

A LITERATURE REVIEW OF THE TREATMENT AND EDUCATION FOR
AUTISTIC AND RELATED COMMUNICATION HANDICAPPED CHILDREN

(TEACCH) PROGRAM

by

Timothy D. Peerenboom

A Research Paper

Submitted in Partial Fulfillment of the

Requirements for the

Master of Science Degree

in

School Psychology

Approved: 2 Semester Credits

Dr. Scott Orme

The Graduate School

University of Wisconsin-Stout

August, 2003

The Graduate School
University of Wisconsin-Stout
Menomonie, WI 54751

ABSTRACT

Peerenboom, Timothy D.

A Literature Review of the Treatment and Education for Autistic and related
Communication handicapped CHildren (TEACCH) Program

Master of Science School Psychology

Dr. Scott Orme

August 1, 2003

#30

American Psychological Association, 5th edition

Autism is a complex disorder that affects a child's social skills, communication skills and restricts a child's activities and interests (American Psychiatric Association, 2000). Since Kanner first identified autism in 1943 (Gresham et al., 1999), several theories regarding causes, treatments, and research directions have been introduced. One of the treatment programs developed to assist children with autism is the Treatment and Education of Autistic and Communication handicapped CHildren (TEACCH) program. Three important aspects TEACCH are early diagnosis and assessment, parental collaboration, and structured teaching. The current investigation reviews the history and characteristics of autism, development of the TEACCH program, relevant literature in the above-mentioned aspects of the program, and suggests future research directions regarding TEACCH.

TABLE OF CONTENTS

	Page
Abstract.....	2
 <i>CHAPTER ONE: INTRODUCTION</i>	
Introduction.....	4
Statement of the Problem.....	11
Purpose of the Study	12
 <i>CHAPTER TWO: REVIEW OF THE LITERATURE</i>	
Premise for Research	13
TEACCH History/Theory	14
Diagnostic Process.....	15
Parental Involvement	20
Structured Teaching.....	21
Conclusions.....	24
Limitations of the Present Investigation	25
Suggestions for Future Research	26
REFERENCES	27

CHAPTER ONE

INTRODUCTION

In 1943, Leo Kanner noticed a group of unique children who all had some common characteristics. These characteristics included extremely limited language abilities, inability to form interpersonal relationships and aggravation in response to changes in environment or routine (Gresham, Beebe-Frankenberger & MacMillan, 1999). Around the same time, Hans Asperger recognized a similar set of characteristics in a group of children who were not as severely impaired as Kanner's group (Grandin, 1995). Since that time, autistic disorders have confused and frustrated many doctors, researchers and families due to their complexity. These disorders are identified by the DSM-IV-TR as autistic spectrum disorders.

Today, the DSM-IV-TR (2000) defines autistic disorder as markedly impaired or abnormal social and communication development combined with a restricted repertoire of activities and interests. Autism is categorized as a pervasive, life-long developmental disorder in which the child affected experiences severe and pervasive impairment in several areas of development (American Psychiatric Association, 2000). Included with classic Kanner type autism in the spectrum are Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder, and Pervasive Developmental Disorder, not otherwise specified (American Psychiatric Association, 2000).

Because these disorders are similar but vary in severity and which areas of development are affected, they are considered to be part of a single spectrum of disorders (Grandin, 1995). In order for a child to be diagnosed with autism, he or she must display at least a total of six characteristics in three main categories, social interaction

impairment, communication impairment and stereotyped patterns of behavior (American Psychiatric Association, 2000). According to the Individuals with Disabilities Education Act, autism is defined as a developmental disability significantly affecting verbal and non-verbal communication and social interaction, generally evident before age 3, that adversely affects a child's educational performance (IDEA, 1997).

Symptoms are evident in an autistic child prior to age three and are sometimes reported by parents to be present from birth (American Psychiatric Association, 2000). Four of the main theories that hypothesize the cause of autism in children are genetic predisposition, adverse reaction to childhood vaccines, environmental toxin or nutritional and biology or neurochemical (Feinberg & Vacca, 2000). The cause is most likely biologically based but diagnosis is made on the basis of behavioral characteristics (Happé & Frith, 1996; Grandin, 1995). Janzen (1996) stated that children with a predisposition to autism can develop symptoms as a result of anything that causes abnormal development of the central nervous system.

There are many estimates of the prevalence of autism in children. Ratios as low as 2 per 10,000 (American Psychiatric Association, 2000) and as high as 1 per 500 have been reported (Feinberg & Vacca, 2000). The DSM-IV-TR suggests a median estimate of 5 cases per 10,000 individuals may be most accurate (American Psychiatric Association, 2000). Over the past two decades, autism diagnoses have been rising to near epidemic levels. In 1999, the state of California reported a 273% increase in cases of autism (Feinberg & Vacca). That same year, Florida reported an increase of 573% (Feinberg & Vacca, 2000).

