THE HOME TEACCHING PROGRAM: A STUDY OF THE EFFICACY OF A PARENT TRAINING EARLY INTERVENTION MODEL

A DISSERTATION

SUBMITTED TO THE FACULTY

OF

THE GRADUATE SCHOOL OF APPLIED AND PROFESSIONAL PSYCHOLOGY

OF

RUTGERS UNIVERSITY

THE STATE UNIVERSITY OF NEW JERSEY

BY

AURELIE WELTERLIN

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

DOCTOR OF PSYCHOLOGY

NEW BRUNSWICK, NEW JERSEY OCTOBER, 2009

APPROVED: _____
Sandra L. Harris, Ph.D.

_____
Gary B. Mesibov, Ph.D.

_____
Lara Delmolino, Ph.D.

DEAN: _____
Stanley B. Messer, Ph.D.

THE HOME TEACCHING PROGRAM: A STUDY OF THE EFFICACY OF A PARENT TRAINING EARLY INTERVENTION MODEL

AN ABSTRACT OF A DISSERTATION

SUBMITTED TO THE FACULTY

OF

THE GRADUATE SCHOOL OF APPLIED AND PROFESSIONAL PSYCHOLOGY

OF

RUTGERS UNIVERSITY

THE STATE UNIVERSITY OF NEW JERSEY

BY

AURELIE WELTERLIN

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

DOCTOR OF PSYCHOLOGY

COMMITTEE CHAIRPERSON: SANDRA L. HARRIS, PH.D.

NEW BRUNSWICK, NEW JERSEY OCTOBER, 2009

ABSTRACT

The current study evaluated the efficacy of the Home TEACCHing Program, a low-cost, short-term comprehensive parent training intervention for children with autism and their families based on the TEACCH model. Parents were taught in their home to work with their two and three year old children on a variety of curriculum areas. Ten children and their parents were matched based on age and functioning level to form five pairs. One member of each pair was randomly assigned to treatment and the other to a waitlist group and they were compared at both pre-treatment and post-treatment on formal dependent measures of child adaptive functioning, maladaptive behavior, and developmental levels and on parent knowledge and parent stress using an independent samples t-test. Direct behavioral measures of child and parent behavior were also collected and compared across matched pairs using a multiple baseline probe design. The results of a one-tailed independent t-test indicated that the treatment group showed significantly more improvement on the Fine Motor subtest of the *Mullen Early Learning Scales (*Mullen, 1995*)*, $t(8) = -2.43$, $p = 0.02$, the Parent Stress subtest of the *Parenting Stress Index* (Abidin, 1995), $t(8) = 2.167$, $p = 0.03$, and the externalizing maladaptive, $t(8) = -2.70$, $p = 0.01$, and the generalized maladaptive behavior subscales, $t(8) = -4.96$, $p = .0005$ of the *Scales of Independent Behavior –Revised* (*SIB-R*) (Bruininks, Woodcock, Weatherman & Hill, 1996). Additional measurable but not statistically significant improvements were also found. The results of the multiple baseline probe design showed robust support for increases in child independent functioning, parent set-up behavior, and parent use of non-verbal and total effective prompts, and decreases in parent use of total ineffective prompts. The implications of these results are discussed.

ACKNOWLEDGEMENTS

Special thanks to Dr. Sandra Harris, Dr. Lara Delmolino, and Dr. Gary Mesibov for their support of this research and of my professional development. I would also like to thank Ron Faulkner, Susan Boswell, Lindsey Schumacher, Devon Hartford, Johanna Lima, Sarah Palmer, Rachel Kitson, Mandy Benson, and Nadette Welterlin-Hugg, whose contributions were invaluable to the completion of this project. Most of all, I'd like to offer my sincerest gratitude to the families for their willingness to participate in this research. And finally, I'd like to thank my family for their unwavering support throughout my graduate school years.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

More than sixty years ago, Kanner (1943) coined the term autism. His initial behavioral descriptions of autism captured prominent features that are still used in the medical literature today. As described by Kanner, and outlined in the *Diagnostic and Statistical Manual* (American Psychiatric Association [APA], 2000) children with autism (Autistic Disorder) exhibit three main clusters of symptoms: qualitative impairment in social interaction, impairment in communication, and narrow and stereotyped patterns of behavior and interests. By definition, these features must develop before three years of age. Approximately 25% of these children also develop a seizure disorder (APA, 2000), and recent epidemiological surveys have shown that the prevalence rates of mental retardation in children with autism are between 40% and 55% (e.g., Chakrabarti & Fombonne, 2001), which is lower than previous estimates.

A 2006 U.S. study found the average age of a formal Autism Spectrum Disorder diagnosis to be 61 months (Wiggins, Baio, & Rice, 2006). At the time of diagnosis, nearly 20% of parents retrospectively report normal development until around the age of two years, at which time they report having witnessed a regression in their child's language abilities (APA, 2000). A recent study, however, suggests that although parents report normal development, over 50% of children who experienced a reported regression

also demonstrated some early social deficits during the first year of life (Ozonoff, Williams, & Landa, 2005).

Autistic Disorder is one of five classified pervasive development disorders thought to be organic in nature. Asperger Disorder, Pervasive Developmental Disorder Not Otherwise Specified, Rett's Disorder and Childhood Disintegrative Disorder complete the Pervasive Developmental Disorder (PDD) classification category in the *DSM – IV-TR* (APA, 2000). Most researchers believe that these neurological disorders have a genetic basis, though the modes of heritability and exact etiologies are unknown. Increased rates among boys (four times that of girls) and findings from twin studies further corroborate a genetic basis (APA, 2000). A number of researchers have hypothesized that environmental factors, such as viral infections, toxins and pollutants, vaccinations, and prenatal, perinatal, and neonatal traumas may play a part in etiology and in the increased reported incidence and prevalence over the past few decades (e.g., Holmes, 1997). In 2007, the Center for Disease Control's Autism and Developmental Disabilities Monitoring Network (Autism and Developmental Disabilities Monitoring, 2000, 2002) released data indicating that about 1 in 150 eight-year-old children in multiple areas of the United States have been diagnosed with an autism spectrum disorder. Most believe the recent increase is best accounted for by changes in diagnostic criteria and by improved identification, however, whether there is an additional 'true' increase not accounted for by these factors is unknown (Fombonne, 2005).

To date there is no known "cure" for autism spectrum disorders, however, a growing number of interventions exist that increase functioning and quality of life for these individuals. A large number of studies support the efficacy of specific treatment

strategies, most of which are based on Applied Behavior Analysis (Rogers, 1998), a methodological approach based the principals of learning theory. With the exception of Applied Behavior Analysis, however, only a small body of research exists on the efficacy of comprehensive intervention programs (Rogers, 1998). Moreover, many of the studies that do exist have not used conventional standards of research design and methodology (Gresham, Beebe-Frankenberger, & MacMillan, 1999). This lack of research leaves families at risk of placing their children in programs that may not be beneficial, and in the worst case, may be harmful. The present study evaluated the efficacy of a comprehensive home-based early intervention program for young children with autism based on the TEACCH methodology and met many of the current research standards.

Early Intervention

Since the second half of the 20th century, three major shifts in public policy have occurred that have brought attention to individuals with disabilities in the United States (Wehman, 1998). The most recent shift occurred in the mid-1970s after Congress passed the special education legislation Public Law 94-142, the Education for All Handicapped Children Act of 1975, which established the right to free and appropriate education for school-aged children with disabilities. This law also mandated the use of Individualized Education Plans (IEP) and stipulated the rights of parent involvement in the IEP process (Public Law 94-142).

It was not until the 1980s, however, that amendments were made that laid the groundwork for providing appropriate programs and services for young children with disabilities below school age (Public Law 99-457). Since then, subsequent reauthorizations have maintained efforts to provide intervention services for infants and

toddlers with disabilities and their families. Providing these services, however, still remains optional at the federal level. Fortunately, at the state level, all states and territories have adopted policies to provide services to infants and toddlers (Bailey, Aytch, Odom, Symons, & Wolery, 1999).

Early intervention (EI) is the term formally used to describe services for young children with a wide variety of developmental delays and disabilities. It has been defined as "multidisciplinary services provided for developmentally vulnerable or disabled children from birth to age three years and their families" (Meisels & Shonkoff, 1990), although some authors use five years as the age cut-off (McCollum, 2002). Wehman (1998) states that two fundamental assumptions underscore EI: 1) the necessity of interdisciplinary activity that pulls assessment and services from a variety of disciplines, and 2) the necessity of implementation of these services using a collaborative approach within the context of the child's family. These assumptions are founded on the belief that the early years of life are crucial for child development and family support.

A number of studies and research reviews have delineated the benefits of EI for children with disabilities and their families (Guralnick, 1997). Clear results of EI research however, are clouded by varying definitions of terms, heterogeneous populations, and difficulties in conducting randomized control trials. In addition, outcome measures in these studies focus primarily on cognitive scales and lack a broader range of outcome measures (Bailey, Aytch, Odom, Symons, & Wolery, 1999). Despite these limitations, overall conclusions state that high quality, comprehensive early intervention services can have moderate effects on children with disabilities and can

positively impact family functioning and participation (e.g., Brinkerhoff & Vincent, 1986; Casto & Mastropieri, 1986; Thompson et al., 1997).

A growing body of research has focused specifically on early intervention efforts for children with autism. The importance of EI for children with autism, particularly when begun before age five years of age (Fenske, Zalenski, Krantz, & McClannahan, 1985) is well established and is prioritized by legislation (Interagency Autism Coordinating Committee, 2003). Most of the current research examines focal treatments directed towards specific symptoms, and many positive findings have been published. Fewer studies, however, have examined the efficacy of large scale comprehensive treatment programs that focus on broader outcomes (Rogers, 1998), and many of those that have, have been methodologically limited. Moreover, the field as a whole is far from understanding which types of comprehensive interventions are most effective in children with autism, what variables mediate and moderate treatment effects, and what can be expected in terms of long-term effects (Rogers & Vismara, 2008).

Evidence Based Interventions

It is important to understand the issue of the lack evidence based interventions for children with autism within the context of the larger evidence based movement in the field of psychology and education that emerged in the 1990s. At this time, psychologists were concerned about responding to managed care company demands and about treatment guidelines in the field of medicine that were challenging the treatment of mental health with psychotherapy. In response to these pressures, the American Psychological Association published guidelines in 1995 (American Psychological Association, 1995) and shortly thereafter, in 1998, the Clinical and Pediatric Psychology

sections of Division 12 of the American Psychological Association formed a task force to identify criteria used to evaluate treatments for childhood disorders (Lonigan, Elbert, & Johnson, 1998). According to the Division 12 task force criteria, a treatment can be determined as "well established" or "probably efficacious" depending on its inclusion of a number of stringent standards (Society of Clinical Psychology, 1995). A heavy emphasis was also placed on the use of Randomized Control Trials (RCT), which is recognized as the best method for comparing treatments.

Controversy over the stringent criteria of Division 12 and their appropriateness for clinical populations led APA to appoint a task force to propose a broader and more flexible definition of "Evidence Based Practice" (EBP) which states that EBP is the "integration of the best available research and clinical expertise within the context of patient characteristics, culture, values, and preference" (American Psychological Association, 2006). A similar controversy over stringent criteria occurred in the field of education. The U.S. Federal Law, the *Elementary and Secondary Education Act (No Child Left Behind Act of 2001) (NCLB*), required schools to implement 'Scientifically Based Research' (Eisenhart & Towne, 2003) which caused the U.S. Department of Education (2003) to publish *Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User-Friendly Guide,* calling for RCTs similar to Division 12 in the field of psychology.

