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# Nonverbal Learning Disabilities Explained Through Student's Narratives

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Nonverbal Learning Disabilities Explained Through Student's Narratives

by  
Brian Wright

An Applied Dissertation Submitted to the  
Abraham S. Fischler School of Education  
In Partial Fulfillment of the Requirements  
For the Degree of Doctor of Education

Nova Southeastern University  
2015

## Approval Page

This applied dissertation was submitted by Brian Wright under the direction of the persons listed below. It was submitted to the Abraham S. Fischler School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

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## Statement of Original Work

I declare the following:

I have read the Code of Student Conduct and Academic Responsibility as described in the *Student Handbook* of Nova Southeastern University. This applied dissertation represents my original work, except where I have acknowledged the ideas, words, or material of other authors.

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*Brian Wright, M.S., CCC-SLP*

\_\_\_\_\_  
Signature

Brian Wright

May 24, 2015

Date

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## Abstract

Nonverbal Learning Disabilities Explained Through Student's Narratives. Brian Wright 2015: Applied Dissertation, Nova Southeastern University, Abraham S. Fischler School of Education. ERIC Descriptors: Learning Disabilities, Perception, Senior High School Students, Self-Efficacy, and Qualitative.

This applied dissertation will provide a deeper understanding of how high school students with nonverbal learning disabilities perceive themselves. Persons with nonverbal learning disabilities are defined primarily through performance measures with less qualitative information available. In this study, high school students identified with nonverbal learning disabilities will have the opportunity to voice their feelings about their disability.

The researcher developed open-ended questions about nonverbal learning disabilities and how it has impacted the students. Information was gathered through a narrative format and transcribed. Information was coded for important themes.

## Table of Contents

	Page
Chapter 1: Introduction.....	1
Statement of the Problem .....	1
Characteristics .....	3
Definition of Term.....	6
Background and Justification .....	7
Purpose of the Study.....	15
Chapter 2: Literature Review .....	16
Introduction .....	16
Theoretical Framework.....	17
Historical Context.....	17
History of Nonverbal Learning Disabilities .....	18
Processing Speed .....	18
Perceptions.....	20
Characteristics of Asperger's Syndrome.....	21
Sensory Issues.....	25
Learning Styles.....	26
Brain Function .....	26
Executive Function .....	29
Social Relations .....	31
Memory .....	34
Central Coherence and Theory of the Mind .....	35
Attending .....	37
Definitive Characteristics .....	38
Pragmatic Language Impairment.....	41
Auditory Processing .....	41
Qualitative Literature.....	42
Research Questions.....	43
Chapter 3: Methodology.....	44
Aim of Study .....	44
Research Approach.....	44
Strategies Used .....	46
Background for Strategies .....	47
Outcome of Study .....	47
Source of Strategy Used .....	47
Participants .....	48
Data Collection Tools.....	49
Procedure .....	51
Data Analysis .....	51
Establishing Data Validity .....	52
Ethical Considerations.....	53
Trustworthiness .....	53

Potential for Bias .....	54
Limitations.....	54
Chapter 4: Findings .....	56
The Study.....	56
The Participants .....	57
Synthesizing the Data .....	60
Themes.....	64
Chapter 5: Discussion.....	66
Introduction .....	66
The Study.....	66
Nonverbal Learning Disabilities.....	67
Theoretical Framework.....	69
Theme 1: Homework Strategies .....	70
Theme 2: Academics .....	71
Theme 3: Learning Style .....	71
Theme 4: Socialization .....	72
Theme 5: Conflict.....	73
Theme 6: Trust.....	73
Theme 7: Stress .....	74
Theme 8: Adulthood.....	74
Triangulating the Data.....	75
Implications of Findings.....	77
Limitations.....	81
Recommendations For Future Research.....	81
Conclusion .....	83
References .....	85
Appendix	
Interview Protocol .....	97
Table	
Participant Characteristics.....	76



## Chapter 1: Introduction

### Statement of the Problem

The term nonverbal learning disabilities has been defined primarily in quantifiable terms. A neurologist identifies persons with nonverbal learning disabilities. The term nonverbal learning disability has also been confusing due to the word nonverbal that was used in its terminology. Based on what was known about the characteristics of the disability there was a need for a qualitative research approach that would provide information about how these students especially at the secondary level perceived themselves in relation to their disability. This information would be informative and assist in the development of the students' self-awareness about their disability. Further, it would assist those people involved with the person who has characteristics of nonverbal learning disabilities to develop a better understanding of the term.

Many studies in the last two decades have identified the characteristics of persons with nonverbal learning disabilities. Most of these studies focused on people older than 18 years of age. The studies found that persons with nonverbal learning disabilities exhibited difficulties with:

**Executive functions.** Planning and implementing tasks.

**Academic performance.** Strategies and techniques used to improve academics.

**Auditory processing.** Hearing and processing sounds into words.

**Visual spatial working memory.** Remembering multistep visual tasks.

**Problem solving.** Applying strategies and options to difficult tasks.

**Humor.** Understanding mixed messages.

These studies did not give a complete picture about persons with nonverbal learning disabilities and there was a need for further information. There was also a need for more information related to the high school student who had nonverbal learning disabilities including strategies that may be helpful with learning strategies (Chow & Skuy, 1999; Cornoldi, Rigoni, Tressoldi, & Vio, 1999; Galway, & Metsala, 2011; Gates, 2009; Hahn, 2004; Harnadek & Rourke, 1994; Keller, Tillery, & McFadden, 2006; Landwher, 2009; Mammarella, Lucangeli, & Cornoldi, 2010; Ortiz, 2010; Schiff, Bauminger, & Toledo, 2009; Semrud-Clikeman, & Glass, 2008; Tuller, Jantzen, Olvera, Steinberg, & Kelso, 2007).

Some of the qualitative studies done used a narrative format. In one such study, students with nonverbal learning disabilities discussed the impact that their disability had on their lives. This narrative format allowed the participants to directly influence how they were represented in the research along with explaining how they dealt with issues related to college students with nonverbal learning disabilities (Conner, 2012). Another researcher used focus groups of eighth and ninth grade students with learning disabilities to gain insight into their disability empowering them through the use of the qualitative data that was collected (Kaehne & O'Connell, 2010). While Orr and Goodman (2010) used qualitative research to gain insight into how college students perceived that they coped with their learning disabilities. In another study, focus groups were used to obtain feedback from teachers and to gain insight into how eighth and ninth grade students with learning disabilities discussed how they learned (Klassen & Lynch, 2007). In a study of young individuals with learning disabilities aged 13 to 21 years, Mitchell (2012) used semi-structured interviews to identify the level of parent involvement in important life

decisions that their children made. The results of the study indicated that parents and children agreed on the life choices that were made. Trainor (2005) used narrative format to allow adolescents with learning disabilities to discuss post high school plans. While these students could identify possible career choices they had more difficulty identifying the necessary steps to obtain their goal. A further qualitative study allowed high school students with nonverbal learning disabilities a chance to voice their perceptions and understanding of their disability (Trainor, 2007).

Many of the past qualitative studies involved college students with learning disabilities and their concerns were related to college life. There was less information about the needs and concerns of the high school students with nonverbal learning disabilities (Orr & Goodman, 2010; Trainor, 2007; Trainor, 2005). Also most of these studies involved participants with learning disabilities and not specifically participants with nonverbal learning disabilities. This current study explored how high school students perceived their nonverbal learning disabilities in relation to their academic, social, and emotional circumstances. By giving a voice to the high school students with nonverbal learning disabilities their narratives will provide a better description and understanding of how their nonverbal learning disabilities affect them (Creswell, 2013).

### **Characteristics**

In research completed by Harnadek and Rourke (1994) the characteristics of persons identified as having nonverbal learning disabilities included:

**Bilateral deficits.** Greater difficulties on the left side.

**Visual deficits.** Difficulties analyzing visual information.

**Poor written comprehension.** A decreased understanding of written language.

**Time management.** Poor awareness of timelines for work completion.

These difficulties also affected performance of physical activities, analysis of charts and graphs; and in learning novel information. These deficits may have caused increased difficulty when completing work and meeting deadlines. People identified with nonverbal learning disabilities were also perceived as being more verbal in speaking situations yet, in comparison; they had more difficulties in math and reading comprehension as well as when discussing complex concepts. Their social skills, especially with peers and in unstructured activities were poor (Harnadek & Rourke, 1994; Rourke et al., 2002). Further Ortiz (2010) stated that a large split in IQ Scores was not needed to identify persons with a nonverbal learning disability.

Students with nonverbal learning disabilities had difficulty with "...reading comprehension, graphomotor coordination, mathematics, and science" (Matte & Bolaski, 1998, p. 40). They also had more difficulty understanding emotions that were based on social cues (Galway & Metsala, 2011). In addition these individuals had a difficult time understanding humor (Semrud-Clikeman & Glass, 2008). In general, persons with nonverbal learning disabilities demonstrated greater variability when they performed academic tasks (Semrud-Clikeman & Glass, 2008). These individuals could benefit greatly from the chance to express how their nonverbal learning disabilities could affect their lives (Connor, 2012). This deeper understanding of their disability could increase and improve the strategies used to assist persons who had nonverbal learning disabilities (Klassen & Lynch, 2007).

**Setting.** The setting was a charter high school in the southeastern United States. This charter school allowed students to choose an academy of interest to study along with their regular academic credits. Some of the Academies included Auto Tech, Computers, and Graphic Design. The researcher had worked at this school for over 11 years and was familiar with the school setting and many of the students. This knowledge was helpful when interacting with students and when obtaining their narrative responses. The students with nonverbal learning disabilities were a convenience sample chosen from the general student population.

**Probable causes related to the problem.** Students who were identified with nonverbal learning disabilities demonstrated lower performance scores and higher verbal scores on the WISC/WISC-R (Landwehr, 2009). There were deficits in tactile and visual perception as well as difficulties with problem solving and in understanding the content and use of language (Rourke et al., 2002). Students were identified as having nonverbal learning disabilities through psychological evaluations that most of these students had prior to high school. Students who received exceptional student education for learning disabilities could also have been identified with a verbal language disability. Those persons identified with nonverbal learning disabilities may have had damage to the right cerebral hemisphere resulting in difficulty with bilateral tactile abilities and decreased nonverbal problem solving skills (Harnadek & Rourke, 1994; Rourke et al., 2002). This could also have resulted in increased difficulties understanding the content and pragmatics of language (Rourke et al., 2002).

Persons having nonverbal learning disabilities did not form a cohesive group and each person benefitted from a more individualized program for optimal learning

(Kimpton Heald, 2011). By identifying strengths and weaknesses of individuals with nonverbal learning disabilities, their instructors could utilize new strategies that used the strengths in each person in order to increase academic success. For instance, people with nonverbal learning disabilities were often found to have a strength using sequential processing and a weakness with simultaneous processing. This may have caused difficulty understanding math concepts and social cues. Information that was presented sequentially could have increased comprehension for these individuals and would likely have improved their academic performance (Chow & Skuy, 1999).

### **Definition of Terms**

**Nonverbal language disorder.** Persons identified with nonverbal language disorders have most difficulty with the pragmatics of language. Individuals with nonverbal learning disabilities and those on the autism spectrum frequently had difficulty understanding nonverbal communication and would demonstrate poor social skills (Karasinski & Weismer, 2010). These individuals may have also had nonverbal language disorders.

**Nonverbal learning disability.** Learning difficulties that were related to the nonverbal aspects of communication and learning. Right brain involvement played a large role in this disability. Individuals had strength areas with verbal tasks involving rote memory; they processed information sequentially better than simultaneously, they worked best in structured settings losing focus easily when they worked independently. They had difficulties learning novel concepts and they also experienced difficulties socially (Harnadek & Rourke, 1994; Landwehr, 2009).

**Typical language development.** This group was referred to as those individuals who had normal language development and IQ scores above 80. They were considered to be free of significant intellectual or communication deficits.

**Nonverbal communication.** This was information communicated nonverbally that complimented the spoken word, which included body language, eye gaze, and tone of voice (Egolf, 2001). This was a characteristic of communication and not generally thought of as a disorder.

### **Background and Justification**

Many studies identified nonverbal learning disabilities with quantifiable measures (Baron-Cohen, 2011; Bloom & Heath, 2010; Cornoldi et al., 1999; Galway & Metsala, 2011; Gates, 2009; Keller et al., 2006; Mammarella et al., 2010). Some qualitative studies about learning disabilities were found in literature and most of these studies included subjects who had finished high school (Brackenbury, Burroughs, & Hewitt, 2008; Connor, 2012; Kaehne & O'Connell, 2010; Klassen & Lynch, 2007; Orr & Goodman, 2010; Trainor, 2007; Trainor, 2005; Weis, Sykes, & Unadkat, 2012). Qualitative research specific to high school students with nonverbal learning disabilities was less prevalent. Students identified with nonverbal learning disabilities at the research site faced additional challenges in school that were more severe than those identified with other learning disabilities. They had difficulties with socialization, time management and work completion, and learning new concepts. These students frequently had difficulty keeping up with their assignments. The more involved that students with nonverbal learning disabilities were the less out going and less likely they were to volunteer for the study.

One study that triangulates information effectively involved high school students with nonverbal learning disabilities. The students were interviewed, as well as their parents and teachers. This provided a broader understanding of how students with nonverbal learning disabilities were perceived (McDonald, 2001). In another study involving children with nonverbal learning disabilities who were interviewed in order to gain a better understanding of cognitive and social concerns. The researchers identified three important characteristics of persons with nonverbal learning disabilities. These included "Procession speed/efficiency disorder, Concept integration disorder, or Social adaptation disorder..." (Grodzinsky, Forbes, & Bernstein, 2010, p. 455). By focusing on these specific deficits effective treatment models were identified.

