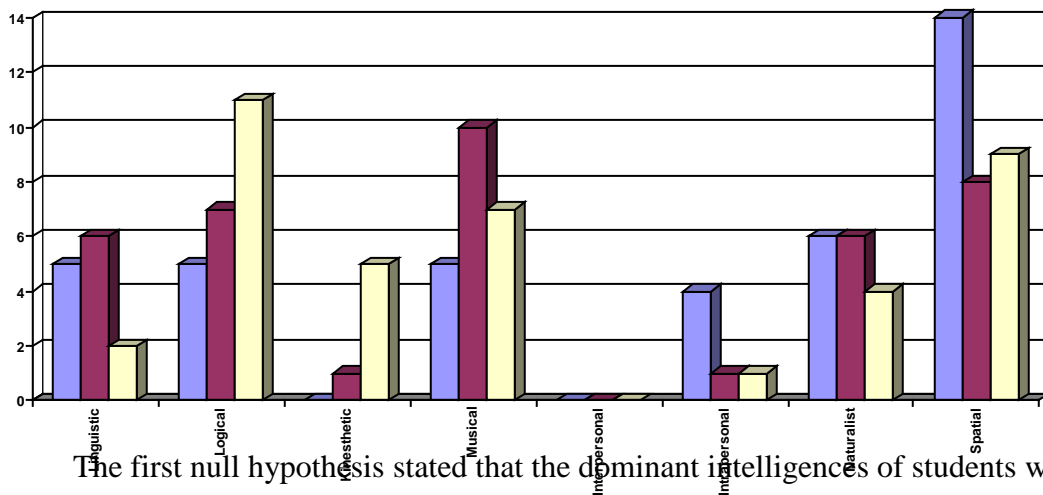
Student Surveys of Strengths

The surveys of student strengths used during the study were adapted from materials presented by Armstrong (2000a). The survey was divided into eight sections, one for each identified intelligence in Gardner’s (1983, 1999) theory. Each section listed ten possible indicators of strength for that intelligence. During the interview process,

students were asked to identify indicators which were most like them from a list of items. The researcher read these to each student and checked their choices. Teachers were given a similar survey to complete and return to the researcher. A copy of both surveys (Student and Teacher Versions) can be found in the Appendices (B & C, respectively).

Frequencies and percentages were calculated on 8 rank ordered Student Survey variables to determine the level of the students' perceptions of their strengths. The frequencies and percents for the variables are listed in Appendix D in Tables 2a-2h respectively. Figure One shows the dominant three intelligences as ranked by the student participant respondents on the Student Survey. Rankings were determined by the intelligence identified with the most items selected in each category. The figure demonstrates the dominant intelligences determined by ranking the eight intelligences with the categories receiving the highest number of responses to the lowest. The figure represents the top three from the students' responses on the student survey.

Figure One. *Dominant Intelligence Ranking from Student Survey*



The first null hypothesis stated that the dominant intelligences of students with mild forms of autism would not exhibit weaknesses in linguistic and/or logical-mathematical areas. The results of the study found that these areas were actually not the

weakest areas of intelligence. This null hypothesis is rejected based on the findings in the linguistic intelligence as this was not highly ranked (see Figure One); however, the results failed to reject the null hypothesis in regard to the logical intelligence as it was selected as the third dominant intelligence.

Student Survey Linguistic Rank. The linguistic intelligence characteristic was ranked first by 12.5% ($n=5$) of the student participants, second by 15.4% ($n=6$), and third by 5.1% ($n=2$) of the student participants. As shown in Table 2a in Appendix D, the responses were distributed across all ranks for this intelligence. Teacher Linguistic was negatively related to Teacher Logical ($r = -.41, p < .05$).

Student Survey Logical Rank. The logical intelligence characteristic was ranked first by 12.8% of the student participants. It is important to note that no student participants ranked this intelligence as the eighth rank. Research has shown that logical/mathematical ability is a strength commonly found in children with autism (Fombonne, 2003; Wing, 1997). Teacher Linguistic was positively related to the Student Linguistic variable ($r = .75, p < .01$). This suggests that Teacher Linguistic increased as Student Linguistic increased.

The second null hypothesis stated that the dominant intelligences of students with mild forms of autism would not exhibit strengths in spatial and/or bodily-kinesthetic areas. The results of the study found that these areas were actually not the weakest areas of intelligence. The study found that the spatial intelligence was ranked highest as a dominant intelligence; however, the kinesthetic was not as highly ranked (See Figure One). Therefore the null hypothesis was rejected in regard to the spatial intelligence and the results failed to reject the null hypothesis in regard to bodily-kinesthetic.

Student Survey Spatial Rank. No student participants ranked this intelligence as the fifth, seventh or eighth ranking. The spatial intelligence was ranked first by 35.9% of the student participants.

Student Survey Kinesthetic Rank. No student participants ranked the kinesthetic intelligence as first and only one ranked the intelligence as second. The remaining responses for this intelligence were distributed from third to eighth ranking as seen in Table 2d in the Appendix D.

Student Survey Musical Rank. The musical intelligence was ranked first (12.8%, $n=5$), second (25.6%, $n=10$), and third (17.9%, $n=7$) by the student participants. Only one student participant ranked this intelligence as eighth, or the least like them. Research has shown that musical ability is a strength commonly found in children with autism (Fombonne, 2003; Wing, 1997).

Student Survey Interpersonal Rank. No student participants ranked the interpersonal intelligence as first, second, or third. Nineteen participants (48.7%) ranked this intelligence as the least like them.

Student Survey Intrapersonal Rank. Four student participants ranked the intrapersonal intelligence as first. The intelligence was ranked seventh by 33.3% of the student participants and ranked eighth by one student participant.

Teale Multiple Intelligence Inventory (TIMI)

Frequencies and percents were calculated on the 7 rank ordered TIMI variables to determine the level of dominant intelligences of the students. The frequencies and

percents for Linguistic Rank, Logical Rank, Spatial Rank, Musical Rank, Kinesthetic Rank, Intrapersonal Rank and Interpersonal Rank are listed in Tables 3a-3g respectively (See Appendix E).

The third null hypothesis stated that there would be no significant correlation between the students' perception of their strengths and the assessment instrument. Based on the results, the null hypothesis would be rejected for all of the intelligences with the exception of interpersonal intelligence. Based on the findings, this study would fail to reject the null hypothesis with regard to the interpersonal intelligence. Forty-nine Spearman correlations were calculated to determine if there was a relationship between the seven ranked TIMI variables and the seven Student Survey variables. The correlation matrix is presented in Table 4. The tests revealed several significant correlations. TIMI Linguistic was positively related to the Student Survey Linguistic ($r = .85, p < .01$). This suggests that TIMI Linguistic increased as the Student Survey Linguistic increased. Similar correlations between the TIMI and the Student Survey responses were found with Logical ($r=.59, p<.01$), Spatial ($r=.56, p<.01$), Musical ($r=.54, p<.01$), Kinesthetic ($r=.61, p<.01$), and Intrapersonal ($r=.43, p<.01$). There was not a significant correlation of the TIMI Interpersonal and the Student Survey Interpersonal.