Despite the revised definition of 'Evidence Based Practice' by APA and the publication of articles critical of the emphasis of rigorous RCTs in psychology and education research (e.g., Berlinger, 2002); the push to use RTC methodology to evaluate treatments remains strong. To date, five comprehensive autism treatment program

studies using a RCT design have been published (Rogers & Vismara, 2008), which is promising, however, three of the five only meet the "possibly efficacious*"* criterion of Division 12, which requires evidence supporting the treatment's efficacy relative to a comparison control condition in one "good" study (Chambless & Hollon, 1998). In addition, the five studies all have drastically different delivery approaches and intensities (Rogers & Vismara, 2008), making conclusions difficult to draw. Only one comprehensive autism treatment program now meets the proposed criteria for "well-established" (Rogers & Vismara, 2008). Four controlled studies with comparison groups, including Lovaas (1987), Smith, Lovaas, & Lovaas (2002), Eikeseth, Smith, Jahr, & Eldevik (2002), and Cohen, Amerine-Dickens, & Smith (2006), all show improvement in the intellectual performance of young children with autism spectrum disorders using the Lovass'(1987) behavioral intervention methodology.

A number of researchers have called for future research to address the paucity of rigorous research demonstrating the efficacy of early intervention programs for children with autism by conducting the necessary RCTs (Gresham et al., 1999; Lord et al., 2005; Rogers, 1998). Others have called for revisions in the way in which "evidence" is currently defined (e.g., Chorpita, 2003). RCTs have been recognized as the gold standard methodology for medicine and clinical practice; however there are a number of methodological challenges in using this design in autism research (Lord et al., 2005). In 2002, the National Institute of Health sponsored a meeting concerning these and other challenges to autism research. Methodological challenges discussed were 1) ethical concerns of withholding treatment from control groups, 2) treatment switching by participants, 3) treatment contamination, 4) maintaining blindness of assessors, and 5)

lack of funding. Overall, the meeting participants prioritized conducting RCTs to measure the efficacy of autism interventions, however, given the aforementioned challenges, other research designs and statistical methods were also regarded as important to innovate (Lord et al., 2005). In their recent review, Rogers and Vismara (2008) also highlight the limitations in RCT designs in autism research, stating that it limits the flexibility needed when initially developing new interventions and when conducting effectiveness studies using community based trials due to ethical and legal issues and policies.

Other approaches that are more in line with APA's definition of EBP are being examined as a basis for assessing the value of autism treatments such as researching treatment components, relying on professional consensus, and focusing on alternative research methods (Mesibov & Shea, unpublished manuscript). Several studies have examined comprehensive autism programs using alternative approaches. The 1987 Lovaas study was the first to demonstrate the effectiveness of a comprehensive early intervention program for young children with autism (Gresham et al., 1999) using a non RCT study. Positive findings have been found by several other controlled, but non-randomized studies examining EI programs based on applied behavioral analysis (e.g., Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Eikeseth et al., 2002; Eldevik, Eikeseth, Jahr, & Smith, 2006; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Ozonoff & Cathcart, 1998; Sheinkopf & Siegel, 1998; Smith, Groen, & Wynn, 2000) and programs based on other theoretical frameworks (e.g., Dawson & Osterling, 1997; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Hoyson, Jamieson, & Strain, 1984; Salt et al., 2002; Strain, Kohler, & Goldstein, 1996).

Another issue of concern is the fact that many studies of EI program include preschool aged or older children with autism. No studies have been published that measure exclusively the effects of EI on participants three years of age or younger (Bruinsma et al., 2004). In addition, these intervention programs are largely staff directed, require intensive hours of intervention, and some require costs that can exceed $50,000 per year (Sallows & Graupner, 2005). The current study attempted to demonstrate the effectiveness of a short-term, low-cost, home-based EI program that serves the needs of children three years of age and younger using an RCT design. In addition, one of the main foci of the intervention was on teaching parents to be 'therapists' for their own children.

Parents as Therapists

Training parents to be early interventionists with their own children is one approach to family involvement in the EI movement that began in the late 1970s and early 1980s. Once Part H of the Education of the Handicapped Act Amendments of 1986 (Public Law 99-457) established the family unit as the focus of intervention services rather than the child, this approach became increasingly used and researched. The legislation assumes that the needs of children with disabilities are best met by enhancing the family's effectiveness at caring for their children (Mahoney & O'Sullivan, 1990). In the field of autism, training parents to implement programs at home is one of the essential features of effective treatment programs (Ozonoff & Cathcart, 1998).

A substantial body of research demonstrates that parent training programs provide a number of benefits for both children with autism and their families (Bruinsma, Koegel, & Koegel, 2004), a few of which are randomized controlled studies (Diggle,

McConachie, & Randle, 2003). Parents who are trained to work with their children extend learning from school into the home, which can help compensate for difficulties children with autism have in maintaining skills and generalizing skills to different contexts (Koegel, Schreibman, Britten, Burke, & O'Neill, 1982). A number of studies have also demonstrated benefits to children with autism such as increased language, IQ, communication, self-care, social interaction, and school performance (Aldred, Green, & Adams, 2004; Anderson et al., 1987; Gillett & LeBlanc, 2007; Harris, Wolchik, & Weitz, S. 1981; Jocelyn Casira, Beattie, Bow, & Eneisz, 1998; Mahoney & Perales, 2005; Schreibman, Koegel, & Koegel, 1989; Smith et al., 2000), and decreased problem behavior (e.g. Powers, Singer, Stevens, & Showers, 1992; Werle, Murphy, & Budd, 1993).

Positive effects of parent training on family outcome have also been demonstrated by research. A series of studies conducted by Koegel and colleagues examined the impact on parents of naturalistic teaching interventions conducted by parents of children with autism. Parents who conducted Pivotal Response Training (PRT) with their children show increased interest and positive affect during interactions with their children as well as reduced stress levels (Koegel, Bimbela, & Schreibman, 1996). Furthermore, other researchers have shown that parent training programs lead to successes in parent ability to implement interventions (e.g. Rocha, Schreibman, & Stahmer, 2007) and improved parent mental health (Tonge et al., 2006).

One program, the Treatment of Autistic and related Communication Handicapped CHildren (Division TEACCH), has emphasized working together with parents since its inception (Schopler, 1994). Division TEACCH has nine regional centers located across

North Carolina, and serves children and adults of all ages who have or are suspected of having autism. The model was developed from close parent-professional collaboration which, within a few years led parents to successfully advocate to North Carolina state legislators to expand the program and provide permanent funding (Schopler, Mesibov, & Baker, 1982). Today, parents continue to have a vital role in treatment delivery, often acting as therapists or co-therapists for their children.

The aim of Division TEACCH is to use general characteristics of learning in autism plus highly individualized approaches to help individuals with autism both learn skills and use visual, organizational, and structured adaptations to their environment to function as independently and effectively as possible in society (Schopler, 1994). The basis of the model lies in a philosophical framework called the "culture of autism" that views individuals with autism as participants in a culture to be understood and respected for its different ways of thinking, learning, understanding, and being (Mesibov, 1998). Structured teaching, the methodological framework of TEACCH, is a series of cognitive, developmental, educational and behavioral strategies that involve using assessments to create highly individualized curricula, visual work systems and teaching tasks, and positive routines that are based on the unique learning styles of children with autism (Mesibov, Schopler, & Hearsey, 1994).

A main focus of the TEACCH programs is to teach parents how to assess and implement individualized supports for their children. TEACCH centers provide parents of children of all ages with opportunities to learn these strategies in 4-8 weekly sessions supervised by staff in the clinics. The TEACCH center in Chapel Hill, North Carolina also provides several preschool programs including an early intervention program in

which parents of two- year-olds learn to work with their children at the clinic preschool. Unfortunately, due to limited placements in the preschool and substantial waitlists, some parents of very young children with autism are restricted in the supports they can obtain immediately after diagnosis, particularly if travel to the clinic is difficult. In response to this limitation, and in consideration of the value of early intervention, the Chapel Hill TEACCH initiated a home-based early intervention program designed to reach families who are otherwise unable to access services.

The "Home TEACCHing Program" is an outreach model designed to serve the early intervention needs of two- to three-year-old children with autism and their families. The program runs for 12, ninety-minute sessions in which a clinician provides hands on training to parents on the "structured teaching" methodology of TEACCH. Over the course of the program, parents begin to take on an increasingly active role in teaching their children, while under the supervision of the clinician, so that upon completion of the program, parents are able to conduct sessions independently. Sessions cover a range of topics from structuring the home to teaching pre-academic skills, communication, and self care.

The body of literature supporting the efficacy of TEACCH methods and programs is growing; however, many programs still lack empirical support (Panerai, Ferrante, & Zingale, 2002). To date, no studies have examined the efficacy of the TEACCH early intervention programs, and only a few studies have examined TEACCH parent training programs in general (e.g., Marcus, Lansing, Andrews, & Schopler, 1978; Ozonoff & Cathcart, 1998; Short, 1984).

Short (1984) used a repeated measures design to evaluate the effects of a TEACCH parent training program on child appropriate and inappropriate behavior, parental guidance and management of behavior, and family stress. Fifteen children with autism and their families were followed from a waitlist period to a treatment period. Direct observation of parent and child behavior, and semi-structured interviews and questionnaires on family functioning were completed before and after the waitlist and treatment periods. Results showed significant improvements in parents' ability to guide their children's behavior as well as increases in appropriate child behavior during the treatment period as compared to the waitlist period. Family stress and child inappropriate behavior were not significantly affected by the treatment; however trends towards significance were demonstrated. Although these results are promising, no separate control group was used; therefore, it is difficult to determine whether the gains made were due to maturation alone or to practice effects.

A more recent study by Ozonoff and Cathcart (1998) examined the effectiveness of a TEACCH home based intervention with 11 children with autism by comparing them to a matched no-treatment control group. Parents were instructed on how to teach cognitive, academic, and pre-vocational skills to their preschool children. Measures on the *Psychoeducational Profile-Revised* (*PEP-R*) (Schopler, Reichler, Bashford, Lansing, & Marcus, 1990) were collected before treatment and after a four month period on both groups of children who were matched according to age and pretest *PEP-R* scores, time to follow-up, and severity of autism. The results indicated that the experimental group demonstrated significantly more improvement than the control group on the imitation, fine motor, and cognitive subtests of the *PEP-R* as well as on the total subtest score. The

use of a control group was a considerable strength in the study, however, participants were not randomly assigned to groups, and those who administered measures of the dependent variable were not blind to group assignment. Furthermore, treatment fidelity measures were missing, and no measures were taken of parent behavior.

The current study extended these earlier studies by examining the efficacy of the Home TEACCHing program. No previous studies of TEACCH programs or in the field of autism as a whole, have examined programs exclusively for children three years of age and younger. In addition, the study addressed methodological and design concerns of EI research in autism that have been raised by several researchers (Charman & Howlin, 2003; Greshman et al., 1999; Kasari, 2002; Wolery & Garfinkle, 2002). First, most previous studies have failed to use a control group or have used a control group without random assignment (Kasari, 2002). The current study used a waitlist control group with random assignment. Second, many previous studies failed to document treatment integrity procedures (Kasari, 2002; Wolery & Garfinkle, 2002). Charman and Howlin (2003) note the importance of independent monitoring of therapy implementation, particularly while in naturalistic parent-training settings, as a means of preventing treatment drift. The current study included a treatment fidelity measure. Third, as recommended, the use of multiple measures of outcome as well as direct measurements of the primary goals of intervention programs was included in the current study (Kasari, 2002; Wolery & Garfinkle, 2002). Fourth, the current study used a treatment manual that allows for reliable training and replication (Kasari, 2002). Finally, in line with the recommendations of Kasari (2002), those administering assessment measures were independent of the research team and blind to group assignment.

The current study assessed the following hypotheses:

1) positive treatment effects on observed parent behavior would occur including increases in parent ability to appropriately set up the structure of work and play areas and to execute appropriate transitions to work and play areas. In addition, it was hypothesized that the intervention would result in increases in parent use of effective verbal, effective non-verbal, and total effective prompts during sessions and decreases in parent use of ineffective prompts. Also, with regard to effective prompts, it was hypothesized that the treatment would result in an increase in parent use of effective non-verbal prompts relative to use of effective verbal prompts.

2) positive treatment effects on observed child behavior including increases in child independent functioning and decreases in child off-task behavior and child escape behavior would occur.