It was found that when in-depth interviews and figurative language were used it helped students with verbal and nonverbal learning disabilities to express their levels of understanding and discuss types of coping strategies that they used. Those students identified with nonverbal learning disabilities were less effective at using coping strategies than were those students with verbal learning disabilities (Givon, 2013). By building on this information and gathering additional depth to the definition of persons with nonverbal learning disabilities the participants in this study then a more focused set of strategies could be developed.

Research had indicated that individuals with Asperger's syndrome and with nonverbal learning disabilities would each benefit from programming that could address difficulties with social interaction skills (Wing, 2005). Individuals with nonverbal learning disabilities were also found to have better rote memory and verbal memory skills and more difficulty with visual memory and attention skills. They were also more



impulsive than their typically developing peers (Nydén et al., 2010). The use of rote memory and teaching good verbal memory skills in educational programming could help to compensate for their weaknesses in visual memory and attending to visual stimuli.

Those persons with nonverbal learning disabilities generally had better verbal intelligence scores than performance scores. Furthermore students with nonverbal learning disabilities had "...significant primary deficits in some dimensions of tactile perception, visual perception, complex psychomotor skills, and in dealing with novel circumstances" (Rourke et al., 2002, p. 310). Those persons with nonverbal learning disabilities had more difficulty with complex thought processes and their language usage, while verbose, they lacked depth and complexity in their language (Leonard, Weismer, Francis, Tomblin, & Kail, 2007). At the high school where the study took place the students were given exceptional student education services for their nonverbal learning disabilities which included strategies for nonverbal learning disabilities and/or due to a speech or language impairment.

**Asperger's syndrome.** People with Asperger's syndrome and nonverbal learning disabilities both lacked awareness of their communication partner's intent although this was more severe in persons with Asperger's syndrome. Those with nonverbal learning disabilities were found to be impulsive with deficits in visual integration, retention, and they performed better in structured rather than unstructured settings (Nydén et al., 2010). In addition they had more difficulty with novel concepts and in understanding new concepts and both of these deficits could interfere with communication. Those with nonverbal learning disabilities had difficulty regulating emotions as well as maintaining emotional stability, yet those with nonverbal learning disabilities were better able to self

regulate than those with Asperger's syndrome (Harnadek & Rourke, 1994; Thompson, Thompson, & Reid, 2010).

There were a variety of characteristics for students with nonverbal learning disabilities including the following:

**Left sided neglect.** Deficits in sensation and coordination more pronounced on the left.

**Visual spatial.** Visual spatial organization deficits.

**Cause and effect.** Difficulties understanding cause-effect and humor.

**Highly verbal.** Knew a lot of words but at a concrete level.

**Novel situations.** They had difficulty understanding novel situations.

**Math skills.** They had less proficiency in math than in reading.

**Repetitive speech.** They had repetitive speech with poor prosody.

**Social deficits.** They could have social deficits with social withdrawal (Harnadek & Rourke, 1994).

A poor visual spatial working memory was also characteristic of persons with nonverbal learning disabilities (Mammarella et al., 2010). Students with nonverbal learning disabilities performed lower on three dimensional tasks involving the manipulation of objects when compared to their typically developing peers (Cornoldi, Ficili, Giofrè, & Mammarella, 2011-2012). Students with nonverbal learning disabilities had intact verbal learning and attending skills (Nydén et al., 2010). Further, their visual learning and memory deficits also reduced their understanding of nonverbal communication. These disabilities became more evident in unstructured social settings and independent academic work while performance of individuals with nonverbal

learning disabilities improved when activities were structured. This condition also made the student with a nonverbal learning disability more functional in the classroom but performance decreased when work was completed outside of the classroom. Those with nonverbal learning disabilities also had more difficulty evaluating their own behaviors as well as other's behaviors in social situations (Nydén et al., 2010). They were also found to have more difficulty with physical problem solving activities (Schiff et al., 2009).

While quantitative research has provided information on the characteristics of nonverbal learning disabilities there has been less information available on assessment and treatment options for persons with nonverbal learning disabilities (Semrud-Clikeman, & Glass, 2008). More qualitative information on nonverbal learning disabilities could improve treatment strategies. Many of the characteristics of nonverbal learning disabilities also overlapped with Asperger's syndrome, autism, and language disability. This overlap has also made identification and treatment specific to nonverbal learning disability more difficult.

These facts about nonverbal verbal learning disabilities, while informative provided limited information about effective strategies. By developing a deeper understanding of nonverbal learning disabilities a more effective treatment model could be developed. This increased knowledge could have a positive impact on the programming needs of persons with nonverbal learning disability as well as to provide insight into the disability. Further qualitative research would allow for a more expansive understanding of this disability (Trainor, 2005).

Students identified with nonverbal learning disabilities often had difficulties in school. Their performance in structured settings was more like that of the typical student.

In independent work however they had more difficulty with organizational skills and this negatively affected work completion. Also they had difficulty problem solving and forming solutions due to poor organizational skills. This caused frustration for the student and others involved (Chow & Skuy, 1999; Foss, 2001; Galeway & Metsala, 2011; Hahn, 2004; Ortiz, 2010).

This study allowed students identified as nonverbal learning disabled the opportunity to convey their ideas and thoughts about their disability through narrative responses. The students were asked open-ended questions that related to academic, social, and emotional issues. They were also asked to comment on their relationships with teachers, parents, and fellow students. They benefitted from expressing concerns, which could lead to increased success academically and socially. Through their discussion the students gained a deeper understanding of themselves and how they dealt with their disability (Foss, 2001).

**The misunderstood term: Nonverbal learning disabilities.** Researchers found that individuals with nonverbal learning disabilities appeared more verbal yet they had great difficulty understanding the subtle nonverbal messages when communicating with others (Hahn, 2004; Harnadek & Rourke, 1994; Landwher, 2009; Nydén et al., 2010). Nonverbal communication encompassed a wide range of events (both verbal and nonverbal) and for the typical person; these messages were understood together, without effort. An important part of good communication was the ability to coordinate all of the pieces of an incoming message both verbal and nonverbal, synthesizing this information and creating at the same time a more accurate understanding of the speaker's message. "The astute listener listens not only to the words but observes the nonverbal behaviors

surrounding those words” (Egolf, 2001, p. 91). The listener interpreted the nonverbal message paired with the verbal information. This was synthesized with past knowledge and then applied to their current understanding of the social rules for communication (Sime, 2006). Nonverbal communication is not just what you did but also what is not done.

It was difficult to stop communicating nonverbally as the communicator was continuously sending a message just by occupying space. These nonverbal messages helped the receiver to identify the possibility that another person was interested in their message and understood what was said. It also assisted in identifying incongruent verbal/nonverbal messages from someone. Egolf (2001) stated that the nonverbal message was continuous and our physical presence gave communicative intent. The verbal/nonverbal messages complimented each other however, in cases such as deception, sarcasm, and humor there may be conflicting messages between the verbal and nonverbal message. The nonverbal message included gestures that “...function in direct relationship to the particular linguistic and social context in which they occur...” (Sime, 2006). For the person with a nonverbal learning disability, there could be confusion about the intent of the message.

**Verbal and nonverbal communication.** The verbal part of the message included the syntax and semantics of language when combined with other nonverbal information such as rate, rhythm, and intonation. Based on this the listener would respond to the message and attempt to match the intent of the message. Not only did the listener need to focus on the semantics and syntax of the language but also the nonverbal message was analyzed in synchrony with the spoken message. Nonverbal communication included

vitalics (body response), organismics (body image), oculusics (eye gaze), personics (facial expression) and proximics (space) and these nonverbal messages were often more difficult to understand than the verbal messages. In vitalics, the person who was at a job interview could have been sweating more and had rapid breathing, which indicated nervousness. In organismics, the person's general look and perceived attractiveness could have affected the message conveyed: For instance, an attractive person was perceived as more competent and well liked by others. In oculusics someone who stared too much could have caused uneasiness to the message receiver. The facial expressions of the listener/speaker had a great impact on the message being delivered. These nonverbal messages were ongoing and were not separate from verbal communication. Nonverbal communication difficulties could be characteristic of nonverbal learning disabilities. The level of difficulty experienced would be different for each person with nonverbal learning disabilities (Egolf, 2006).

**Deficiencies in the evidence.** Current studies provided more factual knowledge about nonverbal learning disabilities but gave less information on the needs of high school aged students with nonverbal learning disabilities. More qualitative information about teenagers with nonverbal learning disabilities would give us a deeper understanding of them and the difficulties they have encountered.

**Audience.** Individuals with nonverbal learning disabilities would benefit personally through increased insight and understanding of their disability. Educators could improve their service delivery model for those with nonverbal learning disabilities. Professionals who gained a better understanding of nonverbal learning disabilities could better identify and serve those with nonverbal learning disabilities.

### **Purpose of the Study**

The purpose of this study was to explore and develop a more in depth understanding of nonverbal learning disabilities from the perspective of the students who had nonverbal learning disabilities. This was done at a charter high school in the southeastern United States. This study employed qualitative narrative research. By asking open-ended questions the participants were able to express their ideas about nonverbal learning disabilities. Characteristically persons with nonverbal learning disabilities had more difficulty with math than reading. Their performance IQ scores were higher than their verbal IQ scores. Those individuals with nonverbal learning disabilities had more difficulty with visual processing, learning novel concepts, and social skills rather than with reading and listening skills (Landwehr, 2009). A better understanding of how nonverbal learning disabilities affected the individual would likely improve the identification of process and the delivery of services for them.

## Chapter 2: Literature Review

### Introduction

The definition of nonverbal learning disabilities dates back to Harnadek and Rourke (1994); it was characterized as a right brain disorder. Further studies have included information about the affects of nonverbal learning disabilities on the academic and social abilities of those persons with nonverbal learning disabilities. One qualitative study used narratives in which college students were asked how they negotiated their own success in college (Conner, 2012). In another study eighth and ninth grade students with learning disabilities participated. The students were placed in focus groups and asked questions related to their beliefs about themselves in relation to their learning difficulties. It was found that these students preferred more discreet assistance for their academic needs (Klassen & Lynch, 2007). While Orr and Goodman (2010) found that college-aged persons attached a negative emotional component to their identification as having learning disabilities. They did state that strong social support did help them to succeed academically. In two studies by Trainor (2005, 2007) students with learning disabilities discussed their use of self-determination when transitioning from high school to college. While these students could identify issues related to improved performance they lacked the ability to implement these ideas. The Trainor studies used narrative inquiry to increase knowledge about the characteristics and specific needs of these students.

Characterizing individuals with nonverbal learning disabilities with descriptive facts has improved our understanding of nonverbal learning disabilities yet there has been less information on how these difficulties have affected the individual. By using qualitative research with a narrative format, it was anticipated that the information



derived would improve the identification process and treatment models for those identified as having nonverbal learning disabilities. It may also have encouraged those identified as nonverbal learning disabled to express what nonverbal learning disabilities meant to them (Creswell, 2013). This literature review provided a perspective of nonverbal learning disabilities at the high school level and how these students were differentiated from typical students and other students with disabilities. The participants in this research study were high school students identified with characteristics of nonverbal learning disabilities.

### **Theoretical Framework**

Through a taped narrative discussion with the students about nonverbal learning disabilities as well as observations, and academic documentation a deeper understanding of nonverbal learning disabilities would unfold. The researcher as a speech language pathologist for 30 plus years has developed an interactive style with high school students in small groups and in one-to-one interactions. This was helpful in encouraging the participants to expand on their ideas. Being aware of how the information was gathered also provided insight about how the narratives would be interpreted (Creswell, 2013).

### **Historical Context**

The students who participated in this research project came from families with average household incomes of \$56,000.00 (<http://www.demographicsnow.com>). Over 75% of the students planned to attend either a technical college or university. Due to the nature of the school both students and staff at the school were creative in their thinking. The students selected a career that they would study along with their required academics. They could also select a second academy if they chose to do so. Examples of some of the

academies were Cosmetology, Auto Technology, Culinary, and Information Technology. This emphasis on a life career along with completing credits necessary for high school graduation helped many students with motivation when completing their needed credits for high school graduation.

### **History of Nonverbal Learning Disabilities**

Harnadek and Rourke (1994) identified persons with nonverbal learning disabilities primarily from a neurological perspective stating that they had difficulties understanding causality, novel situations and social interactions. They also noted more social withdrawal as the student with nonverbal learning disabilities student entered adolescence. In their conclusion they identified four tests that best discriminated persons with nonverbal learning disabilities from their typical peers. They were "The Target Test; the Trail Making Test, Part B; the Tactual Performance Test; and the Grooved Pegboard Test" (p. 150, Harnadek & Rourke, 1994). Persons with nonverbal learning disabilities scored lower on academic testing when compared to typically developing peers. The primary deficits were "...in the use of visuospatial working memory and visual imagery" (Cornoldi et al., 1999).

### **Processing Speed**

Studies have shown that people with nonverbal learning disabilities demonstrated slower processing time in both linguistic and nonlinguistic areas (Cornoldi et al., 1999). Furthermore, children with specific language impairments performed slower than typically developing children while children with nonspecific language impairment had the slowest processing abilities of all groups studied (Harnadek & Rourke, 1994; Miller, Kail, Leonard, & Tomblin, 2001). Those children identified as having nonspecific

language impairment also had lower verbal IQs than performance IQs. This was similar to a characteristic of nonverbal learning disabilities was a higher verbal IQ and a lower nonverbal IQ as stated by Landwehr (2009). Those with nonverbal learning disabilities had a greater deficit in processing speed than those with specific language impairment. This processing deficit affected the development of spoken language, nonverbal language, and higher level thinking skills.

Those with specific language impairments were also found to have average vocabulary knowledge but decreased linguistic and working memory skills. Individuals with specific language impairment had more difficulty with verbal working memory when compared to their typically developing peers. They also had decreased linguistic and working memory abilities that reduced their ability to make inferences (Karasinski & Weismer, 2010). However those individuals with nonspecific language impairment had a lower performance IQ score, lower processing speed, with possible language and cognitive involvement. Their processing deficits also negatively affected communication (Karasinski & Weismer, 2010). Narratives from students with nonverbal learning disabilities were less detailed which showed a difference between those with nonverbal learning disabilities and those classified as nonspecific language impairment.