In coding and analyzing the data collected from the TIMI, it was discovered that identical patterns of responses were reported for all items among different students affecting the first assumption of quantitative statistics that is the independence of the sample. As the instrument consists of only 28 questions, each with one of two choices, which measure one of seven of the intelligences, this probability of occurring increases. Also considered is that the students were very similar in age and all had mild autism. The

instrument can be described as testing basically seven intelligences of two choices each.

Some researchers could consider this enough to not use this data for further analysis. It is included for the purpose of reporting the results of the instrument; however, caution should be taken for interpretation of the findings. Another caution is in comparing these results to the Student Survey; the Student Survey included the naturalist intelligence, whereas the TIMI does not include this intelligence.

TABLE 4

Bivariate Spearman Correlation Coefficients between 7 TIMI & 7 Student Survey Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
TIMI Linguistic (1)	---	.02	-.74**	.11	-.58**	-.13	-.20	.85**	-.11	-.27	-.27	-.22	-.24	.03
TIMI Logical (2)	---	---	.30	-.69**	.11	-.43**	-.18	-.05	.59**	.22	.08	-.42**	.02	-.24
TIMI Spatial (3)	---	---	---	-.17	.58**	-.34*	-.19	-.70**	.26	.56**	.21	.07	.31	-.20
TIMI Musical (4)	---	---	---	---	-.43**	-.02	.50**	.06	-.37*	-.15	-.32*	.54**	.05	.04
TIMI Kinesthetic (5)	---	---	---	---	---	-.22	-.54**	-.47**	.10	.22	.61**	-.07	.07	-.21
TIMI Intrapersonal (6)	---	---	---	---	---	---	.28	-.03	-.27	-.22	-.07	.04	-.06	.43**
TIMI Interpersonal (7)	---	---	---	---	---	---	---	-.19	.01	-.18	-.33*	.34*	.01	.11
Linguistic (8)	---	---	---	---	---	---	---	---	-.13	-.30	-.13	-.26	-.20	-.24
Logical (9)	---	---	---	---	---	---	---	---	---	.09	-.01	-.22	-.16	-.07
Spatial (10)	---	---	---	---	---	---	---	---	---	---	-.09	-.10	.07	-.02
Kinesthetic (11)	---	---	---	---	---	---	---	---	---	---	---	-.20	-.01	-.39*
Musical (12)	---	---	---	---	---	---	---	---	---	---	---	---	.28	.10
Interpersonal (13)	---	---	---	---	---	---	---	---	---	---	---	---	---	-.10
Intrapersonal (14)	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 5.

Bivariate Spearman Correlation Coefficients between 8 Teacher Survey & 8 Student Survey Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Teacher Linguistic (1)	---	-.41*	-.26	-.42*	-.19	.02	.02	-.08	.75**	-.33	-.34	-.28	-.07	-.13	-.06	-.05
Teacher Logical (2)	---	---	-.02	.19	-.12	-.33	-.12	-.09	-.30	.45**	.21	.06	-.10	-.14	-.01	-.04
Teacher Spatial (3)	---	---	---	.04	.07	-.31	-.10	-.08	-.24	.18	.68**	-.21	-.08	.01	.01	-.03
Teacher Kinesthetic (4)	---	---	---	---	-.23	-.17	-.37*	.16	-.33	.19	.14	.75**	.08	-.03	-.26	-.11
Teacher Musical (5)	---	---	---	---	---	-.19	-.20	-.28	-.28	-.22	-.03	-.32	.75**	.21	.15	-.16
Teacher Interpersonal (6)	---	---	---	---	---	---	.24	-.11	-.00	-.01	-.17	-.10	-.08	.34	.05	.04
Teacher Intrapersonal (7)	---	---	---	---	---	---	---	-.40*	.10	.01	-.24	-.03	-.45**	.00	.45**	.00
Teacher Naturalist (8)	---	---	---	---	---	---	---	---	.06	-.06	.02	.26	-.26	-.20	-.36*	.47**
Student Linguistic (9)	---	---	---	---	---	---	---	---	---	-.13	-.30	-.13	-.26	-.20	-.24	-.18
Student Logical (10)	---	---	---	---	---	---	---	---	---	---	.09	-.01	-.22	-.16	-.07	-.23
Student Spatial (11)	---	---	---	---	---	---	---	---	---	---	---	-.09	-.10	.07	-.02	-.10
Student Kinesthetic (12)	---	---	---	---	---	---	---	---	---	---	---	---	-.20	-.01	-.39*	.00
Student Musical (13)	---	---	---	---	---	---	---	---	---	---	---	---	---	.28	.10	-.37*
Student Interpersonal (14)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-.10	-.25
Student Intrapersonal (15)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-.28
Student Naturalist (16)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* p = .05; ** p = .01; *** p = .001

The next sub-question of the study was: “How do the students’ perceived strengths relate to teachers’ perceptions of the students’ strengths?” This also addresses the fourth null hypothesis that there would be no significant correlation between students’ perception and teachers’ perception of student strengths. This null hypothesis found results that rejected the hypothesis on every intelligence except for interpersonal which the results failed to reject. Sixty-four Spearman correlations were calculated to determine if there was a relationship between the 8 Teacher Survey variables and the 8 Student Survey variables . The correlation matrix is presented in Table 5. The results revealed several significant correlations. For example, Teacher Linguistic was negatively related to Teacher Logical ($r = -.41, p < .05$) and Teacher Kinesthetic ($r = -.42, p < .05$). This suggests that Teacher Logical and Teacher Kinesthetic decreased as Teacher Linguistic increased. Teacher Linguistic was positively related to the Student Linguistic variable ($r = .75, p < .01$). This suggests that Teacher Linguistic increased as Student Linguistic increased. Similar correlations were found with Logical ($r = .45, p < .01$), Spatial ($r = .68, p < .01$), Kinesthetic ($r = .75, p < .01$), Musical ($r = .75, p < .01$), Intrapersonal ($r = .45, p < .01$), and Naturalist ($r = .47, p < .01$). However, there was no correlation of the Teacher Interpersonal and the Student Interpersonal Intelligences.

A Pearson correlation analysis was also conducted on the Student Survey and Teacher Survey responses as number of responses for each intelligence to verify the results from the correlation of the ranking data. This exhibited similar correlations to the ranking order and is shown in Table 6. The results revealed several significant correlations. For example, Teacher Linguistic was positively related to the Student Linguistic variable ($r = -.38, p < .05$). This suggests that Teacher Linguistic increased as

Student Linguistic increased. Similar correlations were found with Spatial ($r = .48, p < .01$), Kinesthetic ($r = .41, p < .05$), Musical ($r = .76, p < .01$), Intrapersonal ($r = .73, p < .01$), and Naturalist ($r = .39, p < .05$). However, there was no correlation of the Teacher Interpersonal and the Student Interpersonal Intelligences.

