



SCHOOL of
GRADUATE STUDIES
EAST TENNESSEE STATE UNIVERSITY

East Tennessee State University
**Digital Commons @ East
Tennessee State University**

Electronic Theses and Dissertations

Student Works

12-2002

Special Education Teachers' and Speech Therapists' Knowledge of Autism Spectrum Disorder.

Carol Hendrix Whaley
East Tennessee State University

Follow this and additional works at: <https://dc.etsu.edu/etd>

 Part of the [Communication Sciences and Disorders Commons](#), and the [Special Education and Teaching Commons](#)

Recommended Citation

Whaley, Carol Hendrix, "Special Education Teachers' and Speech Therapists' Knowledge of Autism Spectrum Disorder." (2002). *Electronic Theses and Dissertations*. Paper 717. <https://dc.etsu.edu/etd/717>

This Dissertation - Open Access is brought to you for free and open access by the Student Works at Digital Commons @ East Tennessee State University. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact digilib@etsu.edu.

Special Education Teachers' and Speech Therapists'
Knowledge of Autism Spectrum Disorder

A dissertation
presented to
the faculty of the Department of Educational Leadership and Policy Analysis
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Doctor in Education

by
Carol H. Whaley
December 2002

Dr. Russell Mays, Chair
Dr. Louise MacKay
Dr. Lori Marks
Dr. Russell West

Keywords: Autism Spectrum Disorder, Special Education, ASD Education,
Legal Issues, Pervasive Developmental Disorder

ABSTRACT

Special Education Teachers' and Speech Therapists' Knowledge of Autism Spectrum Disorder

by
Carol H. Whaley

The purpose of this study was to survey special education teachers and speech therapists in 11 school districts in Northeast Tennessee regarding their knowledge level (etiology and educational programming) of autism spectrum disorder (ASD). The primary focus of the study was to identify effective programs and methods used by special educators in this region, comparing them to the latest techniques and teaching methods prescribed by recent research. In addition, identified weaknesses were used to recommend future training and staff development to enable educators to provide the best possible programs for children with autism.

Five hundred fifty-two surveys were disseminated to special education teachers and speech therapists in eleven school districts in Northeast Tennessee. Two hundred ninety-two professionals responded to the survey, resulting in a return rate of 52.9%. Educators were asked to respond to 44 questions (28 true/false items and 16 multiple choice items). The multiple choice items were designed to obtain demographic information, job related characteristics, preparation and experience teaching students with ASD, and professional needs of special educators in this region. The 16 multiple-choice items were categorized into knowledge of ASD etiology and ASD educational programming.

The results of the study indicate that there were no marked deficits in special educators' knowledge levels (etiology and educational programming) of ASD. However, the scores on educational programming were consistently higher than scores on etiology. There is a need for further training because very few special educators have been trained in research based methods currently used with students diagnosed as ASD.

DEDICATION

This study is dedicated to my two children, Amy Christine McKinney and Thomas Harrison Whaley, and my parents, Harold and Helen Hendrix. They have encouraged and supported me throughout this long process. In addition, I never would have made it without the support of my friends, Jerri Beth Lyons and Judy Blevins.

ACKNOWLEDGMENTS

I would like to express my deepest appreciation to Dr. Russell Mays for his assistance and support during the process of writing this dissertation. When I felt like giving up, he was there to encourage me and nudge me forward.

I would also like to thank my graduate committee members for their time, suggestions, and encouragement, especially Dr. Russell West who spent many hours assisting me in the data analysis.

Dr. Russell Mays, Chair

Dr. Louise Mackay

Dr. Lori Marks

Dr. Russell West

CONTENTS

	Page
ABSTRACT	2
DEDICATION	3
ACKNOWLEDGMENTS	4
LIST OF TABLES	10
Chapter	
1. INTRODUCTION	11
Statement of the Problem	13
Research Questions	13
Significance of the Study	15
Limitations and Delimitations.....	17
Definition of Terms	17
Overview of the Study.....	20
2. REVIEW OF RELATED LITERATURE.....	21
Introduction.....	21
Definition	21
DSM-IV Classification	24
ICD-10 Classification.....	28
IDEA Classification.....	28
State of Tennessee Classification	30
Wing’s Classification	32
Characteristics of Children with Autism	
Spectrum Disorder.....	33
Etiology.....	36
Prevalence.....	37
Diagnosis and Evaluation	41

Neurological Factors.....	44
Medication.....	48
Education.....	50
Legal Issues.....	52
Programming.....	58
Behavioral Issues.....	61
Functional Communication Training.....	62
Applied Behavior Analysis.....	64
Lovaas Therapy.....	67
Discrete Trial Training.....	67
Communication.....	70
Facilitated Communication.....	70
Speech and Language Therapies.....	71
Auditory Integration Therapy.....	72
Social Communication.....	73
Sensory Integration Therapy.....	76
Diet.....	77
Vitamin Therapy.....	78
Professional Training in Autism.....	80
Summary.....	85
3. METHODS AND PROCEDURES.....	87
Population and Sample.....	87
The Survey Instrument.....	88
Validity of the Survey Instrument.....	88
Modification of the Instrument.....	88
Reliability.....	91
Validity.....	91
Research Design.....	92
Procedures.....	92

Data Analysis	93
Summary	93
4. ANALYSIS OF DATA	95
Research Question 1	97
Research Question 2	98
Research Question 3	101
Research Question 4	109
Research Question 5	111
Research Question 6	115
Research Question 7	116
Research Question 8	118
Research Question 9	121
Research Question 10	123
Research Question 11	125
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.....	127
Summary	127
Research Question 1	128
Research Question 2	129
Research Question 3	131
Research Question 4	134
Research Question 5	136
Research Question 6	138
Research Question 7	139
Research Question 8	139
Research Question 9	140
Research Question 10	140
Research Question 11	140
Conclusions.....	141
Recommendations for the Improvement of Practice	142

Recommendations for Future Research	143
REFERENCES.....	144
APPENDICES	155
Appendix A: Initial Survey	154
Appendix B: Revised Survey.....	159
Appendix C: Reference Matrix for Survey	166
Appendix D: Informed Consent	176
VITA	180

LIST OF TABLES

Table	Page
1. Comorbid Disorders Associated with ASD.....	47
2. Table of Items Categorized by Knowledge Area	90
3. Number of Participants by School System	95
4. Number Participants by Occupational Characteristics	97
5. Number of Participants by University Preparation.....	99
6. Number of Participants by Preparation for ASD While Teaching	101
7. Number of Participants Reporting Experience Working With Children Diagnosed with ASD	103
8. Number of Children Prescribed Medication and the Number of Teacher Contacts with Physicians Prescribing Medication	104
9. Communication Techniques and Types of Teaching Methods used by Teachers for Children Diagnosed with ASD.....	105
10. Teaching Methods Used Reported by Survey Participants	106
11. Survey Responses to “Is ASD a Legitimate Educational Problem for all Teachers?”	107
12. Prioritized Skills Considered Most Important for Children with ASD	108
13. Study Participants by Professional Needs... ..	110
14. Percentage of Etiology Items Correct by Current Position	112
15. Percentage of Educational Programming Items Correct by Current Position	114

16. Comparison of Etiology Score Means by Current Teaching Position.....	115
17. Comparison of Educational Programming Score Means by Current Teaching Position	116
18. Comparison of Means by Highest Degree Obtained and Etiology Score	117
19. Comparison of Means by Highest Degree Obtained and Educational Programming Score.....	118
20. Comparison of Etiology Score Means of Special Educators with Different Levels of Experience	119
21. Comparison of Educational Programming Score Means of Special Educators with Different Levels of Experience	120
22. Comparison of Special Educators' Etiology Scores by School Level.....	122
23. Comparison of Special Educators' Educational Programming Scores School Level	123
24. Comparison of Etiology Score Means by School System Type.....	124
25. Comparison of Educational Programming Score Means by School System Type	124
26. Differences in Etiology and Educational Programming Scores Adjusted Means by Position	125

CHAPTER 1

INTRODUCTION

Autism is a life long disorder often diagnosed in very young students. Leo Kanner (1943), the first person to describe autism, reported students with autism as being a “unique group of students whose behavioral abnormalities made them qualitatively different from other handicapped students”(p. 217). Kanner characterized the disorder as having the following symptoms: impaired language, lack of eye contact, lack of social interaction, repetitive behavior, and a rigid need for routine.

Ten years ago, the diagnosis of autism was virtually unheard of in educational settings. Children who may have had this disability were diagnosed as having mental retardation often with severe behavior problems. However, in the 1990s, the diagnosis of autism increased with alarming frequency. In Tennessee, the State Department of Education reported a 150% increase of cases of autism from 1994 to 1999 (Bevilaqua, 2001). The increase of students with autism in schools has created a greater need for education and understanding of how to reach these students so that learning can take place.

Children with autism may often seem aloof from peers and/or family, often refusing to be touched or held. These children often exhibit very poor social interaction skills, preferring to remain isolated rather than interacting with other children. Higher functioning children diagnosed under the umbrella of autism spectrum disorder may not understand how to engage in appropriate social interaction thereby alienating their peers with displays of inappropriate behaviors. Many children with autism have limited speech, becoming easily frustrated when their needs cannot be expressed verbally. At times, severe temper tantrums and episodes of aggressive behavior may occur. In addition, repetitive behaviors, such as fixating on certain objects or

repetitive hand motions may be observed. Children with autism may display a rigid need for routine and structure. Transitions are difficult and even a slight change in daily routine may cause the child to exhibit inappropriate behavior.

Autism is a spectrum disorder, defined by a wide variety of characteristics ranging from mild to severe. There are five diagnoses under spectrum disorder: autistic disorder, Asperger's syndrome, pervasive developmental disorder, Rett's syndrome, and childhood disintegrative disorder (American Psychiatric Association, 1994). For the purposes of this study, autistic disorder, Asperger's syndrome, and pervasive developmental disorder were researched.

Due to an increase in prevalence of diagnosed cases of autism, a rise in court litigation, a need to meet the mandates of the Individuals with Disabilities Education Act (IDEA), and a need to provide appropriate educational programs for students with autism, school systems must implement change policies in service and structure to meet these growing demands. Many school systems have been unable to meet the all-encompassing educational needs of children with autism for several reasons. First, there appears to be a lack of intensive training on educational methodology for teaching children with autism at the university level. Second, a lack of training and resources from within school systems contributes to inadequate educational programs for students with autism. In addition, the lack of consensus among professionals in the field regarding educational programming techniques for students with autism can create dissension and controversy among parents and educational personnel.

Statement of the Problem

In an effort to identify effective programming used in Northeast Tennessee, this study will assess the knowledge base of special education teachers and speech therapists regarding autism in 11 school systems of upper Northeast Tennessee. In addition, an analysis of techniques and teaching methods for autism practiced by special education teachers and speech therapists will be analyzed and compared to the latest techniques and teaching methods prescribed by recent research.

Deficits in educators' knowledge level of autism spectrum disorder (ASD) could seriously impact the quality of educational programs for students with autism delivered by local school systems. When schools deliver inadequate programs that do not meet the individual needs of students with disabilities, not only are these students denied an appropriate education, but also the risk is great for litigation due to a lack of meaningful educational benefits. The purpose of this study was to determine the knowledge level of special education teachers and speech therapists regarding the general concepts of etiology and educational programming for autism spectrum disorder.

Research Questions

This study was guided by the following research questions:

1. What are the occupational characteristics of special education personnel employed in 11 Northeast Tennessee School Systems?
2. What training did special education personnel in 11 school systems in Northeast Tennessee obtain to be prepared to teach children with ASD?
3. What types of experience regarding ASD have special education personnel had while teaching?

4. What are the professional needs of special education teachers employed in 11 Northeast Tennessee school systems regarding ASD?
5. What is the level of knowledge (etiology and educational programming) about ASD among educators in Northeast Tennessee?
6. Are there differences between resource teachers', speech therapists', and comprehensive developmental classroom (CDC) teachers' level of knowledge (etiology and educational programming) about ASD?
7. Are there differences between resource teachers, CDC teachers, and speech therapists with different degree levels (BS, MA, EdS, EdD with respect to their level of knowledge (etiology and educational programming) about autism?
8. Are there differences between special educators with different levels of professional experience (0-6 years, 7-11 years, 15-21 years, 22+ years) in terms of their level of knowledge (etiology and educational programming) about autism?
9. Are there differences between elementary special educators, middle school special educators, secondary school special educators, and special educators working at more than one school level in terms of their level of knowledge (etiology and educational programming) about autism?
10. Are there differences between teachers in the city and county school systems in terms of their level of knowledge (etiology and educational programming) about autism?
11. Are there differences in special education teachers' and speech therapists' level of knowledge about autism etiology and

programming when controlling for years of professional experience, highest degree held, and type of system in which employed?

Significance of the Study

The number of diagnosed cases of autism has increased over the last decade. According to the U.S. Department of Health and Human Services (2000), as many as one in 500 students could be diagnosed with autism. According to Feinberg and Vacca (2000), autism is now second only to Down syndrome in childhood disorders. Many states have reported substantial increases in reported cases of autism over the last 10 years. Between 1987 and 1998, California reported a 273% increase while Florida reported a 573% increase in cases of autism over the last 10 years ("Children with autism increases in Florida," 1998). In Tennessee, the State Department of Education reported a 150% increase in cases of autism from 1994 to 1999 (Bevilaqua, 2001).

In addition to the sharp rise in number of diagnosed cases, research funding related to autism has nearly quadrupled in the last five years, from 10.5 million in 1995 to 40 million in 1999. The estimated National Institute of Health budget for 2000 is 45.5 million (United States Department of Health and Human Services, 2000).

The increase in number of diagnosed cases of autism has had a significant impact on education. The Individuals with Disabilities Education Act (IDEA) of 1990 and the IDEA Amendments of 1997 mandate that school systems provide appropriate educational programs in the least restrictive environment for all students with disabilities including students with autism (IDEA, 1997). Since this eligibility category has only recently been added, many teachers lack appropriate training in the field of autism spectrum disorder. Consequently, there has been a lack of educational programs to meet the individual needs of children with autism. According to Bevilqua

(2001), when schools are unprepared to deliver appropriate services, the estimated annual cost to treat one child diagnosed with severe autism could range between \$80,000 and \$90,000 per year. A lack of appropriate programming by a school system could result in a private placement, incurring exorbitant costs that most school systems cannot afford. In order to provide a meaningful educational program for children with autism, school systems must invest in intensive training in the area of autism for special educators.

Many educational and medical methodologies and techniques abound in the literature today, all espousing a unique method of educating and treating students with autism. Parents and educators alike become confused when faced with so many different alternatives. Due to the complex nature and diverse characteristics of autism, it is virtually impossible to design and carry out one program to meet the needs of all students with autism.

Faced with a diagnosis of autism, many parents feel alienated and alone. Too often, family and friends do not understand how devastating such a diagnosis can be to a parent. Thus begins a search for some method or intervention to help the child increase skills and abilities. Because we live in the information age, there is no problem obtaining literature and recommendations for treatment and often, a specific technique may appear to be “the” answer to parents.

A lack of change in school policy, programming, and structure regarding education for students with autism has led to increased litigation by parents in an effort to force school systems to invest solely in certain methods such as applied behavioral analysis techniques (Bevilaqua, 2001; “Schools not Providing IDEA Services, Government Witnesses Charge”, 2001). Until recently, courts tried to define the component of an appropriate individualized educational program (IEP), citing a specific number of hours of intervention per week and determining the professionals who could provide

these services. However, the courts' general thinking has shifted somewhat in recent cases and become more responsive to the idea of multiple methodologies to meet the needs of students with autism ("Courts less favorable", 2000).

The need for professionals to share their expertise is great and will ultimately contribute to more effective programming for students with autism. Educators should be able to design and implement programs that address the individual needs of students with autism, increasing their quality of life. Both educators and parents should adopt a proactive approach by working together to address the complex needs of students with autism.

Limitations and Delimitations

This study was delimited to 11 public school systems in upper Northeast Tennessee.

The study was limited because only special educators and speech therapists were surveyed even though general educators also work with students with autism.

Definition of Terms

For the purposes of this study, the following definitions will be used:

1. Autism Spectrum Disorder (ASD): A term referring to a broad definition of autism ranging in characteristics from mild to severe. ASD refers not only to autism, but also closely related disorders such as Asperger's Syndrome, pervasive developmental disorder not otherwise specified, Rett's Syndrome, and childhood disintegrative disorder that share many of the same core characteristics (Dunlap & Bunton-Pierce, 1999; Dunlap & Fox, 1999; United States Department of Health and Human Services, 2000).

The following disorders, included under autism spectrum disorder, are defined by DSM-IV (American Psychiatric Association, 1994):

- A. Autistic Disorder: The criteria for diagnosis of autism include impairment in social interaction, delay, or lack of communication skills, and repetitive, stereotyped behaviors, interests, and actions. Many children with autism also have mental retardation. The onset of autism is before three years of age.
- B. Asperger's Syndrome: Characteristics of Asperger's Syndrome include impairment in social interaction, and repetitive and stereotyped behaviors, interests, and activities. There is not a significant delay in language or cognitive development. A child diagnosed with Asperger's has no delays in self-help skills, or adaptive behavior, but usually does not understand or display the intricacies of social communication skills such as facial expression, body posture, and gestures. There is a lack of social or emotional reciprocity.
- C. Pervasive Developmental Disorder Not Otherwise Specified (PDDNOS): Atypical autism, occurring when a child does not meet the criteria for autism, Asperger's Syndrome, Rett's Syndrome, or childhood disintegrative disorder, but nonetheless shows signs of a severe developmental disorder with significant autistic symptoms.
- D. Rett's Syndrome: After a brief period of normal development (6 to 18 months), some regression or loss of ability begins to occur in gross motor skills and behavior. Diagnosed primarily in females, this syndrome is noted for the loss of previously acquired purposeful hand skills resulting in stereotyped hand movements such as hand wringing or hand washing. In addition,

the syndrome results in severely impaired expressive and receptive language and retardation.

E. Childhood Disintegrative Disorder: Children develop normally up to two years of age and then rapidly lose acquired skills such as the ability to move, bladder and bowel control, and social and language skills. This usually occurs between 36 and 48 months of age, but may occur up to 10 years of age.

2. Individuals with Disabilities Education Act of 1997(IDEA): IDEA means the collective name for a federal law providing federal funds mandating special education for students including early intervention services, special education services, and related services for students (Individuals with Disabilities Education Act of 1997, 20 U.S.C. §1400, et seq.).
3. Individualized Education Program (IEP): An individual educational program designed for a student with disabilities that addresses the student's individual strengths and weaknesses, educational goals and objectives, and includes needed supplementary aids and services. It is a written statement that is developed, reviewed, and/or revised in an IEP team meeting (Individuals with Disabilities Education Act of 1997, 34 C.F.R. §300.340-300.350).
4. Individualized Education Program Team (IEP team); IEP team means a group of individuals responsible for determining the eligibility of a child and for developing or reviewing and/or revising an IEP for a child eligible for special education (Individuals with Disabilities Education Act of 1997, 34 C.F.R. 1999, § 300.344).
5. Due Process Hearing: Litigation initiated by the parent(s) or the school system when either party determines a child eligible for special education or a child suspected to be eligible for special education is not receiving a free appropriate education program. In addition, hearings

may be initiated on matters relating to the identification, evaluation or educational placement of a child with a disability (Individuals with Disabilities Education Act of 1997, 34 C.F.R., 1999, §300.509).

6. Special Education: Special education is specifically designed instruction to meet the unique educational needs of a child eligible for special education. Services are provided at no cost to parents (Individuals with Disabilities Education Act of 1997, 34 C.F.R. 1999, §300-26).

Overview of the Study

Chapter 2, the literature review, concentrates primarily on autism, Asperger's syndrome, and pervasive developmental disorder. This is, in part, due to the magnitude of literature available about each syndrome. In addition, it is paramount that educators are able to teach children with autism using the most appropriate methods to meet the needs of each individual student. Consequently, described in the literature review are the following: a review of the definitions of autism, etiology, prevalence, diagnosis and evaluation, neurological factors, medication, education, legal issues, programming, behavioral issues, communication, sensory integration, diet, vitamin therapy, and a brief summary. Chapter 3 includes a description of the research design, the population and the sample, instrumentation, data collection, and data analysis. Chapter 4 includes a presentation of the results of the data analyses. Chapter 5 includes a summary of the findings, conclusions, and recommendations for practice and for further study.

CHAPTER 2 REVIEW OF RELATED LITERATURE

Introduction

This literature review begins with information pertaining to descriptions of the meaning of autism and autism spectrum disorder. Section two reviews the prevalence of autism and Section Three discusses possible causes of the disorder. Section Four discusses diagnosis and assessment, Section Five discusses medications, and Section Six discusses the education of students with autism. Section Seven discusses educational treatments and programming.

Definition

Autism, a lifelong disabling condition, affects thousands of students throughout the world. In 1943, Kanner first described "a unique group of students whose behavioral abnormalities made them qualitatively different from other handicapped students" (p. 217). Kanner characterized students with autism as having impaired language, lack of eye contact, lack of social interaction, repetitive behavior, and a rigid need for routine. He considered autism to be a psychiatric disorder.

Since 1943, professionals have determined that autism is not a psychiatric disorder and is not related to a lack of parenting skills as first thought by Bettelheim (1967) when he described the "refrigerator" mother as being the cause of the child's deviant and delayed development. At that time, the treatment of choice was to separate the child from the mother (Bettelheim). Probably due to this initial theory that children with autism do not bond, many people have believed that these children do not show affection toward their mothers. Contrary to this belief, the results of a study conducted by Dissanayake and Crossley (1996) indicated just the opposite. Observations of children with autism with their mothers and a female

stranger clearly showed that children with autism were strongly attached to their mothers.

Much has been learned about autism since that time with a shift-taking place from the theoretical to empirical research. However, the basic characteristics described by Kanner (1943) remain as fundamental in the definition of autism.

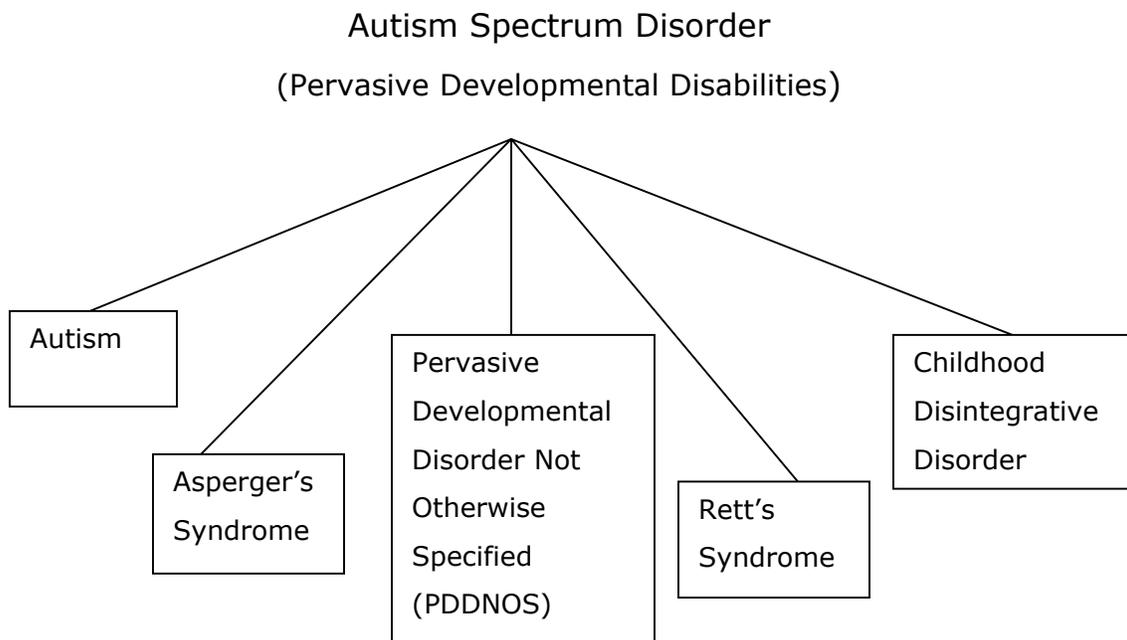
The National Information Center for Children and Youth with Disabilities (2001) reported autism to be a neurological disorder affecting play, communication, ability to understand language, and ability to relate to others. According to Tsai (National Information Center for Children and Youth, 1998), symptoms of autism are evident by three years of age and are caused by problems with the central nervous system with no known specific cause.

In 1944, another form of autism reported by Asperger, a Viennese pediatrician, described a personality disorder, calling the syndrome "autistic psychopathy". Currently called Asperger's syndrome, this disorder had some of the same characteristics as autism but with some major differences. Individuals with Asperger's may have full command of language, yet their speech may be "pedantic, and often considered of lengthy disquisition on favorite subjects of limited interests to others" (Asperger as cited in Tsai, 2000, p. 139). Other features described by Asperger include impaired social interaction, ignoring environmental demands, repetitive play, and isolated areas of interests. According to Asperger, this disorder is usually not recognized in infancy. In addition, individuals with Asperger's syndrome were reported to be capable of originality and creativity in chosen fields and had excellent abstract thinking skills.

The term, autism spectrum disorder (ASD), is used to describe a series of pervasive developmental disorders (PDD) ranging from mild to severe along the autism spectrum. The group of disorders diagnosed as autism

spectrum disorder, or PDD include autism, Asperger's Syndrome, pervasive developmental disability not otherwise specified (PDDNOS), Rett's Syndrome, and childhood disintegrative disorder (Dunlap & Bunton-Pierce, 1999; Dunlap & Fox, 1999; United States Department of Health & Human services, 2000). In the 1980s, the term, pervasive developmental disabilities (PDD), was first used to refer to a broad range of disorders including autism and other disorders with autistic symptoms. Pervasive developmental disability, or PDD refers to a class of disorders with common characteristics such as impairments in social interaction, imaginative activity, verbal and nonverbal problems in communication skills, a limited number of interests, and repetitive activities (See Figure 1.). Some doctors, hesitant to diagnose autism, have used PDDNOS as a general diagnosis because of the confusion surrounding the term "autism" (Tsai, 1998).

Figure 1.



The American Psychiatric Association uses the term pervasive developmental disabilities to define five types of disabilities under the autism

spectrum disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (American Psychiatric Association, 1994). These include Autistic Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder, and Pervasive Developmental Disorder Not Otherwise Specified. For the purposes of this literature review, Autistic Disorder, Asperger's Disorder, and Pervasive Developmental Disorder Not Otherwise Specified will be defined below.

DSM-IV Classification

The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), used most often to diagnose autism and autism disorders describes PDD as a "severe and pervasive impairment in several areas of development such as social interaction skills, communication skills, or the presence of stereotyped behavior, interests, and activities" (American Psychiatric Association, 1994, p. 65).

The DSM-IV criteria by which autistic disorder is diagnosed are presented below (American Psychiatric Association, 1994).