3) improvements in scores on standardized measures of developmental levels and adaptive functioning, and decreases in standardized measures of maladaptive behavior would be found. It was not expected that overall scores on standardized measures would significantly change due to the short-term model of intervention.

4) a significant increase on parent knowledge of autism and of the TEACCH methodology would be found.

5) a clinically significant decrease in parent stress would be reported.

.

CHAPTER II

METHOD

Participants

Ten children with autism or with a suspected diagnosis of autism and their families enrolled in the Home TEACCHing Program participated in the study. Participating children ranged from ages 24.9 months to 39.1 months (M = 32.2). The treatment group was comprised of five boys and the waitlist group was comprised of four boys and one girl. One child in each group had a suspected, but not a formal diagnosis of autism upon enrollment in the study. Eight were Caucasian American, and among the waiting list children one was African American and one was Hispanic. Eight parents were married. In the waitlist group, there was one single parent and one in a partnership. Among the parent participants, 80% had at least some college or post high school training as did 50% of their partners. Fifty percent of the participants had a household income at or above $50,000.

Table 1 presents the means and standard deviations of age, time to follow-up, time spent in occupational and speech therapies, and of all formal measures by group at pretest. Independent-samples t-tests were used to examine whether any significant differences in means existed between groups at pre-test on demographic variables, time to follow-up, time spent in speech therapy and occupational therapy, and all formal measures. The only significant differences between groups were on the

Table 1
Characteristics of the Sample at Pretest

Means and Standard Deviations of Demographics and Formal Measures by Group		Treatment Group (n = 5)		Control group (n = 5)	
		M	*SD*	*M*	*SD*
Age (months)		32.6	3.5	31.8	5.3
Time to follow-up (days)		118	20.4	123.8	19.5
Time in occupational therapy (hrs)		4.8	6.6	5.6	5.6
Time in speech therapy (hrs)		8.4	5.4	9.3	5.4
Mullen (age equiv in months)	Visual Receptive	17.6	5.8	17.6	10.1
	Fine Motor	18.4	2.7	19.2	6.8
	Expressive Lang.	18	4.5	12.4	11.6
	Receptive Lang.	15.4	7.0	15.2	10.4
SIB-R (age equiv in months)	Gross Motor	*54.8	20.7	24.8	9.0
	Fine Motor	34	10.9	28.2	9.5
	Social Inter.	21.8	5.7	18.6	8.9
	Lang. Comp	25.2	11.7	15.8	13.8
	Lang. Express	17	6.6	15.6	10.8
	Eating/Meal Prep	*26.2	12.4	11.8	3.7
	Toileting	13.6	5.0	16.6	8.7
	Dressing	26.8	5.5	21.0	5.7
	Self Care	28.4	5.1	17.4	10.9
	Domestic	31.2	13.5	22.6	5.8
	Time and Punct.	32.8	6.7	39.2	13.0
	Money and Value	25.6	5.9	28.8	8.7
	Work Skills	36.4	20.8	16.4	4.1
	Home/Comm.Orient	26.6	9.0	22.2	9.1
PSI Child Domain		133.6	41.6	129.4	7.4
PSI Parent Dom.		139.6	23.5	117.8	25.9
PSI Total Stress		272.6	58.3	247.2	29.3
PSI Life Stress		10.8	6.6	9.8	12.0
TTQ (# correct)		14.4	3	13.4	8.9
Gender (M.F)		5.0		4.1	

*Significant group differences

Gross Motor, $t(8) = 2.97$, $p = .018$ and the Eating and Meal Preparation scales of the *Scales of Independent Behavior-Revised (SIB-R)* (Bruininks, Woodcock, Weatherman &

Hill, 1996), $t(8) - 2.49$, $p = .037$.; the treatment group had higher means on both variables.

Children were referred to the Chapel Hill and Raleigh TEACCH clinics for an initial diagnostic screening by the Child Developmental Service Agency of North Carolina, pediatricians, daycare centers, local school, or by parents themselves. At initial screening, children were observed, and parents were interviewed to determine whether a full diagnostic evaluation was warranted. Unless autism was ruled out, families were placed on a diagnostic assessment waitlist and were referred to one of several TEACCH early intervention services. All families meeting inclusion criteria and on the diagnostic waitlist were referred to the Home TEACCHing Program during the initial diagnostic screening. Inclusion criteria for the study included a chronological age (CA) of less than 42 months, the absence of comprehensive EI services (excluding 1.5 hr a week of speech and/or occupational therapy), and either a confirmed or suspected diagnosis of autism.

Once an eligible parent/child dyad was referred to the study and consent was obtained, they were paired with another family that consented to participation in the research based on approximate age and functioning level. Each family of the pair was assigned to either "heads" or "tails" and a coin flip was used to assign them randomly to either the treatment (experimental) or waitlist (control) group.

All families lived within approximately one hour of the Chapel Hill TEACCH center. The study was approved by the Institutional Review Boards of Rutgers University and the University of North Carolina. All child/parent dyads were provided with appropriate consent procedures.

Design

The study was a pre-post group treatment design. Dependent measures were assessed for all 10 participants before and after participation in the treatment or waitlist. Participants on the waitlist participated in treatment after their matched dyad completed treatment. The expected waitlist time for waitlist group participants did not exceed typical waitlist time for families not enrolled in the study. This was achieved by offering the treatment group participants immediate services. The waitlist group was also assessed on dependent measures post-treatment; however, these data were reserved for use in future research and were not analyzed in the present study. Table 2 (below) outlines the time line for administration of dependent measures.

Behavioral observations were also done pre-treatment, during, and post-treatment and waitlist, and during and post-treatment for waitlist families once they entered treatment. Changes in parent and child behavior were compared between groups, and across time within the treatment and waitlist groups using a multiple baseline probe design. Complete data for all five treatment group parent/child dyads were collected. Complete data for three waitlist group parent/child dyads were collected. Two waitlist parent/child dyads were missing some data. For one parent/child dyad, data collected during treatment sessions were lost. For the second parent/child dyad, data for child behavior was collected, however data for parent behavior could not be collected because the mother had been part of the baseline session and the father was present for the treatment session.

Table 2
Study Time Line for Administration of Dependent Measures

Group	Measure	Time								
		Week 1		Week 12		Week 24				Week 36
Treatment	Mullen	X	(Treatment)	X	(Finished)					
	SIB-R	X		X						
	TTQ	X		X						
	PSI	X		X						
	Follow-up					X				
Waitlist Control	Mullen	X	(No Treatment)	X	(Treatment)	X	(Finished)			
	SIB-R	X		X		X				
	TTQ	X		X		X				
	PSI	X		X		X				
	Follow-up									X

Measures

Four methods of assessment were used in the study. Assessments were conducted by graduate students who were blind to group assignment.

First, scores of child adaptive behavior, problem behavior, and learning skills were examined pre and post intervention. The *Mullen Scales of Early Learning* (Mullen, 1995) are standardized scales used to assess abilities in Gross Motor, Fine Motor, Visual Reception, Receptive Language, and Expressive Language of young children from birth to 68 months. In most scoring cases, the child receives a "1" for correct responses and "0" for incorrect responses. In some cases, item scores range from anywhere between 0 and 5. Raw scores for each scale are converted into *T* scores which are used to obtain the child's percentile rank and age equivalent scores. The *T* scores for the four cognitive scales are also summed and converted into a standard score representing the child's overall performance, or Early Learning Composite. The scales have demonstrated sound reliability and validity. The median internal consistency split-half coefficients for the

five *Mullen Scales of Early Learning* scales range from .75 to .83. The composite is .91. Inter-rater reliability correlations range from .91 to .99 for age groups between 1 and 44 months. The scales also have good concurrent validity (.53 to .59) with the *Bayley Mental Development Index* (Bayley, 1993).

The *Scales of Independent Behavior –Revised* (*SIB-R*) (Bruininks et al., 1996) is a comprehensive checklist assessing adaptive and problem behavior in individuals from infancy to 80+ years of age. The scales are comprised of 14 adaptive behavior clusters and 8 areas of problem behavior. Items on the adaptive behavior clusters are scored from 0 (never or rarely performed) to 3 (does very well) and are added to obtain a raw score. Items on the problem behavior areas are scored on a scale of one (never; not serious) to five (one or more times an hour; extremely serious) for frequency and severity measures and are converted to an index score. Age equivalents, percentile ranks, and standard scores are provided. The scales have demonstrated good reliability and validity. The median corrected split-half reliability coefficients are reported in the test manual to be mostly in the high .70s to low .90s for ages 0-4 years. Test-retest reliability characteristics are based on children age 6-13 and ranged from .80 to .98. Low to moderate coefficients were found for criterion-related validity, however, higher coefficients were found when comparing handicapped samples, with correlations between the original *Scales of Independent Behavior* (Bruininks, Wood-cock, Weatherman, & Hill, 1984) adaptive behavior and original *Woodcock Johnson* (Woodcock & Johnson, 1977) Cognitive ability scores at about .85.

Second, questionnaires were completed pre and post treatment and waitlist to assess parent stress and knowledge of TEACCH methodology and autism. The

Parenting Stress Index-3rd edition (*PSI*) (Abidin, 1995) is a 120-item parent self-report questionnaire, designed to assess parent stress that may result in deviant parenting styles and child behavior problems. It yields 13 scores, including seven Child Domain scores (adaptability, acceptability, demandingness, mood, distractibility, hyperactivity, and reinforcement), seven Parent Domain scores (depression, attachment, restriction of parental role, sense of competence, spousal support, social isolation, and health status), and a Total Stress score, plus an optional Life Stress score. The *PSI* manual provides data in reliability and validity of the instrument.

The *TEACCH Training Quiz* (*TTQ*) (Grindstaff**,** 2002) is a 20 item short answer and fill in the blank questionnaire that was used to assess knowledge of autism and understanding of the TEACCH methodology among individuals who have completed a five-day hands on training course offered by Division TEACCH (See Appendix A). The *TTQ* was adapted from its original version to suit the home environment. Four questions that were related to the training setting and were not relevant to a home setting were removed and the word "home" was used to replace any references to the training course. The context of the quiz was not otherwise changed. Each item in the original version is scored on a scale of 0 to 2 to yield a possible score of 40. The revised version was scored up to a total score of 32. Internal consistency score for the *TTQ* indicated a correlation of .804 and intraclass correlation for the composite score was r = **.**996. A follow-up questionnaire was also distributed to parents three months after completion of the program to assess parent's experience and maintenance of the program (See Appendix B).

The fourth measurement strategy involved collecting one five-minute videotape sample of a parent/child dyad work session and one five-minute sample of a free play session. Videotapes were collected prior to the first (pre-treatment) treatment session and approximately after the fourth, eighth, and twelfth (post-treatment) treatment sessions for the treatment group. Videotapes for the waitlist group were collected at the same intervals as the treatment group while in the waitlist and again at the same intervals during their treatment phase. Parent behavior and child behavior were measured. Parent behavior variables included 1) work and play session set-up, 2) effective verbal, effective non-verbal, total effective, and total ineffective prompts, and 3) appropriate transitions. Child behavior variables included off task, escape, and independent functioning (See Appendix C for operational definitions and scoring methods). Pilot data were collected to ensure proper operational definitions and scoring methods.

Prior to videotaping, parents were provided with a rug, a shelf, small table, small chair, large 2 x 3 x 2 basket, and a home teaching kit. The home teaching kit was comprised of a 5-7 self-contained tasks designed to teach children with autism a variety of fine motor, cognitive, play, problem-solving, and communication skills. A research assistant directed the parent to complete a 5-minute work session and 5-minute play session using a standardized instruction. The research assistant then began videotaping, stepped away from the parent/child dyad, and provided minimal interaction during the videotaping.