16	20	.14	.17	21	.11	.06	.09	.39*	18	.37*	.04	.09	.11	.02	.05	...
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TABLE 6

Pearson Correlation Coefficients between 8 Teacher Survey & 8 Student Survey Variables

Sample Data Implications

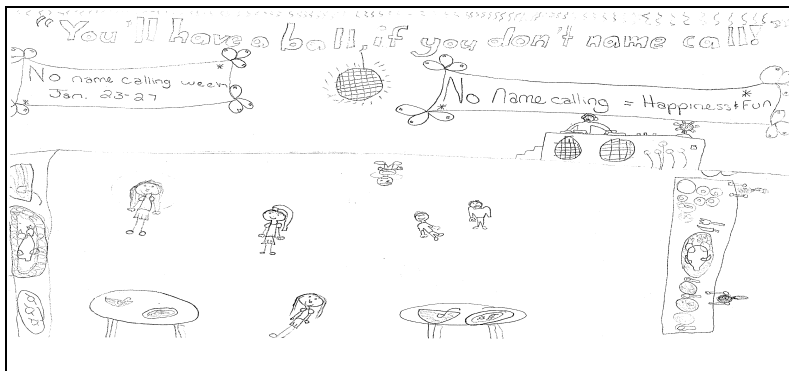
A small amount of data was gathered from students at one selected school from their portfolio documents. With only five students having portfolio data to select from at

* p = .05; ** p = .01; *** p = .001

this school, any analysis of the findings would be of minor importance. However, the data gathered is worth mentioning in this section of the study. Any conclusions should be explored in further evaluation. All names used in this study are pseudonyms.

Abraham was a nine-year old third grade student who was labeled as mildly autistic. Abraham was asked, with his teacher Ms. Smith present, to select an item from his portfolio that he felt was his best work or something he liked very much. Abraham selected the item in Figure 2.

Figure 2. Work Sample Selected by Abraham



Ms. Smith commented, "I wrote the words on this picture, but he drew it. They did it during No Name-Calling Week at school. I don't know why it's a party or dance picture."

Abraham did not wish to talk more and went to the computer to begin working on a graphic reading program.

An examination of Abraham's responses on the Student Survey of Strengths

show his ranking of the intelligences as the following (from most dominant to least dominant): Intrapersonal, Musical, Naturalist, Spatial, Interpersonal, Kinesthetic, Logical, and Linguistic.

Kelsy was an eight year old third grader who was also in Ms. Smith's classroom. She, too, was labeled as mildly autistic. Kelsy selected a worksheet (see Appendix F2) that used picture words for a phonetic exercise. Ms. Smith noted that, "Kelsey struggles with writing and reading but seems to hear letter sounds fine." On her Student Survey, Kelsy ranked the intelligences as follows: Spatial, Musical, Linguistic, Intrapersonal, Naturalist, Logical, Kinesthetic, and Interpersonal.

Charlie was a nine year old fourth grader in Ms. Smith's classroom who has been identified as mildly autistic. Charlie selected a writing sample (see Appendix F1) from his portfolio. The only response the researcher or the teacher could get from him on why he selected this item was "I like". The researcher notes that Charlie was very shy in the classroom; however, upon initially meeting him with his mother present, he was quite talkative and socially responsive.

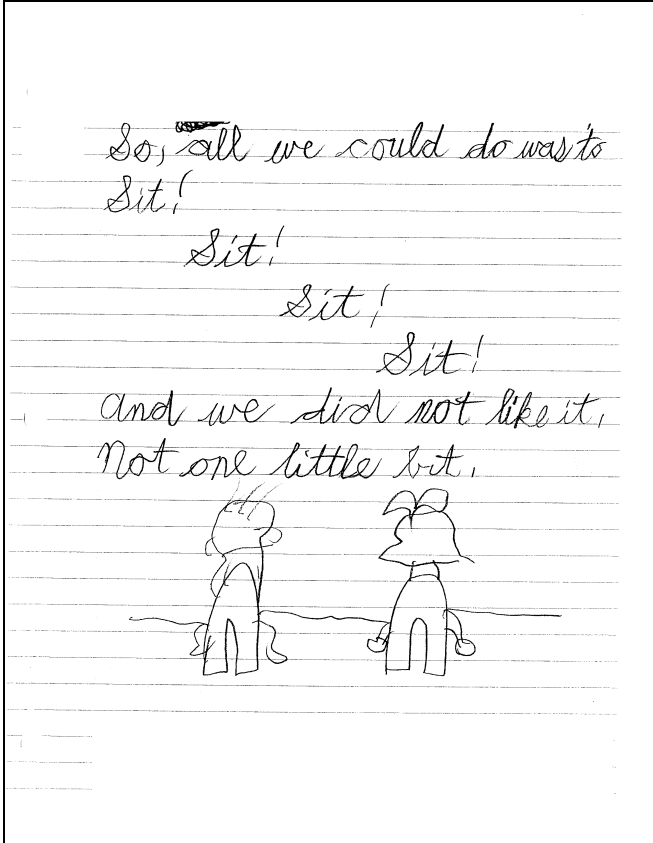
Dylan was an eleven year old in fifth grade with Ms. Pole as his teacher. He was labeled as mildly autistic. Dylan selected the item represented in Figure 3.

Figure 3. Work Sample Selected by Dylan.



Dylan responded about his selection, “They are eating eggs. It’s my family at home in the morning.” When the researcher responded, “Thank you”, Dylan asked, “Do you like eggs?” When the researcher answered, “Yes, I do”, the student turned and left. Dylan ranked the following intelligences on the Student Survey: Linguistic, Spatial, Musical, Logical, Kinesthetic, Interpersonal, Intrapersonal, and Naturalist. Jonathon was a ten year old in Ms. Pole’s fifth grade classroom and was labeled as mildly autistic. The student selected the item in Figure 4. The researcher notes that this student’s portfolio was the thickest of all portfolios in this class. The student had video tapes in his portfolio but did not select one of these items. The student said, “It is good” when asked why he selected this item. Ms. Pole commented, “He wrote this without the book. I believe they read this in library time.”

Figure 4. Work Sample Selected by Jonathon.



The teacher then selected another item from the student’s portfolio with the student present. She suggested that he give the researcher this item as well. Jonathon responded, “Okay.” The teacher said, “This is a kiruko puzzle. I don’t really understand how it works, but I was told it is correct.” This item is represented in Figure 5.

Figure 5. Work Sample Selected for Jonathon by Teacher.

The work samples supported the findings of the survey instruments by identifying strengths in visual and spatial intelligences due to the students' selections of mostly samples of work in these areas. The logical work sample selected by Jonathon also supported the finding from the survey that logical intelligence was not a least dominant intelligence as perceived by students and teachers. Chapter Five discusses the results reported in Chapter Four and will make implications to their relevance in meeting the needs of the student with autism.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This chapter will discuss the research findings in relation to the existing literature. It also specifies the assumptions and the limitations of the study followed by conclusions of the study. Recommendations are provided for future practice and research.