Children began learning some of the morphology of language from the prosodic cues of speech (Bedore & Leonard, 1995). Children with deficits in processing speed including those with nonverbal learning disabilities were more likely to miss many of the cues needed to understand and use complex language skills. Those with nonspecific language impairment also had more difficulty summarizing and identifying important information from spoken language. Children with nonspecific language impairment had

slower processing speeds than those children with specific language impairment. As those children with nonspecific language impairment matured, the gap in their deficits became greater when compared to their typically developing peers. Their difficulties in understanding the complexities of language became more obvious. When adolescents with nonspecific language impairments became adults those deficits continued to interfere with their daily lives.

### **Perceptions**

Persons with nonverbal learning disabilities were classified by decreased academic proficiency, social abilities, and emotional awareness. They were also defined using a neuropsychological profile as stated in the American Psychiatric Association cited in Donaldson and Zager (2010). They had lower visual skills with average auditory skills. People with Asperger's syndrome generally had stronger visual and kinesthetic learning but more difficulty with auditory skills (Ortiz, 2010). School psychologists and speech-language pathologists were the professionals who identified persons with Asperger's syndrome, autism spectrum and language disorder. Whereas the identification of persons with nonverbal learning disabilities was completed by a neurologist.

Persons with nonverbal learning disabilities were characterized with social difficulties and viewed social interactions more negatively than their typically developing peers. They responded more slowly and more likely viewed their social difficulties as failures. They had difficulty making repairs in communication events and they gave up more quickly than their typically developing peers when these difficulties occurred. They had a deficit in planning and executing responses. Their responses were less assertive and they displayed reduced risk taking behaviors in new situations compared to typically

developing peers (Galway & Metsala, 2011). Experiencing these social difficulties made them more likely to experience depression or other mood disorders (Ortiz, 2010). Persons with language deficits were also found to have more difficulties socially, emotionally, and behaviorally (Lindsay, Dockrell, & Strand, 2007). While persons on the autism spectrum addressed social problems in a more cognitive and logical manner, typically developing adolescents used higher level thinking skills to deal with their social problems and they were more willing to take chances socially (Galway & Metsala, 2011). While those with Asperger's syndrome had more difficulty than those with nonverbal learning disabilities in understanding humor and using higher level thinking skills (Gunter, Ghaziuddin, & Ellis, 2002).

Academically people with nonverbal learning disabilities and Asperger's syndrome both had more trouble with math skills when compared to reading skills. Persons with nonverbal learning disabilities also had difficulty with abstract and novel concepts. It was challenging for them to transition to new topics and situations as well as to multitask when completing assignments (Ortiz, 2010). They also perceived failure more quickly and gave up more easily on the work that they were doing (Galway & Metsala, 2011). One coping mechanism for them was to ignore situations that were thought to be too difficult for them to complete (Firth, Greaves, & Frydenberg, 2010).

### **Characteristics of Asperger's Syndrome**

When communicating, individuals with Asperger's syndrome had difficulty understanding the intent of another speaker. As a result these speakers could offend their listeners because of misunderstandings during communication. They often perseverated on a topic of interest to them without being aware that their listeners were not interested.

They also were very rule based and inflexible with their schedule for the activities of their day. Most of them had an intellect that was average to above average with unusual logic and reasoning skills. They could be awkward and appear immature (Ortiz, 2010). This immaturity was most noticeable in areas related to emotions and socialization.

Individuals with Asperger's syndrome were less focused on activities that did not interest them while they could stay focused on preferred activities for extended periods of time. Ortiz (2010) also discussed the difference between individuals with high functioning autism and Asperger's syndrome. People with high functioning autism developed language and social skills later while those with Asperger's syndrome developed these skills at an average rate. Children with Asperger's syndrome had typical articulation development while children with high functioning autism had delayed articulation and language development.

Persons with Asperger's syndrome were more social when compared to those with high functioning autism. They also had better visual abilities with a better ability to read charts and graphs while persons with high functioning autism and nonverbal learning disabilities both had poorer visual processing skills. Both people with Asperger's syndrome and nonverbal learning disabilities had difficulty dealing with stress. Persons with Asperger's syndrome often focused on specific idiosyncratic topics while persons with high functioning autism had more typical interests. Persons with nonverbal learning disabilities were seen to have common characteristics with those on the autism spectrum, having language disorders, and pragmatic language disorders.

Ortiz (2010) found that individuals with nonverbal learning disabilities had difficulty: (a) coordinating cognitive tasks, (b) changing tasks quickly, (c) in their

organizational skills, (d) controlling emotions, and (e) managing stress. They were also at an increased risk for mood disorders such as anxiety and depression. Expanding this knowledge would assist in differentiating nonverbal learning disabilities from Asperger's syndrome and other disorders such as "... ADHD, Oppositional Defiant Disorder (ODD), Conduct Disorder..." (Ortiz, 2010, p.121).

According to Edgin and Pennington (2005) people who had average cognitive function with Asperger's syndrome demonstrated an intact working memory. While past research may have overstated difficulties that individuals with Asperger's syndrome had when using executive functions; their visual spatial skills were similar to typically developing peers. Those individuals with nonverbal learning disabilities and Asperger's syndrome both demonstrated similar performance profiles. However children with Asperger's syndrome had greater variation in their cognitive profiles and more difficulty with social skills. They also performed better at nonverbal perceptual tasks when compared to typically developing peers but they had lower performance in abstract thought and concept formation (Gunter et al., 2002). Individuals with Asperger's syndrome had greater difficulty with conceptually based rather than perceptually based nonverbal tasks. There was also a discrepancy between performance on the Leiter-R Figure Ground and Form Completion subtests of the WISC-IV with a weakness in the Repeated Patterns subtest. The first two subtests mentioned only required linking two items together while the Repeated Patterns subtests required linking up to six items, which required more abstract concept formation (Kuschner, Bennetto, & Yost, 2007).

People with Asperger's syndrome also had sensory difficulties with phonemic awareness, auditory memory and discrimination, visual integration and discrimination,

and conceptualizing whole to part concepts (Ortiz, 2010). The children with Asperger's syndrome were characterized with a more disjointed learning and social abilities profile than those with other disabilities. Each person with Asperger's syndrome demonstrated a unique profile (Ortiz, 2010).

Adolescents (12-20 years) were given parts of the Tower of London task, which they copied given color patterns of blue, red, and green while looking at the target pattern. Those individuals with Asperger's syndrome had more difficulty with the task when compared to their typically developing peers when the task was done alone with no sound interference but they performed equally to their typically developing peers when an articulation suppressor word was included during the trial (the participant said a word while completing the task) (Wallace, Silvers, Martin, & Kenworthy, 2009). Those typically developing peers used self-talk as a strategy to improve their performance on the Tower of London task. When they also included an articulation suppression activity while completing the Tower of London task they performed less accurately. Individuals with Asperger's syndrome were not able to use self-talk effectively and they performed less accurately on the Tower of London task when completed without a suppressor word compared to typically developing peers.

Social and emotional difficulties were noted in persons with Asperger's syndrome. These skills were less developed in comparison to their typically developing peers. Yet many individuals identified with Asperger's syndrome had average to above average in intelligence. In adolescence and adulthood, persons with Asperger's syndrome had increased difficulty understanding complex concepts (Ortiz, 2010). As social and academic demands became more complex, the deficits became more noticeable.



Frequently persons with Asperger's syndrome and nonverbal learning disabilities had a manner of speaking that included body language which could be misinterpreted by their communication partners (Fogle, n.d.). These included reduced awareness of posture and proximity to another; difficulty using and understanding facial expressions, and gestures. The challenge for the listener was to process the nonverbal and verbal messages coming from the speaker and to return the messages that were appropriate to the speaker's intent. Persons with Asperger's syndrome had great difficulty maintaining conversations. While there were common characteristics between people with Asperger's syndrome and nonverbal learning disabilities, persons with Asperger's syndrome were less socially aware and had less available strategies to repair their miscommunications. A better understanding of how people with nonverbal learning disabilities perceived their difficulties would provide more information that would help in differentiating nonverbal learning disabilities from other disabilities.

### **Sensory Issues**

Younger children with autism displayed more sensory problems than typically developing peers. These sensory issues occurred across multiple modalities. Persons with autism at all intellectual levels and ages showed a larger number of sensory issues than those with Asperger's syndrome and their typical peers (Leekam, Nieto, Libby, Wing, & Gould, 2007). Autistic children also displayed more hypersensitivity to external stimuli when compared to same aged Asperger's syndrome children (Ghanizadeh, 2011). Autistic children demonstrated more sensory searching behaviors than Asperger's syndrome children. However, persons with Asperger's syndrome were more likely to experience sensory overload than autistic children (Myles et al., 2004). In comparison to

persons with nonverbal learning disabilities who demonstrated sensory issues related to right brain involvement and also demonstrated deficits that were more noticeable on the left side of the body (Harnadek and Rourke, 1994).

### **Learning Styles**

With regard to learning styles, people with autism had more difficulty with visual spatial memory than did their typically developing peers (Williams, Goldstein, Carpenter, & Minshew, 2005). Those with high functioning autism and Asperger's syndrome were more visual and kinesthetic in their learning while persons with nonverbal learning disabilities learned better by listening (Ortiz, 2010). Children who were language learning disabled (six to 12 years) had more difficulty understanding the form and meaning of language as well as using memory when learning new aspects of language compared to typically developing peers (Evans, Saffran, & Robe-Torres, 2009).

It was recommended that college students with Asperger's syndrome benefitted from a room with natural lighting, sound buffering, such as carpeting, as well as preferential seating. A concise schedule with advanced notice if the schedule changed. This was also found to increase academic performance. Further, if the students were having difficulty communicating then they should be allowed extra time and a variety of modalities to communicate. It was helpful if the students had a quiet and safe place to go if they became agitated (Gobbo & Shmulsky, 2012).

### **Brain Function**

Knowledge of brain anatomy and function provided insight about nonverbal learning disabilities. For instance, the prefrontal cortex was active when processing various social skills and in the awareness of self. Damage to this area of the brain resulted

in socially inappropriate behavior (Devinsky & D'Esposito, 2004). If the corpus callosum was absent or damaged there would also be decreased social awareness including understanding humor, which was characteristic of those on the autism spectrum (Kaufman et al., 2008). The prefrontal cortex also interacted with the cerebellum in motor and cognitive tasks (Diamond, 2000). According to Royall et al. (2002) the frontal lobe organized motivation, motor control, emotion, and sensory awareness, which resulted in action with a purpose. Damage to the frontal cortex was a necessary component of executive function deficits however; it was difficult to localize the damage in relation to its specific affects on executive function. In a study on individuals with autism it was found that as the volume of the frontal lobe increased, the cerebellum showed more abnormality (Carper & Courchesne, 2000). The prefrontal cortex developed later than other motor and sensory areas of the brain. This area affected executive functioning (Gogtay et al., 2004). Executive functions increased the brain's ability to make complex decisions and these improved through adolescence (Cauffman et al., 2010). Also in adolescence the number of synapses in the brain decreased while the remaining synapses became more specialized. White matter in the brain increased in volume until 20 years of age. The prefrontal cortex modified information processing from other parts of the brain. The authors Royall, et al. (2002) concluded that there were separate executive functions involved with instructing the brain for various complex tasks such as memory and language.

Gold and Faust (2010) found that in individuals with Asperger's syndrome there was a right hemisphere dysfunction which led to a decreased ability to analyze complex semantic attributes of words. While McAlonan et al. (2002) found that individuals with

Asperger's syndrome had deficits in the frontotemporal to the occipital lobe in the left hemisphere including the "... fibre tracts such as the inferior and superior longitudinal fascicule and occipitofrontal fasciculus. Additional deficits in the pons and left cerebellum were identified" (p. 1599).

While in a report by Rourke et al. (2002) the authors stated that right cerebral hemisphere dysfunction was "...a *sufficient* condition for the appearance of the NVLD [nonverbal learning disability] syndrome" (p. 311). White matter damage in many areas of the brain was also related to nonverbal learning disabilities. In a study of adult aphasics with right hemisphere involvement Blake, Duffy, Myers, & Tompkins (2002) found that decreased "...attention, neglect, perception, and learning/memory..." were characteristics commonly found (p. 543). Further, Rinehart, Bradshaw, Brereton, and Tonge (2002) found that individuals with autism performed with less accuracy on tasks that involved the left hemisphere than when tasks required executive functioning when compared to Asperger's syndrome and typically developing individuals.

Baron-Cohen (2011) found that damage to the amygdala in both hemispheres decreased a person's ability to make eye contact. It also affected the person's ability to identify fear in another person's face. There were several areas of the brain that had an effect on cognitive performance and were characteristic of both Asperger's syndrome and nonverbal learning disabilities. Further Baron-Cohen (2011) stated that with each individual deficit affected understanding interprets empathy differently and persons with autism spectrum disorder demonstrated less empathy when compared to typically developing peers.

Visual attention was found to be activated by different parts of the brain when compared to the ability to process target cues according to a study by Hopfinger, Buonocore, and Mangun (2000). In their study they used functional magnetic resonance imaging and noted that visual attention was activated in different areas of the brain when compared to task analysis function. When attending to visual cues, numerous cortical parts of the brain were activated. As subjects focused on a target stimulus after cues, different areas of the brain were activated including the supplementary motor area. According to Akshoomoff, Stiles, and Wulfeck (2006) language impaired children demonstrated an "... overall performance and processing strategy [that] suggested an immature and less efficient approach to the visuospatial processing tasks" (General Discussion, Para. 1).