Children with autism display a variety of symptoms in varying degrees of severity. Individual children will show unique patterns of behavior (Janzen, 1996). A child's intellectual ability, the presence of additional disabilities, culture, family, education and community experiences all contribute to how the autism will manifest in the individual (Janzen, 1996). Behaviors indicative of autism can be divided into four categories according to Janzen (1996). These are language/communication behaviors, relating behaviors, responses to sensory stimuli and developmental discrepancies.

Impairments in the child's ability to use language or communicate could take on several forms. The child may have limited non-verbal communication including flat facial expressions and an absence of gesture use. A child with autism will initiate communication less frequently than a normally developing child (Janzen, 1996). When a child with autism does initiate verbal interaction, it will often be idiosyncratic, stereotyped and repetitive (American Psychiatric Association, 2000). This type of speech is often referred to as echolalia. An autistic child will have an unusual rhythm or abnormal intonation in his or her speech if he or she has the ability to speak (Janzen, 1996).

A child with autism may also show abnormalities in relating to both people and his or her environment. These types of behaviors could include being unresponsive to verbal communication, making little or no eye contact, seeking attention in abnormal ways, being content when left alone for abnormally long periods of time, and inability or unwillingness to take turns during play (Janzen, 1996). The DSM-IV-TR defines these types of behaviors as impairments in the use of non-verbal behaviors that help regulate social interaction, failure to develop friendships at developmentally appropriate times,

and failure to spontaneously share positive events with others (American Psychiatric Association, 2000). When relating to his or her environment, a child with autism will display a preoccupation with restricted or stereotyped interests, have rigid, impractical routines, engage in stereotyped repetitive behaviors, and show abnormal interests in parts of objects (American Psychiatric Association, 2000).

Because individual children with autism have varying degrees of intellectual abilities, developmental discrepancies are often observed. A child's skills in various areas can either be very advanced or substantially delayed. He or she may also reach developmental milestones or learn skills out of normal sequence (Janzen, 1996). For example, a child with autism may be able memorize facts but never learn to tie a shoe. Generally, an autistic child's non-verbal skills are stronger than his or her verbal skills (American Psychiatric Association, 2000).

Often, autism occurs comorbidly with other disorders, although it can occur alone. Seventy-five percent of children with autism also have IQs that are in the mental retardation range with far fewer children with autism having average intelligence (Happé & Frith, 1996). The mental retardation can range from mild to profound (American Psychiatric Association, 2000). Epilepsy is present in 1/3 of children who are diagnosed with autism (Happé & Frith, 1996). Other disabilities that are often associated with autism include Down syndrome, tuberous sclerosis and cerebral palsy (Janzen, 1996).

Because there is no known cause or cure that have been identified for autism, working with or raising an autistic child can be very challenging. Several programs and interventions have been proposed since Leo Kanner first identified the disorder in 1943 (Feinberg & Vacca, 2000). Autism is such a devastating disorder, that over the course of

its history people were willing to try anything that could “cure” the disorder. Some therapies that have been attempted in the past include facilitated communication, auditory integration training, sensory integration training (Gresham et al., 1999), gentle teaching, the Options Program, dietary interventions, Irlen Lenses and psychopharmacologic treatments. Several of these treatments offer case study examples of successfully curing children with autism. For a description of these and other interventions, the reader is referred to Heflin & Simpson’s (1998) *Interventions for Children and Youth with Autism*.

The most successful interventions to date have come from the field of applied behavior analysis (Feinberg & Vacca, 2000). In 1970 Ivar Lovaas began the UCLA Young Autism Project (YAP). The Lovaas technique uses applied behavior analysis and discrete trial training to teach young children with autism. Children are exposed to 40 hours per week of intense training, starting with learning simple behaviors and gradually moving toward more complex behaviors. Desired behaviors are immediately reinforced while undesired behaviors are ignored or punished. The Lovaas technique continues to be a popular intervention and has shown some success. Lovaas reported in 1987 that up to 47% of children who undergo the treatment fully “recover” from their autism (Gresham et al., 1999).

Another popular program for children with autism is known as Learning Experiences...an Alternative Program (LEAP). This program began in 1982 and uses behavioral techniques in an inclusive setting. LEAP is based on five basic principles that guide the program: All children can benefit from being in inclusive early childhood settings; home, school and community should be involved to maximize the benefit of

intervention; parents and professionals need to form partnerships; normally developing children can teach children with autism through modeling; and curriculum should be developmentally appropriate regardless of disability (Gresham et al., 1999). LEAP uses a ratio of 10 typical children to 3 autistic children in its classes, has a parent skills training component, national training programs and conducts research on instructional practices (Gresham et al, 1999). However, empirical research on outcomes of LEAP is lacking.