The results of the study could be compared to Armstrong's (1987) findings of bodily-kinesthetic and spatial intelligence skills being prevalent for the group of learning disabled students he studied. Armstrong (2000) found that students who show high levels

of bodily-kinesthetic intelligence may be at risk of being labeled as attention deficit disorder. This could be true for the characteristics of the autistic child. He also found that students who are highly developed in spatial intelligence sometimes have difficulty in school and can be labeled as dyslexic or learning disabled because of their problems with decoding words. Similarly, the autistic child has the same difficulties or can appear to have these difficulties.

Interpretation of Results

The purpose of this study was to examine strengths displayed by students with mild autism, including Asperger Syndrome and compare these strengths to different types of intelligences defined by Howard Gardner in his theory of multiple intelligences (Gardner, 1983, 1999). Little research has been found relating the concept of the multiple intelligences to the abilities of students with autism. The study was also concerned with correlations between the perceptions of students with mild autism about their own strengths and the perceptions their teacher had about each student's strengths or abilities. The study attempted to focus on what each student perceived as his/her aptitudes and strengths-- rather than the student's deficits using a developmental growth paradigm. While the study only examined the perceptions of these students, the results are meant to inspire further research into assessing these actual strengths, though Gardner (1983) has repeatedly stated that no such assessment could accurately be created and it is the student's perception of that strength that identifies what the student will show interest in and will achieve best.

Relationship of Findings to Existing Literature

The study examined the correlations between the student's perception of his/her own dominant intelligences and the perceptions their teachers had of the student's dominant intelligence. Findings showed a significant correlation between the student and teacher's perceptions of the student's strengths. Mettetal, Jordan, and Harper (1998) discovered that learning about multiple intelligences theory changed the ways teachers think about students' abilities and the ways they teach. The participating teachers were not questioned regarding their prior understanding of MI theory which could have an influence on their abilities to identify their students' strengths. The question in the current study of whether the teacher's perception of the student's strengths and how they are taught could have also affected the student's response with regard to his/her own perception of their strengths.

These findings on students' perceptions of their strengths in spatial, musical and logical intelligences also support the researcher's belief that students who are labeled as autistic do have at least perceived strengths in other areas that are not emphasized by the standardized testing of America's school system. For example, the current study found that spatial intelligence was ranked very high as being dominant; however this is not measured on the standardized tests. The researcher has questioned the system in place for labeling these students in special education and has struggled with the questions of cultural bias of the IQ testing used to determine a child's ability to learn. Identifying the strengths in students would better benefit them in the school setting when using these strengths to guide the learning process.

Multiple Intelligences theory can serve the field of curriculum and instruction as a guide and underlying philosophy. Using Multiple Intelligences as an organizing framework allows educators to cross all subject areas, teaching styles, and instructional materials to reach students with different interests, learning styles, and abilities. Before the 1990s, elementary and secondary schools basically allowed tradition to drive the curriculum and did not take into consideration new standards and research into students' differences. Teacher preparation programs were concerned primarily with methodology. Guskey (2000) substantiates the studies of Showers (1987) and Wood and Thompson (1993) stating that the researchers set out to find the most productive approach to planning curriculum and collaboration and then incorporated the best theories of learning and the most effective professional development models. Educators tended to concentrate on the path to the end.

Implementation of change requires a paradigm shift in pedagogical practices. It has been hypothesized that teachers must be shown a more practical approach when addressing the various learning styles or abilities of their students. Though educators need knowledge in methodology and theory to effectively instruct, effective teaching begins with the end in mind in the form of objectives and goals but only in direct correlation with the needs of individual students, rather than a general approach to using the same methods for all students (Darling-Hammond & McLaughlin, 1995).

A thorough literature review reveals that few studies have been conducted relating the use of the multiple intelligences theory to students with autism. However, findings of similar studies have suggested that the multiple intelligences be a useful intervention to learning (Fombonne, 2003; Wing, 2001). In the current study, spatial intelligence was

found to be a dominant strength of the student with mild autism which could be information used to intervene through instruction focusing on the visual or arts curriculum.

The students in this study had one teacher for most of their daily school experience. Social interactions with other students is limited for students with autistic characteristics and thus, the teacher becomes an important part in developing these relationships and the student often seeks the teacher's approval for any actions taken (Frith, 1991).

Students with mild autism are thought to have difficulty with metaphors or anything abstract and in comprehending verbally presented information. However, they have been found to show strengths in oral expression and reading recognition (Church, Alisanki, & Amanullah, 2000). The current study found that spatial, musical and logical were dominant intelligences in these students which was in contradiction of the study by Church, et. al. (2000).

It is imperative that teachers understand and can effectively utilize the concept of the multiple intelligences as opposed to the common misconception of overall innate smartness or generalizations of the deficits of the autistic student.

Gardner (1983) states that teachers can also generate misconceptions about their students and their intelligences. These can lead to negative or positive interactions with regard to the student, particularly the autistic student. Teachers of students with autism must strive to understand the diverse kinds of intelligences and to appreciate the various approaches by which the curriculum could be presented and understood by their students. The autistic student and his/her parents could use their own identified strengths,

supported by the teacher's understanding, to achieve more success in the academic and social setting.

However, this study found that the teachers surveyed were aware of their own students' strengths. Perhaps this is because these teachers may have had the same students in a self-contained classroom for many years. Teachers should understand that certain interventions can be more appropriate for the student with mild autism they take into account the stress and anxiety of social situations (Barnhill, 2001). These can include: watching for facial gestures, focusing attention on other students, interpreting nonliteral language which may confuse them, seeking to understand true intentions and being aware of hidden curriculum. Myles & Simpson (2001) have found that teachers generally are aware of their students' interests, but may fail to see the needs of special needs children, specifically children with autism, because their unique characteristics can be misinterpreted and are often actions similar to their peers. This was inconsistent with the current study, which found many significant correlations among the teachers' and students' perceptions of the students' strengths. The one area that did not find significant agreement was with the interpersonal intelligence which could be seen as an intelligence that is more easily misunderstood or difficult to recognize.

Another explanation for the strong correlations in the current study with teacher and student perceptions of strengths could be the self-fulfilling prophecy. While not investigated in this study, the self-fulfilling prophecy has been evident in the attitudes of those who have planned programs for special education students. Teachers could have a preconceived idea of the strengths of their autistic children based on the characteristics

known about the disorder. From the results of this study, the question is whether a similar influence on perception could be developed from the label given to the child as being “autistic”. Teachers did have similar perceptions of their students in most areas of the multiple intelligence categories.

Following the results of this study showing close similarities of perceptions of the students’ strengths by teacher and student, it is worth exploring whether the student responding to the survey as he/she sees him/herself or as the teacher sees him/her. This could be an explanation of the similarity of their responses on the surveys. Particularly with the autistic student who exhibits difficulties with interpersonal relationships, the teacher’s role in forming basic interpersonal skills is most impressionable and is important in deciding factors related to the curriculum, instruction and IEP goals. This study has shown that the teachers were not as perceptive as the student to the student’s strengths in the area of interpersonal intelligences.

This study attempted to answer the questions of “What are the strengths of students with mild autism, including Asperger Syndrome, from a multiple intelligences perspective” and “How do the perceptions of these strengths by the student relate to his/her teacher’s perceptions. These questions were answered in that spatial, logical and musical were the most dominant strengths of the students in this study and that, with the exception of intrapersonal perceptions, the students and their teachers had significant correlations in their perceptions. Though few in numbers, most of the work samples demonstrated a student’s interest in the more visual or spatial curriculum.