### **Executive Function**

Executive functions were identified as the higher level thought processes that assisted in the organization and execution of cognitive and social tasks. They could be broken down into three distinct areas "... alerting, orienting, and executive control" (Fan, McCandliss, Fossella, Flombaum, & Posner, 2005, p. 477). In their study of typically functioning adults, each was given a test for attention while being observed with functional magnetic resonance imaging. There were distinct patterns for alerting, orienting, and executive control and each appeared to function as an individual system. Also, each of these systems would "... feed into and are modulated by a more general system that serves multiple modalities" (Carr & Hinckley, 2012, p. 69). Best, Miller, and Naglieri (2011) studied executive functions in children from age five to 17 years and 11 months. While executive functions were not easily ranked developmentally, on

standardized tests there were relationships that could be seen as the child developed: For instance younger children were more concerned with the speed of task completion whereas adolescents favored the accuracy of the task over the rate of task completion. The adolescent realized the value of accuracy and not just speed of task completion. Best et al. (2011) also stated that different executive functions were used in different academic subtests such as calculation, which uses recall of math facts from long term memory or math problem solving which "...relies more on strategy formulation and implementation, and self-monitoring..." (p. 334). So those individuals with nonverbal learning disabilities or Asperger's syndrome demonstrated the ability to use executive functions similar to their typically developing peers during structured cognitive tasks whereas their performance using executive functions in less structured settings were more difficult for the students characterized with nonverbal learning disabilities or Asperger's syndrome. It was found that individuals with Asperger's syndrome had deficits in visual spatial memory and central executive function, which involved planning, social, and emotional issues (Cui, Gao, Chen, Zou, & Wang, 2010).

Executive Functions that involved emotion and motivation were developed later than other Executive Functions. In a questionnaire given to parents of typically developing adolescents and those with language impairments, the parents of the adolescents with language impairments reported a greater concern about their adolescent's use of executive functions when compared to the parents' responses of typically developing adolescents (Hughes, Turkstra, & Wulfeck, 2009). Another study discussed the uneven development of executive functions with nonverbal memory gains seen up to age 15 and self-organization skills that were developing through age 16. While

there was not a clear developmental model for these skills, executive functions most likely continued developing through adolescence (Luciana, Conklin, Hooper, & Yarger, 2007).

### **Social Relations**

For the teen on the autism spectrum negotiating friendships and romances were more difficult than for their typically developing peers. Myles, et al. (2004) found that children with Asperger's syndrome had more difficulty responding to social and emotional issues than same age matched autistic peers and typically developing peers. They also had more difficulty modulating behavior and in attending than autistic and typically developing peers. However children with Asperger's syndrome verbalized more about the difficulties they were having socially than did autistic children. Teens on the autism spectrum were noted to have (a) more difficulty analyzing mixed messages, (b) difficulty filtering out background stimulus, (c) poorer decision making skills, and (d) reduced ability to analyze context in reasoning activities when compared to their typically developing peers (McKenzie, Evans, & Handley, 2010).

Kaland, Callesen, Møller-Nielsen, Mortensen, & Smith, (2008) found that Asperger's syndrome students took longer to answer problem solving questions when compared to their typically developing peers. The rapid interchange of ideas that was so common among adolescents likely caused further confusion and frustration for the adolescent on the autism spectrum due in part to their slower processing abilities. The increased time to problem solve could also affect social interchanges.

Those students on the autism spectrum had difficulty understanding social interchanges and often conveyed confusing messages, which created situations that made

these individuals more susceptible to bullying by their peers (Thompson et al., 2010). In a study by Sharabi and Margalit (2011) it was found that 16 to 18 year old high school students who had more severe learning disabilities reported more loneliness than did those with milder learning disabilities. Also, in a longitudinal study by Johnson, Beitchman, and Brownlie (2010) language impaired individuals were found to have been more likely to become parents at an earlier age. They may have had more difficulty connecting causality to their actions. During adolescence the brain continued to develop emotionally and executive functions also continued to develop. This rapid development may have caused confusion in many areas of life including understanding relationships. This was compounded by difficulty understanding causality. They desired acceptance from their peers and this led to increased risk taking behaviors frequently leading to poor life choices when reaching out for acceptance. According to McKown, Gumbiner, Russo, and Lipton, (2009) as the students' increased their understanding of nonverbal language, pragmatics, and social awareness, their social interactions also improved.

Adolescents with nonverbal learning disabilities had difficulty in making an accurate analysis of social situations. Their ability to socialize was less developed than their typically developing peers but better than their peers with Asperger's syndrome. While those persons with Asperger's syndrome had unusual interests or hobbies, those with nonverbal learning disabilities did not demonstrate these idiosyncratic behaviors. Another differentiating factor was that both nonverbal learning disabled and Asperger's syndrome students had higher verbal IQs than performance IQs (Gunter et al., 2002). Although the increased verbal performance was at a simpler level and these individuals with nonverbal learning disabilities had difficulty with complex language usage.



Those with nonverbal learning disabilities also had greater difficulty in math in part due to poor spatial reasoning abilities and in understanding complex concepts (Thompson et al., 2010). Those with nonverbal learning disabilities also had difficulty when giving appropriate responses to the nonverbal feedback given to them by their communication partners. They were less likely to repair miscommunications. Others perceived those with nonverbal learning disabilities as unusual and they had a tendency to become easily frustrated or angry about their miscommunications. Individuals with nonverbal learning disabilities had poor decision making skills and they displayed more dangerous risk taking behaviors (Prencipe et al., 2011).

In a study about persons with nonverbal learning disabilities, Semrud-Clikeman and Glass (2008) found deficits in understanding humor, which were related to poor social awareness rather than poor visual spatial awareness. Also, students with nonverbal learning disabilities had perceptual awareness that was weak including difficulties analyzing social situations. The typical adolescent generally realized social errors, repaired them, and made better communication choices while those adolescents with nonverbal learning disabilities or Asperger's syndrome demonstrated more extreme reactions to what was said or done. Schiff et al., (2009) found that individuals with nonverbal learning disabilities had more difficulty demonstrating an understanding of complex concepts presented in stories than did their typically developing peers. Persons with nonverbal learning disabilities also performed less accurately on problem solving activities involving physical manipulation of objects when compared to both verbal learning disabled and typically developing peers. Further, those with nonverbal learning

disabilities also had more difficulty with analytical problem solving when compared to those with verbal learning disabilities and typically developing peers.

Persons with nonverbal learning disabilities and Asperger's syndrome were more likely to be rejected socially, had mood difficulties, and became more socially withdrawn in their teen years (Semrud-Clikeman, Walkowiak, Wilkinson, & Minne, 2010). The authors further stated that both those with nonverbal learning disabilities and Asperger's syndrome demonstrated social difficulties. However, Ortiz (2010) stated that persons with Asperger's syndrome had more difficulty with social interactions than their peers with nonverbal learning disabilities. Ortiz further suggested that persons with Asperger's syndrome and nonverbal learning disabilities both had a more heterogeneous profile with a wide range of intellectual, social-emotional, and egocentric characteristics.

Those with nonverbal learning disabilities had greater difficulty interpreting social cues and understanding emotions in social situations. They had the most difficulty when they were "... required to infer emotional states based on nonverbal social cues..." (Galway & Metsala, 2011, p. 38). Their findings suggested that as visual spatial ability decreased, awareness of nonverbal cues also decreased. Individuals with nonverbal learning disabilities also had less success socially.

### **Memory**

Persons with nonverbal learning disabilities had more difficulties with memory than their typically developing peers. This decreased memory affected their ability to understand verbal input, visual working memory usage and tasks that required mental imagery. Persons with nonverbal learning disabilities also had difficulty with "... associative learning tasks that required the use of mental images" (Cornoldi et al., 1999,

p. 54). Furthermore persons with nonverbal learning disabilities had slower processing times and less experience with tasks that required memory. In another study, people on the autism spectrum also had more difficulty using working memory for complex language tasks when compared to persons with Asperger's syndrome or typically developing peers (Kamio & Toichi, 2007).

Mammarella et al., (2010) found that persons with nonverbal learning disabilities had poor performance on visual spatial working memory, which negatively affected performance with math calculation. Poorer performance on these tasks were noted for nonverbal learning-disabled students when compared to there typically developing peers (Cornoldi et al., 2011-2012). Related to this was the ability to represent three-dimensional spaces, which caused a greater load on spatial working memory. Furthermore persons with nonverbal learning disabilities had more difficulty remembering nonverbal information and yet they were near average on rote verbal memory tasks (Liddell & Rasmussen, 2005). Individuals with nonverbal learning disabilities also had greater difficulty identifying faces in immediate and delayed memory assessment than their peers. They also benefited from repeated presentations of information as well as extra time to process the information.

### **Central Coherence and Theory of the Mind**

Persons with autism spectrum disorder displayed "... general, atypical selective attention..." (Ploog, 2010, p. 1345). This increased their ability to focus on visual spatial tasks. Edgin and Pennington (2005) found that young children on the autism spectrum performed faster on the WISC-III Block Design subtest when compared to typically developing peers. Yet as teenagers these same students on the autism spectrum performed

similar to their typically developing peers on the WISC-III Block Design subtest. In addition, Grinter, Van Beek, Maybery, and Badcock, (2009) found that healthy individuals who had a high number of autistic characteristics would show higher visual spatial abilities. This higher visual spatial ability was contrasted with adults with autism who had more difficulty identifying matching facial prototypes (from pictures) when compared to typical adults (Gastgeb, Wilkinson, Minshew, & Strauss, 2011). Edgin and Pennington (2005) also found that people on the autism spectrum had spatial performance abilities similar to typically developing peers. Furthermore they found that individuals with Asperger's syndrome could be more easily differentiated from those with nonverbal learning disability but distinguishing between persons with Asperger's syndrome and those on the autism spectrum was not as clear. They concluded that the central coherence theory did not adequately explain all of the characteristics of autism spectrum disorder or Asperger's syndrome.

Beaumont and Sofronoff (2008) found that individuals with Asperger's syndrome when compared to typically developing peers had poorer performance on theory of the mind tasks, which included difficulties in attention and memory when compared to typically developing peers. Asperger's syndrome individuals also had more difficulty with theory of the mind questions related to intellect and emotions. Pellicano, Maybery, and Durkin (2005) did not find a relationship between central coherence and theory of the mind tasks. These high functioning adults on the autism spectrum wrote expository and narrative stories that were shorter and of poorer quality than typical adults and they also had weaker organizational abilities and knowledge of central coherence (Brown & Klein, 2011).

A weak knowledge of central coherence was evident with Asperger's syndrome individuals studied by Vulchanova, Talcott, Vulchanova, and Stankova (2012): They stated that weak central coherence may explain difficulties with some cognitive skills as well as language development. In their study of language development in a girl with Asperger's syndrome they found that her basic grammar skills were intact yet she had more difficulty with complex syntax and figurative language. While the subject was able to learn two languages she continued to have difficulties in understanding the global intent of a message yet she had an intact ability to understand word meanings. This child was able to concretely define simple words quite well but she had greater difficulties understanding complex words and concepts. She also had great difficulty in explaining these new complex words and sentences.

### **Attending**

In high school those persons with nonverbal learning disabilities experienced more difficulties academically, socially and perceived themselves more negatively while typical students were more satisfied with their performance. A poor working memory could contribute to difficulties in attending and in academics. For example it could reduce the ability to understand a lecture or complete complex math problems. Unfortunately, in an effort to do well, these same students focused their attention on the details of a given task, which increased their errors when the tasks were executed (Carr & Hinckley, 2012). Students with nonverbal learning disabilities lacked an accurate awareness of their own performance level. They had difficulty understanding lectures and readings related to their academics (Klassen & Lynch, 2007). One college student with learning disabilities discussed a coping strategy that she used to improve her attention to academics by stating

that she would take less credits per semester to allow for more study time and that she would need 1/3 of her study time for breaks (Conner, 2012). In this instance the student was aware of needing extra time to complete tasks.

### **Definitive Characteristics**

People with nonverbal learning disabilities sometimes had higher verbal and lower performance IQ scores (Landwehr, 2009). They also had more difficulty in acquiring math skills than did their typically developing peers. Math performance on problem solving was also adversely affected by reduced verbal memory and processing speeds (Koponen, Mononen, Rasanen, & Ahonen, 2006). Completing a complex math problem successfully required good memory and the ability to sequence math applications. Without good memory skills the student with nonverbal learning disabilities had difficulty applying necessary math applications before they were forgotten. In addition Silver, Ring, Pennett, and Black (2007) discovered that students with learning disabilities who also had poor visual skills were not always characterized as having poor arithmetic skills.

The application of executive functions that direct cognitive activities increased through childhood and students with nonverbal learning disabilities had a slower development of these executive functions. Executive functions were normally developed during childhood with more rapid development during adolescence and were accompanied by increased myelination of the axons in the brain (Blakemore & Choudhury, 2006). This increase led to the development of more efficient neural pathways in the brain with increased ability to use complex thought processes.

In a related study, Chow and Skuy (1999) found that children with nonverbal learning disabilities scored lower on simultaneous processing than they had done on their sequential processing while students with language and learning disabilities scored better on simultaneous processing when compared to their sequential processing. For the person with nonverbal learning disabilities a deficit in simultaneous processing was correlated with a decreased ability to understand complex academics including mathematics and a decreased awareness of social cues. Tuller et al., (2007) found that typically developing subjects used more specific areas of the brain while students with learning disabilities displayed a more random pattern when performing a verbal and visual thumb to finger touch directed task. The subjects who had nonverbal learning disabilities displayed brain patterns that were less focused and also used more areas of the brain. The person with a nonverbal learning disability had less focused brain activity than when compared to typically developing peers. The subjects with nonverbal learning disabilities performed better when directions were verbal rather than with modeled or tactile directions.