- A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):
 - (1) Qualitative impairment in social interaction, as manifested by at least two of the following:
 - (a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
 - (b) failure to develop peer relationships appropriate to developmental level
 - (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a

- lack of showing, bringing, or pointing out objects of interest)
- (d) lack of social or emotional reciprocity
- (2) Qualitative impairments in communication as manifested by at least one of the following:
 - (a) delay, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
 - (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
 - (c) stereotyped and repetitive use of language or idiosyncratic language
 - (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
 - (e) Restricted repetitive and stereotyped patterns of behavior and activities as manifested by at least one of the following:
- (3) Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 - (a) apparently inflexible adherence to specific, nonfunctional routines or rituals
 - (b) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
 - (c) persistent preoccupation with parts of objects.

B. Delays or abnormal functioning in at least one of the

following areas, with onset prior to age 3 years:

- (1) social interaction,
- (2) language as used in social communication, or
- (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's disorder or Childhood Disintegrative Disorder (American Psychiatric Association, 1994, pp. 70-71).

The DSM-IV criteria for diagnosing Asperger's Disorder are presented below.

A. Qualitative impairment in social interaction, as manifested by at least two of the following:

- (1) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
- (2) failure to develop peer relationships appropriate to developmental level
- (3) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
- (4) lack of social or emotional reciprocity.

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

- (1) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that are abnormal either in intensity or focus
- (2) apparently inflexible adherence to specific,

- nonfunctional routines or rituals
- (3) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping, twisting, or complex whole-body movements)
- (4) persistent preoccupation with parts of objects.
- C. The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.
- D. There is no clinically significant general delay in language (e.g., single word used by age 2 years, communicative phrases used by age 3 years).
- E. There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than in social interactions), and curiosity about the environment in childhood.
- F. Criteria are not met for another specific pervasive disorder or Schizophrenia. (American Psychiatric Association, 1994, p. 74).

According to DSM-IV, the criteria for Pervasive Developmental Disorder Not Otherwise Specified (PDDNOS) should be used when there is a severe and pervasive impairment in the development of social interaction or verbal and nonverbal communication skills, or when stereotyped behavior, interests, and activities are present, but the "criteria are not met for a specific Pervasive Developmental Disorder, Schizophrenia, Schizotypal Personality Disorder, or Avoidant Personality Disorder" (American Psychiatric Association, 1994, pp. 77-78).

ICD-10 Classification

The International Classification of Diseases-10, published by the World Health Organization, is another classification system of mental and behavioral disorders often used to diagnose autistic disorders. This system is similar to the DSM-IV classification system in that PDD is divided into several subgroups. The ICD-10 aims to increase reliability of diagnosis by defining Asperger's Disorder by the same criteria of social impairment and repetitive routines as Autistic Disorder, but with no delay in development of speech, self-help, adaptive skills, and curiosity up to the age of three (Wing, 1997, p. 1761).

IDEA Classification

While mental health facilities and physicians use the DSM-IV criteria to diagnose autism spectrum disorder (ASD), school systems must rely upon the federal legislation of the Individuals With Disabilities Education Act (IDEA) to determine eligibility and services for children suspected of or diagnosed with ASD. The IDEA legislation, as of the 1990 Amendments, specifies autism as one of the 13 recognized classifications but does not specifically define it. Rather, the definition appears in the IDEA regulations. According to 34 C. F. R. (c)(1):

- (i) Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3 that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected primarily because

the child has an emotional disturbance, as defined in this section.

(ii) A child who manifests the characteristics of "autism" after age 3 could be diagnosed as having "autism" if the criteria in paragraph (c)(1)(i) of this section are satisfied.

The regulations also define two other separate, but related classifications:

(b) Children aged 3 through 9 experiencing developmental delays. The term child with a disability for children aged 3 through 9 may, at the discretion of the State and [school district] and in accordance with [the FAPE regulation], include a child- (1) who is experiencing developmental delays as defined by appropriate diagnostic instruments and procedures, in one or more of the following areas: physical development, cognitive development, communication development, social or emotional development, or adaptive development; and (2) Who, by reason thereof, needs special education and related services.

(c)(9) Other health impairment means having limited strength, vitality or alertness, ...that results in limited alertness with respect to the educational environment, that (i) Is due to chronic or acute health problems; and (ii) Adversely affects a child's educational performance" (Individuals with Disabilities Education Act of 1998, 34 C.F.R. §300.7).

The Office of Special Education Programs (OSEP), located in Washington, responded by policy letters to several inquiries concerning the IDEA eligibility of students with pervasive developmental disorder. In September 1999, OSEP noted that the eligibility under DSM-IV does not automatically guarantee eligibility under the IDEA. A student with PDD could

be found eligible under Part B of the IDEA if the student meets one of the eligibility categories. Some state criteria recognize PDD as satisfying the definition of autism under Part B. According to one of the OSEP policy letters concerning autism spectrum disorder (as cited in Zirkel, 2001), states that do not recognize PDD under the category of autism, may determine students eligible under one of the other eligibility categories such as other health impaired or developmental delay.

In March 2000, OSEP responded with a policy letter to an inquiry regarding the classification and rights of children with Asperger's syndrome under the IDEA. OSEP noted that while the IDEA provides no specific disability classification for Asperger's syndrome and since this syndrome is often referred to as "high functioning autism", a student with this syndrome could be classified under the category of autism, other health impaired, or developmental delay if the student met the criteria under one of these categories (Zirkel, 2001).

It is important to note that a student must meet a two-part eligibility process before being declared eligible for special education services. First, a student must be found eligible under one of the 13 categories recognized under IDEA. In addition, a student must need necessary services provided by special education that cannot be obtained with general education services. Therefore, if a student is diagnosed with ASD, the student must also need special education services in order to obtain a free appropriate public education (FAPE) under the provisions of the IDEA. IDEA emphasizes providing FAPE to students with disabilities, not classifying them (Individuals with Disabilities Education Act, 1997). A label may be necessary to secure services but "should never be assumed to convey a precise preconceived set of behaviors and needs" (Klin & Volkmar, 1996, p 1).

State of Tennessee Classification

States must adopt eligibility criteria in accordance with the eligibility criteria found in IDEA. In July of 2002, new eligibility standards were developed pursuant to Chapter 0520-1-9-.07 of the Rulemaking Hearing Rules of the Tennessee State Board of Education. The Tennessee definition of autism is defined as follows:

- a. "Autism means a developmental disability, which significantly affects verbal and nonverbal communication and social interaction, generally evident before age three (3), that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experience. The term does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance . . .
- b. After age three (3), a child could be diagnosed as having autism if the child manifests the above characteristics.
- c. The terms of autism also includes students who have been diagnosed with an Autism Spectrum Disorder such as autism, pervasive developmental disorder-not otherwise specified, (PDDNOS) or Asperger's Syndrome when the child's educational performance is adversely affected. Additionally, it may also include a diagnosis of a pervasive developmental disorder such as Rett's or childhood disintegrative disorder. Autism may exist concurrently with other areas of disability.

Wing's Classification

Wing (1997) stated that autism includes a wider range of characteristics than those first described by Kanner. According to Wing, current attempts to identify specific syndromes with autism spectrum by DSM-IV and ICD-10 are unsatisfactory because the criteria are arbitrary, difficult to apply, and unhelpful in clinical practice. Because behavior attributed to autism changes with age and across different environments, the current classification systems cannot be depended upon to diagnose with certainty. She proposed a system of sub-grouping based on type of social impairments consisting of four types of autistic behaviors: (1) aloof group, (2) passive group, (3) active but odd group, and (4) loners.

According to Wing's classification system, the aloof group is the easiest to recognize, exhibiting the most severe symptoms. These children fall along the lower end of the autistic spectrum with most having profound disabilities with little or no speech and no skills in any area but the gross motor domain. Some children are not mobile, they engage in repetitive behaviors, exhibit odd movements of limbs and body, and have a fascination with simple sensory stimuli such as bright lights or moving objects. Self-injury can be a problem with these children (1997).

In the passive group, social impairment presents as passivity in that approaches from others are accepted without interest. The passive group may exhibit features similar to the aloof group but in less "florid form" (Wing, 1997, p. 1763). Communication and imagination may be impaired, but behavior is more amenable. The passive group is less upset with interference of their repetitive routines and some are average or higher in ability. Diagnosis of this group may be missed until secondary school age when problems with social interaction with peers emerge (Wing).

The "active but odd group" makes active social approaches that "are naive, odd, inappropriate, and one-sided" (Wing, 1997, p. 1765). They tend

to fit Asperger's clinical description of his syndrome in that they are often fluent in speech, have good grammar and vocabulary, but may not use these for reciprocal conversation. Children in this group have no history of delayed speech or adaptive skills. They may have complicated play, but this is not shared with peers and usually restricted to one or two themes. Repetitive behavior consists of a fascination with and talking about particular topics of interest. Gross motor coordination is poor and behavior problems, temper tantrums, and verbal and physical aggression arises from a stubborn resistance to do anything other than their own activities. The range of cognitive ability is wide, but a large proportion has average or superior intelligence (Wing).

Individuals in the fourth group in Wing's classification system, "loners", have average, high, or outstanding abilities. Fluent speech, a lack of empathy, and a preference for being alone are typical of members of this group. In the school setting, children in this group will not conform to the demands of teachers or peers but can be successful and happier as adults (Wing, 1997).

The simplicity of Wing's (1997) classification system may appear to make it easier to group children within the autistic spectrum according to behavioral characteristics. However, it does not lend itself to a clinical diagnosis based on etiology of specific symptoms, as does the DSM-IV or the ICD-10.

Characteristics of Children with Autism Spectrum Disorder

Autism is a developmental disability and a behavioral syndrome "based on patterns of behavior that a person exhibits" (Dunlap & Bunton-Pierce., 1999, p. 1). According to Wing (1997), autism can only be defined using behavioral criteria with a specific etiology being found in only a minority of cases. Individuals with autism and Autism Spectrum Disorder (ASD) vary

widely in ability and personality ranging from children with severe mental retardation to extreme giftedness in intellect and academics. Some individuals prefer isolation; some enjoy affection and social contact. Some may be lethargic and slow to respond while some individuals may be very active and interact constantly with preferred aspects of their environment. Individuals with autism may exhibit extreme tantrums, aggression, or other acting out behaviors. These individuals often present with an uneven pattern of skill development (Dunlap & Bunton-Pierce).

According to Tsai (2000), infants with autism often avoid eye contact and show no interest in the human voice, seldom showing facial responsiveness. Parents may sometimes believe their child to be deaf due to the child's inattentiveness to sounds and people.

Many parents recognize their child as being different from birth. The child may develop normally until age two or three and then experience a setback, often showing regression and a failure to progress. This setback affects language, play, social interaction, and occasionally other skills (Wing, 1997).

Tsai reported distinctive characteristics of autism during the developmental stages of a child's life. During early childhood, lack of eye contact may continue but the student might passively accept physical contact. Even so, the student does not develop attachment behavior. There is a failure to bond and the student may actively avoid other children (Tsai, 2000). According to Wing (1997), play is absent in children with autism and a disturbance of sleep pattern is often present.

The student with autism may develop a greater awareness or attachment to parents or familiar adults during middle childhood. Social difficulties continue at this age (Tsai, 2000).

The student with autism develops a more affectionate and friendly behavior with parents and siblings as he or she becomes older. She or he

may have difficulty understanding the complex nature of social relationships; display a lack of humor and a lack of response to others' interests and feelings. This causes a lack of development of friendships (Tsai, 2000).

Non-verbal communication is impaired in children with autism. During the early years, the student may pull adults by the hand, exhibiting no facial expression, to lead them to the desired object. The student with autism uses no gestures, neither nodding nor shaking the head in response. During the middle and late years, the student may still not use gestures, although some children develop imitative, repetitive play. Children with autism are only able to show the extreme of emotions – joy, fear, or anger - and have no expression to show subtle emotions (Tsai, 2000).

Speech is impaired to varying degrees, depending on where the child is on the autism spectrum. If the child has mental retardation, he/she may never develop more than a limited understanding of speech. Less severe impairments may allow a student to follow simple instructions given in immediate context with gestures such as pointing. If the student has a mild impairment, only subtle or abstract meaning may be affected. A student with a mild impairment cannot understand the subtle meanings sometimes found in humor or sarcasm; this type of speech often confuses them (Tsai, 2000).

Impairment in speech development is common among children with autism. Many infants do not babble or may begin to babble and then stop. When speech does develop, it may be abnormal or echolalic, that is, produced accurately but with no comprehension of meaning (Tsai, 2000). According to Prizant and Rydell (1993), echolalia serves several functions: (1) self-stimulation, (2) a step between nonverbal and verbal, or (3) a way to communicate. Some children with autism may eventually develop speech, but there is no two-way communication in that they only talk about their own interests (Tsai).

Tsai (2000) described distinctive characteristics of children with autism as including ritualistic or compulsive behaviors often consisting of hand flapping, finger mannerisms, and preoccupations with various movements and/or objects. Change in routine can lead to temper tantrums due to not understanding of differences in what is usually expected (Tsai). Compulsive behavior often leads to arranging possessions in a certain order. Patterns of activity are often dominated by repetitive routines such as putting objects into lines and the same bedtime routine which may be lengthy due to compulsive rituals (Wing, 1997). Consequently, the student may become upset if possessions or items are disturbed. Autism can lead to an abnormal attachment to items such as pipe cleaners, batteries, or boxes, or a preoccupation with certain features of objects such as texture, taste, smell, or shape (Tsai).

Children with autism may exhibit unusual responses to sensory experiences, exhibiting under - or over- responsiveness to stimuli. A student with autism may exhibit hypersensitivity or hypo sensitivity to loud noises or exposure to excessive stimulation. Disturbances of movement such as odd posture and/or odd gait are shown due to the delay of typical motor milestones (Wing, 1997). The student may be very overactive and engage in head banging, body rocking, or other extreme movements (Tsai, 2000).

Etiology

According to Wing (1997), there is strong evidence for genetic causes of autism and autism disorders. A variety of organic and metabolic conditions such as tuberous sclerosis, phenylketonuria, and congenital rubella syndrome can produce autism (Dalldorf, 1999). In addition, Fragile X syndrome, diagnosed by DNA analysis, currently appears to account for approximately 5% of autism in children (Dalldorf).

Autism is clearly inherited when it is caused by phenylketonuria or tuberous sclerosis. "On-going studies suggest that a combination of abnormal genes may result in autism. Genetic material on chromosomes 15, 7, and 16 is of current interest" (Dalldorf, 1999).

A familial tendency for autism is supported by epidemiological studies. When the cause for autism is not known, a risk of recurrence of 3-8% for a family with one child with autism is supported by recent studies. "There is also a risk of about 15% for other developmental problems in siblings of an autistic child" (Dalldorf, 1999).

Researchers have identified several different genes that may be implicated in some cases of autism. In 2001, research funded by the National Institute of Mental Health identified a gene called WNT2 that appears to be part of a family of genes that influence brain development. WNT2, found on the long arm of chromosome 7, was found to be mutated in one parent and one autistic child in a study of 135 people with autism (Vastag, 2001).

Ingram et al. (2000) conducted a study of 57 individuals diagnosed with some form of ASD and 166 of their relatives. The outcome of the study revealed that a mutation of HOXA1, a gene critical to brain development, plays a role in the susceptibility to autism. This study adds to the evidence implicating early brain stem injury in the etiology of autism (Ingram et al.).

Prevalence

Over the last ten years, an increasing number of cases of autism have been reported throughout the United States. Feinberg and Vacca (2000) reported autism as second only to down's Syndrome in terms of reported cases. According to Power (1999), the incidence could be one in 500 or more depending on how broadly the spectrum is defined. In California a 273% increase was reported between 1987 and 1998 with 1700 new cases

reported in 1998. In Illinois, the number of reported cases of autism rose from 317 in 1991 to 2305 in 1997 (Feinberg & Vacca). In Florida a 573% increase in the number of new cases was reported over the last 10 years. In Broward County alone, 635 new cases were reported in 1998 (Children with Autism, 1998).

In Tennessee, the State Department of Education reported a 150% increase of cases of autism from 1994 to 1999 (Bevilaqua, 2001). Each year, the Tennessee State Department of Education gathers and publishes statistical information regarding the number of children with disabilities receiving special education services. School systems in Tennessee reported 1242 children diagnosed with autism and receiving special education services in 2000-2001 (State of Tennessee, 2001). This number is an increase over the 714 students with autism reported in 1996-1997 (State of Tennessee, 1997). This number may not include all students with autism receiving special education services since many of the younger students may be reported as students with developmental delay or health impaired due to secondary problems often associated with autism. In addition, this number only includes students in public education receiving special education services.

A review of the data reported by the Tennessee State Department of Education reveals 70 students with autism in 2000-2001 reported by 15 school districts in Northeast Tennessee as opposed to 35 students with autism reported by the same districts in 1996-1997. Davidson County, Tennessee reported the largest number of students with autism (158) in 2000-2001 (State of Tennessee, 2001). The same county reported 123 students with autism in 1996-1997 (State of Tennessee, 1997).

Fombonne (2001) disputed reports of an autism epidemic. Using California's reported rate of increase over the last 10 years, Fombonne states several problems with the reported data:

- (1) reported figures applied only to numbers rather than rates, i.e.
- (2) changes in the size and composition of the underlying population were not taken in to consideration,
- (3) changes in the diagnostic concepts and definitions were not controlled, and
- (4) autistic children are now diagnosed at a much earlier age than 10 years ago (Fombonne, p. 41).

In the British Medical Journal, Wing (1996) agreed that the number of cases of autism appear to be increasing. However, she stated that the estimates of prevalence are tentative because it requires training and expertise to diagnose autism and even then, interpretation of the data may vary according to the criteria used to make the diagnosis.

Wing reviewed 16 studies carried out in Europe, the United States, Canada, and Japan. The prevalence varied from 3.3 to 16 cases per 10,000 people. She found no increase in prevalence over time. According to Wing (1996), factors that may contribute to the impression of an increase are as follows: (1) change in referral practices in Britain (referral for expert diagnosis and treatment is now the rule rather than the exception), (2) widening of diagnostic criteria for typical autism, (3) increased awareness of varied manifestations of disorders in autistic spectrum (especially those associated with a higher IQ), and (4) there could be a real change in prevalence, locally or nationally due to various conditions that may exist temporarily or permanently.

In 1997, the Center for Disease Control reported that autism might be present in as many as one out of every 500 people. There are roughly 500,000 people in the United States who could have autism or autism spectrum disorder (Dunlap & Bunton-Pierce, 1999). According to Zirkel (2001), there are several reasons for the sudden increase in diagnosed

cases of autism and Autism Spectrum Disorder. "The reasons include not only wider public awareness, improved medical/psychological practice, and perhaps even deleterious environmental effects, but also the addition of autism as one of the recognized categories under the IDEA as of the 1990 Amendments" (Zirkel, p. 1.). According to Rollens, the co-founder of the Medical Investigation of Neurodevelopmental Disorders Institute at the University of California at Davis, "the numbers we are seeing are just the tip of the iceberg. People in education feel the brunt of these kids, the whole laundry list of developmental disabilities" (Intensive programs, p. 7).

Spending for autism research has increased due to the increase in reported cases of autism and autism spectrum disorder. In July 1999, the National Institutes of Health appropriated \$25 million dollars for autism research, up from \$10 million appropriated in 1995 (Feinberg & Vacca, 2000). Presently, there are more than 75 investigators from 20 universities working with the National Institute of Student Health and Development on Autism studies (Talan, 1999).

The National Center for Environmental Health, CDC, has one of the few programs in the world to conduct "active, on-going monitoring of the number of children with ASD in a large, multiracial metropolitan area" (National Center for Environmental Health Pub. No. 99-0441, 1999). In 1991, the CDC started the Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP). This program monitors the number of three-to-ten-year old children with mental retardation, cerebral palsy, hearing impairments, and vision impairments in the metro Atlanta area. In 1998, autism was added to the other categories. This surveillance provides opportunities for special studies to identify risk factors and determine whether steps taken to prevent autism and other disabilities have been effective. Fully funded by the CDC, the prevention project is conducted by Marshall University Autism Training Center in West Virginia. A priority is to

prevent secondary conditions among children with autism and reduce stress in families (National Center for Environmental Health).

Diagnosis and Evaluation

The principal source for diagnosing autism and ASD is the DSM-IV. According to Dunlap and Bunton-Pierce (1999), diagnosis usually does not occur until age two or three. A formal diagnosis provided by developmental pediatricians, psychologists, child psychiatrists, or neurologists is often not made before complex language has emerged. In order to diagnose autism or ASD, a comprehensive evaluation that includes neurological evaluations, tests for biochemical abnormalities, and other assessments designed to rule out physical and diagnostic conditions must be conducted along with a battery of developmental and educational evaluations. Family involvement is an integral part of evaluation (Dunlap & Bunton-Pierce).

According to Wing (1997), there are no physical tests with which autism or ASD can be diagnosed. Consequently, a detailed developmental history (from infancy) must be completed to determine when aberrant behaviors and symptoms first began. A differential diagnosis includes evaluation in the following areas: learning disabilities, language, reading, math, motor coordination, hearing, and vision. Any of these secondary disabilities can occur in association with autism. Wing reported that autism can be misdiagnosed as a psychiatric condition in adults or adolescents.

The purpose of the assessment is to gather information to formulate an accurate diagnosis and provide information to formulate an intervention plan. Because there is no biological test, such as a blood test or x-ray, the diagnosis is complicated and often the "clinician's best guess". A medical assessment should consist of a thorough developmental, medical, family history, physical, and neurological evaluation. In addition, Tsai (1998) recommended the following be completed: parent interviews, behavior

rating scales, behavior observations, psychological assessment, educational assessment, communication assessment, and occupational assessment.

Children with autism may require psychosocial treatments such as social skills training, parent training such as behavior modification techniques, and referral to parent support groups. Continuous programming in the form of summer services may be required to prevent regression. One person should be in charge of coordinating a child's entire program so that an interruption of services does not occur (Volkmar, Cook, Pomeroy, Realmuto, & Tanguay, 1999).

Currently, performance based assessments are being explored in two domains: structured play and cognitive-neuropsychological assessments. Structured play sessions elicit behavioral symptoms in a natural environment and provide a valid and consistent means of diagnosing autism across different settings. "Cognitive-neuropsychological tasks have been used to identify possible underlying cognitive impairments in autism including executive function, theory of mind, selective attention, and abstraction" (Klinger & Renner 2000 p. 479). Hopefully, diagnostic protocols will eventually incorporate structured play observations, parent-report diagnostic interviews and identification of a profile of cognitive impairments that will be specific to PDD (Klinger & Renner).

IDEA requires school systems to properly evaluate and diagnose students suspected of being disabled. "Educational services (including special education, some forms of behavior modification, and other services) are the central and integral aspect of the treatment of autism in children and adolescents" (Volkmar et al., 1999, p. 533). According to Harris, Glasberg, and Ricca (1996), the school psychologist plays a vital role in diagnosis, assessment, and classroom consultation for a child with PDDNOS. The school psychologist should be alert to the needs of families of children with PDDNOS and should help train parents in behavior management techniques.

In addition, he/she should gather data using specialized checklists or interview formats along with traditional psychometric instruments for cognitive assessments. Harris, Glasberg, and Ricca (1996) recommended the use of the following instruments for assessing PDDNOS: 1) Childhood Autism Rating Scale, 2) Diagnostic Checklist for Behavior Disturbed Children, 3) Autism Behavior Checklist, and/or 4) Autism Diagnostic Interview Revised (ADI-R). Each of these instruments is linked to the DSM-IV criteria. In addition, the school psychologist should complete a functional behavior assessment to assist in the development of a treatment plan (Harris et al.).

The State of Tennessee sets forth eligibility criteria for each disability. These criteria must be met before a child is eligible for special education services. The evaluation criteria for certifying autism is as follows:

Evaluation Procedures

- (A). Evaluation shall include the following:
 - (1) parental interviews including developmental history;
 - (2) behavioral observations in two or more settings (can be two settings within the school);
 - (3) physical and neurological information from a licensed physician, pediatrician, or neurologist who can provide general health history to evaluate the possibility of other impacting health conditions;
 - (4) evaluation of speech/language/communication skills, cognitive/developmental skills, adaptive behavior skills, and social skills; and
 - (5) documentation and assessment of how autism spectrum disorder adversely affects educational performance in the classroom or learning environment.

Evaluation Participants:

- (A). Information shall be gathered from the following persons in the evaluation of autism spectrum disorders:
- (1) the parent(s) or guardian of the child; the child's general education classroom teacher (with a child of less than school age, an individual qualified to teach a child of his/her age,),
 - (2) an appropriately licensed school psychologist, licensed psychologist, licensed psychological examiner (under the direct supervision of a licensed psychologist), or licensed psychiatrist;
 - (3) a licensed physician, neurologist, pediatrician, or primary health care provider; and
 - (4) a certified speech/language teacher or specialist; and other professional personnel as needed, such as occupational therapist, physical therapist or guidance counselor (Tennessee Department of Education, 2002).

Neurological Factors

According to Tsai (2000), increased sophistication of methods to study the brain such as magnetic resonance imaging (MRI) and positron emission topography (PET) technology are used to investigate brain structure and brain cell function. Brain mapping is used "to pinpoint which areas of the brain become active during particular thoughts or mental states" (Tsai, p. 141). This highly complex technology has added to the knowledge of neurological functions of individuals with autism.

According to Tsai (2000), ASD is a neurobiological disorder and the neurobiological basis for ASD is “topologically and mechanistically complex. Multiple brain regions appear to be involved and the degree of aberrancy varies among individuals” (Tsai, p. 139). Many problem behaviors or disturbed emotions may be caused “at least partially by neurobiological dysfunction” (Tsai, p. 140). Evidence suggests that these behaviors and emotions involve “abnormal neural communication relating to abnormal metabolism or functioning of neurotransmitters (i.e., chemical substances responsible for the transmission of signals between synapses, the highly specialized junctions between nerve cells through which information is carried in particular circuits in the brains)” (Tsai, p. 141).

Behaviors and emotions may involve several kinds of neurotransmitters. For example, too much norepinephrine in the brain may cause the individual to show hypersensitivity to stimuli. A beta-blocker, such as Inderal, blocks receptors for norepinephrine. Thus, with less of this, the individual can calm him or herself and reduce anxiety. A shortage of norepinephrine causes a decrease in attention and ability to pay attention. Ritalin can increase norepinephrine and restore the ability to pay attention (Tsai, 2000).

Autism may result from a dysfunction involving the amygdala, specifically, “impaired recognition of socially relevant information from faces” (Adolphs, Sears, & Piven, 2001, p. 232). Adolphs et al. conducted a study involving eight high-functioning subjects with autism that assessed recognition of social and emotional information from faces. Results were compared to neurological subjects with impaired focal amygdala functioning. Data from this study indicated that children with autism have the ability to form “normal perceptual representations of faces and that they are able to retrieve knowledge regarding the basic emotion expressed, but that they fail

to link perception of the face to the social judgments called for in the experiments” (Adolphs et al., p. 236).

The authors compare this dysfunction to subjects with bilateral amygdala damage in that the impaired social judgment disappears when the subject is presented verbal information. “This suggests that at least some basic social knowledge and some ability to form social judgments are intact in structures necessary to link percepts of visual, nonlexical stimuli with their social meaning” (Adolphs et al., 2001, p. 236). Because early perceptual processing appears to be intact, it appears that autism features an “impaired ability subsequently to trigger normal retrieval of knowledge, and normal social behaviors, on the basis of the visual representations of faces” (Adolphs et al., p. 237).