A third promising program developed for children with autism is the Treatment and Education for Autistic and related Communication handicapped CHildren (TEACCH). Developed at the University of North Carolina at Chapel Hill starting in the 1960's, the TEACCH program is a skill-based approach that depends strongly on collaboration between teachers and parents. Since 1972, TEACCH has been a mandated program for children with autism in the state of North Carolina and is popular worldwide (Heflin & Simpson, 1998).

TEACCH uses structured teaching to train children in the areas of social skills, living skills, vocational skills, leisure skills and communication skills (Gresham et al., 1999; Heflin & Simpson, 1998). The four major components to structured teaching are physical organization, task organization, visual schedules and work systems (Gresham et al., 1999).

TEACCH attempts to adapt the autistic child's environment to maximize his or her strengths. Specifically, the program creates a highly structured environment to capitalize on the autistic child's ability to process visual information and minimize deficits in auditory processing (Heflin & Simpson, 1998; Panerai, Ferrante, Caputo & Impellizzeri, 1998; American Psychiatric Association, 2000). The physical structure in

the TEACCH program adapts the environment to accommodate other deficits specific to the child and attempts to increase independent functioning. Children with autism have been shown to function and learn better in highly structured environments (Panerai et al., 1998). The physical organization of a TEACCH classroom includes visually clear areas and boundaries that minimize visual and auditory distractions (Panerai et al., 1998).

Task organization and work systems are used to structure the activities and clarify expectations of the student. Work systems are used to aid the child in understanding what is expected of him or her (Panerai et al., 1998). Work systems structure the work area for the child. Task organization is set up left to right, top to bottom, using numbers or letters to give the child clear guidelines and help him or her understand the task without direct supervision or prompting. How tasks are organized is dependent on the developmental level of the individual (Panerai et al., 1998). Much like the general physical organization, task organization and work systems attempt to minimize dependence on verbal directions and utilize the strengths in visual processing of children with autism.

Visual schedules are another important aspect of the TEACCH program. Schedules utilize objects, pictures or words representing activities to let the child know what order the activities will occur in (Panerai et al., 1998) and allow the child to anticipate what activity is coming next (Ozonoff & Cathcart, 1998). Schedules can also utilize behavioral principles by adding reinforcers right into the schedule. Schedules are set up individually based on the child's developmental level (Panerai et al., 1998).

Also important to the TEACCH program is early identification, diagnosis and assessment. The program has developed several diagnostic and assessment tools

including the Psychoeducational Profile-Revised (PEP-R), and the Childhood Autism Rating Scale (CARS) (Heflin & Simpson, 1998). These and other assessment methods are used to identify critical skill deficits specific to the individual and aid in creating a treatment plan specific to the individual (Heflin & Simpson, 1998; Van Bourgondien & Schopler, 1996). Accurate diagnosis and assessment of skills are important first steps in providing quality treatment to a child with autism.

The cornerstone of the TEACCH program is its emphasis on forming a partnership between the parents of the autistic child and the professionals working with the child. While professionals may have the knowledge of how to treat a child with autism, parents are regarded as the “experts” on their own children in the TEACCH program (Van Bourgondien & Schopler, 1996). Regarding parents as co-therapists for their children has several advantages. First, it provides an economical way to increase the hours of training and education of the child. It is also assumed that the parents will be involved with treatment for a much longer period of the child’s lifespan than the therapist will. Extending the program into the home also is hoped to increase the generalization of the skills obtained (Ozonoff & Cathcart, 1998). The use of parents as an important part of treatment is a far cry from the days when the cause of autism was blamed on distant, cold, “refrigerator mothers” (Ozonoff & Cathcart, 1998; Grandin, 1995).

Statement of the Problem

In the introduction an attempt was made to describe to the reader how incredibly complex autism is. Another goal was to show the reader that although many treatments and programs exist, none have been established as the preferred treatment for children with autism. Because autism is such a complex disorder and many “fad” treatments have

promised amazing results (Schopler, 1987), quality research on effective treatments is lacking. The focus of this paper will be to examine research on one of the specific programs, TEACCH. Although research on aspects of the TEACCH program is available, there are few, if any, quality outcome studies on the overall effectiveness of the program.

Purpose of the Study

The focus of this paper is on the Treatment and Education of Autistic and Communication handicapped CHildren (TEACCH) program, one of the most popular methods used for children with autism. Specifically, this paper will examine the quality of research available on various aspects of TEACCH. Areas of research that will be addressed include diagnosis and assessment, parental collaboration with professionals, and structured teaching. The study will also attempt to identify and assess the quality of “outcome studies” that are meant to be overall evaluations of the TEACCH program, as this is an area of research that is lacking.