Those individuals on the Autism spectrum had slower response time for recognition of a person's emotional state from pictures (Krebs et al., 2011). It also took individuals with Asperger's syndrome longer to analyze the faces in pictures than their typically developing peers (Gunter et al., 2002). Furthermore, both individuals with nonverbal learning disabilities and who were on the autism spectrum were found to have had difficulty integrating verbal information, which included deeper semantic meanings, assessing complex semantics, spatial relations, and testing situations related to emotions. (Stothers & Cardy, 2012).

Understanding the intent of the speaker was a complicated task. The listener compared the verbal and nonverbal message looking for information that was similar or for conflicting information such as in humor or sarcasm. This analysis needed to be done quickly in order to keep the flow of conversation going. The individual with language impairment had a slower response time, which interfered with communication (Miller, et al., 2006). Adolescents with a nonspecific language disorder also had more difficulty and a slower response time than their typically developing peers when communicating and answering questions that required making inferences (Karasinski & Weismer, 2010).

Semrud-Clikeman et al. (2010) found that the verbal and performance IQ scores (on an abbreviated IQ measure) between nonverbal learning disabled and Asperger's syndrome students were not statistically different however, in a dissertation by Landwher (2009), it was found that there was a statistical difference between the verbal and performance indicators on the full scale WISC-IV with the Verbal and Performance split being higher for those individuals with nonverbal learning disabilities than with Asperger's syndrome. The students with nonverbal learning disabilities also had lower visual spatial abilities than students with Asperger's syndrome yet both had similar scores on a measure of social skills. Students with nonverbal learning disabilities had more difficulty with visual spatial tasks than students with Asperger's syndrome. Students with nonverbal learning disabilities were more likely to have a greater Verbal than Performance split on IQ scores (74% had a greater than 15 point split) and 37% of the students on the autism spectrum had a greater than 15 point split. Students with nonverbal learning disabilities also had more difficulty with spatial reasoning than did the students with Asperger's syndrome or those that were typically developing (Landwher, 2009).



## **Pragmatic Language Impairment**

Pragmatic language impairment relates to the rules and behaviors that affect the intent of communication (Reisinger, Cornish, & Fombonne, 2011). Persons with attention deficit, autism spectrum disorder, and those with linguistic deficits had difficulty with pragmatics (Ketelaars, Cuperus, Daal, Jansonius, & Verhoeven, 2009). In a related study Ketelaars, Hermans, Cuperus, Jansonius, and Verhoeven (2011) found that individuals with pragmatic language impairments also had additional semantic deficits, including the use of context clues to identifying word meanings, although they were not consistent across subjects. Subjects with pragmatic language impairments had lower performance than their typically developing peers when using inferences and literal comprehension (Holck, Nettelbladt, & Sandberg, 2009). Furthermore children with pragmatic language impairments had more difficulty answering inference questions about a story (Adams, Clarke, & Haynes, 2009). While people with nonverbal learning disabilities experienced difficulties with pragmatics it was difficult to use pragmatic abilities as a significant identifier for nonverbal learning disabilities.

## **Auditory processing**

Individuals diagnosed with nonverbal learning disabilities had a significantly higher incidence of auditory processing disorders than did the general population (Keller et al., 2006). Individuals with nonverbal learning disabilities also had difficulties with right and left brain hemisphere localization as well as attention deficits that affected verbal measures more than nonverbal measures (Obrzut & Mahoney, 2011). In contrast, it was found that decreased language competence affected performance on verbal auditory processing scores more than a specific deficit in auditory processing. It was also

stated that those persons with auditory processing disorders had difficulties with language and writing skills. In conclusion, the author stated that language was processed through listening and also through content (Wallach, 2011).

### **Qualitative Literature**

Qualitative research specifically about nonverbal learning disabilities has been more focused on the college student and often only learning disabled individuals were used. There were few studies specific to high school students with nonverbal learning disabilities. Further research using high school students with nonverbal learning disabilities would benefit those students, their family and friends, and persons involved in their education.

Current studies do offer insight into how research may be conducted. In one qualitative study with a college student with learning disabilities, the student was able to discuss the strategies used to increase academic success. From this information themes evolved that addressed academic, social, and emotional concerns. This provided more detail about the difficulties that the individual was having and how they were perceived (Connor, 2012).

Further qualitative literature has provided a better understanding of what learning disabilities were as well as what strategies were used that led to academic success (Gallagher, 2010). Another study addressed the high school students' feelings toward their transition meetings from high school to college and how helpful they were to them. The students found them to be helpful (Trainor, 2005). Gaining further insight from high school students specifically with nonverbal learning disabilities would deepen our understanding of them and their concerns (Roberts, Sanders, Mann, & Wass, 2010).

**The research.** This research will expand our knowledge and give a voice to those with nonverbal learning disabilities. The information will be collected using open-ended questions that will be taped and transcribed in order to allow students the freedom to discuss their feelings about nonverbal learning disabilities. Implications for practice and future research will be explored.

### **Research Question**

Will increased knowledge of nonverbal learning disabilities through qualitative research provide the researcher with better strategies to assist with learning?

## Chapter 3: Methodology

### Aim of Study

The intent of this study was to provide a richer definition of the term nonverbal learning disabilities. An open-ended interview format completed at the participants' high school allowed them the chance to freely express their thoughts on what nonverbal learning disabilities meant to them. Transcribed data was triangulated with school records including grades, observation, and discussion with staff.

### Research Approach

Students with nonverbal learning disabilities were identified based on characteristics that were common in individuals with nonverbal learning disabilities. Students who demonstrated a higher number of characteristics for nonverbal learning disabilities were chosen. The researcher used grounded theory with an emergent design to develop a more informative theory of what nonverbal learning disabilities meant.

Much of the available research on nonverbal learning disabilities has been quantitative. It frequently discussed measurable characteristics. While informative, these characteristics did not provide enough information about how that person with nonverbal learning disabilities had struggled due to their nonverbal learning disability (Cornoldi et al., 2011-2012, Cornoldi et al., 1999, Galway & Metsale, 2011, Harnadek & Rourke, 1994, Schiff et al., 2009). Much of the research focused on individuals who had graduated from high school. This research focused on students currently in high school.

One qualitative study included narratives to develop a better understanding of the strategies that students used to get through college (Conner, 2012). Narratives of these participants with nonverbal learning disabilities provided further insight into strategies

that were successful for them. In another study when questioned it was found that eighth and ninth grade students often misjudged how well they performed academically. Their performance was lower than expected. The researchers used focus groups in order to develop a better understanding of how persons with nonverbal learning disabilities learned (Klassen & Lynch, 2007). From the student interviews five themes about nonverbal learning disabilities were developed. There were also strategies that they had used to become successful academically (Orr & Goodman, 2010). While Trainer (2005, 2007) interviewed adolescents with learning disabilities using focus groups in which he developed an understanding of how these students dealt with self-determination. This study provided further knowledge about high school students, specifically those with nonverbal learning disabilities. The researcher used a narrative approach that allowed students to express their ideas about the affects of nonverbal learning disabilities (Creswell, 2013).

This qualitative research used a narrative format and allowed those individuals affected by nonverbal learning disabilities to discuss their perceptions. This increased the understanding of the phenomenon through an emerging research design. The data was triangulated which provided more credibility to the study (Miles, Huberman, & Saldaña, 2014). This was unlike a quantitative study that focused on proving a hypothesis (Kennedy, 2013). The narratives were read and reread and important information was identified. For primary topics that were identified, a second level coding was used. Through Preliminary Coding the complexity became more detailed through "...First and Second Cycle methods" (Saldaña, 2013, p. 264). First level coding included Initial Coding, Eclectic Coding, Descriptive Coding, and In Vivo Coding as well as theming the

data. Second level coding included Axial Coding, Holistic Coding, Narrative Coding, and Theming the Data (Saldaña, 2013). This allowed for abstraction of the important information. Throughout the analysis, the researcher took notes and stayed aware of the general meaning of the data.

### **Strategies Used**

**Organizing the data into themes.**

**Reading the transcripts and taking notes.**

**Describing and organizing the data.**

**Interpreting the story told and relating it to all other information.**

**Visualizing the data and developing theories (Creswell, 2013).**

The narrative style allowed the individuals to tell their story without adhering to a preset format. Narrative research used open-ended questions. This allowed for the development of themes from the data without bias (Chianga and Jacobs, 2010; Munhall & Chenail, 2008). The researcher collected the students' narratives. Themes were identified and the meaning of the term nonverbal learning disabilities evolved (Creswell, 2013). The participants shared their ideas about what it was like to have nonverbal learning disabilities. A narrative style allowed the students with nonverbal learning disabilities the freedom to discuss the perceptions of their disability and the intrinsic motives for their behaviors (Connor, 2012).

The data was initially coded from broad to more specific categories. Second level coding was used to develop more succinct identification of the characteristics of the data. The data was coded and recoded using axial coding to develop a relationship between codes. Memo writing assisted in developing relationships between categories. Member

checking provided for clarification of themes chosen. Saturation of data collected also increased its accuracy (Lapan, Quartaroli, & Reimer, 2012). In order to minimize bias this researcher used "...better designs, triangulation and skepticism." (Stake, 2010).

### **Background For Strategies**

The narrative approach has been used in many disciplines. In one sociological approach a narrative was used to express a family tragedy (Ellis, 1993). Orr and Goodman (2010) used students' narratives to identify coping strategies used in college. Narrative research has allowed for collaboration between the participants and the researcher. It has provided the opportunity to develop a story and gain a better understanding about the topic (Creswell, 2013).

### **Outcome of Study**

This narrative study provided an in depth understanding of nonverbal learning disabilities. The open-ended questions allowed participants to express their ideas with themes and to develop a richer understanding of the term nonverbal learning disabilities. The participants told their story and provided insight for persons involved in the study as well as those who read the study. This deeper understanding of the term nonverbal learning disabilities provided information that was helpful educationally, socially, and emotionally for the participants, their families, friends, and educators.

### **Source of Strategy Used**

The researcher used inductive logic to evaluate the narratives within their school context (Kennedy, 2013). Narratives, file reviews, field notes, and observation were used to increase the validity of the study. The researcher obtained information from the participants using open-ended questions and transcribed the participants' narrative stories.

Each narrative sample was analyzed individually and themes were identified. Common themes were identified across all participants "as well as assertions or an interpretation of the meaning of the case" (Creswell, 2013, Procedures For Conducting a Case Study, para. 5). First and second level coding were done as well as analysis of themes identified (Saldaña, 2013). The stories developed were also compared to observations of students during school activities as well as to information obtained from a file review.

**Rationale for strategy.** With a narrative design, the participants discussed, with the researcher as the facilitator, the areas that were of most concern to them. The participants were able to speak extensively about living with nonverbal learning disabilities. In this way individuals with nonverbal learning disabilities were able to discuss the term. The narratives were coded and themes were identified from axial coding (Creswell, 2013, Geist & Aldridge, 2010).

**The approach.** A narrative approach assisted the researcher when identifying themes about nonverbal learning disabilities. The use of open-ended questions allowed for a deeper meaning to be expressed. Triangulating data including field notes, student report cards, and repeated interviews also increased the trustworthiness of the study. These narratives also helped both the reader and the participant to develop a better understanding of the term nonverbal learning disabilities (Ramdial, 2002).

### **Participants**

This study used a purposeful convenience sample of five high school students 17 to 20 years of age, identified as nonverbal learning disabled, from a charter high school in the southeastern United States. Qualitative research was not designed to be generalized to a larger population rather a small number of subjects were studied in detail and the



analysis of those results informed about a phenomena. The small purposeful sample allowed for more depth of information when participants expressed their ideas. They had the opportunity to express their opinions about how they perceived nonverbal learning disabilities (Creswell, 2013). The average demographics of the students being interviewed were: White 73.5%, Hispanic 19%, Black 17.3%, and other 9.3%. The family's median household income was \$56,000 (www.demographicsnow). Participants of the study were students identified as nonverbal learning disabled.

**The setting.** The participants attended a charter high school in a southern state that emphasized excellence in high school course work and career exploration and training. Each participant's interviews took place in the researcher's office. The researcher presented open-ended questions designed to explore the meaning of nonverbal learning disabilities. The students participated in as many interviews necessary to saturate the data with information about their perception of nonverbal learning disabilities. Follow up interviews with questions for clarification about data from participants were done as needed. The interviews were audio recorded and notes were taken during the interviews. Individual interviews allowed the students to express their ideas clearly. The examiner encouraged the students to express their ideas freely and anonymously.

### **Data Collection Tools**

The researcher individually interviewed five participants in a private room and recorded the interview through audio recording. For narrative analysis each participant was given an alias name known by the examiner and stored with transcripts in a locked file. The interviews were semi structured with open-ended questions used. Questions

explored the participants' academics, social and emotional concerns, and plans after high school.

The researcher was the data collector. While the students were encouraged to discuss their perspectives of having nonverbal learning disabilities it was possible that interacting with the researcher could have affected their answers. Repeated interviews were undertaken (as needed), which increased the accuracy of information as well as providing the researcher clarification for ambiguous answers (Keegan, 2009). The researcher was a white male from the mid west who had worked with high school students with exceptional needs for over 30 years. This extensive knowledge of the high school student was a valuable part in facilitating the narratives.

The participants of the study were chosen using a convenience sample from the general student body. Those students who self identified as having nonverbal learning disabilities were encouraged to participate. The staff members in the Exceptional Student Education Department and well as other staff helped to verify this (Connor, 2012). At this point students identified with the most characteristics of persons with nonverbal learning disabilities were invited to participate in the study.