As shown in Table 1, there are several comorbid neuropsychiatric disorders such as attention deficit hyperactivity disorder, mood disorders, obsessive-compulsive disorders, anxiety disorders, seizure disorders, and sleep disorders that exist with autism and/or ASD. Psychotherapeutic medications can help decrease negative symptoms of these disorders. Investigators report the following comorbid disorders associated with ASD (Tsai, 1999).

Table 1

Comorbid Disorders Associated with ASD

Percentages	Disorder
60%	Attention Deficit Disorder (ADD)
40%	Hyperactivity Disorder (ADHD)
43 to 80%	Morbid or unusual preoccupations
37%	Obsessive Disorder
16 to 86%	Compulsive Disorder
50 to 89%	Stereotyped utterances
70%	Stereotyped Mannerisms
17 to 74%	Anxiety or Fears
9 to 44%	Depressive mood, irritabilities, agitation and inappropriate affect
11%	Sleep Problems
24 to 43%	History of self-Injury
8%	Tics
25%	Seizure Disorder

Note. From "Autism: Identification, education, and treatment," by Luck Tsai, 1999a, Neurobiological research. In D. Zager (Ed.)

Medication

Throughout the literature, different types of medications were mentioned and recommended for treatment of behaviors and problems associated with ASD. The use of medication in young children can be a very controversial issue not only with parents but also with some pediatricians. Studies have been conducted concerning the improvements in behaviors when certain medications are used. However, many of these studies were not research based and, therefore, unfounded. Since this information is readily available to the general public, parents and educators must be especially careful to determine the validity of these studies before making decisions to recommend administration of certain medications.

Before school personnel decide on a medical referral, several concerns should be clarified. The team should agree on issues to be addressed before the referral is made. A concise definition of each problem behavior to be changed should be provided. Target behaviors must be observable and measurable. School personnel should conduct a functional behavior analysis (FBA) to determine if behaviors are reactions to specific events, environments, or individuals or if these behaviors result from an internal source such as neurobiological deficit or dysfunction. A medical referral is appropriate only after an FBA has been carried out and the school team has agreed on the need of further assessment (Tsai, 2000).

Medication is just a part of the treatment plan and all personnel involved should be aware of possible side effects. "The potential and demonstrated benefits must outweigh the side-effects" (Dalldorf, 1999). Parents and teachers should learn why, when, and how psychotropic medication should be prescribed. Physicians prescribing such medications should become involved with the student's educational programming. According to Tsai (2000), "Integration of a medication treatment regime into

a comprehensive intervention program with good communication between physicians and parents/caregivers is a rare exception, not a rule" (p.140).

More than 20 years of study of psychotropic drugs has led to neurotransmitter theory related to neuropsychiatric symptoms and disorders. "Advances in psychopharmacology have provided better information about dosing levels, ways to concentrate drugs at a chosen effector site, and ways to better achieve the desired end response" (Tsai, 2000, p. 143). Such research has enabled many drugs to be used more effectively to treat psychiatric symptoms.

Psychotropic medication is often used for the treatment of secondary problems associated with autism and ASD. Medication "corrects or compensates for some malfunction in the body" (Tsai, 2000, p. 138) but cannot alter the social and linguistic features of the syndrome. It can reduce the frequency and intensity of coexisting secondary problems and allow learning to take place. Consequently, early detection and treatment of coexisting neuropsychiatric disorders is critical (Tsai).

Medications may help control disruptive behaviors, but they have little or no effect on other behaviors. Major tranquilizers have been documented to rapidly reduce aggressive behavior in young autistic children, but they can produce severe side effects. Consequently, behavioral interventions should be tried before resorting to medication (Smith, 1996).

The primary aim of medical professionals is to ensure physical and psychological health. There is no specific medication that helps all children and the benefits are not dramatic or sustained (Dalldorf, 1999). However, medication can be effective and necessary for conditions that may coexist with PDDNOS such as Attention Deficit Hyperactivity Disorder (ADHD) or Obsessive Compulsive Disorder (OCD). The final decision regarding medication is up to the parents (Tsai, 2000).

Education

Feinberg and Vacca (2000) described services for children with autism as a difficult public issue. The federal mandate of IDEA has contributed to controversy regarding provision of appropriate programs for young children with autism and their families. Because many of the programs and services required for a student with autism or ASD are very expensive, a debate rages over which public agencies and third-party payers provide services. According to Feinberg and Vacca, one should question whether these therapies should be solely under the scope of the IDEA.

Factors contributing to this troublesome issue include: (1) increase in cases, (b) lack of consensus on etiology, (c) lack of consensus on most successful methodology, (d) coincidence of age of diagnosis with upper limits of Part C of IDEA, (e) shift to family centered decision making paradigm, and (f) increase in due process hearing and litigation. There is a concern about the gradual shift toward early intervention and special education systems to provide a full array of services for this population. Consequently, service delivery systems should include a full array of "public and private agencies with shared obligation of services to children with autism" (Feinberg & Vacca, 2000, p. 130).

According to Feinberg and Vacca, "Autism is an extraordinarily complex disorder and it presents unique challenges to those providing services to young children" (2000, p. 134). Policymakers encounter problems when they try to set policies for autism when there is insufficient data to determine the services that should be available. Contributing to this problem is the plethora of information available in magazines articles, journals, television, and the Internet. Much of that information provides conflicting views on methodology (Feinberg & Vacca). "State and local school districts, advocacy organizations, and family associations are contending with the need to define direction, determine how resources are to be used,

define training needs, and ensure implementation of appropriate services” (Feinberg & Vacca, p. 135).

One of the new mandates of IDEA is increased parental participation. Parents play a greater role in development of the Individualized Education Plan (IEP) and programming, and schools welcome parent participation and input. According to Feinberg and Vacca, the new paradigm says that families should not be expected to comply with professional recommendations of school, but should actively participate in decision-making. This can create tension when parents and school personnel disagree about therapies and programming. “Families cannot be selectively empowered” (Feinberg & Vacca, 2000, p. 135). According to these authors, it is not reasonable to expect that systems can be so “consumer driven” that there are no limits to service obligations. The language of IDEA concerning parental involvement leads to a distortion of intent in that certain groups believe families can dictate services (Feinberg & Vacca, p. 136).

IDEA ignores cost issues for special education children. In an effort to provide sufficient services, special educators and disability advocates campaign for additional dollars, assistance, and research (Intensive Programs, 2000). The National Center for Environmental Health estimates special education costs within the school system for one child is around \$8,000 annually with specially structured programs costing over \$30,000 per year (1999). The law requires services to be appropriate; it does not say services should be optimal. For example, if an appropriate program can be provided for a student with ASD within the school district, then programs that may be more expensive outside of the school district do not have to be provided. The problem resides with the idea of appropriateness. In many instances, parties resort to litigation in an attempt to define appropriateness. States differ in interpretation of what is appropriate. Special education departments cannot afford to provide services that should be provided by

health, mental health, or social services. Other service systems now look to education to provide services they formerly provided. Consequently, special education is becoming ever more consuming because the scope of services goes beyond the “conventional notion” of educating children with disabilities. To remedy this situation, Feinberg and Vacca proposed creating a pool of funding available through fiscal and in-kind contributions by all child-serving agencies. Funds could be requested when needed services cannot be provided through typical channels (Feinberg & Vacca, 2000, p. 135-136).

Legal Issues

IDEA 97 defines free and appropriate public education (FAPE) as special education and related services that (a) are provided at public expense, under public supervision and direction, and without charge to parents, (b) meet standards of state education agencies, (c) include an appropriate education, and (d) are provided in conformity with the IEP (Individuals with Disabilities Education Act, 1997). Congress never specified the components of FAPE; they did not provide a substantive definition. This was done intentionally because programs for children with disabilities should be individualized. Congress does mandate specific procedures to develop programs to safeguard a student’s right to FAPE by ensuring parental involvement. However, the lack of a substantive definition of FAPE has led to disagreements between parents and school districts (Yell and Drasgow, 2000).

The *Board of Education v. Rowley*, (1982), the first special education case heard by the Supreme Court, set standards for determining FAPE. In this decision, referred to as the Rowley decision, the Supreme Court held that (1) FAPE is the right of all students in special education and (2) FAPE is more than just access to public school programs. In addition, the court ruled that students with disabilities do not have a right to the best possible

education or an education that allows them to achieve their maximum potential. However, students are entitled to an education that is reasonably calculated to confer educational benefits (*Board of Education v Rowley*, 1982). According to Zelin (1993), many children with disabilities do not have the ability to achieve at the same level as children without disabilities. Therefore, it is idealistic to expect equal outcomes.

The 7th Circuit Court upheld the Rowley decision in 1988. This court stated that parents do not have a right under the IDEA to demand a school district to provide a specific program or use a specific methodology in providing for the education of a child with a disability. However, the school district must show meaningful education progress (*Lachman v Illinois State Board of Education*, 1988).

Thus, the Supreme Court developed this two-part test to determine if a school district had met obligations under IDEA to provide FAPE. The questions are as follows:

- (1) Has the school complied with the procedures of the Act?
- (2) Is the IEP reasonably calculated to enable a child to receive educational benefits? (*Board of Education v Rowley*, 1982 p.206)?

Parents of children with autism have filed court cases involving questions regarding FAPE, directly addressing the meaning of "educational benefit". Most of these cases involved Lovaas methodology. The Lovaas method is a behavioral method that begins with one-on-one therapy and relies heavily on family involvement. Individuals are integrated into a group when the providers agree that he/she is ready. However, the parents did not maintain Lovaas was more appropriate; instead, these cases were filed because the parents said school districts' programs did not convey meaningful educational benefits (When Methodologies Collide, 1995).

In *Independent School District No. 318*, 24 IDELR 1096 (SEA MN 1996), the local education agency (LEA) placed a three-year-old child with autism in a regular preschool program for two days a week. The child's parents implemented a 35 hour a week in-home Lovaas program. For three years the child was served in the same preschool placement and the LEA refused to implement any discrete trial therapy in the child's preschool program. When it came time for kindergarten placement, the parents requested regular kindergarten placement and implementation of Lovaas therapy and requested their Lovaas consultant be hired. The LEA refused.

The court found for the parents stating the LEA placed the child in a "one size fits all" preschool placement despite no evidence of educational benefit. In contrast, the parents were able to show dramatic benefits to the child from the in-home program.

In a review of 45 cases involving questions concerning Lovaas methodology, parents prevailed 34 times. In 76% of the cases, school districts had to reimburse parents for in-home Lovaas treatment programs either because the districts committed procedural errors, violating the first part of *Rowley*, or the district's IEP was not reasonably calculated to confer meaningful educational benefit, violating the second part of *Rowley* (Yell and Drasgow, 2000).

Courts have ruled that FAPE must confer "meaningful educational benefit" (*Polk v Susquehanna Intermediate Unit 16*, 1986). The *Rowley* decision has allowed courts to make a case-by-case determination as to whether educational programs confer "meaningful educational benefit". Thus, when challenged, school districts must show that the IEP was individually designed to provide meaningful educational benefit allowing measurable gain in a student's progress (Yell & Drasgow, 2000).

In a more recent case, *Cobb County School District* (1996), the court found the LEA failed to timely develop the IEP, and failed to include an

administrative level person and person with direct knowledge of evaluations on IEP staff. In addition, the LEA did not provide an appropriate program.

The court used a four-part test to determine meaningful educational benefit in a case heard in the 5th Circuit Court, *Cypress-Fairbanks Independent School District v Michael F.* (1997). "Educational benefit means the benefit must be likely to produce meaningful progress, not regression or trivial (or de minimis) educational advancement" (Wenkart, 2000). The four-part test consisted of the following questions:

- (1) Was the program individualized on the basis of the student's assessment and performance?
- (2) Was the program administered in the LRE?
- (3) Were the services provided in a coordinated and collaborative manner by "key stakeholders"?
- (4) Were positive academic and nonacademic benefits demonstrated?

Meaningful educational benefit can also be shown by progress of children with similar disabilities. A case heard in the 6th Cir., *Tucker by Tucker v Calloway County Board of Ed.*, (1998) dealt with a five-year-old child, diagnosed with PDD, placed at a private, out-of-state school for the summer by the parents. The parents decided to keep the child in the private placement stating the LEA had not provided an appropriate program to ensure educational benefit.

The court held that an appropriate public education does not have to "maximize" a child's potential or be the absolute best. Thus, a school district's program must be upheld if that program confers meaningful educational benefit for the child. The school district's proposed placement of the child was in a self-contained classroom with 10 other students having a range of disabilities. In addition, the district was able to present expert testimony that most children with PDD were educated in a public school

setting and the proposed classroom was typical of the classroom setting in which PDD students had been shown to make successful progress (Wenkart, 2000).

These decisions hold important implications for school districts in working with children with PDDNOS. To implement a defensible program, the school district must ensure no delays in (a) responding to parental requests for evaluation, (b) conducting evaluations, (c) developing and proposing an IEP, and (d) implementing the IEP. Finally, the district must always notify parents of their due process rights (Bevilaqua, 2001; Yell & Drasgow, 2000).

In addition, a school district must have a professional with expertise in autism to conduct evaluations. IEPs should be developed that address all areas of need identified in the evaluation. The goals and objectives must be reasonably calculated to provide meaningful education benefit. The IEP must contain all necessary components (Yell & Drasgow, 2000).

Students with PDDNOS should be placed in integrated settings to the maximum extent appropriate. Empirically validated instructional strategies and programs should be adopted. Research findings should be applied in classroom practice. Teachers must continually collect meaningful data to document a student's progress toward the IEP goals. The data must be measurable and research based, not reports of observations and anecdotal information (Yell & Drasgow, 2000).

Goal attainment scaling (GAS) can be used as an alternative method for evaluating treatments and programs for children with autism. Process goals, the quality of program services delivered to children, and outcome goals, the progress of children in meeting those goals should be the basic concern of educational programs. GAS involves the following steps:

- (1) Collection of data/information from multiple sources.
- (2) Identification of specific areas for which goals will be written.

(3) Development of behaviorally written goals in measurable terms.

(4) Scoring of outcomes in each area is standardized (i.e., $M=50$ and $SD=10$) using the Kiresuk-Sherman Formula (1968) for either individual or total scores. A simplified scale-by-scale score can also be calculated by directly using the +2 to -2 outcome values. (Oren & Ogletree, 2000)

Zirkel (2001) prepared a comprehensive review of case law concerning students with Autism Spectrum Disorder in relation to school districts. Two hundred ninety cases were reviewed resulting in 450 issue rulings. The issues included eligibility, related services, FAPE, extended school year, attorneys' fees, and discipline. A total of 383 relief rulings resulted in 290 cases. Various forms of relief included compensatory education, monetary damages, declaratory or injunctive relief, or tuition reimbursement.

Seventy-six percent of the cases involved male students with autism while 24% of the cases involved females with autism. The largest number of cases occurred at the preschool (78) and elementary levels (103). The largest number of cases (50) occurred in the Ninth Circuit Court of Appeals and the smallest number (5) occurred in the Tenth Circuit Court of Appeals. The Sixth Circuit Court of Appeals, which includes Tennessee, heard 18 cases.

From the early 1980s to the late 1990s, autism litigation experienced dramatic growth. The latest five-year period (1996-2000) accounted for more than two thirds of all the cases. In terms of issue rulings for this time period, neither parents nor school districts prevailed because most of the rulings centered on the mid-point. Although school districts fared better than parents in terms of relief rulings, they did not achieve a predominant position. In fact, school districts did not fare as well in the last 15 years as they did during the first five years of a two-decade period (Zirkel, 2001).

After more than 2,500 families sought legal assistance to obtain Applied Behavior Analysis programming, the House Government Reform Committee staged a public hearing. Parents of children with autism along with other disability advocates voiced their opposition to district wide autism services. In response to these concerns, the chairman of the committee, Rep. Dan Burton, R-Ind., indicated he would like school policy to change. “[Burton] very clearly said it was his intent to draft legislation to allow parents to demand whatever methodology they choose” (Baird, 2001, p. 1).

Parents, therefore, tend to exercise their rights under the IDEA when it comes to autism and Autism Spectrum Disorders. School districts should not assume the courts would favor them in litigation. “When the case is that of a child with an Autism Spectrum condition, careful attention to the IDEA vision of partnership, communication, and individualization is mutually warranted by both parents and districts” (Zirkel, 2001, p. 33).

Programming

No one method or therapy works for all children diagnosed with PDDNOS (Tsai, 1998, p. 15). “Children with Autism should be thought of as children first ...with unique personalities, strengths, and needs” (Feinberg & Vacca, 2000, p. 138). According to these authors, the IEP should be fluid, frequently revised, and “qualitative rather than quantitative” (p. 137). A variety of methods such as behavior modification, structured education approaches, medications, speech therapy, occupational therapy, and counseling should be used simultaneously. The earlier the treatment, the greater the chance for improvement (National Center for Environmental Health, 1999; Tsai, 1998).

According to Tsai (1998), education is the primary tool for treating PDDNOS. Early intervention and intensive services help develop the skills of children with autism (National Center for Environmental Health, 1999). An

appropriate educational program for children with PDDNOS includes the following:

1. A knowledgeable teacher
2. A structured, consistent, and predictable environment
3. Present information visually as well as verbally
4. Focus on improving communication skills
5. Reduced class size
6. Modified curriculum
7. Positive behavior supports and other education interventions
8. Frequent and adequate communication (Tsai, p.18).

The National Information Center for Children and Youth with Disabilities (2001) recommended that educational programs focus on communication, social, academic, behavioral, and daily living skills. In addition to the components recommended by Tsai (1998), they recommended interaction with non-disabled peers to provide models of appropriate behavior and social skills. Educational programs should be developed with parents so that they can be carried over into the home environment providing consistency and predictability (National Information Center for Children and Youth with Disabilities, 2001). In a very young child, the emphasis should be placed on speech and language therapy, special education, and working with parents. In addition, psychoactive medications should only be used with young children for specific target behaviors (Campbell, Schopler, Cueva, & Hallin, 1996).

There are a variety of interventions and strategies suggested but "most have not proven to be effective with large numbers of children" (Dunlap & Fox, 1999, p. 3). Many of these methods have not been substantiated in controlled research. According to Wing, "Many therapies have been promulgated on anecdotal grounds but scientific evidence for

their efficacy is lacking” (1997, p. 1765). The message to families and educators is clear; “Be cautious when considering new, grandiose testimonials, and be very thoughtful and selective when constructing plans for intervention and support” (Dunlap & Fox, p. 3).

A good deal of real progress supported by research has occurred. Interventions derived from educational and behavioral orientations have proven effective by teaching new skills to help enable the individual to function in daily life. These interventions should be developed on an individual basis. The environment should include systems or materials (written or picture schedules) to help the person comprehend and predict the flow and sequence of activities. The focus of an educational program should be on developing functional skills, communication, understanding language, and getting along socially. Parents should be encouraged to participate in all aspects of assessment planning and curriculum development (Dunlap & Fox 1999, p. 3).

Individuals with autism or ASD often function best in a highly structured environment. Therefore, structured educational settings that are highly organized promote optimal learning for students with ASD, allowing them to become more independent. According to Project TEACCH research, structure fits the “culture of autism” better than any other technique (Mesibov, 2002). Structured teaching refers to “setting up a classroom so that students understand where to be, what to do, and how to do it, all as independently as possible”(TEACCH, 2001).

Structured teaching does not dictate where students are educated, only that the physical environment, curriculum, and personnel should be highly organized and manipulated to meet individual needs. To organize the physical environment, schedules and work systems are developed and expectations are clear and precise. The use of visual materials is a high priority in a structured teaching environment, allowing students with ASD to

capitalize on strengths such as visual skills. The use of visual schedules eliminates the problems with transition that often occur with students with ASD (Mesibov, 2002).

With some students, certain skills can be taught entirely in unstructured environments. According to Schank and Cleary (2002), children use incidental learning naturally on their own. Consequently, educators need to provide situations in which functional information can be naturally acquired (Schank & Cleary).

Incidental teaching emphasizes “teaching the child how to learn from the normal environment and how to act on that environment in ways that will consistently produce positive outcomes for the child, her family, and others (Green, 1996, p. 30). The use of incidental teaching allows students with ASD to practice emerging skills in naturalistic environments, thus promoting the generalization of new skills. However, educators must take care to ensure that practice opportunities occur frequently and that reinforcement is applied consistently (Green).

Behavioral Issues

Behavioral issues often accompany PDDNOS making it difficult for educators to concentrate on academic programming without first addressing these issues. “Problem behaviors such as aggression, self-injury and tantrums can serve as major obstacles to even the most sophisticated intervention programs” (Durand & Merges, 2001, p. 110). “Intensive behavioral intervention at an early age has been documented to improve the developmental trajectory of many of these children, and this treatment is therefore essential from the preschool years on” (Harris, Glasberg, & Ricca, 1996, p. 308). Green reported that early intervention using applied behavior analysis can “produce large, comprehensive, lasting and meaningful

improvements in many important domains for a large portion of children with autism” (Green, 1996, p. 38).

According to Tsai, there are several specific guidelines for dealing with the alleviation of behavior problems. First of all, a behavior problem exhibited by a child with severe autism may mean the child is trying to communicate something so one must first determine the cause of the behavior. Second, an organized environment is paramount with clearly stated and consistently enforced rules and expectations. The child’s environment should be highly structured and predictable. Third, all behavior programs should be designed on an individual basis according to the unique needs of each child. Fourth, there should be consistency with skills learned at school carried over to the home environment. Last, a home-community based approach should be implemented to train parents and special education teachers to carry out positive behavioral support strategies (Tsai, 1998).

Functional Communication Training

In functional communication training, an alternative to the traditional treatments of challenging behaviors, behavior problems are identified as a form of communication. Consequently, the first step in alleviating negative behavior is to assess the behavior problem by using one or more functional assessments and then “teach an alternate behavior in the form of a communicative response to serve as a replacement” (Durand, 1990).

When children with limited communication skills engage in tantrums, educators, parents, and other caregivers often feel a sense of frustration at not being able to understand the desires of these children. Functional communication training is a method of looking at behavior problems that suggests these behaviors are the individual’s way of trying to communicate. “Such a view respects the person’s right to communicate, while suggesting alternatives that may serve the same purpose” (Durand & Merges, p. 112).

Durand and Merges (2001) have identified four factors that seem to influence the success or failure of functional communication training. Response match, response mastery, response milieu, and the consequences for challenging behavior appear to be necessary for “initial reduction in behavior, generalization across people and stimulus conditions, and/or maintenance across time” (Durand & Merges, p. 116).

Response match, an important consideration for initial success of the program, involves matching the communication to the function of the challenging behavior. In other words, the new alternative behavior should evoke the same consequences as the challenging behavior. Durand and Merges (2001) conducted a study with a young student with autism who used an unusual speech pattern to escape difficult tasks. The intervention phase (response match) involved teaching the boy to say, “help me” when faced with a difficult task rather than using the negative speech pattern he previously exhibited.

“Response mastery refers to the ability of the trained communicative response or responses to successfully and efficiently produce the desired outcomes” (Durand & Merges, 2001). In this phase, someone must respond appropriately when the student makes a request appropriately. If the student is unable to obtain the desired response, then a reduction in challenging behavior will not occur. Therefore, the person working with the student must be alert to the child’s appropriate behavior and respond accordingly (Durand & Merges).

In response efficiency, the new response must be more effective in obtaining the desired result than the previous challenging behavior. If the communicative response is successful each time it occurs but the challenging behavior is reinforced only occasionally, then the communication will replace it (Durand & Merges, 2001).

Response acceptability refers to the idea that the desired communicative response must be acceptable in community settings. In other words, people in the general community must be able to respond appropriately so that the desired consequence will be obtained (Durand & Merges, 2001).

Response milieu refers to the characteristics of the optimal environment in which training should take place. Ideally, settings should be designed that will facilitate the success, generalization, and maintenance of the reduction of challenging behaviors using functional communication training. However, "No research has, as yet, systematically explored the types of environmental variables that would positively or negatively affect these outcomes" (Durand & Merges, 2001, p. 119).

The last phase of functional communication training, consequences for challenging behavior, involves the issue of how to respond to the challenging behavior. Durand (1990) recommended response-independent consequences as the primary strategy. In trying to make the challenging behavior "nonfunctional", the educator or caregiver should ignore the behavior as often as possible. For example, if the child tantrums or screams, the behavior should be ignored as the person in charge continues his/her work. However, if the child engages in challenging behavior that becomes a danger to himself/herself or others, the behavior cannot be ignored and, at that point, the caregiver must intervene (Durand & Merges, 2001).

Applied Behavior Analysis

The principles of applied behavior analysis (ABA) have been demonstrated to promote learning and behavior change in children with autism spectrum disorder (ASD). ABA, the study of the science of behavior, is based on Skinner's (1953) principles of respondent and operant conditioning. Operant behavior is voluntary and emitted, maintained by environmental events (consequences), which follow them. Respondent

behavior refers to involuntary responses or those events over which individuals have little or no control. These behaviors are elicited when a stimulus is presented and a particular response occurs (Skinner).

When applied across various disciplines, two core elements consistently occur (Heflin & Alberto, 2001). The first element, operant conditioning, focuses on behavior by developing and changing behavior as a result of interactions with the environment. Stimulus control and reinforcement theory are variables that can be systematically managed in an educational environment for learning and instruction. "This structure is applied to instruction to make it effective, efficient, clinically significant, generalizable, and replicable" (Heflin & Alberto, p. 93).

"Behavioral technology is based on the assumption that:

- (1) operant behavior is learned;
- (2) understanding and manipulating observable stimuli and behavior are of paramount importance;
- (3) diagnostic labels may be independent of intervention procedures;
- (4) the utility of intervention methods must be judged empirically; and
- (5) operant behavior is controlled by antecedent and consequent events" (Simpson & Regan, 1988, p. 301).

Many aberrant behaviors of children with autism are assumed to be learned and are developed and maintained in their environment. Thus, the educational implications for the use of ABA are significant.

First, aberrant behaviors can be unlearned by significant changes in the environment by focusing on planned change of inappropriate behaviors and replacement of these behaviors with more appropriate responses. Thus, the use of ABA dispels the theory that children with autism manifest "unusual and nonfunctional behavior exclusively as a function of

unobservable or incomprehensible events, or that educators and others are consequently ill equipped to manage the behaviors of these individuals” (Simpson & Regan, 1988, p. 302).

ABA has a history of and requires empirical research. This second element, research, when applied to education, requires assessment and on-going documentation through observational data collection. “Efficacy is documented through internal replication (functional relationship) and external replication (generalizability)” (Heflin & Alberto, 2001, p. 93). When these elements (operant conditioning and research) are brought together in an educational setting to improve performance or solve social problems, the technology is called applied behavior analysis (Heflin & Alberto).