All 5-minute work session segments were scored by an undergraduate research assistant blind to the hypotheses of the study and to group assignment. The 5-minute play sessions were reserved for use in future research. Using tapes from pilot families the

research assistant was trained by the primary investigator, to reliably use the coding and scoring system. Data from training tapes were not included in the final results. Reliable use of the system was defined as 80% reliability on observed occurrences with the primary investigator over at least two, 5-minute work session videotape segments. Videotapes used for data analysis were identified by numbers provided in random order to ensure the research assistant could not identify dates or the sequence of videotaped sessions in any way. Order effects were controlled by counterbalancing pre-treatment/waitlist and post-treatment/waitlist videotapes. The research assistant collected partial interval data and point-by-point data on paper and pencil data sheets. Tapes were scored according to operational definitions of dependent measures and to specific scoring methods (See Appendix C). For reliability purposes, 33.3% of work sessions were scored by the primary investigator; however these data were used for reliability purposes only and were not used for data analysis.

Inter-observer agreement was calculated using interval-by-interval agreement for items coded in a 10-sec. partial interval scoring method, and by using point-by-point agreement for items coded by presence or absence of individual components. Interval-by-interval reliability was calculated by dividing the total number of agreements by the number of agreements plus the number of disagreements. A scored interval-by-interval method was also used for variables in which scored intervals occurred in less than 30% of total intervals. All intervals in which both observers recorded the nonoccurrence of the behavior were ignored. An unscored interval-by-interval method was used for variables in which scored intervals occurred more than 70% of total intervals. All intervals in which both observers recorded the occurrence of the behavior were ignored. Point-by-

point reliability was calculated by dividing the total number of agreements by the number of agreements plus the number of disagreements. Point-by-point reliability was used for variables in which scored intervals occurred between 30% and 70% of total intervals.

A research assistant also collected treatment integrity data to ensure that the treatment protocol was being followed (See Appendix D). The clinician was unaware of when the fidelity checks were being conducted. Treatment fidelity checks were scored as the number of applicable steps correctly performed.

During the post-treatment and waitlist evaluations, parents were also asked to report the number of hours they spent engaging in Home TEACCHing program work and play sessions with their child outside of treatment sessions as well as any other forms of treatment or child care their child was receiving (See Appendix F).

Assessment Procedures

During their initial screening at a TEACCH clinic, each parent/child dyad referred to Home TEACCHing Program was invited to participate in the study. Parents were told that joining the study would result in one of two alternatives: 1) they would receive immediate treatment, within 1-2 weeks, or 2) they would be placed on a waitlist, with a guarantee of treatment within 12-15 weeks, a wait comparable, if not shorter than families who were not in the study. They were also provided with an explanation of the requirements of the study and a consent form. Requirements included participation in 12 weeks of treatment, completing homework each week, attending one support group session with other parents, and completing measures of dependent variables pre-treatment and post-treatment and waitlist. If a session was missed due to sickness or extenuating circumstances, the session was rescheduled as soon as possible. Those placed on the

waitlist were also asked to participate in videotaped evaluations in the home after placement into the treatment, and to participate in an additional evaluation of dependent measures post-treatment. All parents were told they could discontinue their participation in the study at any time without affecting their ability to continue the home program. No families discontinued participation after enrollment. Parents who declined enrollment in the study were routinely screened and added to the standard waitlist.

Setting and Materials

Treatment sessions were conduced in participants' homes in a living room or similar area of the house. A 6 x 6 foot area in the room was cleared and contained a small desk, a small chair, shelves, a large 2 x 3 x 2 basket, a toy basket, and a home teaching kit. The home teaching kit was comprised of a 5-7 self-contained tasks designed to teach a child a variety of fine motor, cognitive, play, problem-solving, and communication skills.

Treatment Procedure

Waitlist group. Parent/child dyads that were assigned to the waitlist group were contacted by phone and told that they would receive treatment within 12-15 weeks. They were also scheduled to complete and initial videotaped 'work/free play routine.' They then participated in two additional videotapings prior to starting treatment.

After approximately 12-15 weeks, once a parent/child dyad in the treatment group completed the 12 session Home TEACCHing program, the waitlisted matched dyad was scheduled for the final videotaping and administration of dependent measures and was schedule for their first treatment session.

Four out of five waitlist group parent/child dyads completed both the waitlist and treatment sessions. For one parent/child dyad, the mother could not attend all treatment sessions or videotapings due to changes in the family's work arrangements and the father replaced the mother. All five completed the administration of dependent measures pre and post-waitlist and post-treatment.

Treatment group. Parent/child dyads assigned to the treatment group were contacted by phone and immediately scheduled for a pre-treatment videotaping and administration of dependent measures. Within a week that this evaluation was completed, they were scheduled for their initial treatment session.

Families met individually with a clinician (master's level TEACCH staff member) 1.5 to 2 hours a week for a total of 12 sessions. Missed sessions were rescheduled as soon after the missed session as possible. Each session consisted of (1) three 10-15 minute work/free play routines in which parents received training on how to teach their child academic skills and to engage their child during free play (2) approximately 30 minutes of educational discussions about autism and about the application of the TEACCH methodology with their child and (3) approximately 10-15 minutes of education and supportive work with parents addressing individual questions/concerns related to the family and/or child.

During the initial session, parents were introduced to the program. They were given a program manual, and a brief description of the program protocol and structure of individual sessions (See Appendix G for a short description of the treatment manual). After reviewing the manual, the clinician began the initial treatment session (please refer to "Overview of a Treatment Session" below). Throughout the twelve week program, the

clinician followed the content and order of the treatment manual, however, individualization was also built into the program. For example, types and difficulty of tasks were developed based on an initial and on-going assessment of emerging skills. The layouts of tasks and materials, such as incorporating special interests or using photographs versus concrete objects, and the presentation of tasks to children, such as the number and order of tasks, were also individualized based upon the child's needs.

After each parent/child dyads completed the 12 session Home TEACCHing program, they were scheduled for a final videotaping and administration of the dependent measures.

All five treatment group parent/child dyads completed all 12 treatment sessions, all videotapings, and the administration of dependent measures pre and post-treatment.

Overview of a treatment session. The content of each session was based on a specific session topic designated by the manual for that week. During sessions 8-12, parents conducted work/free play routines and the clinician systematically faded his presence. Parents began to fade into conducting the final work/free play routine during sessions 8, 9, and 10. During sessions 11 and 12, parents conducted most if not all 'work/free play routines.' A more detailed overview of a typical session is specified below.

1. At the beginning of each session, the clinician reviewed homework and answered any questions about the previous week, and introduced the current topic.
2. Next, the clinician set-up and demonstrated three 'work/free play routines' with the child. A 'work/free play routine' consisted of two steps. In the first step, the clinician taught the child to complete self-contained tasks while sitting at the

small table. To the left of the child was a shelf containing the tasks and to the right was the large 2 x 3 x 2 basket in which the child placed competed tasks. The number of tasks depended on the child's ability to remain at the table and increased as the child learned the work routine. In the second step, the clinician transitioned the child to the free play area. The clinician then taught the parent how to engage the child during free play. After approximately five minutes of free play, a second 'work/free play routine' began. The child was transitioned to the work area to begin a second 'work/free play routine.'

3. After the final work/free play routine, the clinician and parents spent approximately 20-30 minutes discussing the session topic. The clinician then provided parents with homework.
4. During the final 10-15 minutes the clinician briefly reviewed the session and discussed the following week's agenda. A Home Teaching Session Log (See Appendix G) was competed outlining the session and homework. Any additional questions or concerns of the parents were also discussed during this time.

Parent Support Group. Parents enrolled in the treatment group also met as a group once during the treatment for approximately 2 hours. The "Make it Take it" session is a support group for parents currently and previously enrolled into the Home TEACCHing program. An average of four families attends each group. Out of the ten participants in the current study, three attended at least one "Make it Take it" session. The content of the group consisted of an informal discussion among parents about their experiences with in the Home TEACCHing program as well as any other topics they

chose to discuss. During the group, the clinician also taught and facilitated the development of individually based tasks for parents to use with their children.

Data Analysis

Changes in behavioral observation measures of three matched pairs of parent/child dyads were graphed using a multiple baseline probe design and visual analysis were used to interpret results. In addition, the treatment and waitlist groups were compared on measures of adaptive behavior, developmental measures, parental stress, and knowledge of autism and the TEACCH methodology. Independent samples t-tests were used to compare the treatment and waitlist groups on differences of means across pre and post measures of the dependent variables. Finally, descriptive analyses were used to assess responses on the follow-up questionnaires.

CHAPTER III

RESULTS

Overview of Behavioral Observation Hypotheses

Behavioral observations were collected and coded for child and parent behavior. Child behavior variables included independent functioning, off task, and escape behavior. It was hypothesized that percent of 10-second partial interval ratings of independent functioning within a 5-minute videotaping session would increase 1) in the treatment group compared to the waitlist group and 2) across time due to treatment. For off task and escape behavior, it was hypothesized that percent of 10-second partial interval ratings would decrease 1) in the treatment group compared to the waitlist group and 2) across time due to treatment.

Parent behavior variables included 1) work and play area set-up, 2) effective verbal, effective non-verbal, total effective and ineffective prompts, and 3) appropriate transitions. For set-up behavior, it was hypothesized that percent of total components present would increase 1) in the treatment group compared to the waitlist group and 2) across time due to treatment. It was hypothesized that the number of occurrences of each effective prompt type (effective verbal, effective non-verbal, total effective) out of total number of prompts provided would increase and that the number of occurrences of total ineffective prompts out of total number of prompts provided would decrease 1) in the treatment group compared to the waitlist group and 2) across time due to the treatment.

In addition, with regard to effective verbal and non-verbal prompts, it was hypothesized that the treatment would result in an increase in parent use of effective non-verbal prompts relative to use of effective verbal prompts. For appropriate execution of transitions, it was hypothesized that number of appropriate transitions to work and play would increase in the treatment group compared to the waitlist group.

Dyad 1/Dyad 2

Participant characteristics. Dyad 1 consisted of a 30.5 month old Caucasian boy (age based upon enrollment) and his father. Dyad 2 consisted of a 30.7 month old Latina girl and her Latina mother.

Child behavior. Behavioral observations of child behavior for Dyad 1 (Treatment group) and Dyad 2 (Waitlist group) are presented in Figure 1. The results indicate that treatment was associated with a clear increase in levels of independent functioning across both children, thus supporting part one of the hypothesis. The independent functioning of child 1 increased from 10.7% during the baseline observation to a mean of 40.0% (range, 31.0% to 46.6%) after treatment was implemented. The independent functioning of child 2 remained relatively stable during baseline observations, with a mean of 26.9% (range, 23.3% to 34.4%) and increased only when the treatment was implemented, indicating clear support that the treatment resulted in changes in independent functioning. Mean percent of intervals for child 2 during treatment was 62.5% (range, 53.3% to 67.1%). With regard to part two of the hypothesis, for child 1, visual inspection of the graph indicates a stable trend across the first two treatment probes, with an increasing trend during the last probe. The independent functioning of child 2 showed a stable trend; therefore part two of the hypothesis could not be supported.