Those students who were in the study were encouraged to speak to the researcher voicing opinions about their disability (Trainor, 2007). To increase credibility of the study the transcribed narratives were shared with participants. File reviews and observation were also included. For increased understanding of the participants' responses additional interviews were used as necessary (Orr & Goodman, 2010). Transcribed narratives were read to develop familiarity, and then they were coded using the first cycle coding methods of attribute, structural, descriptive, and In Vivo. The

researcher wrote memos to identify important information. Eclectic coding was used to synthesize data from the first coding. Patterned coding assisted in the analysis of the narratives (Saldaña, 2013). The initial coding broke down the information into factual units while secondary coding developed themes along with memo writing that helped to analyze data (Trainor & Graue, 2013). This brought the coded information to a more manageable level. Axial coding helped to develop relationships and selective coding fine-tuned the information (Creswell, 2013).

### **Procedure**

The researcher received acceptance from the Institutional Review Board. This process insured that the participants' information remained confidential. The researcher maintained a safe environment. Participants were obtained through a purposeful sampling. All participants under age 18 signed assent forms after their parents or guardians signed consent forms giving permission to participate in the research. After parents had given permission the students were then given an assent form giving them permission to participate in the research. Participants 18 years old and above were given a consent form. The participants were given the option of withdrawing from the study at any time. The principal and founder of the high school gave permission for the research to begin. The narratives were recorded and transcribed by the researcher. The researcher interviewed participants to the point of saturation about the topic. The participants received a gift certification for being in the study.

### **Data Analysis**

The coding assisted the researcher in finding themes. Data along with field notes, file reviews, and observations were also used to increase credibility. Data from these

transcripts were organized into files grouped by themes. The examiner read all interviews, took notes and created initial codes. To identify themes second level coding was used. Axial coding assisted in developing relationships between the codes. Narratives were also read with general notes taken to give a deeper understanding of the data (Creswell, 2013). They were reread in order to code information into themes. The codes were defined and sorted into groups. Notes were taken about the coding process (Taylor & Gibbs, 2010). Field notes were taken during the research process.

### **Establishing Data Validity**

The credibility of the study was related to the use of skilled techniques for obtaining and analyzing data. The researcher had knowledge and experience in the area of the study. The researcher was familiar with inquiry through qualitative means. This study looked for data that either provided supporting evidence for current theory and/or gave conflicting but informative information about nonverbal learning disabilities (Patton, 1999). The researcher developed an ethical interaction with the participants in order to present accurate findings from the participants (Creswell, 2013).

Use of multiple sources of data increased the depth and credibility of the information. These included narratives, field notes, observation, and file reviews. Patton (1999) referred to this method as triangulation. This study also had transferability allowing it to be generalized and applied to other settings. Although transferability was subjective it was related to the specific research being completed. It was important to look at more than just the interviews. This helped present some issues more clearly (Nayab, 2011).

Confirmable research should be understandable to the reader when they are reviewing the data used to establish this credibility. Detailed data allowed the readers the ability to transfer the data to other contexts (Brown, 2005). This researcher presented the information as clearly and accurately as possible (Creswell, 2013).

### **Ethical Considerations**

Student confidentiality was maintained at all times. Students chosen through a convenience sample were invited to join using an alias. Taped interviews that were on flash drives, and transcripts that were kept in a secure file cabinet in a locked room. Participation or choosing not to participate would not affect grades or academic standing. They were told that they could withdraw from the research at any time. Parent/Guardian and participant gave written permission. Students also had the option of skipping any questions they did not want to answer.

### **Trustworthiness**

To improve validity of the study the researcher conducted repeated interviews in order to discuss any areas of confusion about the current information collected for that student. Allowing the participants to clarify information increased the trustworthiness of the study. The researcher also presented his interpretation of parts of the narratives to staff members and invited feedback from them about the information. Both the Dissertation Chair and Committee Member also gave feedback to the researcher. Information was presented in a concise manner so others could judge if the material was trustworthy (Creswell, 2013). The examiner has worked at this site for many years so the familiarity of the school allowed for informal observation of participants to further evaluate the accuracy of their responses.

### **Potential for Bias**

This researcher had extensive background working with students at the high school level and serving students' speech and language needs. Many of the students were also identified as learning disabled. Further review of these students indicated that some of them were also nonverbal learning disabled. There was a chance that the researcher's bias about learning disabilities may have been expressed during the interviews. For instance in the past this researcher has found that students who exhibited characteristics of nonverbal learning disabilities were misunderstood by staff and their peers and were felt to be lacking in motivation. The information gathered in this study was about the student's views of high school both socially and academically. Some of the participants were familiar with the researcher so they may have responded in order to gain approval of the researcher rather than stating their actual thoughts. The students were encouraged to discuss the questions from their viewpoint. Familiarity with the data allowed for increased accuracy in presenting the data.

### **Limitations**

This researcher's background as a Speech-Language Pathologist with an extensive background in analysis through quantitative study provided a useful structure when undertaking a qualitative study of individuals with nonverbal learning disabilities. The factual information about individuals with nonverbal learning disabilities could be compared to the qualitative information that was obtained.

Some of the participants knew the researcher personally or were familiar with the researcher who had worked at the school for many years. The characteristics of students who volunteered for the study were different from students who did not volunteer.

Participants that volunteered may have been more outgoing than non-volunteers. To reduce these limiting factors the researcher used thorough documentation. The researcher reviewed the transcripts and followed up interviews as necessary to ensure accuracy and to make the research more accurate (Creswell, 2013).

The interviews were conducted to the point of saturation. This allowed the participants time to express themselves. There was also be at least one follow up check for agreement with the research if needed. There was also adequate time given to develop a rapport with the students (Creswell, 2013).

## Chapter 4: Findings

### The Study

This qualitative, narrative study was undertaken to increase knowledge about nonverbal learning disabilities. The use of narrative interviews provided information directly from individuals who had characteristics of nonverbal learning disabilities. The interviews took place in the participants' high school. The researcher used open-ended questions to encourage a free flow of ideas. These questions addressed academics, social and emotional attitudes, it also asked questions about the participants' plans after high school. Information was also triangulated with the students' performance using a file review, discussion with teachers, and observation. The researcher was a person who had had many years experience with high school students who required language therapy services. Some of these were also students with nonverbal learning disabilities. The researcher also had biases related to students with nonverbal learning disabilities compared to typically developing peers. Some of them are listed here:

1. They would have more academic difficulties.
2. They would have most difficulties in mathematics.
- 3) They would have more social difficulties.

This qualitative, narrative approach allowed the participants the chance to speak about their life experiences within their school setting. The participants were invited to participate in the study through posters that were seen at the high school where the study took place. Those who expressed interest were given a consent form for the students 18 and over. For participants under 18 a consent form was given to the parents and then after that was received, an ascent form was given to those under 18. Questions were answered



prior to the interviews and the consent/assent forms were explained again to each student. For participants that were 18 and over only the consent form was used. Each student was interviewed privately at a time during the school day that they chose. They were interviewed in a private office. Interviews were taped and transcribed by the researcher.

### **The Participants**

The participants who were chosen were high school students from age 17 through 20 years of age. Older subjects were chosen because it was difficult to obtain parent permission from the students under 18 years of age as they kept forgetting to return their parent permission forms. Only one student who was under age 18 years of age remembered to return his parent permission form. Students with more severe nonverbal learning difficulties also had greater difficulty with follow through. All of the participants had modifications on their individual education plans for extra time when testing. To protect confidentiality all participants were given pseudonyms. What follows is a discussion of each student.

Francis was a 20 year-old Haitian female with English as her primary language. She repeated second grade. She was on consult for learning disabilities and only met with teachers who taught learning disabilities as needed. Her individual education plan allowed for 50% extra time during tests, extra copies of textbooks for home, and extra cues to increase comprehension of information. Oral language was noted to be one of her strengths although she had difficulty expressing ideas related to complex reasoning. She had a lower than average processing speed. Reading comprehension and math word problems were difficult for her. Per student records her math quotient was 14 points below her composite index on the Reynolds Intellectual Assessment Scales. In social

situations she sometimes over reacted. She had difficulty expressing complex ideas verbally. She appeared as a stern individual with the possibility that she used this as a protective behavior. She expressed an interest in cosmetology as a career. She was able to explain why she wanted this career. She was also open to other career options. She did have behavioral and learning difficulties that affected her more in her early high school years but as she matured she was able to do better socially and academically. She had a grade point average of 2.5 (C+). She had most difficulty with large exams.

Bill, who was a 17 year-old European male, with English as his primary language whom when interviewed implied that poor teaching and family problems caused his low grades. He had great difficulty attending for long periods of time. He would find ways to leave classes such as bathroom breaks, going to the nurse, checking on another teacher. It was difficult for him to keep track of his assignments and to complete work when it was due. He had career goals but was unable to express how he would attain them. Due to his slower than average processing time he was given 50% extra time to complete tests. He had difficulty connecting consequences to his actions either academically or socially. His grade point average was 2.0 (C) the minimum required for graduation. He had difficulty with large exams and work completion. In his junior year he was able to attend longer but he continued to have academic difficulties.

Nancy was an 18 year-old senior of Haitian decent, with English as her primary language. She was on consultation for learning disabilities and received direct services for language therapy. She received 50% extra time for tests and cues to increase comprehension. She had difficulty with mathematics and expressing complex ideas. She was interviewing for part time jobs and was able to state future goals for either a two or a

four-year college. She frequently would ask questions regarding procedures for college applications and obtaining financial aid. Part of this may have been due to the complexity and her general nervousness about preparing for college. She was reserved and quiet socially. Her grade point average was 3.7 (nearly an A). She worked hard at school and did well on both exams and assignments.

Randy, was an 18 year-old Hispanic male, with English as his primary language. In his first three years of high school he received low grades and was not motivated to improve his grades. This low motivation may have been related to the difficulties that he had in understanding new and complex concepts. In his senior year, he suddenly realized the importance of his grades in his academic classes and he even started planning for college. Randy struggled to get through his math courses. He was on consult for learning disabilities and he had direct services for language therapy. He received 50% extra time for tests and cues to increase comprehension. He received a grade point average of 2.3 (C). He demonstrated improvement in both performance on exams and work completion his senior year.

Nova was a 20 year-old woman of mixed race with English as her primary language. She was on consult for learning disabilities and she was given 50% extra time allowed on her tests with cues for comprehension as needed. She was interested in obtaining a Cosmetology license. She was organized with her Cosmetology items and her books and papers however she was still forgetful of important events and did not always remember to write down important events such as appointments. She also had difficulties with mathematics. She was retained in second grade. She had difficulties with social interactions. Per student records she would overreact to these difficulties. She had a grade

point average of 3.2 (B) and obtained good grades on exams and work completion. Nova did work two jobs while going to high school.

### **Synthesizing the Data**

The data analysis involved pattern coding and sub coding analysis as well as direct quotes related to the coding (Saldaña, 2013). Open-ended questions were used to allow the participants a chance to express their ideas. The data was analyzed and themes developed. This was presented in the following section.

The participants were interviewed in a private room with the researcher during their school day. Interviews were taped and later transcribed. Each participant was given an alias. During the interviews the researcher noted that the interview style was much different from the typical small group work the researcher used with students on his caseload. It was also observed that the verbal output was less than expected compared to discussion with other typically developing high school students. This was observed when the researcher interviewed Bill for more clarity. Bill had difficulty expanding his ideas when questioned about his answers.

**Homework completion strategies.** When questioned about ‘how they learned best,’ the participants were able to express some strategies for learning yet they had difficulty explaining the purpose of strategies that they used to complete work. Nova stated this about assignments, “So I usually just complete them the night of.” Bill referred to difficulty with focus, “...at home I can’t focus sometimes. I get distracted by all the craziness....” Bill also preferred one-to-one teaching. Randy stated, “By trying and not giving up.” He also stated that he learned best by “...watching the teacher do the problem....” Francis stated, “I try to physically do it.” Nancy felt she learned best

visually, including the written word. None of the students were able to discuss the purpose of the strategies that they used.

For work completion Bill had difficulty due to lack of focus while Francis and Nova just completed the work and Nancy stated she was "... searching for answers." Randy needed assistance with work completion for most assignments. Three of the participants discussed organizing with tabbed folders however this did not always result in timely completion of work. The number of strategies appeared limited and the participants did not elaborate on the strategies that they used. It was likely that the limited amount of study strategies suggested that the participants did not know which strategies to use when they had difficulty learning.

**Learning styles.** The preferred learning style varied. Nova and Francis preferred hands on learning, Nancy stated that she learned best visually, and Bill stated he did best if, "... someone was sitting with me ... helping me focus..." Nova also stated, "I'm not going to remember like from a book." All of these participants learned better with a more direct teaching approach. None of the participants expressed great interest in reading.

**Socialization.** When participants were asked about popularity they did not give a ranking or direct answer. Bill stated, "I'm a helpful person." Francis stated that she was, "known for being unique." Randy did not feel that he was popular either in or out of school. None of the participants stated that they were popular. Being slower to respond may have caused these participants great difficulty socializing with their peers who generally speak at a rapid rate.

The participants socialized mostly with a small group of people that had remained constant through high school. They shared common interests such as such as camping,

gossip, hanging out, mall, soccer, and movies. Francis stated that she was "... not very socialized or friendly." Randy participated in social activities and perhaps was more popular than he thought. However when asked each participant felt unpopular.

**Sarcasm.** For dealing with sarcasm when interacting with friends, the coding for this study identified a range of words and phrases: funny, anger, confusion, may take personally, difficult to understand. Randy indicated that a sarcastic person was kidding. Nancy was not sure if a person was kidding or serious. Bill would get angry often thinking the person was serious. Nova felt she dealt with sarcasm effectively. Francis stated that she sometimes laughed because she was 'goofy.' There was confusion about sarcasm. Teenagers used a lot of sarcasm. For the participants this created a challenge in communicating and maintaining friendships.

**Addressing conflict.** When asked how they dealt with conflict Nova discussed difficulty managing her anger and Nancy stated that she would walk away but she would express herself if the feeling became built up. Francis stated that she would speak up to get her point across. Randy stated that, "... you'd give more details why you are right." Finally Bill was more comfortable addressing conflict with his family but had more difficulty dealing with conflict with his friends. The participants had many different but not so effective ways of handling conflict.