The application of ABA to education and instruction may take various forms such as one-on-one instruction involving discrete trial training (Lovaas, 1987), as well as strategies such as time delay (Wolery, Ault, & Doyle, 1992). Empirical research studies (Anderson & Romanczyk, 1999; Cohen & Volkmar, 1997) have documented the effectiveness and paved the way for generalizability for the use of ABA with children with ASD in the educational setting.

The principles of ABA allow educators to choose from a broad array of techniques (both individual and group) to meet the individual educational needs of students with ASD. “ABA also presents a framework for testing the validity of the strategies selected against student performance, thereby linking student outcomes to instructional decision-making” (Heflin & Alberto, 2001 p. 108). The use of ABA with students with ASD in a classroom setting provides empirical evidence for the growth and progression (or lack of) of individual students, thus meeting the mandate of IDEA.

The Lovaas Method

The Lovaas method is a type of applied behavior analysis developed by Ivar Lovaas at the University of California at Los Angeles. The term "Lovaas Therapy" and the term "applied behavior analysis" should not be used synonymously. Lovaas therapy is an intensive behavior intervention program originally designed for preschool children with autism and practiced only by therapists directly associated with Lovaas (Intensive Behavioral Intervention, 2002). Behavioral techniques include discrete trial training, molding and rewarding desired behavior, and ignoring or discouraging undesirable actions to achieve goals. The method requires 30 to 40 hours per week of basic language skills, behavior training, and academic training. In addition, four to six hours per day, five to seven days per week of one-on-one training are required. Research shows remarkable progress in 50% of the children trained with this method. However, the method needs more study (Tsai, 1998, p. 18).

Discrete Trial Training

According to Green (1996), hundreds of studies have been conducted to identify effective ways to increase learning opportunities for children with autism. "In fact, there is abundant scientific evidence that Applied Behavior Analysis methods (also called behavioral intervention or behavioral treatment) can produce comprehensive and lasting improvements in many important skill areas for most people with autism, regardless of their age" (Green, 1996, p. 29).

Discrete trial training, an applied behavior analytic approach, is probably the most extensively studied approach for working with children with autism. "A discrete trial is a small unit of instruction (usually lasting only 5-20 seconds) implemented by a teacher who works one to one with a child in a distraction-free setting" (Smith, 2001, p. 87). "Every skill that a

child with autism does not demonstrate- from relatively simple responses like looking at others, to complex acts like spontaneous communication and social interaction- is broken down into small steps” (Green, 1996, p. 30).

According to Smith (2001, p. 87) each discrete trial has five parts:

1. Cue (technically called a discriminative stimulus): The teacher presents a brief, clear instruction or question, such as “Do this” or “What is it?”
2. Prompt: At the same time as the cue, or immediately after it, the teacher assists the child in responding correctly to the cue. For examples, the teacher may take the child’s hand and guide him or her to perform the response, or the teacher may model the response. As the child progresses, the teacher gradually fades out and ultimately eliminates the prompt (e.g., guiding the student through less and less of the response) so that the child learns to respond to the cue alone.
3. Response: The child gives a correct or an incorrect answer to the teacher’s cue.
4. Consequence: If the child has given a correct response, the teacher immediately reinforces the response with praise, hugs, small bites of food, access to toys, or other activities that the child enjoys. If the child has given an incorrect response, the teacher says “No,” looks away, removes teaching materials, and otherwise signals that the response was incorrect.
5. Intertrial interval: After giving the consequence, the teacher pauses briefly (1-5 seconds) before presenting the cue for the next trial.

Smith (2001) cited the following main uses of discrete trial training: new forms of behavior, new discriminations, receptive language acquisition, expressive language acquisition, conversation, sentences, grammar, and

syntax use, and alternative communication systems. In addition, discrete trial training is useful for expanding children's skills and for management of disruptive behavior.

The amount of discrete trial training depends upon the age of the child and the level of skill acquisition. Children ages two to three years of age may require more intensive training, while older children may require less. In addition, children's individual learning styles must be taken into consideration. Several studies have indicated that intensive discrete trial training may yield improved intellectual functioning as measured by intellectual tests, standardized tests, and/or developmental scales. Placement in less restrictive classrooms for children with autism has been possible in some instances due to intensive discrete trial training (Green, 1996; Smith, 2001).

However, significant limitations exist if discrete trial training is used exclusively in educating children with autism. Children may not be able to generalize or initiate behavior in the absence of cues. For example, they may not initiate socialization or play skills on their own, but only exhibit this behavior in the presence of a teacher when specific cues are present. Because discrete trial training takes place in a highly structured environment, skills learned in this environment may not generalize to unstructured environments. Discrete trial training is limited in the sense that it is highly labor intensive with teachers working individually with a child, continually providing cues (Smith, 2001).

According to Smith (2001), many other ABA methods are useful for teaching children with autism both at home and school. McClannahan and Krantz (as cited in Smith) point out that ABA treatment for autism "should not...be characterized by any one procedure, such as discrete trial instruction...Although the discrete trial paradigm is unquestionably useful, so are incidental teaching, time delay, peer tutoring, photographic and written

activity schedules, script fading, and video modeling procedures” (McClannahan & Krantz as cited in Smith, p. 87).

Communication

Facilitated Communication

Facilitated communication is used with persons who are nonverbal or whose expressive language is severely limited. It is an augmented technique requiring the use of a facilitator who provides physical assistance for the student using a typewriter or computer (Tsai, 1998). Developed by Biklen in 1993, facilitated communication is based upon the premise that children with autism and other developmental disabilities have motor difficulties that prohibit them from using technology effectively, even though they may possess an understanding of written and spoken language. Therefore, the facilitator holds their wrists or hands to help them spell out messages (Smith, 1996).

The use of facilitated communication is not supported by empirical research but may be useful for some children diagnosed with PDDNOS who are precocious readers and good with computers and signs but severely impaired in verbal expressions skills (Tsai, 1998, p. 17). According to Smith (1996), facilitated communication fails to unlock hidden language skills and may cause serious problems by leading parents to believe their child possesses complex language skills. This idea may delude parents into thinking their child no longer needs treatment aimed at enhancing such skills and the beneficial therapies may be stopped (Smith, 1996). The American Academy of Child and Adolescent Psychiatry, the American Academy of Pediatrics, the American Psychological Association, and the American Association of Speech and Hearing have disavowed the use of facilitated communication (Campbell et al., 1996).

Speech and Language Therapies

Speech and language therapists typically teach children with autism to communicate through vocal speech. According to Lovaas, some children with autism progress very well using this method (as cited in Smith, 1996); others, however, make little or no progress. For children in this latter group, alternative strategies such as sign language or picture communication systems may prove to be more effective (Carr, 1997).

Students with autism often have great difficulty expressing themselves due to a lack of language. Speech-language therapists usually focus on expressive language for approximately 12 months. If, after this time period, the student has made minimal progress, the speech language therapist may recommend some form of augmentative communication device or method (Parker, 1996).

Augmentative communication is a method that can be used to supplement and enhance the program of a student with autism. According to Parker (1996), augmentative communication is used to increase communication, not replace speech/language therapy. A student's language skills will often increase with the addition of alternative communication devices and the student's level of frustration is greatly decreased due to the ability to communicate needs and wants. Various types of augmentative communication devices include communication boards, communication books, sign language, and computer devices (Parker).

According to Frost and Bondy (2002), intense and highly structured interventions are required for children with autism if language skills are to be developed. Based upon this premise, Frost and Bondy developed the Picture-Exchange Communication System (PECS) at the Delaware Autistic Program. PECS is an augmentative alternative training program that allows students with little or no language skills to communicate by way of pictures

and visual representations. Initially, students are taught to exchange a picture of a desired item with a teacher in return for the item.

The second step involves teaching the student to initiate requests by choosing a picture of the desired item and presenting the picture to the teacher in exchange for the item. Verbal prompts are not used; therefore, the child must initiate on his/her own accord. Eventually, the PECS system teaches the student to create simple sentences such as "I want..., I see..., I have...etc." Many children with impaired communication begin to develop language skills when they are able to use 30 to 100 pictures (Frost & Bondy, 2002).

Smith (1996) reported many speech and language treatments designed to stimulate the child's interest and ability in learning language. These treatments are very intensive, one-to-one sessions ranging from ½ hour to 3 hours per week. "To the author's knowledge, no scientific studies have evaluated whether any form of speech and language therapy, other than behavior analysis, helps children with autism" (Smith, p. 48).

To achieve significant gains in language, children with autism require intensive instruction such as provided by Lovaas' 40 hours per week of instruction. For these programs, language was the single largest component and, consequently, yielded the largest gains. Programs with less language instruction yielded smaller gains in language than those reported by Lovaas. According to Smith (1996) speech and language therapy by itself "is probably not intensive enough to be very effective" (p. 48).

Auditory Integration Therapy

Developed by a physician named Berard, auditory integration therapy (AIT) uses a device that randomly selects low and high frequencies from a cassette or CD and sends sounds through headphones to the child. The use of AIT should decrease sound sensitivity and elicit a positive change in

adaptive behavior while reducing maladaptive behaviors (Campbell et al., 1996). "Advocates of AIT speculate that hypersensitive hearing causes aggression, hinders children from interacting with others, and impairs their ability to attend to instructional situations" (Smith, 1996, p. 50).

Theoretically, as hypersensitivity is reduced, maladaptive and aggressive behaviors decrease (Smith).

Rimland and Edelson (1995) reported promising results using AIT in a double-blind, controlled study involving 18 subjects. The researchers matched subjects into pairs based on age, sex, history of ear infections, and severity of problems with hypersensitive hearing. One subject in each pair received AIT and the other received a placebo treatment. Based on follow-up of parent-reported measures of behavior problems and comprehension of speech, the individuals in the treatment group improved more than the individuals in the placebo group.

While the results of Rimland and Edelson's study appeared promising, Smith (1996) argued that the groups did not differ on how sensitive they were to sounds after treatment, as measured by audiograms. "Because sound sensitivity was the main target of treatment, the failure to find a difference on this variable raises the possibility that, despite favorable parental reports, the treatment actually may have had no effect on the children" (Smith, 1996, p. 50). A final problem noted by Smith was that the audiogram had not been shown to be a valid assessment procedure for hypersensitive hearing (Smith). Moreover, significant results from a well-designed treatment study were not available (Tsai, 1998).

Social Communication

Children diagnosed as ASD often lack appropriate social communication skills, not having the ability to interact with peers in a socially acceptable manner. "Social communication refers to a set of

behavioral propensities in which complex cognitive and emotional information is communicated through facial expression, emotional gesture, the prosodic melody of speech, and knowledge of the social rules of communication or pragmatics" (Robertson, Tanguay, L'Ecuyer, Sims, & Waltrip, 1999, p. 738).

The lack of social communication in children diagnosed with ASD may be explained by a lack of theory of mind. "Theory of mind, the ability to make inferences about others' mental states, seems to be a modular cognitive capacity that underlies humans' ability to engage in complex social interaction" (Stone, Baron-Cohen, & Knight, 1998, p. 640). A relatively new hypothesis in the field of autism, theory of mind "refers to the notion that many autistic individuals do not understand that other people have their own plans, thoughts, and points of view" (Edelson, 1995). People with autism experience difficulty understanding the way other people think, feel, and behave. In addition, children with autism have difficulty comprehending when others do not know something. At times, they may become upset if the person to whom they ask a question does not know the answer.

Due to this inability to understand other people, people with autism may have problems relating socially and communicating with other people. Students with autism may appear self-centered or uncaring because they may have difficulty understanding that their peers or classmates even have thoughts and emotions (Edelson, 1995). "Humans, like many other species, use a variety of cues (facial expression, body posture, tone of voice) to predict others' behavior" (Stone et al., 1998, p. 640). We also respond to other people's knowledge, intentions, belief, and desires. The ability to make assumptions about others' ideas and thoughts has been termed theory of mind (Stone et al., 1998).

Theory of mind develops in several distinct stages, which can be measured with social reasoning tests of increasing difficulty. A complex high-

level cognitive ability, theory of mind develops over time and does not complete its development until relatively late. Stages of development include the following: (1) joint attention – around 18 months, (2) ability to understand false belief – between 3 and 4 years of ages, (3) ability to understand second-order false belief – between 6 and 7 years of age, and (4) ability to understand and recognize faux pas – between 9 and 11 years of age (Stone, et al., 1998).

The Autism Diagnostic Observation Schedule was used to investigate whether specific social communication deficits could be identified in ASD. Results were compared to a previous study using the Autism Diagnostic Interview-Revised. Fifty-one subjects diagnosed with autism, Aspergers Syndrome, and PDD were evaluated using both instruments.

Three social communication domains (joint attention, affective reciprocity, and theory of mind) were identified as deficit areas in these subjects. The researchers suggested that the “domains identified in ...factor analysis constitute a somewhat arbitrary delineation of what is a seamless process of social development in normal children beginning soon after birth” (Robertson et al., 1999, p. 746).

Findings from this study implicated the three areas as central aspects of social communication deficits in persons with ASD. In addition, the variance in the scores tends to describe severity in this area along a continuum, as implied in the continuum of ASD. The authors suggest scores identified in the social communication domain could be “useful for tracking clinical progress quantitatively overtime, as well as for studying the results of psychosocial, education, and pharmacological treatments” (Robertson et al. 1999, p. 746).

Teaching students with ASD to “read” and understand social situations can address deficits in social cognition in the educational setting. Carol Gray

developed a technique called "social stories" to help students with autism learn to interact appropriately with others (Edelson, 2002).

A social story can be written by a teacher specifically to fit the needs of an individual student. These stories contain four types of sentences: descriptive, directive, perspective, and control. According to Edelson (2002), Gray recommends two to five descriptive and/or perspective sentences for every one directive or control sentence. Each story is simple and to the point, describing what people do in particular social situations (Edelson).

Sensory Integration Therapy

According to some theorists, children with autism have difficulty processing sensory input from the environment and/or translating such input into effective action. Therefore, children may be over stimulated or under stimulated by normal levels of sensory input. According to some theorists, "Such children have difficulty perceiving and responding to environmental events...and try to moderate their arousal levels by engaging in ritualistic behaviors such as rocking their bodies back and forth" (Smith, 1996 p. 49). In some cases, children with autism may cringe when they hear certain sounds such as the ringing of a telephone.

Numerous sensory-motor therapies have been proposed to alleviate self-stimulating behaviors and "Many of the most influential figures in the history of special education have advocated such therapies: Itard, Seguin Montessori, Frostig, Delacato, and others" (Spitz as cited in Smith, 1996, p. 49). They believed the therapies could cure developmental disabilities by getting to the root of the learning problems (Smith, 1996).

Sensory integration, the nervous system's process of organizing sensory information for functional use, is a sensory-motor treatment therapy proposed for children with autism. A licensed occupational therapist guides the individual through activities that challenge his/her ability to respond

appropriately to sensory stimulation (Tasi, 1998). This therapy is directed toward improving how an individual's senses process stimulation and work together by stimulating the child's skin and vestibular system with activities such as swinging in a hammock suspended from the ceiling, spinning in circles on specially constructed chairs, brushing parts of children's bodies, and engaging in physical activities that require balance (Smith, 1996).

No scientifically sound research has demonstrated clear progress with this therapy (Smith, 1996; Tasi, 1998). In addition, research does not indicate over stimulation or under stimulation as being the primary cause of self-stimulatory behavior in children with autism children or the psychological problems that cause no optimal arousal. "Though sensory integration therapy does not appear to enhance language, control disruptive behaviors, or otherwise reduce autistic behaviors, it may offer enjoyable and healthy, physical activity" (Smith, p. 49). However, physical activity such as climbing on playground equipment and playing table top games may be just as beneficial for the child with autism without the involvement of a licensed professional.

Diet

Children with autism often exhibit idiosyncratic eating habits in that they may be picky about what they eat or they may crave large amounts of certain foods. Because of these eccentric habits, some professionals in the field suggest this constitutes a serious underlying problem. They suggest an intolerance of substances found in certain foods may contribute to behavior problems and that the elimination of these foods will improve behavior. Therefore, special diets are recommended for these children so that families can ascertain whether their particular child seems to benefit (Smith, 1996).

Feingold (as cited in Smith, 1996), a pediatrician and allergist, was the first to recommended a specific diet to improve behavior in children. The

Feingold diet eliminated foods that contain preservatives, colorings, or other additives. Other diets eliminate additives and also sugar, milk, wheat, eggs, corn, chocolate, and citrus. Still other authors recommended that some children should curtail their consumption of yeast and/or soy (Smith).

According to Smith, "No scientifically sound studies have evaluated whether children with autism really have trouble tolerating these foods or whether any of the diets are helpful to them "(1996, p. 53). The Feingold diet and the low sugar diets have been evaluated for children with ADHD and for typically developing children. No scientifically sound research supports changes in behavior due to specific diets (Smith).

Vitamin Therapy

According to Dalldorf (1999), there are some children with autism who respond to a megavitamin therapy consisting of pyridoxine (Vitamin B₆) and magnesium. Vitamin B₆ is a chemical that helps to digest proteins. Magnesium is a mineral that helps build bones and maintain nerve and muscle cells (Smith, 1996). It is not known which clients would respond or what the long-term side effects would be (Dalldorf).

Various studies on vitamin B₆ and magnesium have appeared in scientific journals and investigators have reported favorable results in perhaps 30%-50% of a subgroup of children with autism. However, investigations have taken place over a short period of time and the long-term effects are not known (Smith, 1996).

Vitamin B15, currently referred to as DMG, a nontoxic metabolite, has been shown to occasionally improve speech or behavior in children with autism based on anecdotal reports. Little research is available for this treatment (Dalldorf, 1999).

Other nutritional therapies include the use of melatonin and secretin. Melatonin is a hormone secreted by the pineal gland, located in the brain. It

has been helpful in regulating the sleep cycles of persons with chronic sleep disorders, blindness, developmental disabilities, and some autistic persons. Long-term use cannot be supported (Dalldorf, 1999).

“Secretin is a hormone normally produced by the intestines to stimulate release of some pancreatic fluids (especially amount of bicarbonate)” (Dalldorf, 1999, p.13). Social and language skills have been noted to improve in some children with autism when given secretin intravenously. Potential side effects are still uncertain (Dalldorf).

Chez et al. (2000) conducted a two-part clinical trial to investigate claims that secretin had a remarkable effect in reducing specific behavioral components of autism. Fifty-six patients participated in an open-label trial of secretin, during which they received one injection of the hormone. “At follow-up, some reported minimal but potentially significant improvements including changes in GI symptoms, expressive and/or receptive language function, and improved awareness and social interactions. However, these changes occurred most often in children falling in the more severe range of autism at baseline (Chez et al.).

To further investigate these findings, a second study was undertaken with a subgroup of children who had perceived improvements in Study 1. It was hypothesized that second injections of secretin would multiply the changes observed from the first injection.

Twenty-five children participated in a double-blind crossover clinical trial. Selected to enter into either Group A or Group B based on an alternating schedule at entry, patients in Group A received 2 injections of secretin given four weeks apart. Group B participants received an initial injection of secretin and a placebo at four weeks (Chez et al., 2000).

“The results of this two-part clinical investigation of secretin demonstrate that overt behavioral changes do not occur following the hormone injection in children who manifest symptoms of varying autistic

severity at baseline” (Chez et al., 2000, p. 93). Because not enough data exist to document any substantial benefit from secretin injections, further study should be conducted involving “physiological mechanisms and neural pathways involved in the purported neuroactive response to secretin” (Chez et al., p.93.).

Rimland (2000) reviewed the study conducted by Chez et al., commenting that their data do not support their conclusions. According to Rimland, these studies used inappropriate measurement instruments and inappropriate selection of subjects, which caused a lower probability of finding significantly positive results. Yet, improvements were found to be significant after the secretin injections. “Despite their shortcomings, the two Chez studies confirm earlier reports that secretin appears to be a safe and beneficial treatment for autism” (Rimland, p. 95).

Chez and Buchanan (2000) responded to Rimland’s commentary stating, “We stand by our data in concluding that secretin offers no observable clinical improvement in children with varying degrees of autism severity” (p. 97). At this time, the Chez and Buchanan do not advocate the use of secretin as a “treatment” modality. “If, as Rimland states, secretin is a “worthwhile” and “beneficial” treatment for autism, we look forward to that documentation in a peer-reviewed journal. Until that time, we are left to ask, “Where are the data?” (Chez & Buchanan, p. 97.).

Professional Training in Autism

Since its inception in 1975, the Individuals with Disabilities Education Act (IDEA) has provided millions of students with disabilities access to education and the potential to achieve a productive, satisfying life. Over the years, federal law has improved the quality of education provided for students with disabilities. With the advent of the recent amendments to IDEA (1997), an emphasis has been placed on participation and progress in

the general education curriculum for students with disabilities. To meet the ever-increasing demands placed upon both special and general educators to provide quality programs/programming for students with disabilities, Porter (2000) recommends an expanded state comprehensive system for personnel development (CSPD) and credential uniformity across states.

It is the responsibility of the State Education Agency (SEA) to set standards for special education teacher licensure (Porter, 2000). In 1988, McLaughlin, Valdivieso, Spence, and Fuller surveyed 68 university faculty members in 25 special education training programs from five states. Faculty members reported that SEAs controlled licensing of new personnel by setting the course requirements for certification. Thus, the content of the special education teacher training programs was driven by the requirements for licensing as set forth by the various SEAs. In addition, state certification policies determined whether special education programs at the university level were categorical or noncategorical. Consequently, these policies dictate the amount of emphasis that can be placed on specific topics in coursework areas (McLaughlin et al.).

An Internet search of university programs across the United States revealed very few special education teacher programs with a certification or a concentration in the area of autism. Most special education teacher training programs are noncategorical, designed to cover a broad range of disabilities as opposed to offering certifications in a specific disability. However, there are a few teacher education training programs that offer a concentration in the study of autism.

The University of Kansas offers a Masters degree in Special Education with an emphasis in autism and Asperger's syndrome. The program provides a generic background in special education with a specific knowledge base in autism and/or Asperger's syndrome. While there is no independent teaching endorsement in either of these areas, students have the opportunity to

become prepared in the education of students with these disabilities. Specific autism courses are as follows:

1. Characteristics of Exceptional Children and Youth: Autism
2. Education of Exceptional Children and Youth: Autism
3. Management of Children and Youth with Autism
4. Application of Assessment Information in Program
Development for Exceptional children and Youth: Autism
(University of Kansas, 2002)

The University of Nevada, Las Vegas, offers a teaching licensure in autism. In the State of Nevada, a special education teacher must hold an endorsement in autism before teaching pupils with this disability. To obtain this licensure, a person must complete a preparation program for teaching pupils who have autism that has been approved by the state board or hold a current license with this endorsement from another state. In addition to obtaining the license, the student must complete coursework in behavior management, speech and language development, and assistive technology or alternative/augmentative communication (University of Nevada, 2002).

According to e-mail from Mamlin (personal communication, March 29, 2002) Appalachian State University does not specifically cover autism in their courses. Their undergraduate program focuses on learning disabilities. Autism may be covered somewhat in the graduate program in the mental retardation or transition classes. However, no specific courses pertaining to autism are covered.

Meredith College in Raleigh, North Carolina offers a program called MAP, The Meredith College Autism Program in the Psychology Department. This program is a behaviorally based early intervention program for preschool children with autism. In addition, the program provides university students experience in working with children with autism and PDD. Two models of service are offered: (1) the research/clinic based model and (2)

The workshop model. Both models are based on applied behavior analysis and discrete trial teaching (Meredith College, 2002)

Perhaps the most well known university program in North Carolina is the TEACCH Program. This program resulted from legislation passed in the North Carolina General Assembly in 1972 mandating creation of the Division for the Treatment and Education of Autistic and Related Communication Handicapped Children. The TEACCH Program is located in the Department of Psychiatry, School of Medicine, at the University of North Carolina at Chapel Hill (TEACCH, 2002).

Division TEACCH operates nine regional centers and provides diagnostic evaluation, individualized curriculum development, social skills training, vocational training, and parent counseling and training. TEACCH staff provides consultation to classrooms, group homes, and other agencies. In addition, Division TEACCH serves as an "international center for interdisciplinary training in autism" (TEACCH, 2002, P. 4). TEACCH training programs are offered in the areas of diagnosis, assessment, structured teaching, educational services, residential and vocational programs, and parent training. The TEACCH web site includes a list of current training opportunities (TEACCH).

A search of Tennessee Colleges and Universities revealed 38 institutions offering approved teacher education programs. Nineteen of these universities offer teacher certification in special education. The State Department of Education in Tennessee sets the requirements for licensure in special education, and currently Tennessee does not offer a certification or licensure in the area of autism. Special education teacher training programs offer certification in the following areas: modified special education, comprehensive special education, vision, hearing, and/or speech/language (Tennessee Department of Education, 2001).

IDEA regulations require states to develop comprehensive systems of personnel development (CSPD) to ensure the availability of an adequate supply of qualified special education, regular education, and related services personnel (IDEA, 34 C.F.R. Sec. 300.380). To comply with the CSPD requirement of IDEA, the Tennessee Department of Education, Division of Special Education created the Tennessee Autism Network (TAN). The goal of TAN is to “build local and regional expertise in programming for children with autism spectrum disorder” (Tennessee Autism Network, 2002).

The Tennessee Autism Network’s website provides a list of various trainings and workshops pertaining to ASD.

In addition, the Tennessee Department of Education, Division of Special Education in cooperation with the Treatment and Research Institute for Autism Spectrum Disorders (TRIAD) program at Vanderbilt University (TRIAD, 2002) provides hands-on TRIAD teacher training (TTT) across the state several times a year. This training is offered at no cost to local school systems and provides in-depth training for teachers working with students diagnosed with autism or ASD (Tennessee Autism Network, 2002).

In an effort to use local resources and develop local expertise, TTT provides a train-the-trainer replication process. Sessions are open to school personnel and other interested professionals. TRIAD teacher training requires an application, interview, and acceptance process. Successful applicants must be willing to participate in future TTT training sessions for other professionals.

Six days of training and support are provided throughout the yearlong process. Specific skills in the areas of communication, socialization, structured teaching, behavior management, classroom assessment, and working with parents are provided. School systems participating in TRIAD training are provided as professional resources and members receive a

quarterly newsletter and access to chat rooms on the web site (Tennessee Autism Network, 2002).

In addition to the TTT, the Tennessee Department of Education, Division of Special Education offers monthly training sessions and videoconferences conducted by staff members of TRAIID of Vanderbilt University on a variety of topics. All sessions except for the teacher training sessions are open to parents, school system personnel, and any other interested professionals.

Summary

An increase in the number of diagnosed cases of children with autism and autism spectrum disorder has found school systems ill prepared to meet the numerous educational demands associated with this disorder. Due to a lack of training and experience, school districts have opened themselves to litigation as a result of providing inappropriate educational programs for these children. IDEA mandates a free appropriate public education program in the least restrictive environment, ensuring that students make meaningful educational progress. Because of the abundance of available literature on autism, parents are now demanding programs and methods that may not be researched based.

Autism is an all-encompassing disorder that can severely limit a child behaviorally, socially, and academically. In addition, communication may be so impaired that children with this disorder often exhibit severe tantrums due to the frustration of not being able to express themselves. Special educators need training in research-based methods and techniques for use in the classroom setting to provide an appropriate education program for children with autism and/or autism spectrum disorder. Teachers should be able to institute a defensible program that will enable these children to make progress, both behaviorally and academically, thus eliminating the potential

for litigation and poor parent relationships while providing ways for children with autism to make meaningful educational progress.