Assumptions and Limitations of the Study

Assumptions

Two assumptions were made with regards to this study. First, it was assumed that all information collected from the survey was accurate, and students and special education teachers completed the survey to the best of their ability. Second, it was assumed that the surveys and assessment instrument provided the information needed to answer the research questions posed by this study.

Limitations

One limitation of the current study could be the problem that some researchers may find the results of the assessment instrument unreliable due to students having similar responses. Also, the limited amounts of qualitative data could be seen as a limitation; however, these limitations could lead to further research being conducted to investigate these issues.

Other limitations of this study include the limited number of work samples analyzed, the number of teachers involved, the limited number of students by grade and that only student and teacher perceptions were reported – it could be beneficial to include the perceptions of the students' parents as well.

Due to the need to explain or clarify the survey instrument, another improvement would be to have the instrument simplified for the particular students participating while maintaining the same identification of intelligences. No generalization should be drawn from the findings of this study as it was not randomized.

Conclusions

Participants in this study were from one school district located in Southwest

Florida. All students were identified by the district as students with mild autism or Asperger Syndrome. The participants were in grades three through eight and ranged in age from eight to fourteen. It is hoped that the results of this study will be the same for this population or to populations similar in profile and demographics. Generalization should be made cautiously. The findings and information provided could be of interest to those working with similar populations of students.

The surveys of student strengths used during the study were adapted from materials presented by Armstrong (2000a). The survey was divided into eight sections, one for each identified intelligence from Gardner's (1983, 1999) theory. Each section listed ten possible indicators of strength for that intelligence. During the interview process, students were asked to identify indicators which were most like them. The teachers were given a similar survey to complete.

The research questions addressed in this study attempted to answer questions of the perceptions of the abilities or strengths of students with mild autism and Asperger Syndrome. The primary question was to discover the perceptions of the strengths of students with mild autism, including Asperger Syndrome. The student participants showed dominant ranking in the area of Spatial (35.9%=First) with 12.8% of student participants ranking as first in each of the following areas: Linguistic, Logical, Musical, and Naturalist. Intrapersonal was ranked as first by 10.3%. The lowest number of student participants ranking as first were the intelligences of Kinesthetic and Interpersonal (each at 2.6%). While not ranked first, Linguistic and Logical were ranked as less-dominant by the student participants. There were many significant correlations between the Student Survey and the TIMI and the Student Survey and Teacher Survey.

In conclusion, this study revealed that students did indeed show perceived strengths in the spatial intelligence with no major weakness in the other intelligences with the exception of kinesthetic and interpersonal. The study also revealed that the teachers of these students were accurate in their perceptions of the students' strengths when compared to the students' own perceptions, though they were not as accurate in the area of interpersonal intelligence identification.

Implications for Practice

Perhaps the labeling system of the special education programs in our schools should be reexamined. The current deficit model in education could be the cause for increases in identifications of students with autism, as well as other areas of ESE such as students with learning disabilities and attention-deficit disorder. As Armstrong (2001) expressed in his work:

Many students labeled as having learning, attention, and behavioral disorders may have brains that are not necessarily abnormal, but rather that are different. When we value only restricted ways of learning, behaving, and attending—especially high-stakes-testing learning, sit-down-in-your-seat-and-look-at-the-blackboard behaving, and focus-on-the-vocabulary-word attending—then we ignore, stifle, or repress the other marvelous things that a student's brain might be capable of doing (p. 40).

The role MI can play in raising the autistic students' self-esteem within academics, as well as in the social aspects of school and in general should be examined. It is widely accepted that as students progress through their school years, peer pressure

and the push to conform to the norm is of great importance. Teachers and guidance counselors may be able to use the concept of MI to help autistic students understand and appreciate their various intelligences and the uniqueness of themselves and their peers.

Continued research is needed to confirm the importance of identifying and teaching to the dominant multiple intelligences in student with autism and the influence that a teacher's perception of student strengths can have on the students under their care. Teachers need to recognize the strengths and abilities in students while using the students' greatest gifts and abilities for the benefit of students (Fombonne, 2003, Rogers, 2000, Wing, 1997).

Recommendations for Future Research

A recommendation for future research to expand on the current study would be to include parent surveys for more input into a better understanding of the students' strengths. The surveys should also be further developed and restructured or reworded to be directed to the student to require less interpretation during administration.

A further recommendation would be to examine the effects of using the MI profile and strategies with students who have autism. Would exposure to the MI theory, and the encouragement to use their strongest intelligences as entry points, help the autistic child to overcome various issues related to their disability and become more successful academically and socially?

There is a dilemma in dealing with education. If the goal of education is to

challenge students to do their very best, thus living up to their potential, should they be expected to use only one or two intellectual styles that schools deem important? This study found that spatial, musical, and logical intelligences were perceived by students and teachers as strengths. These are not always strongly emphasized in the curriculum. Rather, students should be given the opportunity to use their individual strengths to grow and become contributing members of their culture and society. MI theory provides the foundation for students to be successful regardless of their strengths or weaknesses.

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APPENDIX

APPENDIX A1

Barry University Informed Consent Form

Your participation in a research project is requested. The title of the study is **ACCOMMODATING STUDENTS' ABILITIES: EXAMINING STUDENT AWARENESS AND TEACHER PERCEPTION OF THE STRENGTHS OF THE STUDENT WITH AUTISM USING GARDNER'S THEORY OF MULTIPLE INTELLIGENCES AS A FRAMEWORK**. The research is being conducted by Dr. Tye McKeehan, a student in the graduate education department at Barry University, and is seeking information that will be useful in the field of exceptional student education. The aims of the research are to identify the strengths of students placed in special education programs who are identified with mild to moderate forms of autism and to analyze the student's own perception of his/her strengths with the perceptions of their strengths by their teachers. In accordance with these aims, the following procedures will be used: portfolio evaluation, student, parent and teacher questionnaires, and classroom observation.

If you decide to participate in this research, you will be asked to do the following: allow the observation of your child in the classroom setting, allow the teacher to complete a checklist of your student's strengths and allow your child to be assessed by Dr. McKeehan with a multiple intelligences checklist and to examine the student's classroom portfolio. The child will only be out of the classroom environment for approximately 10 minutes for the assessment. Following the study, you will be asked to meet with Dr. McKeehan to discuss your child's identified strengths and receive information on how you can assist your child at home for school success.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse effects on your child's school experience.

There are no known risks to your child with this study. The benefits to you for participating in this study may include an awareness of your child's strengths and intelligences as well as an understanding of how you can assist your student in concentrating on those strengths.

As a research participant, information you provide will be held in confidence to the extent permitted by law. Any published results of the research will refer to group averages only and no names will be used in the study. Data will be kept in a locked file in the researcher's office. Your signed consent form will be kept separate from the data.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, Dr. Tye McKeehan, at (239) 823-5938 or the Institutional Review Board point of contact, Ms. Avril Brenner, at (305)899-3020. If you are satisfied with the information provided and are willing to participate in this research, please signify your consent by signing this consent form.