CHAPTER TWO

REVIEW OF THE LITERATURE

Premise for Research

Programs and interventions for children with autism can be difficult to research. Most programs involve many different facets that target different deficits caused by the disorder (Schopler, Mesibov & Baker, 1982). It makes sense then, that research evaluating the overall effectiveness of any particular program is scarce. Besides the complexity of the disorder, autism itself is a relatively new diagnosis, and new discoveries about its causes and manifestations occur often. This means that programs that serve children with autism are even newer and need to be constantly adjusted based on these new discoveries (Schopler, 1974). These factors make overall program evaluation studies very difficult.

Because of these factors, research has tended to focus on parts of programs as opposed to their overall effectiveness. For example, the TEACCH program conducts studies in several areas in which its program focuses on. These areas include child behavior changes, parent training competence, parental and professional perception of treatment outcome, and long-term follow up information (Schopler et al., 1982). The three areas of the TEACCH program that the present paper will review include diagnosis and assessment, parents as co-therapists in the treatment of their autistic children, and the effectiveness of structured teaching. First, however, an introduction to the historical and theoretical basis for the TEACCH program is provided.

History of TEACCH

In the early 1970's Eric Schopler and Robert J. Reichler created the Developmental Therapy Program for what were then labeled as psychotic children (Schopler, 1974). Over thirty years ago, Schopler recognized parents as not only the victims of their child's disability but also as being an important part of the treatment of their child (Schopler, 1974). Schopler felt that the therapist's role should simply be as a consultant and model to the parent as well as directly working with the child. Schopler (1974) also recognized the importance of a thorough assessment and treatment planning for the child with autism to target his or her specific deficits. Finally, through clinical work with autistic children Schopler (1974) hypothesized that children with autism responded better to a structured learning situation than an unstructured one.

TEACCH itself began as the Child Research Project (Schopler, 1985) at the University of North Carolina Medical School's Psychiatry Department in 1966 (Schopler et al., 1982). Its aim was to aid autistic and language-impaired children and their families in the state. The North Carolina state legislature funded this project to cover the entire state in 1972. Services included individual developmental assessment, and parent counseling and training (Schopler et al., 1982). Today, TEACCH continues to be a statewide program and has gained popularity worldwide (Heflin & Simpson, 1998).

Another important aspect of the program is its clinical research unit (Schopler, 1987). The program places an emphasis on clinical research as opposed to investigating theoretical issues in autism. The reasoning behind this is that research can be used for practical purposes in clinical and educational settings (Schopler, 1987). TEACCH has received the Gold Achievement Award for establishing productive research on

developmentally disabled children from the American Psychiatric Association and an award for the year's greatest contribution to human welfare in North Carolina in 1985 (Schopler, 1987). Other aspects of the TEACCH program's clinical research unit include state-wide computer based data collection, peer reviews including an editorial role for the *Journal of Autism and Developmental Disorders*, instrument and curriculum development, in-services on new techniques to broaden research, and dissemination of research to staff and families to keep them up to date (Schopler, 1987). It is in the area of research that will be the focus of the current investigation of the TEACCH program.

Diagnostic Process

The first area of research that will be reviewed is the TEACCH program's diagnosis and assessment process of children with autism. A review of the research in this area was chosen because accurate diagnosis and assessment of skills and deficits are an important first step in effectively treating a child with autism. An important part of the TEACCH program is the designing of an individual treatment plan for each autistic or communication handicapped child (Steerneman, Muris, Merckelbach & Willems, 1997). It is therefore important to evaluate the instruments and processes that are used assess these skills and deficits because if they are inaccurate treatment would therefore be ineffective.

Two of the instruments developed by the TEACCH program are the Psychoeducational Profile-Revised (PEP-R) and the Childhood Autism Rating Scale (CARS). An instrument to assess older people with autism was developed in the late 1980's as an extension of the PEP-R is known as the Adolescent and Adult Psychoeducational Profile (AAPEP) (Mesibov, Schopler & Caison, 1989). The CARS is

used to diagnose children with autism (Pilowsky, Yirmiya, Shulman & Dover, 1998) while the PEP-R and AAPEP are used to assess strengths and weaknesses in important developmental domains (Steerneman et al., 1997). The following paragraphs will review research literature on these diagnostic and assessment instruments.

Pilowsky et al. (1998) conducted comparison study between the CARS and the Autism Diagnostic Interview-Revised (ADI-R). Participants included seventy children suspected of having autism. Fifty-six of the 70 participants in the study were found to be autistic by both instruments. Six of the 70 participants were found to be not autistic by each instrument. This is an overall agreement of 85.7% between the CARS and the ADI-R. The remaining 10 participants in the study were not agreed upon by the two measures. The high percentage of agreement offers support for the validity of the instruments (Pilowsky et al., 1997).

Although the CARS was developed to identify, discriminate and assess the severity of autism in children from mild to severe; factor analytic studies have found that the CARS may measure between 3 and 5 distinct factors that could be used for more specific diagnosis and individual treatment plans (DiLalla & Rogers, 1994; Stella, Mundy & Tuchman, 1999). DiLalla & Rogers (1994) found three factors responsible for 69% of the total variance of scores. These factors are social impairment, negative emotionality and distorted sensory response. They conclude that the three scales found in the CARS are useful for diagnosis, treatment planning and evaluation of individual progress. They also state that this study offers support for the CARS ability to distinguish between autistic and non-autistic children (DiLalla & Rogers, 1994).