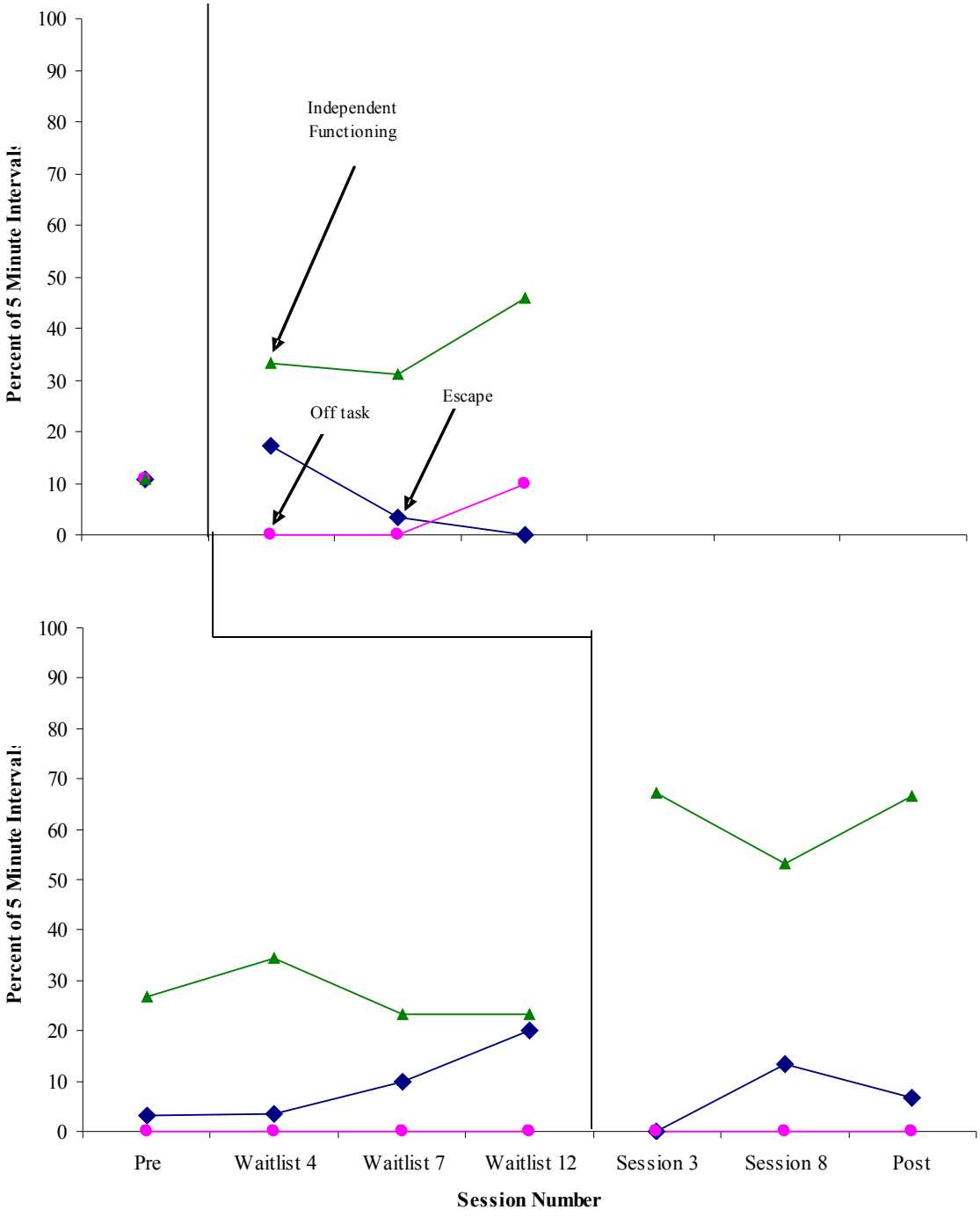


Figure 1. Dyad 1/Dyad 2 Child Behavior.

For both escape and off-task behavior, the results indicate that the treatment was not associated with changes in level, trend, or variability of escape and off-task behavior. It is likely that the low rates of escape and off-task behavior at baseline for child 1 (10.7% and 10.7% respectively) and child 2 (mean of 0% and 9.2% respectively), however, masked possible treatment effects.

Parent set-up behavior. The behavioral observation of parent behavior for Dyad 1 and Dyad 2 are presented in Figure 2. Parent 1 set-up behavior increased from 12.5% during the baseline observation to a mean of 67.4% (range, 60.0% to 73.3%) after treatment was implemented. Parent set-up behavior of parent 2 showed a relatively stable trend during baseline, with a mean of 44.4% (range, 37.5% to 53.3%), and increased to a mean of 72.8% (range, 66.6% to 78.6%) only when treatment was implemented, verifying that the treatment was associated with a clear increase in parent set-up behavior. Part two of the initial hypothesis was also clearly supported, with both parents demonstrating an increasing trend across time across all three treatment probes.

Parent verbal and non-verbal prompt behavior. The results of the behavioral observation are presented in Figure 3. The treatment was not associated with an increase in use of effective verbal prompts for either parent. Although effective verbal prompt behavior for parent 1 increased from 18.8% during the baseline observation to a mean of 45.6% (range, 30% to 76.9%) after treatment was implemented, visual inspection of the graph indicates a large increase in level after the first probe but then a decrease to a level only slightly above baseline during the last two probes. For parent 2, effective verbal prompt behavior slightly decreased from a mean of 27.9 (range, 18.9-34.5) during the baseline observation to a mean of 24.1% (range, 16.7% to 29.4%) after treatment was

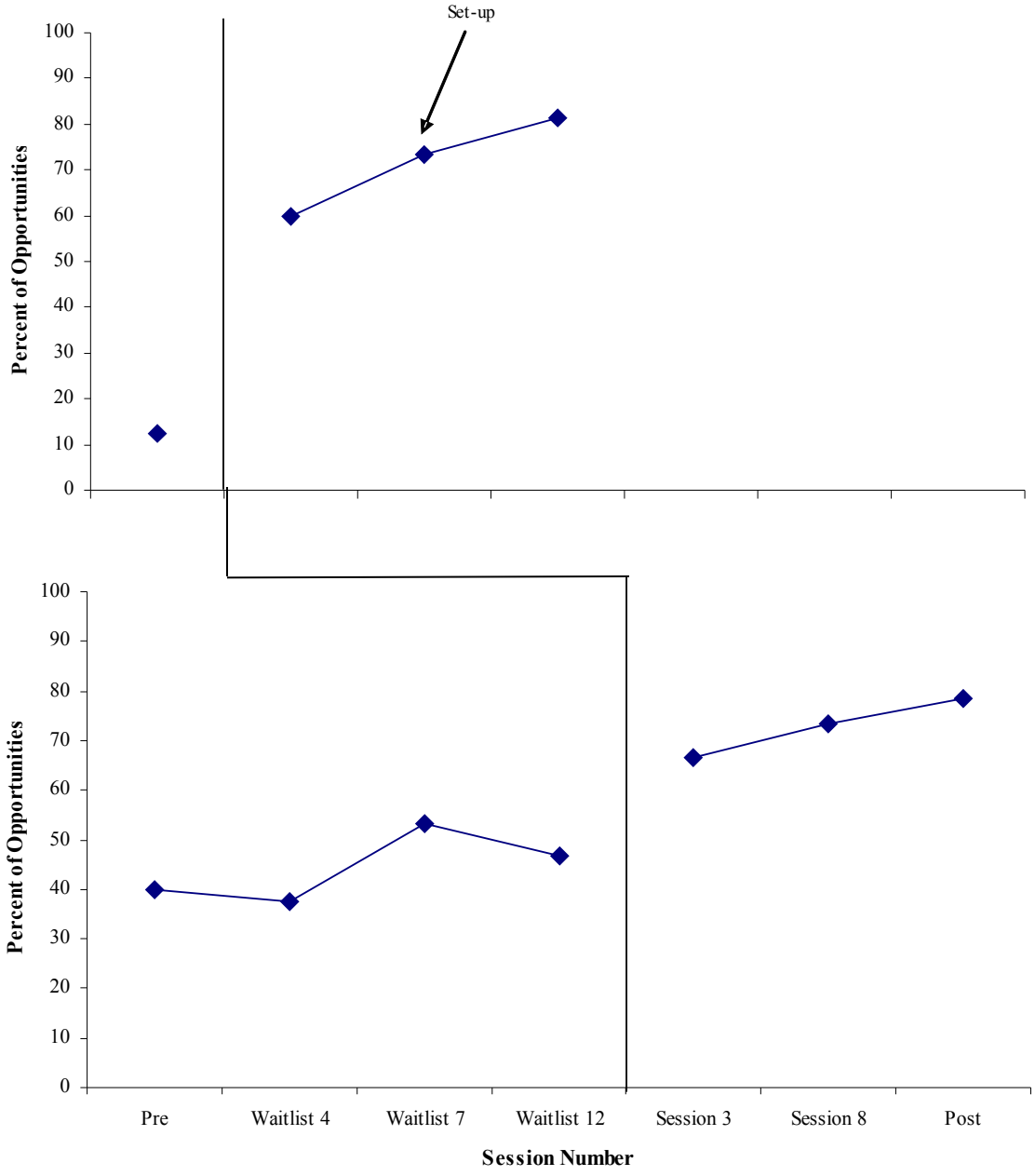


Figure 2. Dyad 1/Dyad 2 Parent Set-up Behavior.

implemented, providing further evidence that the treatment did not result in an increase in use of effective verbal prompts. Part two of the hypothesis was minimally supported by parent 2 only who showed a slight increasing trend across treatment probes.

Part one of the hypothesis for effective non-verbal prompts was moderately supported across the matched dyad pair. Effective non-verbal prompt behavior for parent 1 increased from 18.8% during the baseline observation to a mean of 48.7% (range, 46.2% to 50.0%) after treatment was implemented. Visual inspection of the graph shows that the treatment resulted in a clear change in level across all treatment probes. Effective non-verbal prompt behavior of parent 2 remained stable during baseline, with a mean of 33.2% (range, 28.6% to 40.5%), and increased to a mean of 53% (range, 39.1% to 61.1%) only after treatment was implemented. The moderate change in level of parent 2, taken together with a clear change in level of parent 1, provides moderate support for treatment effects. Part two of the hypothesis was not supported by either parent.

The results also showed that the treatment resulted in an increase in parent use of effective non-verbal prompts relative to use of effective verbal prompts. At baseline, Parent 1 showed the same use of effective non-verbal prompts and effective verbal prompts (18.8%) out of total prompts provided. Although the first treatment probe indicate that parent 1 used more effective verbal than effective non-verbal prompts, during the last two treatment probes, parent 1 used more effective non-verbal than effective verbal prompts. Likewise, at baseline, Parent 2 showed similar use of effective verbal (mean of 27.9%) and non-verbal prompts (mean of 33.2%) during the baseline observation, with overlapping data paths. Only after treatment was implemented did parent 2 show a clear differentiation of mean levels of effective verbal prompts (mean at

24.1%) and effective non-verbal prompts (mean at 53%) and of data paths across all three treatment probes.

Parent total effective and total ineffective prompt behavior. The results of behavioral observations are presented in Figure 4. Total effective prompt behavior for parent 1 increased from 37.5% during the baseline observation to a mean of 81.5% (range, 80% to 84.6%) after treatment was implemented. Total effective prompt behavior of parent 2 was stable, with a mean of 61.4% (range, 53.7% to 70.0%) during the baseline observations, and increased moderately, to a mean level of 77% (range, 65.2% to 88.2%) only after treatment was implemented. The moderate change in level of parent 2, taken together with a clear change in level of parent 1, provides moderate evidence for treatment effects. Part two of the hypothesis was minimally supported. Parent 1 showed no trend, and parent 2 showed a very slight increase in trend, but with a decrease in percent of 10 second partial intervals during the second treatment probe.

A treatment effect for total ineffective prompt behavior was also moderately supported. Total ineffective prompt behavior for parent 1 decreased from 62.5% during the baseline observation to a mean of 18.5% (range, 15.4% to 20%) after treatment was implemented. Total ineffective prompt behavior for parent 2 decreased from a stable mean of 38.9% (range, 31.0% to 46.4%) during the baseline to a mean of 22.9% (range, 11.8% to 34.8%) after treatment was applied, thus verifying treatment effects. Part two of the hypothesis was not supported. Only Parent 2 showed a slight decreasing trend in total ineffective prompt behavior, but with a slight increase in percent of 10 second partial intervals during the second treatment probe.