By conducting this study, I attempted to identify effective programs and methods used by special educators in this region, comparing them to the latest techniques and teaching methods prescribed by recent research. In addition, identified weaknesses can be used to recommend future training and staff development to enable educators to provide the best possible programs for children with autism.

CHAPTER 3 METHODS AND PROCEDURES

This chapter includes an overview of the research methodology used in this study. It includes a description of the population and sample, sampling method, instrument development, research design, procedures, and data analysis.

Population and Sample

A criterion sample of the population of special education teachers and speech therapists working in 11 school districts of the First Educational District of Northeast Tennessee was selected as participants in the study. The special education supervisors in the 11 school districts of Northeast Tennessee were contacted via e-mail to determine the number of special education teachers and speech therapists in each school district. The total population of special education teachers was 434. The total population of speech therapists was 68.

The total population of special education teachers and speech therapists was surveyed. Three hundred seventy-nine survey instruments were hand delivered to the special education supervisors or mailed to the supervisors through each school's central office mail system. The supervisors were contacted a second time to remind them about the survey.

The remaining 123 surveys were mailed to the home addresses of the special education teachers and speech therapists in Unicoi County, Johnson City, Johnson County, and Kingsport City School Systems. Items mailed to these people included a cover letter, a copy of the informed consent, a survey instrument, and a self-addressed stamped return envelope. In addition, a self-addressed stamped postcard with the teacher's name written on the back was included with directions to mail the postcard at the time the survey was mailed. This made it possible to identify those people who did

not return the survey while maintaining confidentiality. As the postcards were returned, the names of the teachers were checked off the list. After two weeks, surveys and reminders were mailed to the names on the list that were not checked.

The Survey Instrument

An ADHD questionnaire developed by Blevins (1996) to determine principal and teacher knowledge level of ADHD in the First Development District of Northeast Tennessee was used as a model to design an autism questionnaire. The original questionnaire contained a 31-item true/false test of knowledge. The items were categorized into knowledge of etiology, knowledge of assessment, and knowledge of treatment. In the initial development of the survey, special education teachers and regular education teachers from Elizabethton City Schools served as the panel of experts in an effort to review the material to insure the appropriateness of the items.

Validity of the Survey Instrument

The content validity of the instrument was addressed by designing items based on the review of professional literature and by examining and evaluating other instruments that were designed for similar studies of the original survey instrument. Content validity is essential when developing tests of knowledge. Special education supervisors Janie Snyder and Susan Belcher of the First Tennessee Educational District confirmed the face validity. With the field study process, I attempted to refine face validity of the instrument; two university special education classes reviewed the items. No evidence of construct or predictive validity is available.

Modification of the Instrument

Permission was obtained from Blevins to adapt or modify the instrument developed for her study to compare the knowledge level of special education teachers and speech therapists regarding autism. (Appendix A).

The instrument was modified to test the study's hypotheses regarding etiology and educational programming of children with autism. A panel of special education teachers from Elizabethton City reviewed the 29-true/false-item survey assessing general knowledge of autism. Judges were instructed to carefully review the items and mark those items they believed would assess the knowledge level of autism. These 29 items were intended to assess general knowledge level of autism. The items were categorized into knowledge of etiology and knowledge of educational programming as shown in Table 2.

Table 2

Table Of Items Categorized By Knowledge Area

Etiology Items	Educational Programming Items
1	5
2	9
3	10
4	14
6	15
7	16
8	17
11	18
12	19
13	21
20	22
	23
	24
	25
	26
	27
	28
	29

A pilot study was conducted at East Tennessee State University during the spring semester of 2002. The 29-item instrument was administered to two graduate classes of students working toward a degree in special education. Twenty-three surveys were administered. The participants were instructed to complete the questionnaire and to carefully review the true/false items and mark those items they felt were confusing and ambiguous. Suggestions from the participants were analyzed and changes were made. Item 10 on the questionnaire was deleted and item 7 was divided into 2 separate questions. On the true/false portion of the survey minor revisions were made in the wording of some items. Woody Johnson, an expert in the field of autism, and Malinda Pennington, TRIAD consultant with Vanderbilt University, reviewed the results of the pilot study and suggested changes in wording of some items.

Reliability

Data from the pilot study were analyzed and the items were investigated on the premise of increasing reliability. The decision was made to change the wording while retaining the same meaning on items 1, 2, 3, 5, 6, 8, 10, 11, 13, 14, 17, 19, 21, 23, 26, 27, and 29. The decision was made to continue the study based on Thorndike and Hagen's (1977) interpretation that the appraisal of reliability in any new measurement procedure must always be made in terms of other procedures with which it is in competition. No other surveys could be found that were similar in nature.

Validity

Designing items based on the review of professional literature addressed the content validity of the modified survey instrument. Face validity of the instrument was refined by the field study process and confirmed by Special Education Supervisors Janie Snyder and Susan Belcher of the First Tennessee Educational District. In addition, Woody Johnson of

East Tennessee State University and Malinda Pennington of Vanderbilt University reviewed the revised items and confirmed the face validity.

Research Design

The research design is that of a descriptive study, using survey research. Gall, Borg, and Gall (1996) identified research by questionnaire or survey as being a systematic method of data collection and analysis used extensively in educational research to collect information that is not directly observable. The survey instrument developed for this study was used to ascertain the knowledge level of autism in order to better provide services for the child with autism.

Procedures

Survey instruments were delivered to special education supervisors at the monthly Northeast Tennessee Special Education Supervisors' meeting in May 2002. Respondents selected through the sampling procedure received a copy of the survey instrument, a consent form, and a cover letter with a brief explanation of the study from their special education supervisor directly or through school mail. Participants in six of the school systems surveyed (Hawkins County, Unicoi County, Johnson County, Bristol City, Johnson City, and Kingsport City Schools) were instructed to return the completed surveys in the stamped self-addressed envelopes provided with the survey instrument. The remaining respondents were asked to anonymously complete and return the survey instruments to the special education supervisor of their respective school system within two weeks. The instruments were picked up at each central office by the researcher. Prior to the collection of the instruments, the Special Education Supervisors were contacted by e-mail and asked to remind the participants to forward their information to the supervisor's office.

Two weeks after the initial delivery, those educators who had not responded were sent a second survey instrument, consent form, and cover letter requesting their response be returned to their special education supervisors.

Data Analysis

The numerical data gathered through the use of the survey instrument were entered into a computer data file and analyzed using the statistical package for Social Sciences (SPSS/PC+). The independent variables were type of class taught, highest degree, years of experience, and type of school system. The dependent variables were general knowledge, etiology knowledge, and educational programming knowledge. A t-test for two dependent means was used when comparing the means of two groups as in Research Questions 1 and 2. Analysis of variance was used when comparing the means of more than two groups as in Research Questions 4 and 5.

Analysis of covariance was used to compare the means of more than 2 groups while controlling for position, years of professional experience, highest degree held, and the type of system in which employed as in Research Questions 7, 8, 9, and 10. Responses to Research Questions 5 and 6 were placed into categories. The frequency and percentage of comments in each category were then recorded.

Summary

The purpose of this study was to determine the knowledge level of special education teachers and speech therapists regarding the general concepts of etiology and educational programming for autism. To measure these concepts, an ADHD survey was modified to test the study's hypotheses regarding autism. The survey consisted of 45 questions (29 true/false items and 16 multiple-choice items). The sample consisted of 455

special education teachers and 71 speech therapists during the 2001-2002 school year. The numerical data gathered through the use of the survey instrument were entered into a computer data file and analyzed using the statistical package for Social Sciences (SPSS/PC+).

CHAPTER 4
ANALYSIS OF DATA

It is imperative that today’s special educators have the knowledge and skills to provide children with autism a meaningful educational program in the public school setting. Marked deficits in educators’ knowledge level of autism spectrum disorder could seriously impact the quality of educational programs for students with autism delivered by local school systems. The purpose of this study was to determine the knowledge level of special education teachers and speech therapists regarding the general concepts of etiology and educational programming for autism spectrum disorder.

The study’s population consisted of special education teachers and speech therapists in twelve school systems in Northeast Tennessee. The schools are identified as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11. Table 3 presents the number of special education teachers by school, the number of study participants by school system, and the response rate percentage.

Table 3

Number of Participants by School System

<u>School</u>	<u>n Sped Teachers</u>	<u>n Study Participants</u>	<u>Response Rate %</u>
1	21	15	71.4
2	20	14	70.0
3	43	22	51.7
4	64	29	45.3
5	107	31	28.9
6	64	48	75.0
7	63	35	55.5
8	51	27	52.9
9	20	17	85.0
10	49	41	83.6
11	50	13	24.0
Total	552	292	52.9

During the spring of 2002, surveys were administered to 552 special education teachers and speech therapists. Information regarding basic characteristics pertaining to position, preparation for teaching, experience with children who have autism, and professional needs was obtained. Simple descriptive statistics were used for initial analysis of data. In addition, a survey containing items dealing with etiology of autism spectrum disorder (ASD) and educational programming for children who have ASD was administered. Two hundred ninety two teachers signed consent forms agreeing to participate in the study. The overall survey return was 52.9%.

The answers to the first four research questions developed while analyzing the characteristics of special education personnel.

1. What are the occupational characteristics of special education personnel employed in 11 Northeast Tennessee school systems?
2. What training did special education personnel in 11 school systems in Northeast Tennessee obtain to be prepared to teach children with ASD?
3. What types of experience regarding ASD have special education personnel had while teaching?
4. What are the professional needs of special education teachers regarding ASD?

To answer these questions, demographic information was separated into four distinct categories: occupational characteristics, preparation for working with special education students diagnosed as ASD, experience with children who have ASD, and professional needs of personnel teaching students with ASD. Items dealing with work related questions were grouped together into a category called "occupational characteristics". Items relating to educational training, type of degree, instruction and training relating to ASD, and educational reading relating to ASD were grouped under "preparation for working with special education students diagnosed as ASD".

The third category, “experience with children who have autism”, incorporated information pertaining to teachers’ experience regarding children who have autism. “Professional needs”, the fourth category, consisted of questions dealing with future training for working with children with ASD.

Research Question 1

What are the occupational characteristics of special education personnel employed in 11 Northeast Tennessee school systems?

Information pertaining to occupational characteristics included the school level (preschool, elementary, middle, and/or secondary), the number of years each person had taught in special education, and his/her current teaching position. Information pertaining to occupational characteristics is shown in Table 4.

Table 4

Number of Participants by Occupational Characteristics

<u>Occupational Characteristics</u>	<u>f</u>	<u>%</u>
<u>School Level</u>		
Preschool	16	5.5
Elementary	119	41.0
Middle	58	19.7
Secondary	62	21.4
More Than One School	36	12.4
Total	291	100.0
<u>Years of Experience</u>		
0-6	74	27.7
7-14	79	29.6
15-20	60	22.5
21-32	54	20.0
Total	267	100.0

Table 4 (continued).	<i>f</i>	<i>%</i>
<u>Current Position</u>		
Resource	170	58.8
CDC	74	25.6
Speech/Language	39	13.5
Other	<u>6</u>	<u>2.1</u>
Total	289	100.0

As shown in Table 4, 12.4% special education teachers and speech therapists reported working at more than one school. Thus, not all participants could be grouped strictly into a preschool, elementary, middle, or secondary level. The majority of those respondents were speech therapists working at two or more school levels. The majority ($n=119$, 41.0%) of participants worked at the elementary level.

Seventy-nine respondents reported having worked in special education from 7 to 14 years (29.6%). Fifty-four (20.2%) teachers reported working over 21 years.

The participants were asked to identify their current position in special education. The majority of the participants ($n=170$, 58.8%) work in a resource position. For the purposes of this study, resource positions included special education resource, consulting teachers, inclusion teachers, preschool special education teachers, deaf educators, gifted teachers, and itinerate special education teachers.

Thirty-nine (13.5%) speech teachers responded to the survey. Six respondents (2.1%) were classified into an "other" category because their positions did not fall into either of the other categories even though they reported having experience in working with special education students.

Research Question 2

What training did special education personnel obtain to be prepared to teach children with ASD?

Preparation for working with special education children, particularly those diagnosed with ASD, was the second category used to answer question 2. Information pertaining to university preparation is presented in Table 5.

Table 5
Number of Participants by University Preparation

	<i>f</i>	<i>%</i>
<u>Highest Degree</u>		
Bachelors	120	41.1
Masters	163	55.8
Educational Specialist	8	2.7
Doctorate	<u>1</u>	<u>.3</u>
Total	292	100.0
<u>Universities Attended</u>		
East Tennessee State University	164	56.9
University of Tennessee	31	10.8
Tusculum College	22	7.6
Carson Newman College	9	3.1
Milligan College	9	3.1
Other Universities	<u>53</u>	<u>18.5</u>
Total	288	100.0
<u>Year Degree Was Obtained</u>		
1998-2002	64	26.7
1993-1997	52	21.7
1988-1996	29	12.1
1983-1987	29	12.1
1978-1982	33	13.8
1973-1977	24	10.0
1967-1972	<u>9</u>	<u>3.8</u>
Total	240	100.0

Table 5. (continued)

	<i>f</i>	<i>%</i>
<hr/>		
<u>Major</u>		
Special Education	167	64.5
Special Education + Other Area	25	9.7
Area Other Than Special Education	<u>67</u>	<u>25.9</u>
Total	259	100.0
<u>Autism Instruction During College</u>		
None	56	19.2
Yes, Briefly	229	78.4
Yes, Entire Class	6	2.1
Entire Class & Briefly During Another Class	<u>1</u>	<u>.3</u>
Total	292	100.0

As shown in Table 5, the majority ($n=163$, 55.8%) of teachers surveyed in the 11 systems had master's degrees. Eight (2.7%) teachers had an educational specialist degree, and 1 (.3%) teacher had a doctorate.

Two hundred forty teachers responded to the question asking for the year in which their highest degree was obtained. Sixty-four (26.7%) of the teachers answering this question obtained their degree between 1998 and 2002. Nine (3.8%) teachers obtained degrees between 1967 and 1972.

Participants reported earning degrees from 35 different universities. For the purposes of this study, the top 5 universities were noted. As shown in Table 5, the majority of participants (164, 56.9%) earned degrees from East Tennessee State University.

Participants were asked to indicate the major of their highest degree. One hundred sixty-seven (64.5%) had a major in special education. For the purposes of this study, a major in special education included comprehensive special education, modified special education, general special education,

speech/language therapy, audiology, special education early childhood and/or deaf education. Twenty-five (9.7%) of the respondents earned degrees in dual fields - special education and an additional field.

Most respondents (229, 78.4%) received brief instruction about ASD as part of their teacher training. However, 56 (19.2%) reported receiving no training regarding ASD during their university training.

Research Question 3

What types of experience regarding ASD have special education personnel had while teaching?

“Experience with children diagnosed as ASD” was a category used to answer question 3. Information pertaining to teacher preparation for working with students diagnosed as ASD while teaching is presented in Table 6.

Table 6:
Number of Participants by Preparation for ASD While Teaching

	<u>f</u>	<u>%</u>
<u>Autism Instruction While Teaching</u>		
None	81	28.1
Attended Workshops, Read Articles	149	51.7
TRIAD, TEACCH, ABA	24	8.3
Entire Class or Program Regarding ASD	2	.7
TRIAD, TEACCH, ABA, Class, Program	5	1.7
Workshops, Articles, TRIAD, TEACCH, ABA, Class	5	1.7
Workshops, Articles, Class, Program	<u>1</u>	<u>.3</u>
Total	288	100.0

Table 6 continued		
<u>Number of Books Read Relating to ASD</u>	<u>f</u>	<u>%</u>
None	149	51.7
1-5	130	45.1
6-10	7	2.4
Over 15	2	.7
Total	288	100.0
<u>Number of Articles Read Relating to ASD</u>		
None	34	11.8
1-5	154	53.5
6-10	50	17.4
11-15	11	3.8
Over 15	39	13.5
Total	288	100.0

The participants were asked if they received any instruction about ASD while teaching. As shown in Table 6, 149 (51.7%) reported attending workshops and reading articles. Eighty-one (28.1%) reported receiving no instruction about ASD while teaching.

Participants were asked to respond to the number of books and professional articles they had read relating to ASD within the last five years. One hundred forty-nine (51.7%) respondents reported reading no books relating to ASD and 34 (11.8%) reported reading no professional articles relating to ASD within the last five years.

One hundred thirty respondents (45.1%) reported reading from one to five books relating to ASD within the last five years and 154 respondents (53.5%) reported reading from one to five professional articles relating to ASD within the last five years.

Two respondents (.7%) reported reading over 15 books relating to ASD within the last five years. Thirty-nine respondents (13.5%) reported

reading over 15 professional articles relating to ASD within the last five years.

Participants were asked to report the number of children diagnosed as ASD with whom they had worked during the last five years of teaching. Information pertaining to this question is found in Table 7.

Table 7

Number of Participants Reporting Experience Working with Children Diagnosed with ASD

	<i>f</i>	<i>%</i>
<u>Number of Children Diagnosed as ASD Teachers worked with During the Last Five Years</u>		
None	112	39.0
1-5	159	55.4
6-10	10	3.5
11-15	2	.7
16-20	1	.3
21+	<u>3</u>	<u>1.0</u>
Total	287	100.0

As shown in Table 7, 39% (112) of the participants reported working with no children diagnosed as ASD within the last five years. One hundred fifty-nine (55.4%) had worked with from one to five students diagnosed as ASD. Three participants reported working with over 21 students diagnosed as ASD within the last five years. These teachers worked in more than one school and were speech therapists who traditionally work with a large number of different children.

Participants were asked to report the number of children diagnosed with ASD prescribed medication and if they had contact with the physicians prescribing the medication. Information pertaining to these data is shown in Table 8.

Table 8

Number of Children Prescribed Medication and Number of Teacher Contacts with Physicians Prescribing Medication

	<i>f</i>	<i>%</i>
<u>Children with ASD Prescribed Medication</u>		
Yes	126	44.4
No	<u>157</u>	<u>55.6</u>
Total	283	100.0
<u>Teacher Contact with Physicians</u>		
Yes	45	15.7
No	<u>242</u>	<u>84.3</u>
Total	287	100.0

As shown in Table 8, results indicated that 157 respondents (55.5%) reported the students with ASD with whom they had worked had not been prescribed medication and 241 respondents (84.3%) indicated they had no contact with physicians regarding the students with whom they had worked. One hundred twenty-six teachers indicated the students with ASD with whom they had worked had been prescribed medication, but only 45 teachers (15.7%) reported having had contact with physicians regarding medication issues of students with ASD.

Two hundred eighty-five out of 292 participants responded to the question relating to communication techniques they had used in working with students with ASD. Participants were asked to check any of the following techniques they used: facilitated communication, augmentative communication devices, picture exchange communications, or auditory integration therapy. Information pertaining to these analyses is shown in Table 9.

Table 9

Communication Techniques and Types of Teaching Methods used by Teachers for Children Diagnosed with ASD

	<i>f</i>	<i>%</i>
<u>Communication Techniques</u>		
Facilitated Communication		
Yes	62	21.8
No	<u>223</u>	<u>78.2</u>
Total	285	100.0
Picture Exchange Systems		
Yes	111	38.9
No	<u>174</u>	<u>61.1</u>
Total	285	100.0
Auditory Integration		
Yes	15	5.3
No	<u>270</u>	<u>94.7</u>
Total	285	100.0
Augmentative Communication Devices		
Yes	63	22.1
No	<u>222</u>	<u>77.9</u>
Total	285	100.0

As shown in Table 9, the majority of respondents (111) reported having used picture exchange communication systems more than any other communication technique. However, 174 (61.1%) of 285 respondents had never used this technique.

To further determine experience in teaching methods pertaining to students diagnosed with ASD, teachers were asked to identify specific teaching methods they had used in working with children with ASD. Information pertaining to this question is presented in Table 10.

Table 10:

Teaching Methods Used Reported by Survey Participants

	<i>f</i>	<i>%</i>
<u>Teaching Methods</u>		
<u>Applied Behavior Analysis</u>		
Yes	57	19.9
No	<u>229</u>	<u>80.1</u>
Total	286	100.0
<u>Discrete Trial Training</u>		
Yes	53	18.5
No	<u>233</u>	<u>81.5</u>
Total	286	100.0
<u>Structured Teaching</u>		
Yes	137	47.9
No	<u>149</u>	<u>52.1</u>
Total	286	100.0
<u>Incidental Teaching</u>		
Yes	55	19.2
No	<u>231</u>	<u>80.8</u>
Total	286	100.0
<u>Functional Communication Training</u>		
Yes	52	18.2
No	<u>234</u>	<u>81.8</u>
Total	286	100.0

As shown in Table 10, out of the choices listed, 137 respondents (47.9%) identified structured teaching as the method used most by teachers in this area. However, 149 respondents (52.1%) reported never having used this method.

Applied behavior analysis (ABA) was the second method used most often by teachers in this area with 57 respondents (19.9%) indicating “yes”, they had used this method. Even so, 229 respondents (80.1%) indicated “no” they had never used ABA.

To further answer the question relating to experience of teachers working with children diagnosed with ASD, teachers were asked if they considered ASD to be a legitimate educational problem for all teachers. Information pertaining to this question is presented in Table 11.

Table 11

Survey Responses to "Is ASD a Legitimate Educational Problem for all Teachers?"

	<i>f</i>	<i>%</i>
<u>ASD is a Legitimate Educational Problem</u>		
Yes	213	73.7
No	32	11.1
Do Not Know	<u>44</u>	<u>15.2</u>
Total	289	100.0

Two hundred eighty-nine participants out of 292 responded to this question. Seventy-three percent (212) indicated that ASD is a concern for all teachers, while 32 respondents (11.1%) said "no" it is not a legitimate concern for all teachers.

Participants were asked to prioritize (with 1 being highest and 6 being lowest priority) skill areas with regard to teaching children with ASD. They were asked to rate these areas indicating the skills they thought were most important for children with ASD to learn. Skill areas listed were vocational, behavior, self-help, academic, social, and communication skills. Information pertaining to this analysis is shown in Table 12.

Table 12

Prioritized Skills Considered Most Important for Children with ASD

	<i>f</i>	<i>%</i>
Skill Areas		
Vocational Skills		
1 st	0	0.0
2 nd	8	3.5
3 rd	10	4.3
4 th	30	13.0
5 th	107	46.5
6 th	<u>75</u>	<u>32.6</u>
Total	230	100.0
Behavior Skills		
1 st	40	17.4
2 nd	69	30.0
3 rd	63	27.4
4 th	37	16.1
5 th	15	6.5
6 th	<u>6</u>	<u>2.6</u>
Total	230	100.0
Self-Help Skills		
1 st	46	20.0
2 nd	50	21.7
3 rd	46	20.0
4 th	54	23.5
5 th	27	11.7
6 th	<u>7</u>	<u>3.0</u>
Total	230	100.0
Academic Skills		
1 st	2	.9
2 nd	6	2.6
3 rd	18	7.8
4 th	24	10.4
5 th	53	23.0
6 th	<u>127</u>	<u>55.2</u>
Total	230	100.0

Table 12 (continued)

	<i>f</i>	%
Social Skills		
1 st	33	14.3
2 nd	53	23.0
3 rd	65	28.3
4 th	60	26.1
5 th	14	6.1
6 th	<u>5</u>	<u>2.2</u>
Total	230	100.0
Communication Skills		
1 st	109	47.4
2 nd	44	19.1
3 rd	28	12.2
4 th	25	10.9
5 th	14	6.1
6 th	<u>10</u>	<u>4.3</u>
Total	230	100.0

Special Education teachers chose communication skills ($n=109$, 47.4%) as the highest priority skill that should be taught to children with ASD. Behavior skills were chosen as the second highest priority ($n=69$, 30.0%) skill area that should be taught. Sixty-five teachers (28.3%) chose social skills as third priority and 54 teachers (23.5%) chose self-help skills as fourth priority. Vocational skills ($n=107$, 46.5%) were chosen as fifth priority. Special education teachers ($n=127$, 55.2%) indicated that academic skills were the least important skills to be taught to children with ASD.

Research Question 4

What are the professional needs of special education teachers employed in 11 Northeast Tennessee school systems regarding ASD?

The fourth category of teacher characteristics was “professional needs”. To answer question 5, respondents were asked survey questions to

determine the areas and types of future training needed regarding ASD. Information pertaining to this category is presented in Table 13.

Table 13
Study Participants by Professional Needs

	Yes		NO		Total	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
<u>Do You Want Additional Training?</u>	223	77.4	65	22.6	288	100.0
<u>Areas and Methods to Receive Training</u>						
<u>Areas for Additional Training</u>						
ABA	135	48.0	145	52.0	280	100.0
<hr/>						
Social Stories	77	27.5	203	72.4	280	100.0
Picture Exchange Systems	72	25.7	208	74.3	280	100.0
Academic Skills	100	35.7	180	64.3	280	100.0
Self-Help Skills	101	36.1	179	63.9	280	100.0
<hr/>						
<u>Method to Receive Information</u>						
In-Service Training	197	68.2	92	31.8	289	100.0
Attend Conferences	139	48.1	150	51.9	289	100.0
Attend Workshops	183	63.3	106	36.7	289	100.0
Read Books	45	15.6	244	84.4	289	100.0
Read Professional Articles	106	36.7	183	63.3	289	100.0
Observe Teachers/Classes	125	43.3	164	56.7	289	100.0
Internet	55	19.0	234	81.0	289	100.0
<hr/>						
Attend Class on Autism at ETSU	154	53.5	134	46.5	288	100.0

As shown in Table 13, 288 participants responded to the question regarding additional training on autism. Two hundred twenty-three (77.4%) indicated a desire for additional training in the field of autism. However, the majority of the respondents indicated they did not want additional training on the areas listed on the survey. Three areas indicated most often for

additional training were the areas of ABA ($n=135$, 48.0%), academic skills ($n=100$, 35.7%), and self-help skills ($n=101$, 36.1%).

Two hundred eighty-eight teachers responded to the question concerning the best method to receive information about ASD. The majority ($n=197$, 68.2%) of teachers preferred to receive information during in-service training. The following methods to receive information are prioritized as to the methods chosen most often by the respondents: in-service training workshops, conferences, observation of other classes and/or teachers, read professional articles, Internet, and read books. Only 45 participants (15.6%) responded affirmatively to reading books about ASD to obtain information.

As a final question in the area of professional needs, participants were asked if they would attend a class or classes for certification in ASD if such classes were offered by East Tennessee State University. One hundred fifty-four participants (53.3%) answered "yes" to attending class or classes about ASD.

Research Question 5

What is the level of knowledge (etiology and educational programming) about ASD among educators in Northeast Tennessee?

On the knowledge survey for ASD, 13 items comprised the etiology scale on the ASD survey. Each correct item was given a score of 1 so the maximum score for the etiology portion of the survey was 13. In Table 14, the percentage of questions answered correctly by current position is presented.