Stella et al. (1999) performed a replication and extension of the DiLalla & Rogers study and found five distinct factors identified by the CARS. The Stella et al. (1999) study named the following factors: social communication, emotional reactivity, social orienting, cognitive and behavioral consistency, and odd sensory exploration. The researchers in this study suggested that their findings could be important because the five factor model agrees with the DSM-IV view that several distinct areas within autism exist, the instrument is sensitive in measuring social impairments, and that the five factors may operate independent of each other (Stella et al., 1999). The researchers also stated that adjusting the CARS to include factor based scale scores could increase the utility of the tool (Stella et al., 1999).

Independent reviews of the CARS have also been generally favorable, although they pointed out weaknesses as well. Prizant (1992) in a *Mental Measurements Yearbook* review, stated that the CARS fails to weight the separate scales in its scoring criteria, contains scales that are not necessary for diagnosing autism, and assumes administrators have knowledge of age appropriate developmental functioning (Prizant, 1992). Welsh's (1992) review in the *Mental Measurements Yearbook* pointed out that reliability and validity data of the CARS is outdated, the Total Score of the CARS is vaguely defined, and data used for the development of the scale were only retrieved in North Carolina limiting its generalizability. The reviewers in the *Mental Measurements Yearbook* also stated, however, that the CARS is useful, reliable and valid; and that it may be the most appropriate tool available for diagnosing autism (Prizant, 1992; Welsh, 1992).

The other popular instrument used to develop individual education programs for children with autism is the Psychoeducational Profile-Revised (PEP-R) (Steerneman et al., 1997). The PEP-R is designed to assess seven developmental areas and four areas of behavior (Mirenda, 1995). Unique features in its design, which is tailored to children with autism, include minimal language usage in directions and responses, several levels of difficulty to ensure success in at least some developmental areas, providing extra time for responses, and a pass-emerge-fail scoring method (Mesibov et al., 1989; Mirenda, 1995). The PEP-R is considered to be a very important aspect of the assessment process in the TEACCH program (Mesibov et al., 1989).

Steerneman et al. (1997) conducted a study that compared PEP-R scores between autistic, pervasive developmental disorder not otherwise specified (PDD-NOS), and not-autistic children, compared PEP-R scores with scores on the Snijders-Oomen Nonverbal intelligence test (SON), and also analyzed the internal consistency of the PEP-R. The study was conducted in The Netherlands where the SON is a frequently used measure of non-verbal intelligence (Steerneman et al., 1997). The study found adequate internal consistency for the developmental and behavior subscales of the PEP-R. The study also found that differences in developmental scale scores could be found between autistic and not-autistic children but not between autistic and children identified as PDD-NOS (Steerneman et al., 1997). Differences between behavior scale scores were found between all three groups, with autistic children showing the most severe autistic behaviors, and not-autistic children showing none at all (Steerneman et al., 1997). Finally the study found a strong correlation between PEP-R scores and SON scores. Overall the study concluded that the PEP-R is a good tool for assessing children with

autistic spectrum disorders with adequate reliability and validity (Steerneman et al., 1997).

The AAPEP is an age extension of the PEP-R designed for adolescents and adults with autism and pervasive developmental disorders. Because the skills necessary for functioning as an adult differ from those needed to function as a child, the AAPEP focuses on different criterion, maturational levels, and skills such as leisure and vocational, than the PEP-R does (Mesibov et al., 1989). In a study meant to evaluate the reliability and validity of the AAPEP, Mesibov et al. (1989) compared a sample matched in I.Q. and age of autistic and non-autistic children. There were 30 subjects in each group, and all were administered the AAPEP. The study concluded that the AAPEP is a reliable and valid assessment instrument for autistic and mentally retarded children (Mesibov et al., 1989). The study also found that recommendations generated from the results of the AAPEP were judged as more helpful than recommendations made without the scores by professionals working with the children (Mesibov et al., 1989). Due to the facts that only 60 subjects were used in this study and that one of the authors of the AAPEP conducted the study, these findings should be viewed with caution.

Independent reviews have also identified areas of concern about the PEP-R. Mirenda (1995) stated that the PEP-R is a psychometrically weak in the areas of validity, reliability data, and a small norming sample. Another review of the PEP-R cited difficulty in administration, weak construct validity, and generally poor scientific evidence supporting its usefulness (Tindal, 1995). One review in the *Mental Measurements yearbook* did concede that the test may be helpful in identifying strengths, weaknesses and educational needs for autistic children as well as aid in the design of

effective teaching methods and educational programming for developmentally disabled children (Mirenda, 1995).