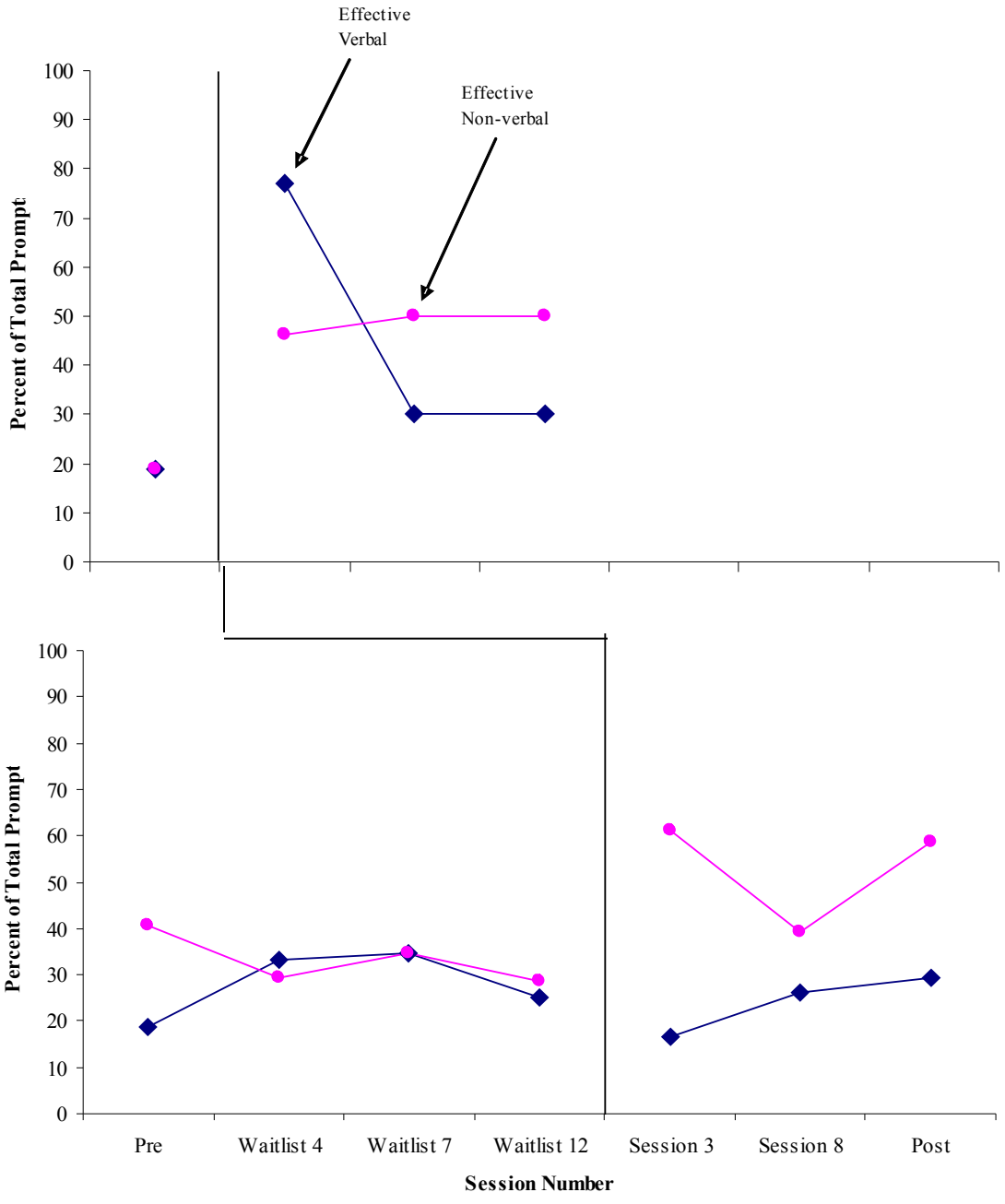


Figure 3. Dyad 1/Dyad 2 Effective Verbal and Non-Verbal Prompts.

Parent transition behavior. The hypothesis for transition behavior was not supported in the results of Dyad1/Dyad 2. Parent 1 completed no appropriate transitions to work or play during treatment probes. Parent 2 completed only one appropriate transition to play, during the last treatment probe.

Follow-up questionnaires. Parent 1 and parent 2 returned follow-up questionnaires (See Appendix B) that were sent three months following their last treatment session. Parent 1 reported that the family spends 1-2 hours a week teaching their child using the methods they learned during the Home TEACCHing program, however, they stated that they use a "looser," natural environment based format than what was taught during treatment sessions. Parent 2 stated that she spends 2-4 hours a week working with her child, with a particular focus on using bedtime routines and on developing communication using food and high interest activities.

When asked how their child benefited most from the program, both parents discussed work behavior. Parent 1 reported that his child benefited most from learning pre-academic skills. Parent 2 reported that her child benefited most from learning the expectations that sitting at the table meant it was time to engage in work activities. When asked how they, as parents, benefited most from the program, parent 1 stated that he benefited most from learning new ways of engaging his child in pre-academic skills. Parent 2 benefited most from seeing her child respond to the routines of the program and from understanding and using her child's strengths.

Parents 1 and 2 reported differences in the types of changes they would make to the program. Parent 1 felt that the program was too rigid for his high-functioning child.

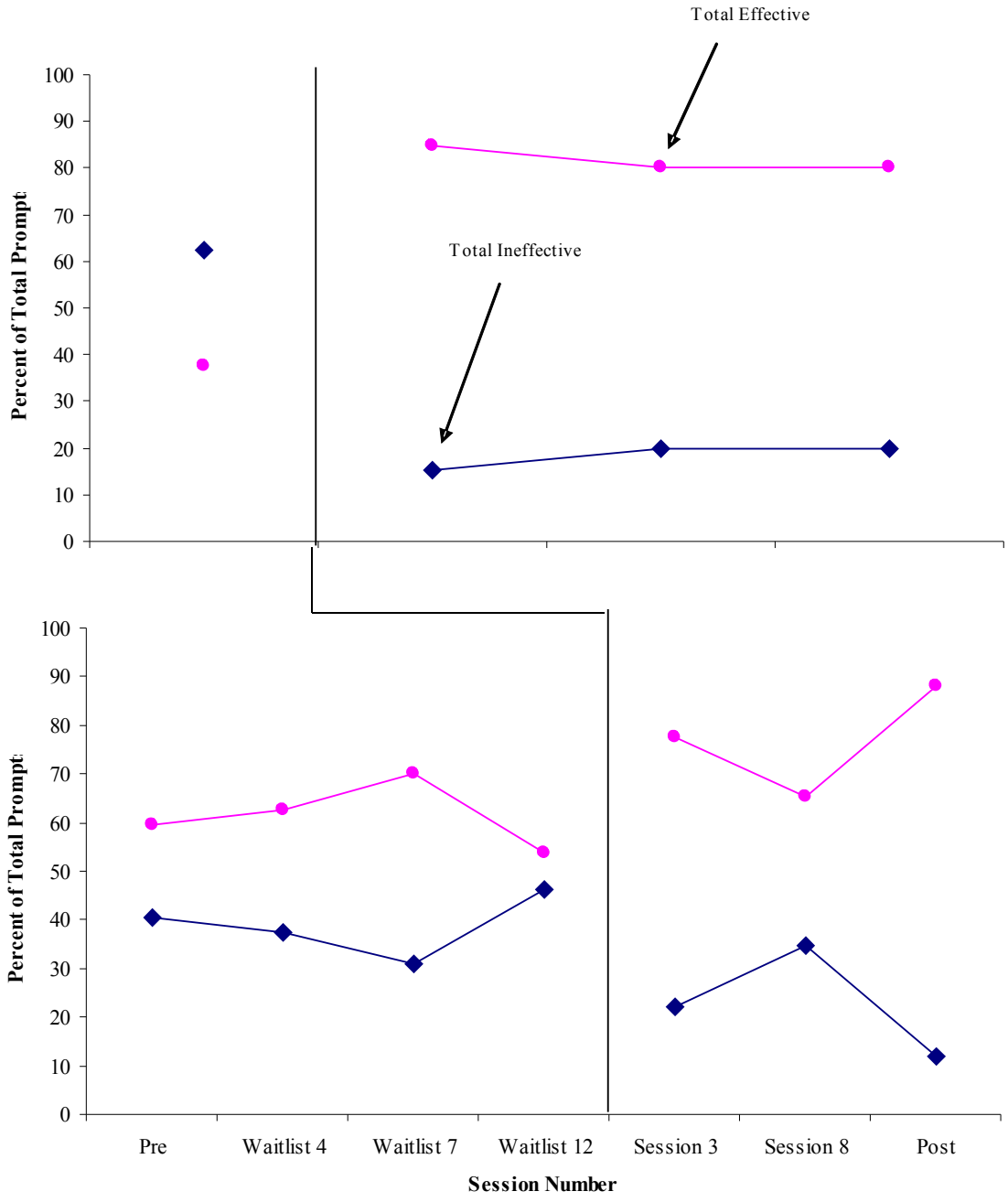


Figure 4. Dyad 1/Dyad 2 Total Effective Verbal and Ineffective Prompts.

He thought that the use of pictures as a basis for communication exchange and the use of objects as transitions tools did not match the functioning level of his child. Parent 2 stated she would have liked to have more treatment sessions, with more time between challenging sessions to practice skills. She also stated that periodic follow-up sessions from the clinician would be beneficial.

Treatment fidelity checks. Treatment integrity, scored from a 19-step checklist for the administration of a treatment session, was conducted for Dyad 1 and Dyad 2. During treatment session three for Dyad 1, the results of the treatment integrity indicated that 94.7% (18 out of 19) of components were appropriately conducted. The clinician did not teach the parent how to engage the child during free play during at least one play session. During session six for Dyad 2, the results of the treatment integrity indicated that 100% (18 out of 18) of components were appropriately conducted.

Dyad 3/Dyad 4

Participant characteristics. Dyad 3 consisted of a 37.4 month old Caucasian boy and his Caucasian mother. Dyad 4 consisted of a 34.2 month old Caucasian boy and his Caucasian mother. Due to missing data, behavioral observation measures are not reported for Dyad 4. In addition, because of the lack of comparison data it is unclear whether the positive treatments effects for Dyad 3 were the result of the treatment or passage of time. Formal dependent measures and information from the follow-up questionnaire, however, are reported.

Child behavior. Behavioral observations of child behavior for Dyad 3 are presented in Figure 5. The results indicate that treatment was associated with a moderate increase in level of independent functioning. The independent functioning of child 3

increased from 33.3% during the baseline observation to a mean of 43.2 (range, 40.0% to 46.4%) after treatment was implemented. For child 3, visual inspection of the graph indicates that independent functioning did not significantly change in trend over time, providing no support for part two of the hypothesis.

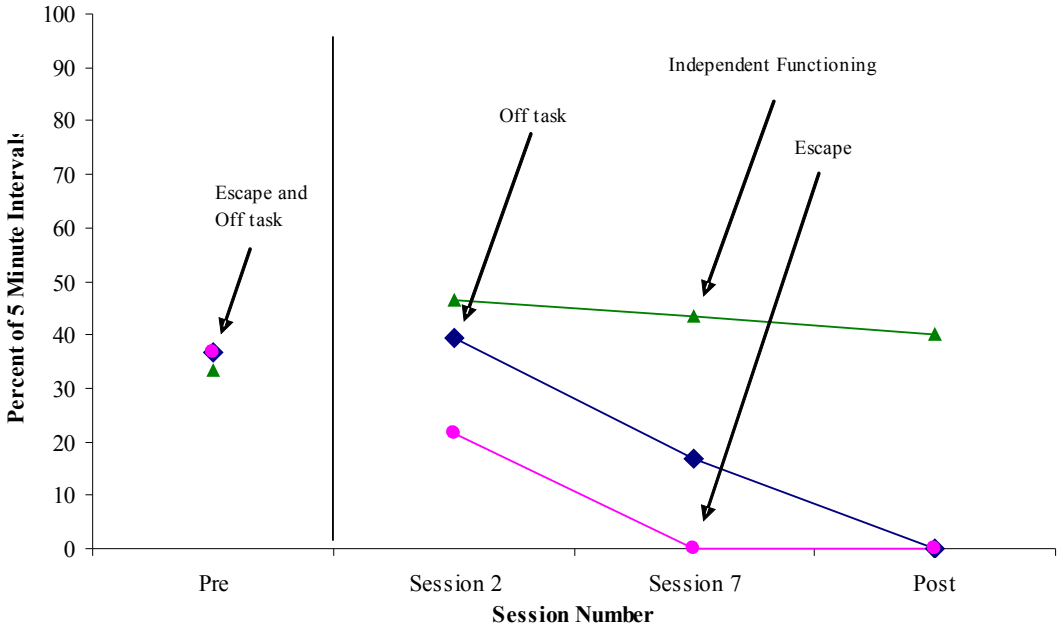


Figure 5. Dyad 3 Child Behavior.