Voluntary Consent

I acknowledge that I have been informed of the nature and purposes of this experiment by Dr. Tye McKeehan and that I have read and understand the information presented above, and that I have received a copy of this form for my records. I give my voluntary consent to participate in this experiment.

Student Name: _____ Student's School: _____

Signature of Parent/Guardian *Date* *Contact Phone Number for Parent/Guardian*

Researcher *Date* *Witness* *Date*

APPENDIX A2

Dear Parent/Guardian:

As a graduate student in the doctoral program at Barry University, I am conducting research that focuses on the strengths of children with mild to moderate forms of autism, including Asperger's Syndrome. I have developed a questionnaire that looks at the abilities of students based on Multiple Intelligences theory as developed by Howard Gardner. Information gained from this questionnaire will provide parents, teachers and others information regarding the strengths these students possess. Often procedures used to assess special needs students focuses on a deficit model (weaknesses), what students cannot do in relation to either a set of norms or students the same age.

I am inviting you and your child to participate in this study. You are under no obligation to have your child participate. If you agree, the following activities will occur:

1. You will receive further information regarding the procedures for the study by mail. You may withdraw your child from the study at any point in time.
2. You, your child, and his/her special education teacher will complete a questionnaire regarding the strengths of the student. Your child will have the questionnaire read to him/her by myself at the school he/she attends. The questionnaire is expected to take 5 to 10 minutes.
3. Your child will be observed in his/her daily routine in the classroom. As well, you will be contacted by phone for a personal interview regarding your child's activities at home. Your child's special education teacher will also be interviewed.

4. The portfolio kept by your child's teacher may be examined to identify strengths in your child's school work, such as artwork, poems, math skills, recognitions, etc. Any items copied for this study will not include the student's name.
5. Once the data is collected, I will set up an appointment with you to discuss the findings. Your child's presence is up to you.
6. The choice of whether I will share the information with your child's special education teacher(s) for possible use in the development of your child's educational program is your decision.

Since this study is looking for general trends in the area of intellectual abilities of autistic students, you and your child's privacy will be protected. Specific information on your child will be shared only with those person(s) you agree to. Pseudonyms (false names) will be used if there is any mention of a particular student in this doctoral dissertation, or if any research findings are published.

If you would like further information about this study, please do not hesitate to contact me at Veterans Park Academy for the Arts (239) 303-3003 or at home (239) 541-7287.

Thank you in advance for your consideration in participating in this study. If you do so agree to participate in this study, please read and sign the attached consent form and return it to me in the enclosed self-addressed stamped envelope.

Yours in educational efforts,

Dr. Markthomas Tye McKeehan
Doctoral Student, Barry University

APPENDIX A3

Date

Dear (Principal):

I am writing to inform you of a graduate study which is being conducted by Dr. Tye McKeehan, a graduate student in the School of Education at Barry University. The study is titled: ACCOMMODATING STUDENTS' ABILITIES: EXAMINING STUDENTS' AND TEACHERS' PERCEPTION OF THE STRENGTHS OF STUDENTS WITH MILD AUTISM USING GARDNER'S THEORY OF MULTIPLE INTELLIGENCES AS A FRAMEWORK.

The parents of students in our district who qualify for this study will have letters that give them the opportunity to participate in the study. Your school could have at least one student participating in the study.

For the study the researcher, Dr. McKeehan, will be visiting your school to give each participant a 10 minute questionnaire and a 10 minute assessment of strengths. The teacher of each participant will have the opportunity to complete a questionnaire on their own time and can submit the completed questionnaire to the researcher at a later time. Some students in the study will also be reviewing their classroom portfolios for documents that demonstrate their strengths. These items may be copied, however student and teacher will maintain anonymity. Portfolio items will be coded and names removed.

The researcher is an employee of the school district so there are no issues of clearance for security while the study is being completed on campus. Any student involved in the study will have a letter of consent from the parent and letter of assent from the student to participate in the study. It is expected that this one-time visit to your school will take place in February and March of 2006. The school will be contacted prior to the visit.

If you have any questions about the study, you may contact me at 239-823-5938. You may also contact, Sharon Brooks, ESE Staffing Specialist at 239-303-3003 regarding your agreement for the students selected at your school to participate. If you do not wish these students to participate in any part of this study, you may inform Ms. Brooks.

Thank you for your time and consideration in allowing your school to participate in this valuable study.

In educational efforts,

Dr. Markthomas Tye McKeehan

APPENDIX A4

Barry University

ASSENT FORM INVOLVING MINORS

Assent for Children

The age of majority in Florida is 18. For subjects under 18 years of age, consent must be obtained from the parent or court-appointed legal guardian. In addition, the Institutional Review Board requires assent from children aged 7-17. The following assent statement should be included with the parental consent form.

We are doing a research study that includes children such as you. We have explained the study to you, and we need to know whether you are willing to participate. Please sign your name below so that we can be certain whether you want to be in the study or not. Thank you.

____ I am willing

____ I am not willing

to participate in the research study which has been explained to me by

Signature of Researcher

Date

Signature of Child

Date

Signature of Parent

Date

APPENDIX A5

Barry University Informed Consent Form (Teachers)

Your participation in a research project is requested. The title of the study is **ACCOMMODATING STUDENTS' ABILITIES: EXAMINING STUDENT AWARENESS AND TEACHER PERCEPTION OF THE STRENGTHS OF THE STUDENT WITH AUTISM USING GARDNER'S THEORY OF MULTIPLE INTELLIGENCES AS A FRAMEWORK**. The research is being conducted by Dr. Tye McKeehan, a student in the graduate education department at Barry University, and is seeking information that will be useful in the field of exceptional student education. The aims of the research are to identify the strengths of students placed in special education programs who are identified with mild to moderate forms of autism and to analyze the student's own perception of his/her strengths with the perceptions of their strengths by their teachers. In accordance with these aims, the following procedures will be used: portfolio evaluation, student, parent and teacher questionnaires, and classroom observation.

If you decide to participate in this research, you will be asked to do the following: allow the observation of students in the classroom setting and complete a checklist of your student's strengths. The child will only be out of the classroom environment for approximately 10 minutes for the questionnaire when given by the researcher.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse effects on you.

There are no known risks to those in this study. The benefits to you for participating in this study may include an awareness of your student's strengths and intelligences as well as an understanding of how you

can assist your student in concentrating on those strengths.

As a research participant, information you provide will be held in confidence to the extent permitted by law. Any published results of the research will refer to group averages only and no names will be used in the study. Data will be kept in a locked file in the researcher's office. Your signed consent form will be kept separate from the data.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, Dr. Tye McKeehan, at (239) 823-5938 or the Institutional Review Board point of contact, Ms. Avril Brenner, at (305)899-3020. If you are satisfied with the information provided and are willing to participate in this research, please signify your consent by signing this consent form.