Parental Involvement

Parents of autistic children were once blamed for causing their children's disorder and were labeled emotionally cold, rejecting of their children, and interpersonally traumatized (Schopler, 1985). At that time, part of the treatment for autistic children was to separate children from their parents (Ozonoff & Cathcart, 1998). As research on the etiology of autism grew, it was soon discovered that parents may be a necessary component of effectively treating their autistic child (Ozonoff & Cathcart, 1998). As one of the guiding principles of the TEACCH program, using parents as co-therapists for their children is an important area of research on the treatment of autistic children.

A study by Short (1984) examined the short-term treatment effects of involving parents in the education and training of their children. Short (1984) hypothesized that parents would become more actively involved in the treatment of their child, the child's inappropriate behavior would decrease, appropriate behavior would increase, and family stress resulting from child behaviors would decrease as a result of using parents as co-therapists. The study tested these hypotheses by comparing changes during a waiting period (non-treatment phase) and changes during the treatment phase as measured by direct observation and interviews with mothers of the subjects. Short (1984) concluded that use of parents as parents as co-therapists was effective based on his findings that active involvement of parents and appropriate behaviors increased. Short (1984) also reported a positive change in overall interaction patterns between the parent and child. It

was also found, however, that family stress was not reduced as a result of the program, or was there a significant reduction in inappropriate behavior (Short, 1984).

A more recent study by Ozonoff & Cathcart (1998) also found positive results from utilizing parents as co-therapists. Eleven children with autism received TEACCH home programming for a period of four months. A control group of autistic children not receiving in-home programming was also evaluated over the same time period. Both groups were administered the PEP-R at the beginning and the end of the four month treatment interval (Ozonoff & Cathcart, 1998). The authors stated that children in the treatment group improved significantly more than the control group on four of the seven PEP-R scales, the total PEP-R score, and made developmental gains averaging 9.6 months during the four month treatment period (Ozonoff & Cathcart, 1998). They concluded that TEACCH home-based programming can improve cognitive and developmental functioning of young children with autism (Ozonoff & Cathcart, 1998). Because parents are with their children for a larger number of hours in the day, and days in the lifetime of an autistic child than therapists are, the training and use of them in the treatment of their own autistic children is another important area of research (Ozonoff & Cathcart, 1998).

Structured Teaching

The final area of research that this paper will investigate is in the area of structured teaching. The TEACCH program places an emphasis on the use of structure in its teaching methods (Schopler et al., 1982). Included in structured teaching are the use of physical organization of the learning environment, visual schedules, work systems and task organization (Van Bourgondien & Schopler, 1996) which were described in the

introduction chapter. Schopler (1974) holds firmly to the belief that the best environment for learning new skills is one with a high degree of structure, especially one that is specifically structured to accommodate an autistic child's individual deficits. The next section of this investigation will review research on the TEACCH program's use of structured teaching methods.

Schopler, Brehm, Kinsbourned & Reichler (1971) conducted one of the earliest studies on structured teaching. This study employed an ABAB research design to evaluate the effects of structured vs. unstructured environments on children enrolled in what was at that time the Child Research Project. It used parental and therapist reporting to measure five behavioral variables: Attending vs. Not Attending, Appropriate vs. Inappropriate affect, Relating vs. Not Relating, Meaningful Vocalization vs. Non-meaningful Vocalization vs. Silent, and Psychotic Behavior vs. Non-psychotic Behavior. Both parents and therapists were utilized in the study to facilitate the sessions during the study (Schopler et al., 1971). Overall, autistic children were found to respond more favorably to structured sessions than unstructured ones. Individual differences between the subjects revealed that the higher functioning the child was, the easier it was for them to function in an unstructured environment (Schopler et al., 1971).

Part of the TEACCH structured teaching method includes the use of visual schedules (Van Bourgondien & Schopler, 1996). In a study conducted by Pierce and Schreibman (1994), it was found that lower functioning children with autism could use pictures to manage their own behavior, generalize those behaviors to different environments and tasks, and maintain their behaviors over time (Pierce and Schreibman, 1994). This study was specifically aimed at using pictures to teach independent daily

living skills to children with autism. The authors stated that before the idea of using pictures to manage behaviors, parents were responsible for tasks such as setting the table, making lunch, doing laundry, getting dressed, and making the bed (Pierce & Schreibman, 1994). Three children with autism were taught to perform these tasks through task analysis and representing steps of each task through pictures (Pierce & Schreibman, 1994). Although this study is not specifically designed to assess a component of the TEACCH program, the findings do appear to support the benefits of structured teaching.