For both escape and off-task behavior, child 3 showed a clear change in level and trend as a result of treatment, supporting both parts of the hypothesis. For escape behavior, percent of 10 second intervals decreased from 36.7% during the baseline observation to a mean of 7.1 (range, 0.0% to 21.4%) after treatment was implemented. For off-task behavior, percent of 5 minute intervals decreased from 36.7% during the baseline observation to a mean of 18.6 (range, 0.0% to 39.3%) after treatment was implemented.

Parent set-up behavior. Parent set-up behavior for Dyad 3 is presented in Figure 6. The results showed that the treatment was associated with a clear increase in level and

trend of parent set-up behavior, supporting the initial hypothesis. Parent 3 increased from 20% during the baseline observation to a mean of 76.2% (range, 68.8% to 81.3%) after treatment was implemented.

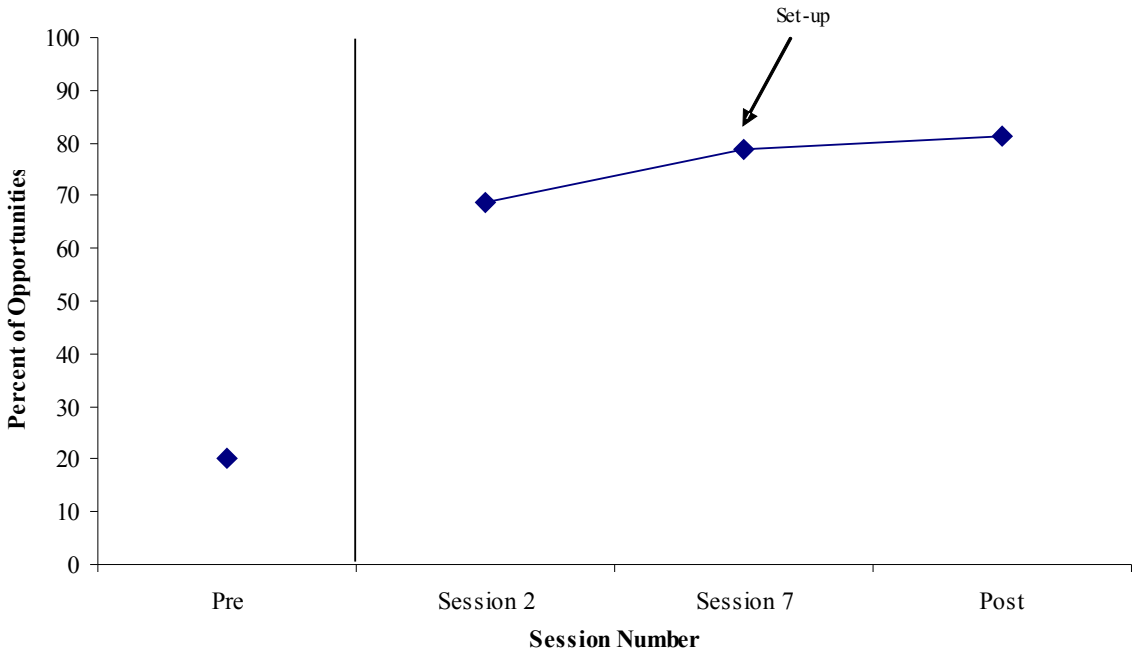


Figure 6. Dyad 3 Parent Set-up Behavior.

Parent effective verbal and non-verbal prompt behavior. The results of the behavioral observation for Dyad 3 are presented in Figure 7. The treatment was not associated with an increase in use of effective verbal prompts. Effective verbal prompt behavior for parent 3 remained stable across the baseline and treatment session probes. Effective verbal prompts were exhibited 14.8% during the baseline and at a mean of 14.7% (range, 0% to 25.0%) after treatment was implemented. The treatment was, however, associated with an increase in use of effective non-verbal prompts. Effective non-verbal prompt behavior for parent 3 was exhibited 26.0% during the baseline probe and increased to a mean of 51.5% (range, 33.3% to 66.7%) after treatment was implemented. Also, the increasing trend across all three treatment probes provides support for part two of the hypothesis.

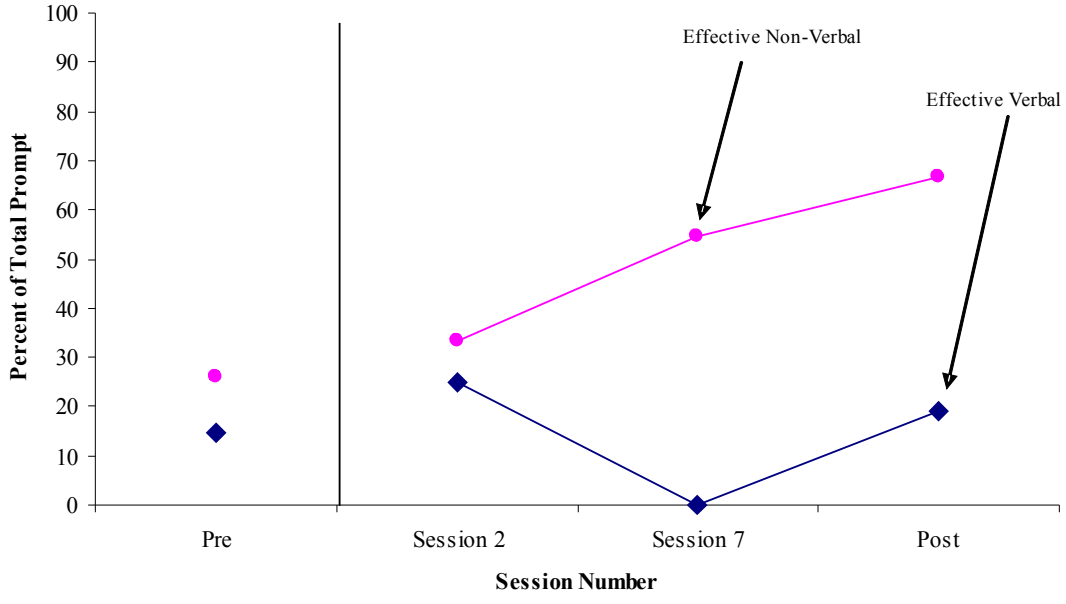


Figure 7. Dyad 3 Effective Verbal and Non-Verbal Prompts.

The differentiation between use of effective verbal prompts and effective non-verbal prompts by parent 3 supports the initial hypothesis. At baseline, Parent 3 showed slightly higher usage of effective non-verbal prompts (14.8%) than effective verbal prompts (26.0%) and out of total prompts provided. This differentiation remained similar during the first treatment probe, however during the last two treatment probes, parent 3 used significantly more effective non-verbal relative to effective verbal prompts.

Parent total effective and total ineffective prompt behavior. The results of the behavioral observation are presented in Figure 8. A treatment effect for both total effective and total ineffective was supported. Total effective prompt behavior for parent 3 increased from 40.7% during the baseline observation to a mean of 66.1% (range, 54.5% to 85.7%) after treatment was implemented. Total ineffective prompt behavior of

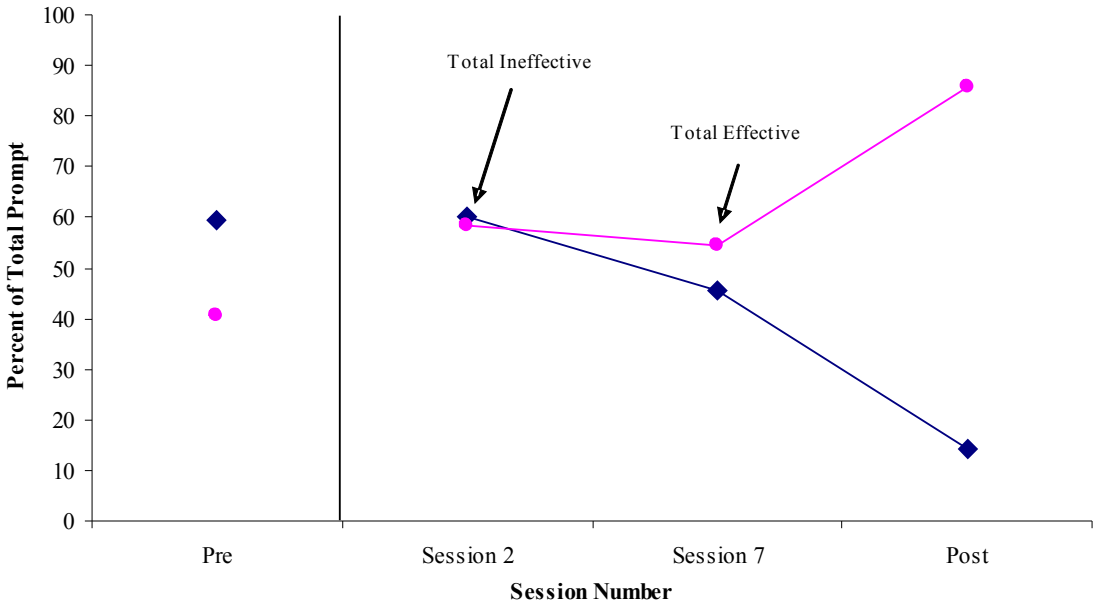


Figure 8. Dyad 3 Total Effective Verbal and Ineffective Prompts.

parent 3 decreased from a 59.3% during baseline to a mean of 39.9% (range, 14.3% to 60.0%) after treatment was implemented. Both behaviors showed clearest treatment

effects during the last treatment probe. Visual inspection of the graph also shows increasing trends for both behavior, supporting part two of the hypotheses.

Parent transition behavior. For parent 3, the initial hypothesis was supported for transitions to work, but not play. No appropriate transitions to work or play occurred during baseline. Only once treatment was implemented, however, did parent 3 execute all appropriate transitions to work. No appropriate transitions to play, however, were completed after treatment was implemented.

Follow-up questionnaires. Both parents returned follow-up questionnaires. Parent 3 reported that she works approximately 10 hours per week with her child using the methods she learned during the Home TEACCHing program. She stated she worked mainly on communication using books and play materials. Parent 4 reported spending approximately 7-10 hours a week with her son. She said she used social stories and that she uses a visual schedule every day with her son. She also uses the work station to practice reading and matching skills.

Similar to parent 2, parent 3 reported that her child benefited most from learning how to sit to finish work. She herself benefited most from learning about the importance of structured activities. Parent 4 stated that her child benefited most from the organization of materials and his interaction with the clinician, and that she benefited most from learning how to present new activities to her son.

When asked what types of changes she would make to the program and what she would like to see as a follow-up to treatment sessions, parent 3 stated that she would like a program for older children. Parent 4 reported no need for changes in the program. She

stated that the program was "just the right amount of everything" and that the clinician did a great job individualizing the sessions to her son.

Treatment fidelity checks. Treatment integrity could not be collected for Dyad 3 or Dyad 4 due to time constraints of the research assistants.

Dyad 4/Dyad 5.

Participant characteristics. Dyad 5 consisted of a 28.3 month old Caucasian boy and his Caucasian mother. Dyad 6 consisted of a 24.9 month old Caucasian boy and his Caucasian mother.