Voluntary Consent

I acknowledge that I have been informed of the nature and purposes of this experiment by Dr. Tye McKeehan and that I have read and understand the information presented above, and that I have received a copy of this form for my records. I give my voluntary consent to participate in this experiment.

Student Name: _____ Student's School: _____

Signature of Teacher *Date* *Contact Phone Number for Teacher*

Researcher *Date* *Witness* *Date*

APPENDIX B

Teacher Code _____ Student Code: _____

Student Interview Protocol
Survey of Student Strengths
Adapted from *In Their Own Way: Discovering and Encouraging Your Child's Multiple Intelligences*
Thomas Armstrong (2000)

Below are some statements about what you may like to do. Place an "X" on the line next to the statements that are true about you. Check all statements that apply to you. Do not compare yourself to anyone else. Answer the questions as honestly as you can. Do not think too long about any one statement, go with your first impression.

Section 1: Linguistic

- ____ likes to write creatively at home
- ____ spins tall tales or tells jokes or stories
- ____ has a good memory for names, places, dates, or trivia
- ____ enjoys reading books for pleasure
- ____ spells words accurately and easily

- _____ appreciates nonsense rhymes and tongue twisters
- _____ likes doing crossword puzzles or playing games such as Scrabble or Anagrams
- _____ enjoys listening to the spoken word (stories, radio programs, talking books, (etc.))
- _____ has a good vocabulary for his or her age
- _____ excels at subjects in school that involve reading and/or writing

Section 2: Logical-Mathematical

- _____ computes arithmetic problems quickly in his/her head
- _____ enjoys using the computer languages or logical software programs
- _____ asks questions like, "Where does the universe end?" or "Why is the sky blue?"
- _____ plays chess, checkers, or other strategy games with skill
- _____ reasons out problems logically
- _____ devises experiments to test out things that aren't understood at first
- _____ spends a lot of time working on logic puzzles such as Rubik's cube or logical games
- _____ enjoys putting things in categories or hierarchies
- _____ has a good sense of cause and effect
- _____ enjoys math or science classes at school and does well in them

Section 3: Spatial

- _____ excels in art class at school
- _____ reports clear visual images when thinking about something
- _____ easily reads maps, charts, or diagrams
- _____ draws accurate representations of people or things
- _____ likes it when you show movies, slides, or photographs
- _____ enjoys doing jigsaw puzzles, mazes, or other visual activities
- _____ daydreams a lot
- _____ builds interesting three-dimensional constructions (e.g., Lego buildings)
- _____ doodles on stray scraps of paper or on schoolwork
- _____ gets more out of pictures than words while reading

Section 4: Bodily-Kinesthetic

- _____ does well in competitive sports at school or in the community
- _____ moves, twitches, taps, or fidgets while sitting in a chair
- _____ engages in physical activities such as swimming, biking, hiking, or skateboarding
- _____ needs to touch things in order to learn more about them
- _____ enjoys jumping, running, wrestling, or similar activities

- _____ demonstrates skill in a craft like woodworking, sewing, carving, or sculpture
- _____ cleverly mimics other people's gestures, mannerisms, or behaviors
- _____ gets "gut feelings" when working on problems at home or at school
- _____ enjoys working with clay, finger-painting, or other "messy" activities
- _____ loves to take things apart and put them back together

Section 5: Musical

- _____ plays a musical instrument at home or in the school band
- _____ remembers melodies of songs
- _____ does very well in music class at school
- _____ studies better when background music is playing
- _____ collects CDs or tapes
- _____ sings to him/herself or to others
- _____ keeps time rhythmically to music
- _____ has a good singing voice
- _____ is sensitive to environmental noises
- _____ responds strongly to different kinds of music

Section 6: Interpersonal

- _____ has lots of friends
- _____ socializes a great deal at school or around the neighborhood
- _____ appears to be "street smart"
- _____ gets involved in after-school group activities
- _____ serves as the "family mediator" when disputes arise
- _____ enjoys playing group games
- _____ has a lot of empathy for the feelings of others
- _____ is sought out as an "advisor" or "problem solver" by peers
- _____ enjoys teaching others
- _____ seems to be a natural leader

Section 7: Intrapersonal

- _____ displays a sense of independence or a strong will
- _____ has a realistic sense of his/her strengths and weaknesses
- _____ reacts with strong opinions when controversial topics are being discussed
- _____ works or studies well alone
- _____ has a sense of self-confidence
- _____ marches to the beat of a different drummer

- _____ learns from past mistakes
- _____ accurately expresses inner feelings
- _____ is goal-directed
- _____ engages in self-directed hobbies or projects

Section 8: Naturalist

- _____ relates well to pets
- _____ enjoys walks in nature or to the zoo or a natural history museum
- _____ shows sensitivity to natural formations (e.g., mountains, clouds, etc.)
- _____ loves to garden or be around gardens
- _____ spends time near aquariums, terrariums, or other natural living systems
- _____ displays an ecological awareness (e.g., through recycling, community service, (etc.))
- _____ believes that animals have their own rights
- _____ keeps records of animals, plants, or other natural phenomena (e.g., photos, diaries, drawings, collections, etc.)
- _____ brings home bugs, flowers, leaves, or other natural things to share with family members

APPENDIX C

Student Code: _____

Teacher Interview Protocol
 Survey of Student Strengths
 Adapted from *In Their Own Way: Discovering and
 Encouraging Your Childs Multiple Intelligences*
 Thomas Armstrong (2000)

Below are some statements about what your student may like to do. Place an “X” on the line next to the statements that are true about your student. Check all statements that apply to your student. Answer the questions as honestly as you can. Do not think too long about any one statement, go with your first impression.

Section 1: Linguistic

- _____ likes to write creatively at home
- _____ spins tall tales or tells jokes or stories
- _____ has a good memory for names, places, dates, or trivia

- ___ enjoys reading books for pleasure
- ___ spells words accurately and easily
- ___ appreciates nonsense rhymes and tongue twisters
- ___ likes doing crossword puzzles or playing games such as Scrabble or Anagrams
- ___ enjoys listening to the spoken word (stories, radio programs, talking books, (etc.))
- ___ has a good vocabulary for his or her age
- ___ excels at subjects in school that involve reading and/or writing

Section 2: Logical-Mathematical

- ___ computes arithmetic problems quickly in his/her head
- ___ enjoys using the computer languages or logical software programs
- ___ asks questions like, "Where does the universe end?" or "Why is the sky blue?"
- ___ plays chess, checkers, or other strategy games with skill
- ___ reasons out problems logically
- ___ devises experiments to test out things that aren't understood at first
- ___ spends a lot of time working on logic puzzles such as Rubik's cube or logical games
- ___ enjoys putting things in categories or hierarchies
- ___ has a good sense of cause and effect
- ___ enjoys math or science classes at school and does well in them

Section 3: Spatial

- ___ excels in art class at school
- ___ reports clear visual images when thinking about something
- ___ easily reads maps, charts, or diagrams
- ___ draws accurate representations of people or things
- ___ likes it when you show movies, slides, or photographs
- ___ enjoys doing jigsaw puzzles, mazes, or other visual activities
- ___ daydreams a lot
- ___ builds interesting three-dimensional constructions (e.g., Lego buildings)
- ___ doodles on stray scraps of paper or on schoolwork
- ___ gets more out of pictures than words while reading