Persson (2000) conducted a longitudinal study in Sweden that followed seven autistic adults living in group homes that utilized TEACCH program's structured teaching methods over a period of 2 ½ years. These methods included visual schedules, work systems, and visual communication (Persson, 2000). Prior to moving into the group homes, the seven residents had little or no experience with these methods (Persson, 2000). The AAPEP was administered to each subject twice per year for a total of six times per resident during the study. Persson (2000) found that each resident improved his or her developmental skills and independence as measured by the AAPEP. From this it was concluded that with more skills and increased independence, the group home residents' functional quality of life also improved as a result of the TEACCH structured teaching methods (Persson, 2000).

Panerai, Ferrante, Caputo & Impellizzeri (1998) conducted a multidimensional study of the TEACCH program. Its aim was to evaluate whether the TEACCH program increases learning capacities and spontaneous communication through individual education programming, structuring the environment, and alternative communication training (Panerai et al., 1998). The researchers used several methods of data collection

including the Vineland Adaptive Behavior Scale (VADS), the PEP-R, The Echelle d'Evaluation Fonctionnelle des Comportements (EFC), structured observations of maladaptive behavior and spontaneous communication (Panerai et al., 1998). The researchers conceded that it is difficult to evaluate a complex program like TEACCH because of the number of factors that can affect the outcome of treatment (Panerai et al., 1998). But based on their findings from the measures used in the study, they concluded that the TEACCH program improved autistic children's competence, reduced behavioral problems, and increased spontaneous communication.

Although several areas of research on the TEACCH program exist, this review of the literature has focused on three specific areas: diagnosis and assessment, parental collaboration, and structured teaching methods. Diagnosis and assessment is an important area because it plays such a large role in the development of individual education planning for children with autism. Parental collaboration has been shown to also be an important part in effective treatment of children with autism (Ozonoff & Cathcart, 1998). Finally, structured teaching was included because it encompasses a variety of techniques utilized in the TEACCH program, and because it has been found that children with autism tend to learn better in highly structured environments (Schopler, 1974).

Conclusions

Autism is a complex disorder that affects a child's social skills, communication skills and restricts a child's activities and interests (American Psychiatric Association, 2000). Since Kanner first identified autism in 1943 (Gresham et al., 1999), several theories regarding causes, treatments, and research directions have been introduced.

Because these children display varying degrees of severity, a unique set of symptoms, and individually display different profiles of strengths and deficits, educating and treating children with autism poses a challenge to those who work with them.

Several programs have been developed to maximize the potential of children with autism. One of these programs is the TEACCH program. Originally begun as the Child Research Project at the University of North Carolina Chapel Hill in 1966, today TEACCH is a mandated program statewide in North Carolina (Schopler et al., 1982) and has gained worldwide popularity (Heflin & Simpson, 1998). Three important aspects of the TEACCH program include early diagnosis and assessment, parental collaboration, and structured teaching. The article reviews relevant research on these three areas that are important aspects of the program. The literature reviewed in this investigation indicates that these three areas of the TEACCH program are both successful and important in the intervention and education of children with autism.

Limitations of the Current Investigation

Because this investigation focused on only three aspects of the TEACCH program, it would be misleading to state that this review completely summarizes all relevant research on the program. The current paper also is limited by the accessibility of research involving the TEACCH program. Given the complexity of the disorder and the TEACCH program, finding relevant research on the specific investigation questions was a challenge. Also, much of the research regarding the program and theories that the TEACCH program is based on is decades old and difficult to locate. One final limitation of the paper is the possibility of bias on the part of many of the researchers cited in this paper. Many of these researchers are affiliated with the TEACCH program, which could

bias the findings in the studies. The TEACCH program's clinical research unit has won several awards for its efforts (Schopler, 1987); however, one cannot ignore the fact that research on one's own program is susceptible to bias.

Suggestions for Future Research

Based on the findings of this investigation, future research directions on the TEACCH program can be suggested. First, more studies on program effectiveness need to be conducted by researchers who are not affiliated with the program. This will help in eliminating the potential for bias in the research findings. Also, studies that carefully control confounding variables that may affect outcomes should be designed and carried out. Since the TEACCH program encompasses so many areas of the treatment and education of children with autism, research should continue investigating the effectiveness of specific aspects of the program. Research that investigates specific areas of the program could then be synthesized to evaluate the overall effectiveness of the TEACCH program. Finally, studies evaluating the overall effectiveness of the program should be attempted, although this will most likely prove to be difficult. Findings from such studies could then be compared to synthesized research findings as further evidence of the effectiveness of the TEACCH program.