Table 14

Percentage of Etiology Items Correct by Current Position

<u>Question #</u>	<u>Resource</u>	<u>CDC</u>	<u>Speech</u>	<u>Other</u>	<u>Total</u>
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
#1	91.9	94.6	94.9	100.0	92.7
#3	63.5	58.1	51.3	50.0	60.1
#7	91.6	95.9	89.7	100.0	92.7
#8	91.7	97.3	94.9	83.3	93.4
#9	95.2	97.3	94.9	100.0	95.8
#10	88.6	94.6	87.2	83.3	89.9
#14	12.0	14.9	12.8	33.3	13.3
#19	64.1	71.2	63.2	33.3	65.1
#21	7.8	12.2	18.4	33.3	10.9
#23	30.5	41.9	55.3	50.0	37.2
#24	73.7	85.1	70.3	66.7	76.1
#25	95.8	98.6	94.7	100.0	96.5
#28	70.1	74.3	86.8	100.0	74.0

Educators obtained a Mean score of 8.85 on the etiology portion of the ASD survey. As shown in Table 14, educators scored below 50% on three questions: 14, 21, and 23.

Question 14 stated: "Many children with autism have a great deal of difficulty with change in routines. The use of response cost can help correct this problem." The breakdown of correct percentages for this question was as follows: resource teachers (12%), CDC teachers (14.9%), speech therapists (12.8%), and all other (33.3%). Responses to this question could possibly have been affected by the construction of the item. Consequently, the question should be modified/clarified if the scale is used in other studies.

In answer to question 14, Bevilqua (2001) recommended the use of positive behavioral supports and structured visual schedules to reduce anxiety due to change in routines for students with ASD. Likewise, Dunlap

and Fox (1999) recommended the use of written or picture schedules to ensure that the flow of activities was understandable and predictable to reduce the anxiety caused by change in routines for students with ASD. Heflin and Alberto (2001) also recommended using visual/concrete systems to structure a predictable environment for students with ASD.

The second question (#21) stated, "There is valid research that shows that the use of sensory integration techniques can cause increased educational gains." Again, over 50% of the respondents answered this question incorrectly. Although this method is widely used by occupational therapists in school districts in this area, valid research does not exist supporting the educational benefits of this treatment (Green, 1996; National Information Center for Children and Youth with Disabilities, 1998; Smith, 1996; Tsai, 1998).

The third question with the highest percentage of incorrect answers was question 23: "Facilitated communication is validated by research." Again, there is no valid research indicating that facilitated communication is a method with beneficial results for children with ASD (National Information Center for children with Disabilities, 1998; Smith, 1996). In fact, according to Smith, scientific studies conducted involving this method revealed that the complex statements that were attributed to people with disabilities using a facilitator were actually written by the facilitator and not the individual with the disability. Sixty-two (21.8%) of the survey respondents reported using this method with children with ASD.

Sixteen items comprised the educational programming portion of the ASD knowledge survey. Each correct item was given a score of 1 so the maximum score on this portion of the survey was 16. An item analyses for correct responses for the educational programming portion of the survey is found in Table 15.

Table 15

Percentage of Educational Programming Items Correct by Current Position

Question#	Resource	CDC	Speech	Other	Total
#2	8.4	5.4	5.1		7.0
#4	74.4	71.6	74.4	83.3	73.9
#5	94.0	97.3	92.3	100.0	94.8
#6	90.4	95.9	87.2	83.3	91.2
#11	89.8	91.9	84.6	100.0	89.9
#12	94.0	95.9	89.7	100.0	94.1
#13	92.2	89.2	87.2	100.0	90.9
#15	58.7	43.2	61.5	33.3	54.5
#16	95.2	91.9	94.9	100.0	94.4
#17	91.6	91.9	71.8	100.0	89.2
#18	69.5	58.1	63.2	83.3	66.0
#20	93.4	94.6	100.0	66.7	94.0
#22	67.7	70.3	64.9	66.7	68.0
#26	77.8	82.4	78.9	100.0	79.6
#27	83.2	81.1	86.8	83.3	83.2
#29	88.6	85.1	89.5	100.0	88.1

Educators obtained a mean score of 12.76 on the educational programming section of the survey. As shown in Table 15, respondents scored below 50% on question 2. For the remaining 15 questions, respondents scored above 50%.

Question 2 stated the following: Autism is an emotional disorder, not a neurological one. Students with ASD oftentimes display emotional problems, but according to Tsai, "both behavioral and biological studies have found sufficient evidence to suggest that there are neurobiological etiologies for ASD" (2000, p. 142).

Research Question 6

Are there differences between resource teachers', speech therapists', and comprehensive developmental classroom (CDC) teachers' levels of knowledge (etiology and educational programming) about ASD?

Two statistical hypotheses were developed and analyzed from question 6.

Ho1: There is no significant difference in etiology scores of resource teachers, speech therapists, and CDC teachers.

Ho2: There is no significant difference in educational programming scores between resource teachers, speech therapists, and CDC teachers.

An analysis of variance (ANOVA) was used to determine if there was a significant difference in the level of knowledge regarding etiology of ASD among resource teachers, CDC teachers, and speech therapists. Information pertaining to this analysis is presented in Table 16.

Table 16

Comparison of Etiology Score Means by Current Teaching Position

<u>Current Position</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Resource	164	8.87	1.30	.148	.931
CDC	74	8.90	1.12		
Speech Therapist	38	8.66	1.63		

As shown in table 16, there was not a statistically significant difference among resource teachers, CDC teachers, and speech therapists regarding knowledge of etiology for ASD. The null hypothesis was retained.

An analysis of variance (ANOVA) was again used to determine if there were differences in the level of knowledge (educational programming) about ASD among resource teachers, CDC teachers, and speech therapists. Information pertaining to this hypothesis is presented in Table 17.

Table 17

Comparison of Educational Programming Score Means by Current Teaching Position

<u>Current Position</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Resource Teacher	165	12.64	1.67		
CDC Teacher	73	12.91	1.58		
Speech Therapist	37	12.91	1.96		
Between Groups				1.16	.324

As shown in Table 17, there was no statistically significant difference in the level of knowledge regarding educational programming for ASD among resource teachers, CDC teachers, and speech therapists. The null hypothesis was retained.

Research Question 7

Are there differences between resource teachers, CDC teachers, and speech therapists with different degree levels (B.S., M.A., Ed.S., Ed.D.) with respect to their level of knowledge (etiology and educational programming) about ASD?

Two statistical hypotheses were developed from research question 7. Ho7₁: There is no significant difference between resource teachers, CDC teachers, and speech therapists with different degree levels (BS., MA., Ed.S, Ed.D) with respect to their level of knowledge regarding etiology of ASD. Ho7₂: There is no significant difference between resource teachers, CDC teachers, and speech therapists with different degree levels (B.S., M.A., EdS, EdD) with regard to their knowledge level of educational programming for ASD.

Four categories existed on the questionnaire: B.S., M.A., Ed.S., and Ed.D. Only one respondent had an EdD and only eight respondents had an EdS; therefore, the categories were collapsed into bachelors and masters+. The t-test for independent means was used to address question 8 and null hypotheses Ho7₁. Results of the analysis are shown in Table 18.

Table 18:

Comparison of Means by Highest Degree Obtained and Etiology Score

<u>Highest Degree</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Bachelors	116	8.83	1.28	.261	.795
Masters+	168	8.87	1.34		

As shown in Table 18, there was no significant difference between special education teachers with different degree levels (bachelors, masters+) with respect to their level of knowledge (etiology) of ASD. The two-tailed probability was .795; therefore, the null hypothesis was retained.

Ho7₂: There is no significant difference between special education teachers with different degree levels (B.S., M.A., Ed.S, Ed.D) with respect to their level of knowledge (educational programming) about ASD. A t-test for independent means was used to address question 7 and null hypothesis Ho7₂. Information pertaining to the analysis is found in Table 19.

Table 19

Comparison of Means by Highest Degree Obtained and Educational Programming Score

<u>Highest Degree</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Bachelors	117	12.70	1.72	.501	.617
Masters+	166	12.80	1.69		

As shown in Table 19, there was no significant difference with regard to knowledge level about educational programming for ASD among resource teachers, CDC teachers, and speech therapists. The two-tailed probability was not significant ($p=.617$); therefore, the null hypothesis was retained.

Research Question 8

Are there differences between special educators with different levels of professional experience (0-6 years, 7-11 years, 15-21 years, 22+ years) in terms of their level of knowledge (etiology and educational programming) about ASD?

Two statistical hypotheses were developed from research question 8.

Ho8₁: There are no differences between special educators with different levels of professional experience (0-6 years, 7-14 years, 15-21 years, 22+years) in terms of their level of etiology knowledge about ASD.

Ho8₂: There are no differences between special educators with different levels of professional experience (0-6years, 7-14 years, 15-21 years, 22+years) in terms of their level of educational programming knowledge about ASD.

An analysis of variance was used to address question 8 and null hypotheses Ho8₁. The results of this analysis are shown in Table 20.

Table 20

Comparison of Etiology Score Means of Special Educators with Different Levels of Experience

Years of Experience	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
0-6	84	8.72	1.25	.879	.453
7-14	78	8.88	1.46		
15-21	59	8.72	1.48		
22+	59	9.05	.99		
Total	280	8.83	1.31		

Analysis of the data indicated no significant difference existed between the groups in terms of etiology score on the knowledge survey. Eighty-four teachers ($M=8.72$, $SD=1.25$) comprised the largest group reporting years of experience ranging from 0-6 years. The results of the ANOVA supported the hypothesis that there was no difference between special educators level of knowledge about etiology of ASD and their different levels of professional experience. Hypothesis H_{08_1} was retained.

An analysis of variance was conducted to evaluate the relationship between special educators level of knowledge about educational programming for ASD and their different levels of professional experience. The results of the analysis are shown in Table 21.

Table 21

Comparisons of Educational Programming Score Means of Special Educators with Different Levels of Experience

Years of Experience	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	Tukey LSD PostHoc Comparison
0-6	84	13.01	1.76	3.161	.025	>2
7-14	77	12.29	1.66			<1,3
15-21	58	13.05	1.46			>2
22+	60	12.71	1.79			
Total	279	12.75	1.70			

A one-way analysis of variance was conducted to evaluate the relationship between special educators with different levels of professional experience and scores obtained on the educational programming portion of the ASD Knowledge Survey. The independent variable, years of experience, included four levels: 0-6 years, 7-14 years, 15-21 years, and 22+ years of experience. The dependent variable was educational programming scores.

As shown in Table 21, the ANOVA was significant, $F=3.161$, $p=.025$. Follow-up tests were conducted to evaluate pair wise differences among the means. The Tukey LSD Posthoc Comparison Test indicated significant mean differences between the group with 0-6 years of experience and the group with 7-14 years of experience ($p=.036$). Tukey's also indicated differences between the group with 7-14 years of experience and the group with 15-21 years of experience ($p=.049$).

The Tukey LSD Posthoc Comparison Test resulted in significant mean differences between the group with 0-6 years of experience and the group with 7-14 years of experience, $p<.05$ (.008). In addition, there was a significant mean difference between the group with 7-14 years of experience and the group with 15-21 years of experience on the educational programming portion of the survey.

The results of the ANOVA shown in Table 21 do not support the hypothesis that there are no differences between special educators with different levels of professional experience in terms of their level of educational programming knowledge of ASD. Therefore, the null hypothesis was rejected.

Research Question 9

Are there differences between elementary special educators, middle school special educators, secondary school special educators, and special educators working at more than one school level in terms of their level of knowledge (etiology and educational programming) about ASD?

Two statistical hypotheses developed from research question 9.

Ho9₁: There are no differences between elementary special educators, middle school special educators, and secondary school special educators in terms of their level of etiology knowledge about ASD.

Ho9₂: There are no differences between elementary special educators, middle school special educators, and secondary school special educators in terms of their level of educational programming knowledge about ASD.

Nine categories of "school level" were reported by respondents on the questionnaire: preschool, elementary, middle, secondary, all levels, elementary and middle, elementary, middle, and secondary, middle and secondary, and preschool and elementary. Thirty-six respondents reported working at more than one school level. The number of respondents working at more than one school level ranged from a high of 12 working at both elementary and middle schools to a low of 5 who reported working either at all levels or at the middle and high school level. Therefore, the categories were collapsed into four main levels: elementary, middle, secondary, and more than one school level.

A one-way analysis of variance was conducted to evaluate the difference between elementary special educators, middle school special educators, secondary school special educators, and special educators working at more than one school level in terms of their level of etiology knowledge about ASD. The results of the analysis are shown in Table 22.

Table 22

Comparison of Special Educators' Etiology Scores by School Level

<u>School Level</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Elementary	132	8.90	1.36	2.038	.109
Middle	57	8.96	1.05		
Secondary	60	8.50	1.50		
More Than One Level	34	9.00	1.11		

As shown in Table 22, there was no significant difference between the groups in terms of etiology score on the knowledge survey. The largest group of teachers ($n=132$, $M=8.90$, $SD=1.36$) reported working at the elementary school level. The smallest group of teachers ($n=34$, $M=8.85$, $SD=1.31$) reported working at more than one school level. The null hypothesis was retained.

An analysis of variance was conducted to evaluate the difference between special educators working at different school levels and their educational programming knowledge of ASD. The results of the analysis are shown in Table 23.

Table 23

Comparison of Special Educators' Educational Programming Scores by School Level

<u>School Level</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Elementary	131	12.69	1.75	1.35	.258
Middle	57	12.64	1.54		
Secondary	60	12.65	1.63		
More Than One Level	34	13.29	1.81		

Analysis of the data indicated no significant difference existed between the groups in terms of educational programming scores on the knowledge survey for ASD. One hundred thirty-one elementary teachers ($M=12.69$, $SD=1.75$) comprised the largest group in the school level category. The null hypothesis was retained.

Research Question 10

Are there differences between teachers in the city and county school systems in terms of their level of knowledge (etiology and educational programming) about ASD?

Two null hypotheses emerged from research question 10 for analysis. Ho_{10_1} : There is no difference between teachers in the city and county school systems in terms of their level of knowledge (etiology) about ASD. Ho_{10_2} : There is no difference between teachers in the city and county school systems in terms of their level of knowledge (educational programming) about ASD.

To compare differences on etiology scores between the city and county systems, an independent samples *t*-test was used to test the null hypothesis. This analysis is presented in Table 24.

Table 24

Comparison of Etiology Score Means by School System Type

Type of School System	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
City	51	12.70	1.65	.217	.828
County	232	12.76	1.71		

As shown in Table 24, there was no difference in mean etiology scores between special educators working in the city and county school systems. The failure to find a significant difference may have been due to the low power of the statistical test caused by the small number of city school systems ($n=3$) in the group. The null hypothesis was retained.

An independent samples *t*-test was used to test the null hypothesis stating there is no difference between educational programming scores between city and county educators. Information pertaining to this analysis is presented in Table 25.

Table 25

Comparison of Educational Programming Score Means by School System Type

Type of School System	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
City	51	12.70	1.65	.217	.828
County	232	12.76	1.71		

As shown in Table 25, there was no significant difference with regard to knowledge level of educational programming scores for ASD between city and county educators. The null hypothesis was retained.

Research Question 11

Are there differences in special education teachers' and speech therapists' level of knowledge about ASD etiology and educational programming when controlling for years of professional experience, highest degree held, and type of system in which employed?

Two null hypotheses emerged from research question 11.

Ho11₁: There are no differences in special education teachers' and speech therapists' level of knowledge about etiology of ASD when controlling for years of professional experience, highest degree held, and type of system in which employed.

Ho11₂: There are no differences in special education teachers' and speech therapists' level of knowledge about educational programming of ASD when controlling for years of professional experience, highest degree held, and type of system in which employed.

The analysis of covariance (ANCOVA) was used to address research question 11 and the two null hypotheses. Results for the analysis of the two hypotheses are presented in Table 26.

Table 26

Difference in Etiology and Educational Programming Scores Adjusted Means by Position

<u>Group</u>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>ADJ. M</i>	<i>F</i>	<i>p</i>
<u>Etiology</u>						
Special Education Teachers	234	8.86	1.25	8.87	.525	.758
Speech Therapists	38	8.76	1.63	8.72		
<u>Educational Programming</u>						
Special Education Teachers	234	12.73	1.64	12.73	.474	.795
Speech Therapists	37	12.91	1.96	12.94		

When controlling for years of experience, highest degree held, and type of system in which employed, there was no difference in special education teachers' and speech therapists' etiology scores. The covariate effects were as follows: years of experience ($F=2.20, p=.139$), highest degree held ($F=.326, p=.568$), and type of system ($F=.014, p=.907$). When comparing the adjusted means, the covariates did not have much effect on "adjusting" means for position. The null hypothesis was retained.

As shown in Table 26, there was no significant difference in special education teachers' and speech therapists' level of knowledge regarding educational programming scores on the survey when controlling for years of professional experience, highest degree held, and type of system in which employed. The covariate effects were as follows: years of experience ($F=.202, p=.653$), highest degree ($F=.004, p=.951$), and type of system ($F=.086, p=.770$). When comparing the adjusted means, the covariates did not have much effect on "adjusting" means for position. The null hypothesis was retained.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The primary goal of this study was to determine the knowledge level (etiology and educational programming) of ASD among special educators and speech therapists in Northeast Tennessee. The study's population consisted of special educators and speech therapists employed in 11 school systems in Northeast Tennessee.

The survey instrument used in the study had two sections. The first section, consisting of 16 multiple-choice items, was designed to elicit demographic information from the participants. The second section, 29 true/false questions, was designed to ascertain ASD knowledge concerning etiology and educational programming.

Data from the survey instrument were analyzed using the Statistical Package for Social Sciences version 10.0 and were presented in Chapter 4. Frequency tables were used to provide answers to the first section of the survey dealing with research questions one through five.

Analysis of Variance was used to identify significant differences associated with research questions 6, 8, and 9. These analyses included the comparisons of resource teachers', speech therapists', and CDC teachers' scores on the etiology and educational programming portion of the survey. In addition, ANOVA was used to compare differences between special educators with different levels of experience and special educators working at different school levels in terms of their scores on the etiology and educational programming portions of the survey.

Independent samples *t*-tests were used to identify significant differences associated with research questions 7 and 10. Question 7 determined if there were differences between special educators with

different degree levels with respect to the level of knowledge about ASD. Question 11 sought to determine if there were differences in etiology and educational programming scores on the ASD survey between city and county special educators.

Finally, an analysis of covariance (ANCOVA), was used to analyze research question 12 which sought to determine significant differences in special educators' and speech therapists' ASD scores when controlling for years of professional experience, highest degree held, and type of system in which employed.

Research Question 1

What are the occupational characteristics of special education personnel employed in 11 Northeast Tennessee School Systems?

Information pertaining to the occupational characteristics of special educators was divided into three categories. These included the school level at which the educators were employed (preschool, elementary, middle, and/or secondary), the number of years each person had taught in special education, and his/her current teaching position.

The majority (41.0%) of special educators surveyed reported working at the elementary level. This is not surprising because school systems traditionally have more elementary schools than middle or high schools. Surprisingly, 36 respondents (12.4%) reported working at more than one school. It is not unusual for speech therapists to work at more than one school. However, some of the respondents were also resource teachers. This would lead one to assume that some schools do not have enough students identified as requiring special education to employ a full-time teacher. Only 5.5% of the respondents reported working at the preschool level. Many school systems either have only one preschool or no preschool at all.

Out of 267 respondents reporting the number of years worked in special education, the majority (29.5%) reported working from 7 to 14

years. The second largest group was the educators who had worked from zero to six years (27.7%). Fifty-four respondents reported working from 21–32 years in special education. In the next several years, a large percentage of special education teachers will be eligible for retirement, adding to the shortage of available qualified teachers that already exists in this area.

The third category of occupational characteristics was current teaching position. Within this category, participants were asked to list the special education position in which they were currently employed. The majority (170, 58.8%) of special educators in our region reported working as resource teachers. This may be due in part to the federal law requiring students be placed in the least restrictive environment which includes many inclusion or partial inclusion placements. Resource teachers serve these students in a variety of ways from consultation with the regular classroom teacher to direct services.

Only 74 (25.6%) out of 289 respondents reported working in a CDC position. The term, CDC, is unique to Tennessee and refers to a classroom setting where the majority of a student's education takes place. With the onset of inclusion, many students who were placed in CDC classrooms are now able to participate in the regular education program.

Research Question 2

What training did special education personnel in 11 school systems in Northeast Tennessee obtain to be prepared to teach children with ASD?

Frequencies were used to determine and categorize training special education personnel obtained in preparation for working with students diagnosed with ASD. One hundred twenty (41.1%) of the participants obtained Bachelor's degrees. The majority (55.8%) of special educators had master's degrees and eight (2.7%) reported obtaining an educational specialist degree. One respondent had a doctorate.

In response to the question asking for highest degree major, the majority (167, 64.5%) of respondents majored in special education. However, 67 (25.9%) special educators had highest degrees in fields other than special education and 25 (9.7%) special educators obtained degrees in dual fields including special education and some other area. The field of special education is increasingly complex and there is a high rate of turn over in the field leading to chronic shortages (Porter, 2000). Special educators with degrees in other fields bring diverse abilities to the classroom. However, many are also looking for an opportunity to leave the field of special education and have thus made themselves employable in other areas of education. According to the United States Department of Education (1998), a shortage of 27,000 special educators existed throughout the nation during 1987-1995.

Participants reported obtaining degrees from 35 different universities throughout the United States. The top five universities reported were as follows: East Tennessee State University (164), University of Tennessee (31), Tusculum College (22), Carson Newman College (9), and Milligan College (9). Fifty-three educators received degrees from other universities.

Participants were asked to report the year in which they obtained their most recent degree. The largest percentage (64, 26.7%) obtained degrees between 1998 and 2002, while 52 (21.7%) obtained degrees between 1993 and 1997.

Twenty-four special educators obtained degrees from 1973 to 1977. Nine special educators obtained degrees between 1967-1972. The Elementary and Secondary Education Act of 1965 (ESEA) was the first program to provide funding for children with disabilities. However, it was not until 1974 when The Education Amendments of 1974, P.L. 93-380, went into effect that states receiving federal special education funding were required to provide full educational opportunities for all children with disabilities (Yell,

Rogers, & Rogers, 1998). Thus, 33 of the respondents have virtually “grown up” with special education and have much to contribute to the special programs in our region.

Out of 292 survey participants, only 6 reported completing an entire class dedicated solely to ASD. Fifty-six received no instruction regarding ASD during their university training, but the majority (229) of special educators received brief instruction about ASD as part of a class during their university training.

Due to the difficulty of being able to extensively cover every disability during university training, new teachers may not be adequately prepared to provide an appropriate education for students with ASD or other disabilities. Thus, it is up to the local school district and state education agencies to provide further opportunities for these educators to learn methods and strategies to address problem areas involved with specific disabilities. According to Porter (2000), FAPE violations can occur when students with disabilities receive education from a certified special education teacher who may not be certified in the area of the students’ disabilities.

Research Question 3

What types of experience regarding ASD have special education personnel had while teaching?

Participants were asked if they had received any instruction regarding ASD while teaching. The majority (149, 51.7%) attended workshops and read articles pertaining to ASD while employed as a special educator. Twenty-four of the respondents obtained training through TRIAD, attended TEACCH training, or completed training in applied behavior analysis. TRIAD is a program offered through Vanderbilt University in cooperation with the Tennessee State Department of Education that provides extensive training in methods and strategies for students with ASD to special educators. The TEACCH Program is located in North Carolina and is another method specific

to working with students with ASD. While applied behavior analysis can be used with any student, research has shown that these methods are of particular use with students diagnosed with autism.

Special educators in this region prefer to read articles about ASD rather than books. The majority (149, 51.7%) of special educators in this region reported reading no books about ASD, but 154 special educators reported reading from one to five articles about the subject. Only two educators reported reading over 15 books dealing with ASD while 39 (13.5%) reported reading over 15 articles about ASD. This could be because articles are shorter and require less time to read, or it could be that educators have greater access to journal articles rather than books concerning ASD.

Participants were asked to report the number of children diagnosed with ASD with whom they had worked in the past five years. The majority (159, 55.4%) reported working with from one to five students diagnosed with ASD. One respondent worked with 16-20 students and three worked with over 21 students diagnosed with ASD. The educators working with the highest number of students diagnosed with ASD were speech therapists.

Frequencies were again used to analyze responses to the number of children prescribed medication and the number of teacher contact with physicians prescribing medication. The majority (158, 55.6%) of participants worked with children diagnosed with ASD who were not prescribed medication. One hundred twenty-six (44.4%) survey participants worked with children diagnosed as ASD who were prescribed medication, but only 45 of those surveyed had contact with the prescribing physicians. The vast majority, 242, had no contact with physicians prescribing medication.

Some students diagnosed with ASD have severe communication problems that can lead to high frustration levels because of an inability to communicate. Survey participants were asked if they had used any of the

following communication techniques with students diagnosed with ASD: facilitated communication, picture exchange systems, auditory integration, and/or augmentative communication devices.

While picture communication exchange systems was the most popular (111, 38.9%) method used to teach communication skills by special educators in this region, the majority (174, 61.1%) of special educators had never used this system. According to the special educators involved in this survey, only 63 had used augmentative communication devices and 62 had used facilitated communication techniques. Again, the majority (222 and 223) had never used these techniques. Fifteen special educators had used auditory integration therapy, while 270 had never used this method.

Survey participants were asked to indicate the following teaching methods used with students diagnosed as ASD: applied behavior analysis, discrete trial training, structured teaching, incidental teaching methods, and/or functional communication training. Of the special educators surveyed, 137 out of 286 identified structured teaching as the method used most frequently to work with students identified as having ASD. Special educators identified applied behavior analysis as the second most frequently used method (57, 19.9%) to work with students diagnosed with ASD. Nevertheless, 229 special educators had never used this method.

Fifty-five participants (19.2%) reported using incidental teaching methods and 53 (18.5%) had used discrete trial training. However, over 200 of the respondents had never used either of these methods.

Frequency distributions indicated that the majority ($n=213$, 73.7%) of survey participants believe ASD is a legitimate educational problem for all teachers. Recent IDEA amendments emphasize the need for participation and progress in the general education curriculum for students with disabilities along with provisions for the increased participation of general

education teachers in planning and service delivery (IDEA, 1997). Therefore, ASD is an educational problem for special educators and general educators.

According to special educators in this region, communication skills are more important than academic skills for children diagnosed with ASD. Survey participants were asked to prioritize skill areas from most important to least important with regard to teaching children with ASD. Mean scores in these areas indicated the following list of skills with the first area being most important and the last area being least important: communication skills (2.21), behavior skills (2.62), self-help skills (2.85), social skills (2.89), vocational skills (4.81), and academic skills (5.05).

Research Question 4

What are the professional needs of special education teachers employed in 11 Northeast Tennessee school systems regarding ASD?

Of the special education teachers surveyed, 77.4% reported a need for additional training regarding ASD. Of this number, 68.2% indicated that in-service training was the most popular method to receive such training. The second most popular method chosen for training ($n=183$, 63.3%) was to attend workshops. Participants chose attending conferences (48.1%), observing other teachers/classes (43.3%), and reading professional articles (36.7%) as the next most viable methods for training regarding ASD. However, only 55 participants (19.0%) chose the Internet as a method to receive information for ASD. The least most popular method chosen by participants ($n=45$, 15.6%) to obtain information was to read books about ASD.