Section 4: Bodily-Kinesthetic

- ___ does well in competitive sports at school or in the community
- ___ moves, twitches, taps, or fidgets while sitting in a chair
- ___ engages in physical activities such as swimming, biking, hiking, or skateboarding

- ___ needs to touch things in order to learn more about them
- ___ enjoys jumping, running, wrestling, or similar activities
- ___ demonstrates skill in a craft like woodworking, sewing, carving, or sculpture
- ___ cleverly mimics other people's gestures, mannerisms, or behaviors
- ___ gets "gut feelings" when working on problems at home or at school
- ___ enjoys working with clay, finger-painting, or other "messy" activities
- ___ loves to take things apart and put them back together

Section 5: Musical

- ___ plays a musical instrument at home or in the school band
- ___ remembers melodies of songs
- ___ does very well in music class at school
- ___ studies better when background music is playing
- ___ collects CDs or tapes
- ___ sings to him/herself or to others
- ___ keeps time rhythmically to music
- ___ has a good singing voice
- ___ is sensitive to environmental noises
- ___ responds strongly to different kinds of music

Section 6: Interpersonal

- ___ has lots of friends
- ___ socializes a great deal at school or around the neighborhood
- ___ appears to be "street smart"
- ___ gets involved in after-school group activities
- ___ serves as the "family mediator" when disputes arise
- ___ enjoys playing group games
- ___ has a lot of empathy for the feelings of others
- ___ is sought out as an "advisor" or "problem solver" by peers
- ___ enjoys teaching others
- ___ seems to be a natural leader

Section 7: Intrapersonal

- ___ displays a sense of independence or a strong will
- ___ has a realistic sense of his/her strengths and weaknesses
- ___ reacts with strong opinions when controversial topics are being discussed
- ___ works or studies well alone

- _____ has a sense of self-confidence
- _____ marches to the beat of a different drummer
- _____ learns from past mistakes
- _____ accurately expresses inner feelings
- _____ is goal-directed
- _____ engages in self-directed hobbies or projects

Section 8: Naturalist

- _____ relates well to pets
- _____ enjoys walks in nature or to the zoo or a natural history museum
- _____ shows sensitivity to natural formations (e.g., mountains, clouds, etc.)
- _____ loves to garden or be around gardens
- _____ spends time near aquariums, terrariums, or other natural living systems
- _____ displays an ecological awareness (e.g., through recycling, community service, (etc.))
- _____ believes that animals have their own rights
- _____ keeps records of animals, plants, or other natural phenomena (e.g., photos, diaries, drawings, collections, etc.)
- _____ brings home bugs, flowers, leaves, or other natural things to share with family members

APPENDIX D

TABLE 2a.

Student Survey Linguistic Rank

Rank	<u>n</u>	<u>%</u>
First	5	12.8
Second	6	15.4
Third	2	5.1

Fourth	4	10.3
Fifth	3	7.7
Sixth	8	20.5
Seventh	5	12.8
Eighth	6	15.4

TABLE 2b

Student Survey Logistic Rank

Rank	<u>n</u>	<u>%</u>
First	5	12.8
Second	7	17.9
Third	11	28.2
Fourth	4	10.3

Fifth	7	17.9
Sixth	4	10.3
Seventh	1	2.6

TABLE 2c

Student Survey Spatial Rank

Rank	<u>n</u>	<u>%</u>
First	14	35.9
Second	8	20.5
Third	9	23.1
Fourth	6	15.4

Sixth	2	5.1
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TABLE 2d

Student Survey Kinesthetic Rank

Rank	<u>n</u>	<u>%</u>
Second	1	2.6
Third	5	12.8
Fourth	8	20.5
Fifth	7	17.9

Sixth	5	12.8
Seventh	7	17.9
Eighth	6	15.4

TABLE 2e

Student Survey Musical Rank

Rank	<u>n</u>	<u>%</u>
First	5	12.8
Second	10	25.6
Third	7	17.9
Fourth	6	15.4

Fifth	7	17.9
Sixth	1	2.6
Seventh	2	5.1
Eighth	1	2.6

TABLE 2f

Student Survey Interpersonal Rank

Rank	<u>n</u>	<u>%</u>
Fourth	1	2.6
Fifth	2	5.1
Sixth	6	15.4
Seventh	11	28.2

Eighth	19	48.7
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TABLE 2g

Student Survey Intrapersonal Rank

Rank	<u>n</u>	<u>%</u>
First	4	10.3
Second	1	2.6
Third	1	2.6
Fourth	5	12.8
Fifth	5	12.8
Sixth	9	23.1
Seventh	13	33.3
Eighth	1	2.6

TABLE 2h

Student Survey Naturalist Rank

Rank	<u>n</u>	<u>%</u>
First	6	12.8
Second	6	15.4
Third	4	5.1
Fourth	5	10.3

Fifth	8	7.7
Sixth	4	20.5
Eighth	6	15.4

APPENDIX E

TABLE 3a

TIMI Linguistic Rank

Rank	<u>n</u>	<u>%</u>
First	7	17.9
Second	6	15.4
Third	5	12.8

Fourth	3	7.7
Fifth	5	12.8
Sixth	4	10.3
Seventh	9	23.1

TABLE 3b

TIMI Logistic Rank

Rank	<u>n</u>	<u>%</u>
First	6	15.4
Second	9	23.1
Third	4	10.3
Fourth	11	28.2

Fifth	9	23.1
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TABLE 3c

TIMI Spatial Rank

Rank	<u>n</u>	<u>%</u>
First	18	46.2
Second	8	20.5
Third	11	28.2
Fourth	2	5.1

TABLE 3d

TIMI Kinesthetic Rank

Rank	<u>n</u>	<u>%</u>
Third	10	25.6
Fourth	8	20.5
Fifth	4	10.3
Sixth	5	12.8

Seventh	12	30.8
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TABLE 3e

TIMI Musical Rank

Rank	<u>n</u>	<u>%</u>
First	4	10.3
Second	16	41.0
Third	7	17.9
Fourth	6	15.4
Sixth	6	15.4

TABLE 3f

TIMI Interpersonal Rank

Rank	<u>n</u>	<u>%</u>
Fifth	10	25.6
Sixth	11	28.2
Seventh	18	46.2

TABLE 3g

TIMI Intrapersonal Rank

Rank	<u>n</u>	<u>%</u>
First	4	10.3
Third	2	5.1
Fourth	9	23.1
Fifth	11	28.2
Sixth	13	33.3

APPENDIX F1

- ΔX
"

"We live on a prairie."
"O O O Okay. The caravan
has to main X settlers. Van
"O Okay with settlers
"Oregon, Utah, Montana &
California are hot states.
Just find oxen here.
All right. Go to the
homestead you'll find oxen
there. There's a woman with

APPENDIX F2

Say It Loud

Say the picture words.

Circle the picture word that begins with the same sound.

ka



F
fox



J
jelly