**Stress.** As a group these participants didn't have effective tools for dealing with stress. Nova stated, "... I stress over a lot of things. Sometimes I just brush it off and keep going. I don't really stress over things too much." Nancy stated this about stress, "Just deal with it. There's nothing you can do." Francis chose to do fun activities to relieve the stress. Bill got frustrated easily especially when standard procedures were not

done correctly. Randy stated an interesting option for stress, “I would think about it some and then think about something else for a while. Then I would go back to it.”

**Trust.** With questions about who they trusted coded words included brother, cousin, parents, mother, sister with only one participant Nova discussed a non family member, “... one female friend...” Randy felt he could talk with his family members but they provided little support stating that his parents would tell him to get those things of concern done first. Bill both trusted and mistrusted his mother. Nancy trusted family but not friends. So family members were trusted to some degree.

**Completing high school – options.** Only one of the participants were working while in high school. Nova was working two part time jobs in cosmetics and in a hair salon. She was on track to graduate. The other participants were most concerned with completing their high school requirements in order to gain employment or go to college after high school. All of the participants were on track to graduate.

The high school that these individuals attended placed on emphasis on career planning both in high school and after graduation. Each participant did have a plan after high school. Nova planned to pass her state board exam for cosmetology. She did not plan to attend college and she stated that she would like to do some service work for an organization. Nancy was torn between a private out of state four year university and attending a state college for two years and then transferring to a university. Francis planned to complete her state exam for cosmetology and possibly become a probation officer. Bill had ideas but they contained less specific information. He wanted to open a motorcycle shop or just a good business of some kind. He talked about possibly getting a two-year degree. But he stated that he was not into books. Randy stated, “I will probably

work at some store, make some money.” He was also considering going to a state college for an associate degree.

### **Themes**

Coded words and phrases for living situations included moving out of state (Nancy and Nova), “... house and some luxury things...” (Francis). “...away from people... outside of town.” (Bill). While Randy stated he wanted to live in a nice community. Through use of coded words several themes were developed from the interviews.

**Overview of themes.** When questioned about being placed in ESE classes there were different themes. Nova was resigned to it, “I’m used to having somebody take a test with me.” While Bill expressed more anger and reasons, “Nobody helped me.... I wasn’t just learning anything.” He also referred to personal problems with family and friends. Randy felt “... it meant that I wasn’t doing well in school.” He did feel that the language and learning disabilities label got him more assistance at school.

The participants learned best with hands on learning although they could not explain how they learned from this. Their organizational systems did not show a clear sense of order with strategies from folders, tabs, notes in pocket, and one participant was unable to describe any system of order. They had external blocks to learning including people, personal issues, and what they perceived as poor teaching. Stress and conflict were not dealt with effectively nor was sarcasm. Key issues were difficulty discussing concern and a tendency to walk away from the conflict. All of the participants were able to discuss possible college and they had career ideas that related to their academics.



All of the participants had difficulty explaining the purpose of the study strategies that they used. They also could not clearly explain how they dealt with social concerns. Most participants were 18 years of age and older as they signed the permission form themselves and did not have to remember to return a parent permission form. The participants had increasing difficulty communicating as the characteristics for their nonverbal learning disabilities became more noticeable. As a group these participants had difficulty remembering appointments, assignments, and tests. They were compliant and friendly and had difficulty understanding sarcasm. When asked about trust issues they focused more on the negatives of trusting someone. In part this could have been related to the researcher's tone of voice during the interview as well as the researcher's own issues with trust. When asked about stress none of the participants could give effective strategies to address or reduce it.

The researcher discussed high school students who did not have learning disabilities with a coworker who was both a mother and who worked with high school students of all ages. Typical high school students also had difficulty explaining social situations. They also had difficulties explaining the study strategies that they used. They would forget assignments and appointments. They had difficulty dealing with sarcasm and trust of nonfamily members. They had difficulty explaining what they did to deal with stress. However, they were quicker to respond and better able to explain rationales for their behaviors and their difficulties were milder.

## Chapter 5: Discussion

### Introduction

The purpose of this grounded theory study was to gain further knowledge through qualitative research. This study provided deeper knowledge about the phenomenon of nonverbal learning disabilities. It also helped to better define the concept nonverbal learning disabilities and to clarify the difference between it from nonverbal language disorders and nonverbal communication. The term nonverbal learning disabilities referred to many characteristics of learning including difficulties with complex language and higher-level intellectual activities. Much of the research currently found excluded high school students and it focused more on quantitative rather than qualitative research. This study considered the term nonverbal learning disabilities to include higher thinking, executive functions, socialization, and academic performance. The executive functions were the command center for the actions of the brain. The term nonverbal learning disability was defined as a deficit in right brain function (Harnadek & Rourke, 1994). This study focused on individuals with nonverbal learning disabilities and what they experienced. This Qualitative study bridged the gap between the 'disability' and the actual events and perceptions from the participants.

### The Study

The study was conducted over a three months period. Participants were interviewed using a narrative, qualitative style. Each participant answered the same questions and was allowed to answer them in any manner. The researcher asked additional questions about a topic if the participant's response was unclear. Information

was triangulated with file reviews, current report cards, and feedback from staff observations.

### **Nonverbal Learning Disabilities**

Nonverbal learning disabilities included deficits in academic, social function, decreased processing speed, and poor executive functions. There was little information on remediation or life experiences for the high school student. The participants expanded their ideas about nonverbal learning disabilities and provided insight. This was helpful in providing more knowledge about strategies for remediation. Previous Qualitative studies provided some information about strategies for remediation. One such study looked at learning disabilities and college-aged students and another was a study with high school students with nonverbal learning disabilities (Trainor, 2007). Most of these studies however focused on college students and their needs (Orr & Goodman, 2010; Trainor, 2007; Trainor, 2005). In this chapter the researcher discussed findings from chapter two as well as suggestions for those involved. Some characteristics of nonverbal learning disabilities:

**Brain.** Right brain involvement with difficulty in organizing and planning.

**Memory.** Had good verbal memory for concrete ideas (May appear knowledgeable but may lack the ability to synthesize new information.)

**Processing.** Had difficulty processing simultaneous information.

**Focus.** Lost focus easily in unstructured settings (Academic ability improves with structure).

**Speed of social interactions.** Had difficulties with social interaction especially rapid interchanges.

**Concepts.** Had difficulty learning new concepts (Harnadek & Rourke, 1994; Landwehr, 2009).

Individuals with nonverbal learning disabilities also had difficulty processing incoming information, forming concepts, and interacting socially (Grodzinsky, Forbes, & Bernstein, 2010). None of the participants in the study considered themselves popular. Randy stated that he was not popular but had a few friends outside of high school. While Francis stated that she was known but not popular, “People know me but they don’t know me.” They each felt unpopular. Persons with nonverbal learning disabilities view social situations more negatively than do their typically developing peers (Galway & Metsala, 2011).

Some of the participants had difficulty attending. The researcher observed both Randy and Bill and noted their difficulty attending during academic instruction. This difficulty attending also occurred at home. Bill stated that he “... can’t focus at home too much craziness.” It was unclear if the difficulties that the participants stated they had with studying at home were entirely accurate.

Socially all of the students stated that they were closest to their families. Bill stated, “Blood you can trust.” The relationships with family were safer and more predictable. Family was more likely to understand your difficulties. The individuals were also better able to understand their family members.

This qualitative, narrative study allowed the participants the opportunity to explain how nonverbal learning disabilities had affected their lives. The students were interviewed in their school environment allowing them to freely express their ideas about nonverbal learning disabilities. During the interviews the researcher noted that the

responses were of good quality and reasonableness although the statements were shorter and simpler and the students spoke at a slower rate than their typically developing peers. This was observed (by the researcher) when typical high school students were asked similar questions. They responded more quickly and they used more complex sentence structure.

### **Theoretical Framework**

The theoretical framework was a qualitative, narrative style. The participants were interviewed and the information obtained was triangulated with observations, reviewing information with participants, feedback from students' teachers, and looking at student records. The participants verbal output was limited corresponding to Karasinski and Weismer (2010) who stated that persons with nonverbal learning disabilities had a processing deficit that affected communication. The interview was a small set of questions that all of the students answered. There were no time constraints although all of the participants' interviews were shorter than the researcher had expected.

Students with nonverbal learning disabilities were characterized as having difficulty understanding novel ideas, they were verbose yet had deficits in language content, and decreased social awareness that worsened as the student reached adolescence (Harnadek & Rourke, 1994). Of the five participants, one had social and behavioral difficulties in ninth and tenth grade, and two displayed some signs of depression (e. g. withdrawn, low affect). When observed outside of the classroom by the Researcher, there were noticeable social difficulties observed. Randy was reluctant to admit that he did not understand information and rarely requested clarification. Bill was very self critical and at times he created a much worse situation than was necessary. As an example he did

poorly on a test and told me that he wanted to quite school. Francis was observed in the hallway yelling about a test she needed to take being unaware of others around her.

The interviews by the participants provided much information about nonverbal learning disabilities so the research question will be restated here: Will increased knowledge of nonverbal learning disabilities through qualitative research provide the researcher with better strategies to assist with learning? A discussion of the themes that relate to school success and personal well being follows.

### **Theme 1: Homework Strategies**

The participants had difficulty explaining the purpose of any strategy that they used for homework completion. The had difficulty with complex language usage (Leonard et al., 2007). This was a task that was difficult for all of the participants. Each participant focused on one strategy and they did not have any additional strategies. They all struggled to complete work on time. They were more likely to give up on an assignment if it became too difficult partly because they had few strategies that they could use when unsure of how to complete an assignment. This was confirmed by Galway and Metsala (2011) who stated that if work became too difficult the person with nonverbal learning disabilities would give up more quickly. Bill had difficulties with work completion and he was not able to clearly state why it was a problem or what he might do to improve. The participants focused more on the details and overlooked the process involved in completing the assignment (Carr & Hinckley, 2012). If students with nonverbal learning disabilities became more aware of good study habits and additional strategies their school performance may be improved (Dill et al., 2014). The participants were not able to explain why they used particular learning strategies. Also four of five

participants had difficulty completing homework on time. They had difficulty managing time lines, keeping track of work, and completing the work when they found it.

### **Theme 2: Academics**

Academically people with nonverbal learning disabilities had more trouble with math skills when compared to reading skills. The individual with nonverbal learning disabilities had difficulty understanding abstract and novel concepts including complex math. It was challenging for them to transition to new topics and situations as well as to multitask when completing assignments (Ortiz, 2010). It was also more difficult for the participants to ask for clarification. Three of the five participants were taking a math course that reviewed known concepts and one of them failed the mid term. Two of the five participants had a greater than 15 point split between verbal and nonverbal IQ scores which was sometimes a characteristic of nonverbal learning disabilities (Landwehr, 2009). Nova and Randy struggled with math courses and Francis had difficulties understanding math.

### **Theme 3: Learning Style**

The preferred types of learning styles mentioned were hands on, visual, and one-to-one. These same teaching styles also increased the participants' ability to attend to task. They all felt that a direct teaching style helped with learning in part because it was difficult for them to request assistance when they did not understand. None of the participants stated that they asked the teacher for assistance. The exceptional student education program allowed for direct teaching as needed. Participants who also had nonverbal learning disabilities had more difficulty with unstructured cognitive tasks (Cui et al., 2010). Studies stated that the individuals with nonverbal learning disabilities

learned best by listening rather than seeing (Ortiz, 2010). Bill stated that he did better with one-to-one teaching that was more structured. This may in part be related to the difficulties that they had processing information (Grodzinsky et al., 2010). One-to-one instruction assisted in learning new concepts and the instruction could be matched to the student's needs.

#### **Theme 4: Socialization**

The participants were closer to their families and not fellow students. The family unit provided the beginnings of a belief system (Islam, 2014). This family system was more familiar and comfortable to each participant. The difficulties they had with socializing and the different belief systems of their friends made it appear easier and safer to socialize with family members. Francis stated this about her status socially: "People know of me but they don't know me." While Bill stated that eventually he would like to live, "... on a lot of land so away from people." All of the participants stated that they trusted their families the most but that trust was guarded. Four out of the five mentioned family members as their closest friends. This corresponds to Harnadek and Rourke (1994) who stated that deficits in social awareness were found in individuals with nonverbal learning disabilities who withdrew further as they got older. When typical high school students were asked they stated their family was close but they also mentioned one or two close friends. The person with nonverbal learning disabilities was more guarded in social encounters leaving the family as the most viable group to socialize with.

Persons with nonverbal learning disabilities had more difficulty socially and viewed their interactions with people more negatively (Grodzinsky et al., 2010) Participants also had difficulty understanding humor possibly leading to fewer friends



(Semrud-Clikeman & Glass, 2008). Their slow processing time made it more difficult to respond quickly which was the typical demand when communicating with other teenagers. They may have experienced more loneliness (Johnson et al., 2010). Family members were likely allow more time and were more forgiving than their peers.

### **Theme 5: Conflict**

The participants preferred to walk away from conflict but some stated they would speak up if their anger increased. There was not a common solution to solving conflict. One technique that could improve the outcome was to visualize each person in the conflict in a positive manner (Cerni, Curtis, & Colmar, 2012). However, the most popular way to manage conflict according to the participants was to speak up about their point of view. This option was done more easily with family members. When they expressed themselves it could be effective if the concerns stated were clear to their listeners. However the participants had difficulty using clear language consistently resulting in increased difficulty communicating and likely more conflict. Conflicts were also avoided at times until they could no longer be ignored.