REFERENCES

- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revision*. Washington D.C. Author.
- DiLalla, D.L., & Rogers, S.J. (1994). Domains of the childhood autism rating scale: relevance for diagnosis and treatment. *Journal of Autism and Developmental Disorders*, 24, 115-128.
- Feinberg, E., & Vacca, J. (2000). The drama and trauma of creating policies on autism; critical issues to consider in the new millenium. *Focus on Autism & Other Developmental Disabilities*, 15, 130-138.
- Grandin, T. (1995). *Thinking in pictures and other reports from my life with autism*. New York: Vintage Books.
- Gresham, F.M., Beebe-Frankenberger, M.E., & MacMillan, D.L. (1999). A selective review of treatments for children with autism: description and methodological considerations. *School Psychology Review*, 28, 559-576.
- Happe, F., & Frith, U. (1996). The neuropsychology of autism. *Brain*, 119, 1377-1400.
- Heflin, L. J., & Simpson, R.L. (1998). Interventions for children and youth with autism: prudent choices in a world of exaggerated claims and empty promises. Part I: intervention and treatment option review. *Focus on Autism and Other Developmental Disabilities*, 13, 194-211.
- Individuals with Disabilities Education Act of 1997, 20 U.S.C.S. §§ 1400 et seq.
- Janzen, J.E. (1996). *Understanding the nature of autism: a practical guide*. San Antonio, TX: Therapy Skill Builders.

- Mesibov, G.B., Schopler, E., & Caison, W. (1989). The adolescent and adult psychoeducational profile: assessment of adolescents and adults with severe developmental handicaps. *Journal of Autism and Developmental Disorders*, 19, 33-41.
- Mirenda, P. (1995). Review of the Psychoeducational profile revised. In J.C. Conoley & J.C. Impara (Eds.), *The 12th Mental Measurements Yearbook* (pp. 828-831). Lincoln, NE: The University of Nebraska Press.
- Ozonoff, S., & Cathcart, K. (1998). Effectiveness of a home program intervention for young children with autism. *Journal of Autism and Developmental Disorders*, 28, 25-32.
- Panerai, S., Ferrante, L., Caputo, V., & Impellizzeri, C. (1998). Use of structured teaching for treatment of children with autism and severe and profound mental retardation. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 367-374.
- Persson, B. (2000). Brief report: a longitudinal study of quality of life and independence among adult men with autism. *Journal of Autism and Developmental Disorders*, 30, 61-66.
- Pierce, K.L., & Schreibman, L. (1994). Teaching daily living skills to children with autism in unsupervised settings through pictorial self-management. *Journal of Applied Behavior Analysis*, 27, 471-481.
- Pilowsky, T., Yirmiya, N., Shulman, C., & Dover R. (1998). The autism diagnostic interview-revised and the childhood autism rating scale: differences between

- diagnostic systems and comparison between genders. *Journal of Autism and Developmental Disorders*, 28, 143-151.
- Prizant, B.M. (1992). Review of the childhood autism rating scale. In J.J. Kramer & J.C. Conoley (Eds.), *The 11th Mental Measurements Yearbook* (pp. 169-173). Lincoln, NE: The University of Nebraska Press.
- Schopler, E. (1974). Changes of direction with psychotic children. In A. Davids (Ed.), *Child personality and psychopathology: current topics. volume 1* (pp. 205-236). New York, N.Y: John Wiley & Sons, Inc.
- Schopler, E. (1985). Parents of psychotic children as scapegoats. In A.M. Donnellan (Ed.), *Classic readings in autism* (pp. 236-241). New York, N.Y: Teachers College Press.
- Schopler, E. (1987). Specific and nonspecific factors in the effectiveness of a treatment system. *American Psychologist*, 42, 376-383.
- Schopler, E., Brehm, S.S., & Kinsbourne, M. (1971). Effect of treatment structure on development in autistic children. *Archives of General Psychiatry*, 24, 415-421.
- Schopler, E., Mesibov, G., & Baker, A. (1982). Evaluation of treatment for autistic children and their parents. *Journal of the American Academy of Child Psychiatry*, 21, 262-267.
- Short, A.B. (1984). Short-term treatment outcome using parents as co-therapists for their own autistic children. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 25, 443-457.
- Sterneman, P., Muris, P., Merckelbach, H., & Willems, H. (1997). Brief report: assessment of development and abnormal behavior in children with pervasive

- developmental disorders. Evidence for the reliability and validity of the revised psychoeducational profile. *Journal of Autism and Developmental Disorders*, 27, 177-185.
- Stella, J., Mundy, P., & Tuchman, R. (1999). Social and nonsocial factors in the childhood autism rating scale. *Journal of Autism and Developmental Disorders*, 29, 307-317.
- Tindal, G. (1995). Review of the psychoeducational profile revised. In J.C. Conoley & J.C. Impara (Eds.), *The 12th Mental Measurements Yearbook* (pp. 828-831). Lincoln, NE: The University of Nebraska Press.
- Van Bourgondien, M.E., & Schopler, E. (1996). Intervention for adults with autism. *Journal of Rehabilitation*, 62, 65-71.
- Welsh, J.S. (1992). Review of the childhood autism rating scale. In J.J. Kramer & J.C. Conoley (Eds.), *The 11th Mental Measurements Yearbook* (pp. 169-173). Lincoln, NE: The University of Nebraska Press.