Frequencies were used to compare the areas (applied behavior analysis (ABA), social stories, picture exchange systems, academic skills, self-help skills) needed for additional training pertaining to ASD. Out of 280 responses, participants ($n=135$, 48.0%) chose ABA as the number one area

for additional training. According to Smith (2001), ABA is recognized as an essential method for educating students with ASD. Only 57 (19.9%) survey participants indicated experience with using ABA in the classroom with students diagnosed with ASD. Therefore, there is a need for such training in our area.

Surprisingly, special educators ($n=101$, 36.1%) chose self-help skills as the second area needed for additional training. Perhaps, the usual methods for teaching these skills to students with disabilities do not work as well with students diagnosed with ASD.

Participants ($n=100$, 36.1%) chose academic skills as the third area needed for training and social stories ($n=77$, 27.5%) as the fourth area for additional training. Although the number of participants requesting this training was less than one half of the total population ($n=280$) responding to this question, the number is large enough to warrant serious consideration for training purposes.

Picture exchange systems were chosen as the fifth method needed for additional training ($n=72$, 25.7%). As indicated in Table 9 of the survey results, 111 (38.9%) of the survey participants have training in this method and already use this method in the classroom with students diagnosed as ASD. Therefore, it would appear that picture exchange systems are one of the methods already used by special educators most frequently in this area.

As a final question under "professional needs", participants were asked if they would attend a class or classes pertaining solely to ASD if offered at East Tennessee State University. Over half ($n=154$, 53.5%) of the respondents indicated they would be interested in attending such a class or classes if offered at ETSU. The large affirmative response to this question indicates a desire on the part of Northeast Tennessee special educators to not only learn more about ASD, but also to make a personal commitment to becoming certified in this area.

Research Question 5

What is the level of knowledge (etiology and educational programming) about ASD among educators in Northeast Tennessee?

On the knowledge section of the instrument, 13 items comprised the etiology scale on the ASD survey. Educators obtained a mean score of 8.85 out of a possible score of 13 on the etiology scale. Educators scored below 50% on 3 of the 13 questions. The high scores obtained on this scale can be the result of two possibilities: (1) educators are very knowledgeable about the etiology of ASD, or (2) everyone scored high because there was a problem with the ability of the instrument to discriminate.

Question 14 stated: "Many children with autism have a great deal of difficulty with change in routines. The use of response cost can help correct this problem." The breakdown of correct percentages for this question was as follows: resource teachers (12%), CDC teachers (14.9%), speech therapists (12.8%), and all other (33.3%). Interestingly, participants in the other category (school psychologists and diagnosticians) scored higher percentage wise (33.3%) than special educators in the other categories.

In answer to question 14, Bevilaqua (2001) recommended the use of positive behavioral supports and structured visual schedules to reduce anxiety due to change in routines for students with ASD. Likewise, Dunlap and Fox (1999) recommend the use of written or picture schedules to ensure that the flow of activities is understandable and predictable to reduce the anxiety caused by change in routines for students with ASD. Heflin and Alberto (2001) also recommend using visual/concrete systems in addition to reinforcement to structure a predictable environment for students with ASD.

The second question (21) stated, "There is valid research that shows that the use of sensory integration techniques can cause increased educational gains." Again, over 50% of the respondents answered this question incorrectly. Only 7.8% of the resource teachers surveyed answered

this question correctly. The other breakdowns were as follows: CDC teachers (12.2%), speech therapists (18.4%), and all other (33.3%). Although this method is widely used by occupational therapists in school districts in this area, valid research does not exist supporting the benefits of this treatment (Green, 1996; National Information Center for Children and Youth with Disabilities, 1998; Smith, 1996; Tsai, 1998).

The third question with the highest percentage of incorrect answers was question 23: "Facilitated communication is validated by research". Again, there is no valid research indicating that facilitated communication is a method with beneficial results for children with ASD (National Information Center for Children with Disabilities, 1998; Smith, 1996). In fact, according to Smith, scientific studies conducted involving this method revealed that the complex statements that were attributed to people with disabilities using a facilitator were actually written by the facilitator and not the individual with the disability. Sixty-two (21.8%) of the survey respondents reported using this method with children with ASD as opposed to the majority ($n=223$, 78.2%) who reported never using this technique. Therefore, the assumption is made that the majority of special educators knew nothing about this method when they answered the question affirmatively.

Sixteen items comprised the educational programming portion of the ASD knowledge level survey. Each correct item was given a score of 1 so the maximum score on this portion of the survey was 16. Educators obtained a mean score of 12.76, answering the majority of the questions correctly. Only one question, question 2, was answered incorrectly by over 50% of the total number (287) of respondents.

Question 2 stated the following: "Autism is an emotional disorder, not a neurological one." Only 8.4% of the resource teachers, 5.4% of the CDC teachers, and 5.1% of the speech therapists answered this question correctly. Students with ASD oftentimes display emotional problems and this

may be the reason special educators answered the question incorrectly. However, according to Tsai, "Both behavioral and biological studies have found sufficient evidence to suggest that there are neurobiological etiologies for ASD" (2000, p. 142).

CDC teachers (43.2%) answered question 15 incorrectly as opposed to resource teachers (58.7%) and speech therapists (61.5%) who answered the question correctly. Question 15 stated the following: "To have a defensible educational program, the school system must have an expert in ASD to conduct evaluations." One may infer from this analysis that CDC teachers have had less problems involving ASD evaluations than have resource teachers and speech therapists.

Interestingly, 100% of the speech therapists answered question 20 (Children with autism may be gifted.) correctly. In addition, 100% of respondents in the "other" category answered question 26 correctly. This question stated the following: "The Lovaas Method, used originally with preschool children, is an intensive behavior intervention program based upon the principals of applied behavior analysis." This may be due, in part, to the fact that psychologists and diagnosticians are exposed to a wider variety of methods and theories as a result of working with many different areas of evaluations and teaching strategies.

Research Question 6

Are there differences between resource teachers', speech therapists', and comprehensive developmental classroom (CDC) teachers' level of knowledge (etiology and educational programming) about ASD?

Both of the null hypotheses were retained. There was very little difference between resource teachers', speech therapists', and comprehensive developmental classroom (CDC) teachers' level of knowledge (both etiology and educational programming) about ASD.

Research Question 7

Are there differences between resource teachers, CDC teachers, and speech therapists with different degree levels (bachelors, masters, EdS, EdD) with respect to their level of knowledge (etiology and educational programming) about ASD?

Results of the *t* test for independent samples revealed no significant difference on the etiology and educational programming scores between the groups of teachers with different degree levels. Therefore, the null hypotheses were retained.

Research Question 8

Are there differences between special educators with different levels of professional experience (0-6 years, 7-11 years, 15-21 years, and 22+ years) in terms of their level of knowledge (etiology and educational programming) about ASD?

The first null hypothesis (5) was retained. There was very little difference between special educators with different levels of professional experience with regard to the level of knowledge on the etiology portion of the survey.

Results of the ANOVA indicated a statistically significant difference between special educators with 0-6 years of experience and 15-21 years of experience and special educators with 7-14 years of experience and 22+ years of experience. Therefore, null hypothesis 6 was rejected. Educators with 0-6 years of experience and 15-21 years of experience scored higher than the others. Educators with fewer years of experience are usually young graduates and have had training in many of the newer methods and theories. Oftentimes, during 7-14 years of experience, many educators experience "burn-out" and may not keep up with current trends. Then, a

period of renewal (15-21 years) may take place whereby educators experience a revival of interest in recent methods.

Research Question 9

Are there differences between elementary special educators, middle school special educators, secondary school special educators, and special educators working at more than one school level in terms of their level of knowledge (etiology and educational programming) about ASD?

Each of the two null hypotheses associated with this question was retained. Results of the analyses indicated very little difference between special educators working at more than one school level and elementary school, middle school, and secondary school special educators.

Research Question 10

Are there differences between teachers in the city and county school systems in terms of their level of knowledge (etiology and educational programming) about ASD?

City school systems usually have more money available for education purposes than do county schools. Therefore, one might assume that city educators have greater access to materials and staff development regarding educational topics. However, results of independent samples t-tests indicated very little difference between the two groups and their level of knowledge (both etiology and educational programming) about ASD. The null hypotheses were retained.

Research Question 11

Are there differences in special education teachers' and speech therapists' level of knowledge about ASD etiology and educational

programming when controlling for years of professional experience, highest degree held, and type of system in which employed?

Results of the Analysis of Covariance (ANCOVA) indicated no statistically significant difference. When comparing the adjusted means, the covariates (years of experience, highest degree, and type of system) did not have much effect on “adjusting” means for position. Both of the null hypotheses were retained.

Conclusions

Based on an analysis of the findings from this study, there appear to be very few deficits in special educators knowledge level of ASD. The following conclusions emerged as a result of this study:

Conclusion 1: Teachers in the Northeast Tennessee region have had very little training in research-based methodologies designed for use with students diagnosed as ASD. A low number of special educators reported having actually used methods such as ABA, discrete trial training, and picture exchange systems in the classroom setting. Even fewer survey participants ($n=29$) reported having received training through TRIAD or TEACCH.

Conclusion 2: Teachers in the Northeast Tennessee region have had very little training in research based communication methods designed for students with ASD although they recognized communication as the most important skill area to be taught. The majority reported being familiar with picture exchange systems. Lack of communication can be very frustrating for some students diagnosed with autism and can lead to behavior problems. Therefore, a need exists for further training in research based communication systems.

Conclusion 3: Special educators with 0-6 years of experience and 15-21 years of experience scored higher on the educational programming

portion of the survey than did special educators with 7-14 years of experience and 22+ years of experience.

Conclusion 4: There appears to be a severe lack of communication between educators and physicians in the Northeast Tennessee region.

Conclusion 5: The majority of special educators in this area believe that ASD is a legitimate educational problem for all teachers.

Conclusion 6: The majority of special educators in the Northeast Tennessee region have master's degrees.

Conclusion 7: The majority of special educators in this region desire additional training in the area of ASD. The preferred method to receive additional training is through in-service training.

Conclusion 8: The scores on the educational programming portion of the survey were consistently higher than the scores on the etiology portion of the survey.

Recommendations for the Improvement of Practice

The following recommendations are made based upon the analyses conducted of the survey responses regarding ASD.

1. With the increase in the number of identified children diagnosed with ASD, area universities could offer classes or workshops specific to this disability.
2. In lieu of university classes, area universities could put together teams of professionals knowledgeable about ASD that could provide intensive training for special educators and general educators at the local school district level.
3. Special education supervisors in the Northeast Tennessee District could combine to provide intensive training sessions regarding ABA, picture exchange systems, and discrete trial analysis to area special educators.

4. Special educators need closer contact with physicians prescribing medication for students with ASD so that they might better serve the needs of these students in the educational setting.
5. Local school districts should provide ASD training for both special education and general education teachers.

Recommendations for Further Research

Due to an increasing number of students diagnosed as ASD in the public school system and because of the multitude of theories and methodologies that abound regarding ASD, it is imperative that educators obtain training in research based educational practices in order to provide a meaningful education for these students. The following recommendations are made for further research.

1. This study could be replicated in other portions of the state.
2. Future studies might include qualitative research in which the researcher could directly observe methods used by special educators for students diagnosed with ASD and then interview parents to ascertain their opinion of the effectiveness of the methods used in the educational setting.
3. Future studies might determine the effectiveness of TRIAD Training throughout Tennessee by interviewing professionals who have completed the training, implemented training method and practices, and then served as trainers by teaching participants from other school districts.
3. Future studies may involve giving the same instrument to "general" education teachers and make comparisons about the knowledge section.
4. The same instrument could be given to "general" education teachers and compare the results with the results of special educators.

REFERENCES

- Adolphs, R., Sears, L., & Piven, J. (2001). Abnormal processing of social information from faces in autism. *Journal of Cognitive Neuroscience* 13, 232-244.
- Anderson, S. R., & Romanczyk, I. G. (1999). Early intervention for young children with autism: Continuum-based behavioral models. *Journal of the Association for Persons with Severe Handicaps*, 24,162-173.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author. 66-78.
- Baird, M. (2001). Public autism hearings may pose 'scary' threat to schools, attorneys say. *The Special Educator*, 16, 1, 5-6.
- Bettelheim B. (1967). *The empty fortress: Infantile autism and the birth of the self*. NY: Free Press.
- Bevilaqua, S. (Ed.). (2001). *Best practices for educating students with autism*. Horsham, PA: LRP Publications.
- Biklen, D. (1993). *Communication unbound: How facilitated communication is challenging traditional views of ability/disability*: New York: Teachers College.
- Blevins, J. (1996). *Public School Teachers' and Principals' Knowledge of Attention Deficit Hyperactivity Disorder*. Unpublished doctoral dissertation, East Tennessee University, Johnson City.
- Board of Education of the Hendrick Hudson Central School District v. Rowley* 458 U.S. 176 (1982).
- Board of Education v. Diamond*, 808 F.2nd 987 (3rd Cir. 1986).

- Campbell, M., Schopler, E., Cueva, J., & Hallin A. (1996). *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 134-144.
- Carr, E. G. (1997). Teaching autistic children to use sign language: Some research issues. *Journal of Autism and Developmental Disorders*, 9, 345-359.
- Chez, M., & Buchanan, C. (2000). Reply to B. Rimland's "Comments on 'Secretin and autism: A two-part clinical investigation'". *Journal of Autism and Developmental Disorders*, 30, 97.
- Chez, M., Buchanan, C., Bagan, B., Hammer, M., McCarthy, K., Ovrutskaya, I., Nowinski, C., et al. (2000). Secretin and autism: A two-part clinical investigation. *Journal of Autism and Developmental Disorders*, 30, 87-93.
- Children with autism increases in Florida. (1998, Oct. 7.) *Miami Herald*, 5.
- Cobb County School District*, 24 IDELR 875 (SEA GA 1996).
- Cohen, D. J., & Volkmar, F. R. (Eds.). (1997). *Handbook of autism and pervasive developmental disorders* (2nd ed.). New York: Wiley.
- Courts less favorable to single methodology demand. (2000, September). [Special Issue]. *The Special Educator*, 1-4.
- Cypress-Fairbanks Independent School District v. Michael F.*, 26 IDELR 303, 118 F. 3rd 245 (5th Circuit 1997).
- Dalldorf, J. S. (1999) An introduction to the medical aspects of autism. Retrieved 3/2/01 from <http://www.teacch.com/medinfo.htm>.

- Dissanayake, C., & Crossley, S.A. (1996). Proximity and sociable behaviors in autism: evidence for attachment. *Journal of Child Psychology and Psychiatry and Allied Discipline*, 37(2), 149-157.
- Dunlap, G., & Bunton-Pierce, M. (1999). *Autism and autism spectrum disorder (ASD)* (Report No. 583). Reston, VA: Eric Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED 436 068).
- Dunlap, G., & Fox, L. (1999). Teaching students with autism. (Report No. E5820. Arlington, Va: *The Eric Clearing House on Disabilities & Gifted Education*. (ERIC Document Reproduction Service No. ED-99-CO-0026).
- Durand, M., (1990). *Severe behavior problems: A functional communication training approach*. New York: Guilford Press.
- Durand, M., & Merges, E. (2001). Functional Communication Training: A Contemporary Behavior Analytic Intervention for Problem Behaviors. *Focus on Autism and Other Developmental Disabilities*, 16(2), 110-126.
- Edelson, S. (1995). Theory of mind. Retrieved 3/30/01 from <http://www.autism.org/mind.html>
- Feinberg, E., & Vacca, J. (2000) The drama and trauma of creating policies on autism: Critical issues to consider in the new millennium. *Focus on Autism and Other Development Disabilities*, 15, 130-137.
- Fombonne, E. (2001) Is there an epidemic of autism? *Pediatrics*, 107, 411.
- Frost, L., & Bondy, A. (2002) The Picture Exchange Communication System. Retrieved October 31, 2002, from <http://www.autism.net/html/bondy-frost.html>
- Gall, M., Borg, W., & Gall, J. (1996). *Educational research: An introduction*. White Plains, NY.: Longman.

Green, G. (1996). Early behavioral intervention for autism: What does the research tell us? In C. Maurice (Ed.), *Behavioral intervention for young children with autism: A manual for parents and professionals* (pp. 29-38). Austin, TX: Pro-Ed.

Handleman, J. & Harris, S. (2000). Behavior analysis and intervention for preschoolers at the Princeton Child Development Institute. *Preschool programs for children with autism* (2nd ed.), 191-213, Austin, TX: Pro-Ed.

Harris, S., Glasberg, B., & Ricca, D. (1996) Pervasive developmental disorders: Distinguishing among subtypes. *School Psychology Review*, 25, 308-315.

Heflin, L.J., & Alberto, P. A. (2001). Establishing a behavioral context for learning for students with autism. *Focus on Autism and Other Developmental Disabilities*, 16, 93-108.

Independent School District No. 318, 24 IDELR 1096 (SEA MN 1996).

Individuals with Disabilities Education Act 1997, 20 U.S.C. Section 1401, et seq.

Individuals with Disabilities Education Act 1998, 34C.F.R. §300.7 (b) (c) (1) (i) (ii).

Ingram, J.L., Stodgell, C.J., Hyman, S. L., Figlewicz, D. A., Weitkamp, L. R., & Rodier, P. M. (2000). *Discovery of allelic variants of HOXA1 and HOXB1: Genetic susceptibility to autism spectrum disorder*. *Teratology*, 62, 393-405.

Intensive programs must meet increasing autism-related demand. (2000, July 28). *The Special Educator*, 16(2), 7.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-50.

- Klin, A., & Volkmar, F. (1996). *Asperger's Syndrome: Guidelines for treatment and intervention*. Yale Study Center, New Haven, Ct: Learning Disabilities Association of American, 3, 1-5.
- Klinger, L., & Renner, P. (2000). Performance-based measures in autism: Implications for diagnosis, early detection, and identification of cognitive profiles. *Journal of Clinical Child Psychology*. 29, 479-493.
- Lachman v. Illinois State Board of Education*, 853 F. 2nd 290 (7th Cir. 1988).
- Lovaas, O. I., (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology*, 55, 3-9.
- McLaughlin, M., Valdivieso, C., Spence, K., & Fuller, B. (1988). Special education teacher preparation: A synthesis of four research studies. *Exceptional children*, 55, 215-222.
- Meredith College, Psychology Department. Retrieved April 28, 2002, from <http://www.meredith.edu/psych/autism.htm>
- Mesibov, G. (2002). What is TEACCH? Retrieved April 28, 2002, from <http://www.teacch.com>
- National center for environmental health, CDC. 1999. Autism spectrum disorders among children. NCEH Pub. No. 99-0441. Retrieved March 7, 2001, from [http://www.cdc.gov/nce\)h/cddh/fact/tasdfs.htm](http://www.cdc.gov/nce)h/cddh/fact/tasdfs.htm).
- National Information Center for Children and Youth with Disabilities. (1998, January). *Pervasive developmental disorders*. (Briefing Paper No. FS20). Washington, D.C.: Tsai, L. Y.
- National Information Center for Children and Youth with Disabilities. (2001, January). *General information about autism and pervasive developmental disorder*. (Fact Sheet #1 1-4). Washington, D.C.

- Oren, T., & Ogletree, B. (2000) Program evaluation in classrooms for students with autism: Student outcomes and program processes. *Focus on Autism and Other Developmental Disabilities*, 15, 170-180.
- Parker, R. (1996). Incorporating speech-language therapy into an applied behavior analysis program. In C. Maurice (Eds.), *Behavioral intervention for young children with autism: A manual for parents and professionals* (pp. 301-302). Austin: TX: Pro-ed.
- Polk v Central Susquehanna Intermediate Unit 16* (1988), 853 F. 2nd 171 (3rd Circuit).
- Porter, L. (2000). Personnel Qualifications in Special Education. *Journal of Disability Policy Studies*, 11, 130-137.
- Power, M. (1999). Presentation to the worldwide summit on autism. United States Department of Defense. Washington, D.C: Author.
- Prizant, B., & Rydell, P. J. (1993). Assessment and intervention considerations for unconventional verbal behavior. In J. Reichle & D. Wacker (Eds.), *Communicative alternatives to challenging behaviors*. (pp. 263-297). Baltimore, MD: Paul H. Brookes.
- Rimland, B. (2000). Comments on "Secretin and autism: A two-part clinical investigation" by M.G. Chez et al. *Journal of Autism and Developmental Disorders*, 30, 95.
- Rimland, B., & Edelson, S. M. (1995). Auditory integration training in autism: A pilot study. *Journal of Autism and Developmental Disorders*, 25, 61-70.
- Robertson, J., Tanguay, P., L'Ecuyer, S., Sims, A., & Waltrip, C. (1999). Domains of social communication handicap in autism spectrum disorder. *Journal of the American Academy of Child and Adolescent Psychiatry* 38, 738-746.

Schools not providing IDEA services, government witnesses charge. (2001, March). *The Special Educator*, 16(16), 6-7.

Skinner, B.F. (1953). *Science and human behavior*. New York: Free Press.

Simpson, R. L., & Regan, M. (1988). *Management of autistic behavior*, (Rev. ed.). Austin, TX: Pro-Ed.

Smith, T. (1996). Are other treatments effective? In C. Maurice, G. Green, & S. Luce (Eds.), *Behavioral intervention for young children with autism. A manual for parents and professionals*, (pp. 45-57), Austin, TX: Pro-Ed.

Smith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism and Other Developmental Disabilities*, 16, 86-106.

State Board of Education Rule 0520-1-9.01, 2002

State of Tennessee (1996-1997). *Annual statistical report*. Retrieved April 28, 2002, from

http://www.k-12.state.tn.us/arc/asr9697/asr9697_table11.htm

State of Tennessee (2000-2001). *Annual statistical report*. Retrieved April 28, 2002, from

http://www.k-12.state.tn.us/arc/asr0001/asr0001_table11.htm

Stone, B., & Knight. (1998). Frontal lobe contributions to theory of mind. *Journal of Cognitive Neuroscience* 10, 640-657.

Talan, J. (1999, July 13). National institute of health sets \$25 million for autism. *Newsday*, 17.

TEACCH. (2002). Retrieved March 28, 2002, from

<http://www.DivisionTEACCH>

- Tennessee Autism Network (2002). Retrieved April 2, 2002, from <http://www.state.tn.us/education/setnanet.htm>
- Tennessee Department of Education. (2001). Tennessee approved teacher education programs 2001-02. Retrieved March 28, 2002, from http://www.state.tn.us/education/lic_prog1.htm
- Tennessee Department of Education, Division of Special Education. (2002). *Tennessee eligibility standards*. Nashville, TN: Author.
- The ICD –10 classification of mental and behavioral disorders: Clinical descriptions and diagnostic guidelines. (1992) Geneva: World Health Organization. 252-59.
- Thorndike, R. L., & Hagen, E., P. (1977). *Measurement and evaluation in psychology and education*. John Wiley & Sons: New York.
- TRIAD Services. (2002). Retrieved April 2, 2002, from <http://www.mc.vanderbilt.edu/peds/vch/triad>
- Tsai, L. (1998). Pervasive developmental disorders. *National Information Center for Children and Youth with Disabilities briefing paper #FS20*. Retrieved March, 2001 from www.nichcy.org/pubs/factshe/fs20txt.htm
- Tsai, L. (1999). Neurobiological Research. In D. Zager (Ed). *Autism: identification, education, and treatment*. (pp. 63-95). Mahwah, New Jersey: Erlbaum.
- Tsai, L. (2000). Children with autism spectrum disorder: Medicine today and in the new millennium. *Focus on Autism and Other Developmental Disabilities*, 15, 138.
- Tucker by Tucker v. Calloway County Board of Education*, 3 ECLPR 159, 136 F. 3rd 495 (6th Circuit 1998).

United States Department of Health and Human Services. (2000). HHS on the forefront of autism research. Retrieved February, 2001 from

United States Department of Education (1998). *20th Annual report to congress on the implementation of IDEA*. Washington, DC: Author.
<http://www.hhs.gov/news/press/2001pres/o1fsautism.htm/>

University of Kansas, Department of Special Education. Retrieved April 28, 2002, from http://www.sped.ukans.edu/masters/autism_asperger.htm

University of Nevada, College of Education, Special Education. Retrieved April 29, 2002, from http://www.univ.edu/Colleges/Education/Special_Ed/Requirements/391378.html

Vastag, B. (2001) Brain gene for autism? *JAMA, The Journal of the American Medical Association*. 285, 2966.

Volkmar, F., Cook, E., Pomeroy, J., Realmuto, G., & Tanguay, P. (1999) Summary of the practice parameters for the assessment and treatment of children, adolescents, and adults with autism and other pervasive developmental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*. 38 (suppl) 32S-54S.

Wenkart, R. (2000). Appropriate Education for students with disabilities: how courts determine compliance with the IDEA. *Individuals with Disabilities Education Law Report*. Special report No. 24. LRP Publications. Horsham: PA. 9, 11-12.

When methodologies collide. (1995, Sept. 29). *The Special Educator*, 11(5), 1-4.

Wing, L. (1996). Autism spectrum disorders: No evidence for or against an increase in prevalence. *British Medical Journal*. 312, 327-328.

Wing, L. (1997). The autism spectrum. *The Lancet*. 350, 1761-1767.

Wolery, M., Ault, M., & Doyle, P. (1992). *Teaching students with moderate to severe disabilities*. New York: Longman.

Yell, M., & Drasgow, E. (2000). Litigating a free appropriate public education: The Lovaas hearing and cases. *The Journal of Special Education* 33, 205-214.

Yell, M., Rogers, D., & Rogers, E. L. (1998). The legal history of special education: What a long, strange trip it's been! *Remedial and Special Education*, 19, 219-228.

Zelin, G. (1993). The constitutional foundations of special education law. *Individuals with disabilities education law report*. Special report No. 8, 19. Horsham: PA. LRP Publications.

Zirkel, P. (2001). *Autism and the law: Rulings and expert analysis*. 1-33, 36-42, Horsham: PA., LRP Publications.

APPENDICES

APPENDIX A

Initial Survey

AUTISM SPECTRUM DISORDER
KNOWLEDGE LEVEL
A SURVEY FOR SPECIAL EDUCATORS
PART I—PROFESSIONAL PROFILE

This survey is not a test. There are no right or wrong answers, and it does not reflect on your teaching ability. The purpose is to determine the amount of information special educators have about autism spectrum disorder. For the purposes of this survey, autism spectrum disorder (ASD) refers to autism, Asperger’s Syndrome, or pervasive developmental disorder not otherwise specified.

Directions: *Please do not sign your name to this survey.* Answer the following questions by placing a check in the box next to your response. Please answer all questions. Thank you.

Please check the school level at which you work.