### **Theme 6: Trust**

The participants had most trust for their family members. This researcher noted this through a discussion with a teacher who has high school aged children and works with the entire student body at the high school. The researcher also casually spoke with a number of students who were not labeled as having nonverbal learning disabilities. The students with nonverbal learning disabilities trusted their family members while typical high school students mentioned trusting friends outside of the family as confirmed by Galway and Metsala (2011). They further stated that the persons with nonverbal learning

disabilities viewed social interactions in a more negative way with slower response times when they communicated causing their social encounters to be viewed more negatively. Speaking with family members would be a safer social outlet. While typical high school students stated that they had close friends outside of the family.

### **Theme 7: Stress**

Stress created a sense of unrest in all participants although what constituted stress was different for each. Stressful events for two of the participants were:

**Family demands.** Randy who felt stress when family demands were too great. He also became upset when tasks were not completed in the expected way.

**Anger management.** Nova who had difficulty managing her anger. The participants had a limited number of responses to stress and they included avoiding the stress or to minimize it, uncertainty in response, and trying to meet the expectations of others. Nancy stated that she did not know how to manage stress. The participants with nonverbal learning disabilities had limited coping methods such as to keep occupied, participate in fun activities, or talking the problem over with someone. High school students without learning disabilities were able to provide more options and they were stated more quickly. Difficulty managing stress could have a negative impact on socializing.

### **Theme 8: Adulthood**

Four out of five participants were planning on college after high school and they were planning to complete either a two-year Associates degree or a four-year college degree. The remaining participant planned on doing volunteer work. While their plans may have been unclear, their goals indicated that these students believed they could

continue with higher education. This was supported in research by Trainor (2005) and Trainor (2007) in interviews with students who transitioned to college it was found that they had difficulty creating a specific plan to achieve their goals. When explaining their post high school goals the participants' verbal output was slower and less detailed than that of typical peers. This researcher observed this in casual conversations when comparing the participants' responses with other typical high school students.

### **Triangulating The Data**

The following data from interviews, file reviews, literature, and observations confirmed credibility using triangulation.

**Slow processing time.** Slow processing time affecting communication according to studies (Karasinski & Weismer, 2010). Also there were deficits in executing responses (Galway & Metsala, 2011). All students were given extra time for testing in their Individual Education Plans related to their slow processing ability.

**Learning style.** Four of five participants were hands on learners. They stated that they learned better with hands on activities. Their career tracks included two in Cosmetology, one in Motor Cycle Repair, one in Medical studies, and one in Auto Body. Each career was hands on involving physical movement. This extra assistance they required made the participants feel distant from their peers and they thought they were unpopular. High school students reported more loneliness as their disabilities increased (Johnson et al., 2010). All participants improved academically in 11th and 12th grade.

While these participants performed similar to their peers in many respects it was likely that they used more effort when communicating, when engaged in learning activities, or speaking with their friends. This was compounded by the difficulty that they

had in formulating information when communicating or in classes. They benefited from increased structure and hands on teaching. See characteristics in Table.

## Table

*Participant Characteristics*

Name <sup>a</sup>	Age	Learning <sup>b</sup>	Math <sup>c</sup>	Social	Spoken Language	ESE Category <sup>d</sup>
Francis (Haitian decent)	20	Difficulty reasoning and taking exams. Hands on learner.	Math quotient 14 points less than composite index quotient.	Sometimes over reacts to situations.	Difficulty explaining complex ideas.	Consult for Learning Disabilities.
Bill (European decent)	17	Difficulty attending. Hands on.	15 points lower on math than cognitive quotient.	Likeable person. Few friends in and out of school.	Could clearly state ideas. More difficulty listening than visually.	Consult for Learning Disabilities.
Nancy (Haitian decent)	18	Good student. Visual learner.	Decreased language skills.	Small social group at school.	Reserved and quiet.	Consult Learning Disabilities. Direct language services. <sup>e</sup>
Randy (Hispanic decent)	18	Low grades Better in 12 <sup>th</sup> . Hands on learner.	Difficulty with math concepts.	No close friends.	Difficulty asking for help and questioning.	Consult Learning Disabilities.
Nova (Mixed decent)	17	Organized but forgetful. Hands on.	Difficulty with applied math.	Difficulty interacting. Prefers small groups	Misunderstood intent of speaker.	Consult Learning Disabilities.

a) Four of five spoke two languages but English was their primary language.

b) All students were given extra time on exams.

c) Four of the five had difficulty with math.

d) ESE stands for exceptional student education.

e) Refers to direct Speech and Language services not English Language Learner.

Research also stated that in unstructured learning tasks the individuals with nonverbal learning disabilities had more difficulty (Nyden et al., 2010). Their difficulties were in many ways invisible to themselves and to those around them. This created even more frustration for the participants, as they may not have been aware that they had trouble and yet they were unable to formulate the questions needed to obtain clarification. Since these difficulties were often unseen by the teacher, the teacher would not be able to offer assistance which created a cycle of difficulties. Once a class became overwhelming to the participants they would shut down intellectually.

### **Implications of Findings**

**Homework strategies.** Current research indicates that individuals with nonverbal learning disabilities had greater difficulty completing work without structure and work that involved new concepts or complex concepts. Most of the participants had difficulty completing tasks. They had difficulty with academics and completing their homework (Donaldson & Zager, 2010). Part of their difficulty was related to their reduced language output, inability to make requests, and limited strategies for academic success. The participants explained how they completed their work but they were unable to give a concise description of what they had done. Francis stated this about homework: "... I just get it done." While Randy and Bill both had great difficulty completing their homework on time. Individuals with nonverbal learning disabilities benefitted from more structured assignments that were broken into small parts, modeling of clear questions for clarification, and one-to-one assistance when possible. They also benefitted from working directly with a person who would assist them with organization and work completion.

**Academics.** Individuals with nonverbal learning disabilities had difficulty with math, novel ideas, and complex concepts. It would be beneficial to have smaller math classes with more one-to-one teaching for these individuals. All of the participants stated that they had difficulty with math and their grades were also lower for math when compared to other subjects. Providing repetition of key concepts, multimodal presentation, and inviting the teacher to dialogue with the student about new concepts would likely help these students learn. They would do better with a course that was designed to review new concepts and proceed at a slower pace. Reading skills could be improved through use of metacognitive strategies (Melanlioglu, 2014). These skills would be most important to the student if they were taught in ninth and tenth grades. If the student experienced more success in the early year of school they may continue with academic success rather than shutting down.

**Learning style.** Four out of the five participants indicated that they learned better with hands on teaching. Some of the participants stated that they understood better through their auditory senses rather than their visual senses (Nydén et al., 2010). Longer assignments could be broken down. The participants could benefit from one-to-one or small group instruction as indicated by their interest in hands on learning. This small group instruction would help compensate for a poor working memory and to provide accurate feedback to the student on their performance level (Carr & Hinckley, 2012). This style of teaching would also allow the educator time to provide teaching to address the student's deficits in visual skills. This small group instruction could allow students time to understand expectations for academic success (Bruce-Davis et al., 2014). Further a small group learning strategies class allowed the student regular follow ups about

completing assignments, upcoming tests and quizzes, and new concepts that they were having difficulty learning. All of the participants stated that they had difficulty with work completion. Also supported by Ortiz (2010) who stated that persons with nonverbal learning disabilities have difficulty with organizing. In working directly with students who had nonverbal learning disabilities, this researcher noted that students with nonverbal learning disabilities were able to discuss an assignment and even set a timetable but when left to work independently the student often had difficulty completing the assignment. Students with nonverbal learning disabilities would give up more easily on their assignments (Galway & Metsala, 2011).

**Socialization.** Individuals with nonverbal learning disabilities were most comfortable with their families rather than their friends. Research stated that adolescents with nonverbal learning disabilities withdrew socially as they got older. All of the participants in the study were cautious about their social encounters and had difficulty trusting nonfamily members. Offering more structured small group social settings with their peers would allow them to get to know their peers and provide increased opportunities to socialize outside of the family. It could also encourage better relationships. Individuals with nonverbal learning disabilities sometimes experienced depression related to their learning, communication, and social difficulties. Teachers and other staff should be aware of and observe for difficulties these students may demonstrate.

**Conflict.** One solution for dealing with conflict according to some of the participants was to speak your mind about the issue however this difficulty was more pronounced in the person with nonverbal learning disabilities due to limited language

skills. The participants also had difficulties understanding social interactions as well as in using clear language when stating their concerns. In general there was no clear solution that the participants had for solving conflicts. Persons with nonverbal learning disabilities would benefit from having a teacher or another staff member as a confidant whom they could speak to when they were in conflict. They would benefit from having a small social group to help them manage conflicts and other social issues (Kourmoulaki, 2013).

**Trust.** Participants trusted family members more than friends. This was confirmed by the literature. However, this was also an issue with individuals who did not have nonverbal learning disabilities although to a lesser degree. Providing a setting that would allow for positive interaction with peers may increase trust. Having a mentor throughout high school may also help.

**Stress.** The participants did not have a clear solution for stress. This was an area that caused them confusion. Students without nonverbal learning disabilities also had this difficulty but to a lesser degree. Providing direct instruction and problem solving about stress could improve the outlook of persons with characteristics of nonverbal learning disabilities. Small group discussion led by teachers would help develop more options.

**Post high school.** Four of the five participants planned on going on to some schooling after high school. While they could state their general goal for a career they were unable to state the steps needed to achieve that goal. This was supported by the research (Harnadek & Rourke, 1994). The participants would benefit from individual or small group discussion about choices that are realistic and possible as well as timelines to complete goals.



Students with nonverbal learning disabilities struggled academically, had trouble reading social cues, had trust issues, and they had difficulty dealing with stress. While they did struggle in school each of them had learned to compensate to some extent and be more successful in high school especially in the 11th and 12th grades. All of the participants were on track to graduate. In many ways they were similar to their peers without characteristics of nonverbal learning disabilities however they struggled more to maintain this success. Our current exceptional student education programs have addressed many of the needs of these students already however persons with nonverbal learning disabilities, their educators, family, and friends need more assistance in understanding this disability.

### **Limitations**

There were limitations to this study. A small group of only five high school students were selected using a convenience sample. They were from 17 to 20 years of age as the researcher found the younger high school students were not reliable in obtaining parent permission forms. The data was limited to older high school students. Each participant had only some of the characteristics of nonverbal learning disabilities. It may have been helpful to have a wider range of questions for the participants as well as more interview time. Nonverbal learning disability has been identified from a neurological perspective. It was difficult to find a clear definition that satisfied both a neurological and an educational model.

### **Recommendations for Future Research**

The researcher developed a deeper understanding of the term nonverbal learning disability. There is a select group of individuals who can be identified as nonverbal

learning disabled. More research is needed to develop this phenomenon further. The researcher offers the following recommendations for future research?

**Use younger participants.** Undertake a similar study using younger high school aged students. The findings may be quite different due to their young age as the participants in this study were all 17 years of age and above. The information gathered for remediation would also likely be different. The younger students may not have learned as many strategies to compensate for their disability and their programming needs may be different.

**Social difficulties.** Develop a qualitative, narrative study for individuals with nonverbal learning disabilities with a focus on how these individuals socialize. Areas of interest could include relations with their family and friends, romantic interests, trust issues, dealing with sarcasm, and techniques to obtain and maintain friendships. Use of a qualitative narrative study would allow them to speak to the difficulties that they were having.

**Combine research methods.** Mixed methods research using a survey format in order to discover strategies that all high school students use to complete work and a qualitative narrative follow up to gain more in depth information on how they completed their work. Then compare this to participants who have nonverbal learning disabilities. The qualitative information obtained about study strategies from typical performing peers may be useful for many types of students having difficulty with school. Strategies that were successful for typical high school students could be incorporated with students with nonverbal learning disabilities.

**Common definition.** Clarify the definition of nonverbal learning disabilities by including researchers with educational and neurological backgrounds.

**Qualitative research and stress.** Research qualitatively how stress affects those with nonverbal learning disabilities.

### **Conclusion**

The educators can use information on nonverbal learning disabilities to better serve the students. Techniques that would assist students with nonverbal learning disabilities may also assist other students academically and socially. Here are some suggested strategies:

**Structure tasks.** Educators and others could provide more structure to homework.

**Safe and positive.** Provide a safe environment that allowed the students to socialize in a positive manner.

**One-to-one instruction.** The school and others could provide the students with help in understanding new concepts.

**Addressing conflict and stress.** Provide more opportunities to reduce conflict and stress.

**Extra processing time.** Allow extra time for tests and quizzes.

**Learning strategies course.** Provide the student with more success.

**More educational opportunities at younger ages.** More direct services during their early high school years.

The term nonverbal learning disability continues to be confusing both in the definition and in the strategies that can be used to improve student performance. This

dissertation was designed to provide a better understanding of what it meant to have a nonverbal learning disability. It was found that participants with nonverbal learning disabilities faced difficulties beyond those of their learning disabled peers. While these difficulties persisted through high school, the older high school students with nonverbal learning disabilities did learn to compensate for some of their difficulties. So current strategies used for all students with learning difficulties do assist the students with nonverbal learning disabilities. This increased knowledge about nonverbal learning disabilities will provide a clear definition of the term nonverbal learning disability as well as provide a greater number of strategies to assist those individuals.

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Appendix  
Interview Protocol

## Interview Protocol

Questions used during the narrative interview.

### 1. Academics

- A. Discuss the task of completing homework.
- B. Discuss how you organize.
- C. How do you learn best?

### 2) Socialization

- A. How popular are you at school?
- B. How popular are you outside of school?
- C. What are some activities you do with friends?
- D. How do you deal with sarcasm?

### 3) Emotionally

- A. How do you manage conflict?
- B. How do you deal with rejection?
- C. How do you manage stress?
- D. Tell about a person you trust?

### 4) Plans after high school

- A. Work
- B. School
- C. Living situation

Students were interviewed in a quiet room with the researcher. Interviews were taped and transcribed. Transcribed interviews were analyzed using level one and two coding. Themes were developed from the codes. Data was triangulated with school records, student grades, observation, and discussion with staff.