- Preschool Elementary Middle High

School System Name _____

Number of years in special education _____

1. What is your current teaching position?

- | | |
|---|--|
| <input type="checkbox"/> Resource Teacher | <input type="checkbox"/> Homebound Teacher |
| <input type="checkbox"/> CDC Teacher | <input type="checkbox"/> Consulting Teacher |
| <input type="checkbox"/> Inclusion Teacher | <input type="checkbox"/> Speech/Language Therapist |
| <input type="checkbox"/> Other/ Please specify: _____ | |

2. Please answer the following questions regarding your level of education.

- | | | |
|---|--|--------------------------------|
| <input type="checkbox"/> Bachelor’s | <input type="checkbox"/> Yr. Completed | <input type="checkbox"/> Major |
| <input type="checkbox"/> Masters | <input type="checkbox"/> Yr. Completed | <input type="checkbox"/> Major |
| <input type="checkbox"/> Educational Specialist | <input type="checkbox"/> Yr. Completed | <input type="checkbox"/> Major |
| <input type="checkbox"/> Doctorate | <input type="checkbox"/> Yr. Completed | <input type="checkbox"/> Major |

3. Please indicate the name of the university from which you received your degree.

4. Did you receive any instruction about autism spectrum disorder as part of your teacher training?
- No Yes, briefly as a section about autism within another sped class
 Yes – covered extensively (a class devoted entirely to autism)
5. Have you received any instruction about autism while teaching?
- No Yes – attended workshop(s), read articles
 Yes – training in one or more of the following – TRIAD, TEACCH, ABA
 Yes – completed a class or program pertaining to autism
6. How many children diagnosed as having ASD have you worked with over the last five years? _____
7. Were any of these children prescribed medication for secondary behavior problems? If so, how many?
- No Yes How many?
8. In the last five years, how many books have you read about ASD?

9. In the last five years, how many articles (professionally/otherwise) have you read about autism?

10. For the students diagnosed as ASD prescribed medication(s), how many of their prescribing physicians have you had contact with either by phone or in person?
- None
 About ¼ of cases
 About ½ of cases
 About ¾ of cases
 All cases
11. What communication techniques for working with children with ASD have you used?
- Facilitated Communication
 Picture Exchange Communication
 Auditory Integration Therapy
 Other (please specify) _____
12. Which of these methods have you employed in working with children with ASD?
- ABA – Applied Behavior Analysis
 DTT – Discrete Trial Training
 Functional Communication Training
 Other (please specify) _____
13. Do you agree that ASD is a legitimate educational problem for all teachers?
- Yes
 No
 Don't know

14. Please prioritize the following skill areas with regard to teaching children with ASD.

- | | |
|---|---|
| <input type="checkbox"/> Vocational Skills | <input type="checkbox"/> Behavior Skills |
| <input type="checkbox"/> Self-Help Skills | <input type="checkbox"/> Academic Skills |
| <input type="checkbox"/> Social Skills | <input type="checkbox"/> Communication Skills |
| <input type="checkbox"/> Other (please specify) _____ | |

15. How would you most like to receive information on ASD?

Please check all that apply.

- In-Service Training
- Conferences
- Workshops
- Read Books
- Read Professional Articles
- Observe Other Classes/Teachers
- Internet
- Other (please specify) _____

16. If East Tennessee State University offered a class or classes for certification in ASD, would you be interested in attending?

- Yes
- No

PART II – BELIEFS

Directions: Please answer all of the following questions by circling (T) true or (F) false. If you are unsure, please circle the one you think is right. Remember, this information is confidential and will only be seen by the researchers. Your answers do not reflect the quality of your teaching skills.

1. T or F Poor parenting practices can cause ASD.
2. T or F ASD is a neurobiological disorder.
3. T or F There is strong evidence for a genetic cause of ASD.
4. T or F Children with ASD are born with vulnerabilities toward behavior problems.
5. T or F Children with autism need a very structured educational environment with predictable occurrences.
6. T or F The behavior and social problems of children with autism can be a consequence of frustration over not being able to communicate.
7. T or F Autism is a medical disorder that should always be treated with medication.
8. T or F Autism occurs equally as often in girls as in boys.
9. T or F If medication is prescribed, educational interventions are unnecessary.
10. T or F Children with ASD should always be segregated from their peers to benefit educationally.
11. T or F Children with ASD have problems relating socially and communicating to other people due to a lack of "theory of mind".
12. T or F ASD affects play, communication, and the ability to understand language.
13. T or F Pervasive developmental disorder (PDD) refers to a broad range of disorders including autism and other disorders with autistic symptoms.
14. T or F For optimum educational performance, visual schedules should be used for children with autism
15. T or F To have a defensible educational program, the school system must have an expert in ASD to conduct evaluations.
16. T or F Multiple methodologies are needed for successful educational interventions for children with ASD.
17. T or F In an educational and/or home setting, early intervention based on applied behavior analysis can produce large, comprehensive improvement for a large proportion of children with ASD.

18. T or F Sign language and/or communication through pictures are effective methods to teach children with ASD to communicate.
19. T or F If discrete trial training is used exclusively, children with ASD can generalize or initiate behavior in the absence of cues.
20. T or F Children with ASD may be gifted.
21. T or F Research shows that sensory integration techniques are very effective in working with children with ASD.
22. T or F To achieve significant gains in language, children with ASD require very intensive one-on-one sessions.
23. T or F Facilitated communication can be validated by empirical research.
24. T or F Applied behavior analysis (ABA) is a method used solely to change inappropriate behavior.
25. T or F Academics should be the primary educational focus for children with ASD.
26. T or F The Lovaas Method is an intensive behavior intervention program originally designed for preschool children with autism.
27. T or F Discrete trial training (DTT) is a form of applied behavior analysis.
28. T or F The use of social stories in the classroom is not an effective method of teaching social skills to children with ASD.
29. T or F Functional communication training is used to increase language skills in children with ASD.

APPENDIX B
Revised Survey

AUTISM SPECTRUM DISORDER
KNOWLEDGE LEVEL
A SURVEY FOR SPECIAL EDUCATORS
PART I – PROFESSIONAL PROFILE

This survey is not a test. There are no right or wrong answers, and it does not reflect on your teaching ability. The purpose is to determine the amount of information special educators have about autism spectrum disorder. For the purposes of this survey, autism spectrum disorder (ASD) refers to autism, Asperger’s syndrome, or pervasive developmental disorder not otherwise specified.

Directions: *Please do not sign your name to this survey.* Answer the following questions by placing a check in the box next to your response. **Please answer all questions.** Thank you.

Please check the school level at which you work.

- Preschool Elementary Middle High

School System Name _____

Number of years in special education _____

1. What is your current teaching position?

- Resource Teacher Homebound Teacher
 CDC Teacher Consulting Teacher
 Inclusion Teacher Speech/Language Therapist
 Other/ Please specify. _____

2. What is the highest degree you have completed?

- Bachelor’s _____ Yr. Obtained _____ Major
 Masters _____ Yr. Obtained _____ Major
 Educational Specialist _____ Yr. Obtained _____ Major
 Doctorate _____ Yr. Obtained _____ Major

3. Please indicate the name(s) of the university from which you received your degree.

4. Did you receive any instruction about autism spectrum disorder as part of your teacher training?

- No
- Yes – briefly as a section about autism within another special education class
- Yes – covered extensively (a class devoted entirely to autism)

5. Have you received any instruction about autism while teaching?

- No
- Yes – attended workshop(s), read articles
- Yes – training in one or more of the following – TRIAD, TEACCH, ABA
- Yes – completed class or program pertaining to autism

6. How many children diagnosed as having ASD have you worked with over the last five years? _____

7. Were any of these children prescribed medication for secondary behavior problems?

- No Yes

8. Have you had contact with any physicians regarding medication issues of students with ASD?

- No Yes

9. In the last five years, how many books have you read about ASD?

10. In the last five years, how many articles (professional/otherwise) have you read about autism? _____

11. What communication techniques for working with children with ASD have you used?

- Augmentative Communication Devices
- Facilitated Communication
- Picture Exchange Communications
- Auditory Integration Therapy
- Other (please specify)_____

12. Which of these methods have you employed in working with children with ASD?

- Structured Teaching
- Incidental teaching
- ABA – Applied Behavior Analysis
- DTT – Discrete Trial Training
- Functional Communication Training
- Other (please specify)_____

13. Do you agree that ASD is a legitimate educational problem for all teachers?

- Yes
- No
- Don't know

14. Please rate the following skill areas with regard to teaching children with ASD. (1=highest priority and 7=lowest priority)

- | | |
|---|---|
| <input type="checkbox"/> Vocational Skills | <input type="checkbox"/> Behavior Skills |
| <input type="checkbox"/> Self-Help Skills | <input type="checkbox"/> Academic Skills |
| <input type="checkbox"/> Social Skills | <input type="checkbox"/> Communication Skills |
| <input type="checkbox"/> Other (please specify) _____ | |

15. Would you like additional training on autism? Yes No

If so, please specify the areas in which you are most interested.

- Applied Behavior Analysis
- Social Stories
- Picture Communication Systems
- Academic Skills
- Self-Help Skills
- Communication devices

16. How would you most like to receive information on ASD?

Please check all that apply.

- In-Service Training
- Conferences
- Workshops
- Read Books
- Read Professional Articles
- Observe Other Classes/Teachers
- Internet
- Other (please specify) _____

17. If East Tennessee State University offered a class or classes for certification in ASD, would you be interested in attending?

- Yes No

PART II – BELIEFS

DIRECTIONS: Please answer all of the following questions by circling (T) true or (F) false. If you are unsure, please circle the one you think is right. Remember, this information is confidential and will only be seen by the researchers. Your answers do not reflect the quality of your teaching skills.
If you are unsure of an answer, please circle the answer you think is correct.

1. T F Autism can be caused by a neglectful mother.
2. T F Autism is an emotional disorder, not a neurological one.
3. T F Theories regarding causes indicate that ASD is probably not attributed to genetics.
4. T F Children with ASD are born with a vulnerability toward behavior problems.
5. T F In order to optimize learning, children with autism need a very structured educational environment.
6. T F Many children with autism who have poor communication skills also exhibit behavior and social problems.
7. T F Autism is a medical disorder that should always be treated with medication.
8. T F The majority of children with autism are female.
9. T F If medication is prescribed, educational interventions are unnecessary.
10. T F Many children with autism make academic progress with one-on-one instruction, therefore, the optimal way to educate children with autism is to segregate them from their peers.
11. T F Many children with ASD have problems relating socially due to an inability to read subtle cues in interactions with other people and an inability to understand that other people may not know the right answer.

12. T F ASD affects play, communication, and the ability to understand language.
13. T F Many parents and professionals have sought to broaden the definition of autism to include other disorders with autistic symptoms.
14. T F Many children with autism have a great deal of difficulty with change in routines. Response cost is the method used most often to correct this problem.
15. T F To have a defensible educational program, the school system must have an expert in ASD to conduct evaluations.
16. T F Multiple methodologies are needed for successful educational interventions for children with ASD.
17. T F If preschool children with ASD receive educational interventions based on applied behavior analysis, many of these children exhibit large comprehensive improvements.
18. T F Sign language and/or picture communication systems are the most effective methods to teach many children with ASD to communicate.
19. T F If discrete trial training is used in one setting, you can expect many students with ASD to demonstrate the same skills in another setting.
20. T F Children with autism may be gifted.
21. T F There is valid research that shows that the use of sensory integration techniques can cause increased educational gains.
22. T F To achieve significant gains in language, children with ASD require very intensive one-on-one sessions.
23. T F Facilitated communication is validated by research.
24. T F Applied behavior analysis is a method used solely to change inappropriate behavior.

- 25.T F Academics should be the primary educational focus for children with ASD.
- 26.T F The Lovaas method, used originally with preschool children, is an intensive behavior intervention program based upon the principles of applied behavior analysis.
- 27.T F Discrete trial training is a method for individualizing and simplifying instruction to enhance children's learning.
- 28.T F The use of social stories in the classroom is not an effective method of teaching social skills to children with ASD.
- 29.T F A student with autism uses an unusual speech pattern to escape difficult tasks. The student is taught to say, "Help me" when faced with a difficult task rather than using the negative speech pattern. This is a form of functional communication training.

APPENDIX C

Reference Matrix for Survey

Questions	Reference(s)
1. Autism can be caused by a neglectful mother.	Campbell, M., Schopler, E., Cueva, J., & Hallin A. (1996). Journal of the American Academy Of Child and Adolescent Psychiatry. 35 (2) p. 134-144.
2. Autism is an emotional disorder, not a neurological one.	Tsai, L. (2000). Children with autism spectrum disorder: Medicine today and in the new millennium. Focus on Autism and Other Developmental Disabilities, v15; 3.
3. Theories regarding causes indicate that ASD is probably not attributed to genetics.	Wing, L. (1997). The autism spectrum. The Lancet. 350. (9093) 1761-1767.
4. Children with ASD are born with a vulnerability toward behavior problems.	Tsai, L. (2000). Children with autism spectrum Disorder: Medicine today and in the new millennium. Focus on Autism and Other Developmental Disabilities, v15; 3.

5. In order to optimize learning, children with autism need a very structured educational environment.

Dunlap, G. & Pierce, M.K. (1999). Autism spectrum disorder (ASD). (Report No. 583). Reston, VA: Eric Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED 436 068).

Feinberg, E., & Vacca, J. (2000). The drama and trauma of creating policies on autism: Critical issues to consider in the new millennium. *Focus on Autism and Other Development Disabilities*, (15) i3 130-137.

National Information Center for Children and Youth with Disabilities. (1998, January). Pervasive developmental disorders. (Briefing Paper No. FS20). Washington, D.C.: Tsai, L.

6. Many children with autism who have poor communication skills also exhibit behavior and social problems.

Tsai, L. (2000). Children with autism spectrum disorder: Medicine today and in the new millennium. *Focus on Autism and Other Developmental Disabilities*, V15;3, 138.

Wing, L. (1997). The autism spectrum. *The Lancet*. 350. (9093) 1761-1767.

7. Autism is a medical disorder that should always be treated with medication.

Dalldorf, J. S. (1999). An introduction to the medical aspects of autism. Retrieved 3/2/01.
<http://www.teacch.com/medinfo.htm>.

8. The majority of children with autism are female.

Dunlap, G. & Pierce, M.K. (1999). Autism and autism spectrum disorder (ASD). (Report No. 583). Reston,

9. If medication is prescribed, educational interventions are unnecessary.

VA: Eric Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED 436 068).

Tsai, L. (2000). Children with autism spectrum disorder: Medicine today and in the new millennium. *Focus on Autism and Other Developmental Disabilities*, V15; 3, 138.

Dalldorf, J. S. (1999). An introduction to the medical aspects of autism. Retrieved 3/2/01. <http://www.teacch.com/medinfo.htm>.

Smith, T. (1996). Are other treatment effective? In Catherine Maurice, Gina Green, & Stephen C. Luce (Eds.), *Behavioral intervention for young children with autism. A manual for parents and professionals*. (pp. 45-57). Austin, TX: Pro-Ed.

10. Many children with autism make academic progress with one-to-one instruction. Therefore, the optimal way to educate children with autism is to segregate them from their peers.

Yell, M. & Drasgow, E. Litigating a free appropriate Public education: The Lovaas hearing and cases. *The Journal of Special Education* 33 (4) 2000 pp. 205-214.

11. Many children with ASD have problems relating socially due to an inability to read subtle cues in interactions with other people and an inability to understand that other

Edelson, Stephen. (1995). Theory of mind. Retrieved 3/30/01. <http://www.autism.org/mind.html>

people may not know the right answer.

Tsai, L. (1998). Pervasive developmental disorders. NCHCY briefing paper #FS20. www.nichcy.org.

12. Autism affects play, communication, and the ability to understand language.

National Information Center for Children and Youth with Disabilities. (1998). Pervasive developmental disorders. (Briefing Paper No. FS20). Washington, D.C.

United States Department of Health and Human Services. (2000). HHS on the forefront of autism Research. Retrieved 2/21/01. <http://www.hhs.gov/news/press/2001pres/01fautism.htm/>

13. Many parents and professionals have sought to broaden the definition of autism to include other disorders with autistic symptoms.

National Information Center for Children and Youth with Disabilities. (1998). Pervasive developmental disorders. (Briefing Paper No. FS20). Washington, D.C.

Tsai, L. (1998). Pervasive developmental disorders. NCHCY briefing paper #FS20. www.nichcy.org.

14. Many children with autism have a great deal of difficulty with change in routines. The use

Bevilqua, S. (Ed). (2001). Best practices for educating students with autism. Horsham, PA: of response cost can help correct this problem.

Dunlap, G. & Fox, L. (1999). Teaching students With autism. (Report No. E5820. Arlington, Va:

15. To have a defensible educational program, system must have an expert in ASD to conduct-to-conduct evaluations.

The Eric Clearing House on Disabilities & Gifted Education. (ERIC Document Reproduction Service No. ED-99-Co-0026).

Heflin, L. J., & Alberto, P. A. (2001). Establishing a behavioral context for learning for students with autism. *Focus on Autism and Other Developmental Disabilities*, (16) 12 93-108.

National Information Center for Children and Youth With Disabilities. (2001, January). *Pervasive Developmental disorder*. (Fact Sheet No. 1 1-4). Washington, D. C.

Bevilaqua, S. (Ed.). (2001). *Best practices for school educating students with autism*. Horsham, PA: LRP Publications.

Yell, M. & Drasgow, E. (2000) Litigating a free appropriate public education: The Lovaas hearing and cases. *The Journal of Special Education* 33 (4) pp.205-213.

16. Multiple methodologies are needed for successful educational interventions for children with autism. Simpson, R. L. (2001). ABA and students with autism spectrum disorders: Issues and Considerations for effective practice. Focus on Autism and Other Developmental disabilities. V16 i2 pp68.75.
17. If preschool children with ASD receive educational interventions based on applied behavior analysis, many of these children exhibit large comprehensive improvements. Green, G. (1996). Early behavioral intervention for autism: What does the research tell us? Behavioral intervention for young children with autism. (C. Maurice, Ed.). Austin TX: PRO-ED.
- Tsai, L. (1998). Pervasive developmental Disorders. NCHCY briefing paper #FS20. www/nichcy.org.
18. Sign language and/or picture communication systems are the most effective methods to teach many children with ASD to communicate. Carr, E. G. (1997). Teaching autistic children to use sign language: Some research issues. *Journal of Autism and Developmental Disorders*, 9, 345-359.
- Green, G. (1996). Early behavioral interventions For autism: What does the research tell us? Behavioral interventions for young children With autism. (C Maurice, Ed.). Austin TX: PRO-ED.

19. If discrete trial training is used in one setting, you can expect many students with ASD to demonstrate the same skills in another setting.
20. Children with autism may be gifted.
21. There is valid research that shows that the use of sensory integration techniques can cause increased educational gains.
22. To achieve significant gains in language, children with ASD require very intensive one-on-one sessions.
- Smith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism and Other Developmental Disabilities*, v16, 12, Pp. 86-106.
- Dunlap, G. & Bunton-Pierce, M. K. (1999). Autism and autism spectrum disorder (ASD). (Report No. 583). Reston, VA: Eric Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED 436 068).
- Green, G. (1996). Early behavioral intervention for autism: What does the research tell us? behavior intervention for young children with autism. (C. Maurice, Ed.). Austin, TX: PRO-ED.
- National Information Center for Children and Youth with Disabilities. (1998). Pervasive Developmental disorders. (Briefing Paper No. FS20). Washington, D.C.
- Smith, T. (1996). Are other treatments effective? In Catherine Maurice, Gina Green, & Stephen professionals. Austin, Tx: PRO-Ed., 45-57.
- Tsai, L. (1998). Pervasive developmental disorders. NCHCY briefing paper #FS20. www.nichcy.org.
- Green, G. (1996). Early behavioral intervention in autism: What does the research tell us? In Catherine Maurice, Gina Green, & Stephen C. Luce (Eds.), *Behavioral intervention for young*

children with autism. A manual for parents and professionals. Austin, TX: Pro-Ed.

United States Department of Health and Human Services. (2000). *HHS on the forefront of autism research.* Retrieved 2/21/01, from <http://www.Hhs.gov/news/press/2001pres/01fsautism.htm/>

Smith, T. (1996). Are other treatments effective? In Catherine Maurice, Gina Green, & Stephen C. Luce (Eds.), *Behavioral intervention for young children with autism. A manual for parents and professionals.* Austin, TX: Pro-Ed.

23. Facilitated communication is validated by research.

National Information Center for Children with Disabilities. (1998). *Pervasive developmental disorders.* (Briefing Paper No. FS20). Washington, D.C.: Tsai, Luke Y.

24. Applied behavior analysis is a method used solely to change inappropriate behavior.
- Smith, T. (1996). Are other treatments effective? In Catherine Maurice, Gina Green, & Stephen C. Luce (Eds.), *Behavioral intervention for young children with autism. A manual for parents and professionals*. Austin, TX: Pro-Ed.
- Anderson, S. R. & Romanczyk, IL. G. (1999). Early intervention for young children with autism: Continuum-based behavioral models. *Journal Of the Association for Persons with Severe Handicaps*, 24, pp. 162-173.
- Green, G. (1996). Early behavioral intervention in autism: What does the research tell us? In Catherine Maurice, Gina Green, & Stephen C. Luce (Eds.), *Behavioral intervention for young children with autism. A manual for parents and professionals*. Austin, TX: Pro-Ed.
- Heflin, L. J., & Alberto, P. A. (2001). Establishing Context for learning for students with autism. *Focus On Autism and Other Developmental Disabilities*, (16) 12 pp. 93-108.
25. Academics should be the primary educational focus for children with ASD.
- National Information Center for Children with developmental disabilities. (1998). Pervasive Developmental disorders. (Briefing Paper No. FS20) Washington, D. C. : Tsai, Luke Y.
- Dunlap, G. & Bunton-Pierce, M. K. (1999). Autism and Autism spectrum disorder (ASD). (Report No. 583).

- Reston, VA: Eric Clearinghouse on Disabilities and Gifted Education, (ERIC Document Reproduction Service No. ED 436 068).
26. The Lovaas Method is an intensive behavior intervention program originally designed for preschool children with autism.
27. Discrete trial training is a method for individualizing & simplifying instruction to enhance children's learning.
28. The use of social stories in the classroom is not an effective method of teaching social skills to children with autism.
29. Functional communication training is an effective method to increase language skills in children with autism.
- National Information Center for Children with Disabilities. (1998). Pervasive developmental disorders. (Briefing Paper No. FS200. Washington, D. C.; Tsai, Luke.
- Smith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism And Other Developmental Disabilities*, v16 12, pp 86-106.
- Fouse, B., & Wheeler, M. (1997). A treasure chest of behavioral strategies for individuals with autism. Arlington, TX: Future Horizons, Inc.
- Durand, V. M. (1990). Severe behavior problems: A functional communication training approach. New York: Guilford Press.
- Durand, V. M. & Merges, E. (2001) Functional Communication training: A contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disabilities*, v16 i2 110-127.

APPENDIX D

East Tennessee State University INFORMED CONSENT

Principal Investigator: Carol H. Whaley, Doctoral Student

Title of Project: Special Education Teachers' and Speech Therapists'
Knowledge of Autism

This Informed Consent will explain about a research project in which I would appreciate your participation. It is important that you read this material carefully and then decide if you wish to be a volunteer. By no means is there any pressure for you to participate in this research.

PURPOSE:

The purpose of this research study is to collect and analyze data regarding special education teachers' and speech therapists' knowledge about the general concepts of etiology and educational programming for autism spectrum disorder. The number of diagnosed cases of autism has increased in this area within the last ten years. This study will attempt to identify areas of need regarding programming for students with autism spectrum disorder. In addition, this study will attempt to identify existing areas of knowledge and training needed to improve educational programming for students with autism.

DURATION

It should only take about 10 minutes for you to complete the entire survey.

PROCEDURES

The instrument to be used in this study is a two-part survey instrument calling for you to respond by placing a check next to a response for the first 16 items and marking true/false to the next 29 items. Please do not write your name on the survey. However, please indicate the name of the school in which you work. This is strictly to permit the data to be analyzed by type of school (elementary, middle, high). In no way will the name of your school be used to determine your identity. When you finish, please return the survey to your special education supervisor and keep the copy of the informed consent. If you received this survey by mail, please return your completed survey in the enclosed self-addressed stamped envelope. In addition, please mail the enclosed postcard so that I will know that you have returned a survey.

POSSIBLE RISKS/DISCOMFORTS

No risks or discomforts should be associated with this research, nor is there any direct benefit or compensation to the volunteer participants. Any potential benefit to the participant would arise from that individual's reflection upon the items contained on the survey instrument and his or her personal reaction to those items. The benefits to the research would be a better understanding of general knowledge, etiology, and educational programming for students with autism.

CONTACT FOR QUESTIONS

If you have any questions, problems, or research-related medical problems at any time, you may contact Carol Whaley or Dr. Russell Mays. You may also call the Chairman of the Institutional Review Board for any questions you have about your rights as a research participant.

CONFIDENTIALITY

Every attempt will be made to see that participants will not be identified by name. A copy of the records from this study will be stored in the office of the Supervisor of Special Education for the Elizabethton City Schools. For at least 10 years after the end of this research. The results of this study will be presented in a dissertation and may be published and/or presented at meetings without naming you as a participant. Although your rights and privacy will be maintained, the Secretary of the Department of Health and Human Services, The East Tennessee State University/V.A. Medical Center Institutional Review Board, the Food and Drug Administration, and the ETSU Department of Educational Leadership and Policy Analysis have access to the study records. My records will be kept completely confidential according to current legal requirements. They will not be revealed unless required by law, or as noted above.

COMPENSATION FOR MEDICAL TREATMENT

East Tennessee State University (ETSU) will pay the cost of emergency first aid for any injury which may happen as a result of your being in this study. They will not pay for any other medical treatment Claims against ETSU or any of its agents or employees may be submitted to the Tennessee Claims commission. These claims will be settled to the extent allowable as provided under TCA Section 9-8-307. For more information about claims call the Chairman of the Institutional Review Board of ETSU.

VOLUNTARY PARTICIPATION

The nature, demand, risks, and benefits of the project have been explained to me as well as are known and available. I understand what my participation involves. Furthermore, I understand that I am free to ask questions and withdraw from the project at any time, without penalty. I

have read, or have had read to me, and fully understand the consent form. I sign it freely and voluntarily. A signed copy has been given to me.

Your study record will be maintained in strictest confidence according to current legal requirements and will not be revealed unless required by law or as noted above.

Signature of Volunteer

Date

Signature of Investigator

Date

VITA

CAROL H. WHALEY

Personal Data: Date of Birth: March 25, 1952
Place of Birth: Erwin, Tennessee

Education: Public Schools, Erwin, Tennessee
East Tennessee State University, Johnson City, Tennessee;
Secondary Education, English, History, Psychology,
B.A., 1978
East Tennessee State University, Johnson City, Tennessee;
Guidance and Counseling, M.A., 1980

Professional

Experience: Special Education Counselor, Carter County Schools;
Elizabethton, Tennessee, 1980-1993
Supervisor of Special Education, Carter County Schools;
Elizabethton, Tennessee, 1993-2000
Supervisor of Special Education & Federal Projects,
Elizabethton City Schools; Elizabethton,
Tennessee, 2000 - present