Child behavior. Behavioral observations of child behavior for Dyad 5/Dyad 6 are presented in Figure 9. The results indicate that the initial hypothesis for independent functioning was supported by the waitlist family but not the treatment family; therefore treatment effects could not be verified. Despite an initial treatment effect during the first treatment probe, the independent functioning of child 5 across the final two treatment probes dropped below baseline levels. Child 5 exhibited independent functioning for 23.3% of intervals during the baseline probe and for a mean if 21.4% (range, 10.0% to 37.5%) after treatment was implemented. The independent functioning of child 6, on the other hand, showed moderate response to treatment. His behavior increased from nearly zero levels of independent functioning (mean, 1.6%; range, 0.0% to 3.3%) during baseline observations, to a mean of 16.7% (range, 0.0% to 30.0%) only after treatment was implemented. Neither child showed support for the second part of the hypothesis.

Treatment effects for escape and off-task behavior were also only supported by child 5, and not verified by child 6. With regard to escape behavior, child 5 showed a large response to treatment; however this response was not replicated by child 6. Child 5

engaged in escape behavior during 76.7% of intervals during baseline and exhibited a mean of only 7.8% of intervals after treatment was implemented (range, 0.0% to 16.7%). Visual inspection of the graph indicates that Child 6 showed a large decrease in escape behavior; however this decrease occurred across the first three baseline probes and remained at 0% for the remaining baseline probes and for all treatment probes. A similar pattern was demonstrated for off-task behavior of child 6. Visual inspection of the graph indicates that off-task behavior for Child 5 showed a moderate response to treatment, with the exception of the second treatment probe, with a change from a baseline percentage of 26.7 to a mean of 22.2% (range, 0.0% to 60.0%) after treatment was implemented.

Parent set-up behavior. Parent set-up behavior graphs for Dyad 5 and Dyad 6 are presented in Figure 10. The results showed clear treatment effects. Parent 5

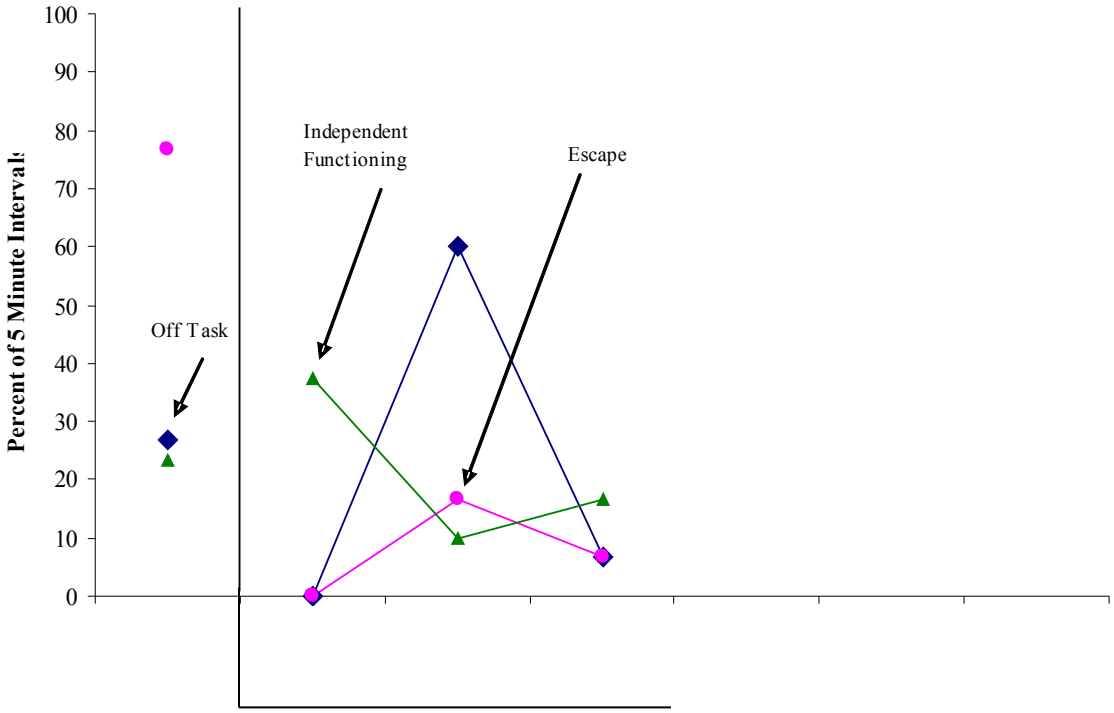
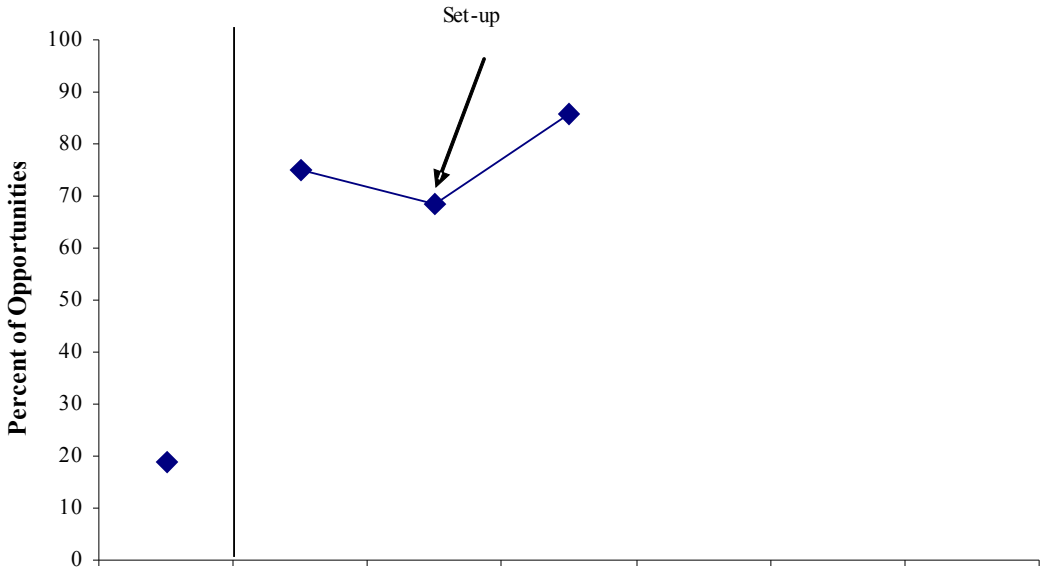
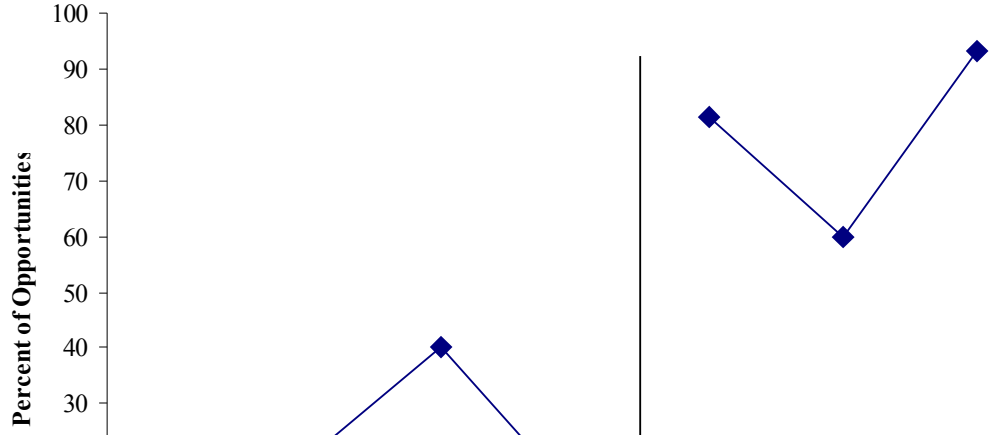

Percent of 5 Minute Intervals
100
90
80
70
60
50
40
30
20
10
0
Off Task
Independent
Functioning
Escape

Figure 9. Dyad 5/Dyad 6 Child Behavior.

increased from 18.8% during the baseline observation to a mean of 76.4% (range, 68.6% to 85.7%) after treatment was implemented. Only after treatment was implemented for parent 5, did the mean percent of set-up components correctly implemented increase to a mean of 78.2% (range, 60.0% to 93.3%) from a baseline mean of 20.0% (range, 6.6% to 40.0%).

Parent verbal and non-verbal prompt behavior. The results of the behavioral observation measures are presented in Figure 11. The treatment was slightly associated with an increase in use of effective verbal prompts. Effective verbal prompt behavior for parent 5 increased from 20.8% during the baseline observation to a mean of 36.6% (range, 23.1% to 44.4%) after treatment was implemented. For parent 6, effective verbal prompt behavior also slightly increased from a relatively stable baseline mean of 8.9 (range, 0.0-17.4) to a mean of 14.9% (range, 4.5% to 31.0%) only after treatment was implemented. This treatment effect was evident only during the last treatment probe, however, therefore provides only weak support. Part two of the hypothesis was supported by parent 2 only, with the data path showing an increasing trend across time after treatment was implemented. Treatment effects for effective non-verbal prompts were moderately supported for parent 6, but not for parent 5, thus providing no support for the initial hypothesis. Effective non-verbal prompt behavior for parent 5 decreased from 37.5% during the baseline observation to a mean of 35.2% (range, 23.1% to 55.5%) after treatment was implemented. Visual inspection of the graph shows that the treatment resulted in a moderate increase during the first treatment probe; however the second and third treatment probes showed a percentage below baseline levels. Effective non-verbal prompt behavior of parent 6, on the other hand, remained stable during baseline, with a


Set-up
Percent of Opportunities
100
90
80
70
60
50
40
30
20
10
0


Percent of Opportunities
100
90
80
70
60
50
40
30

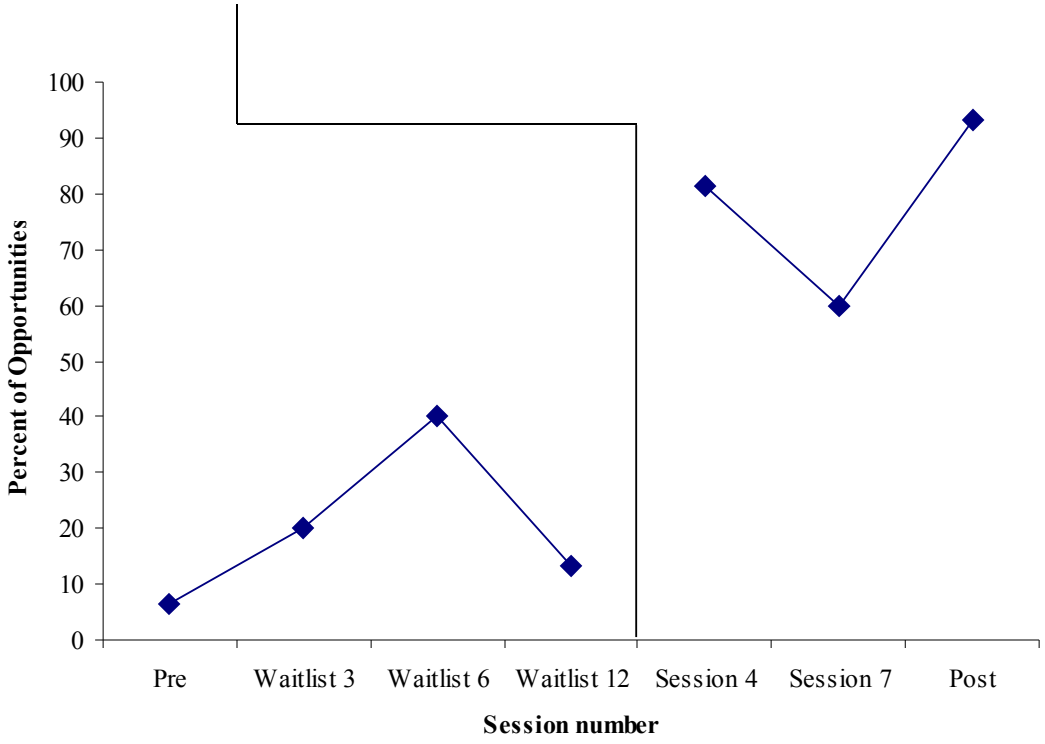


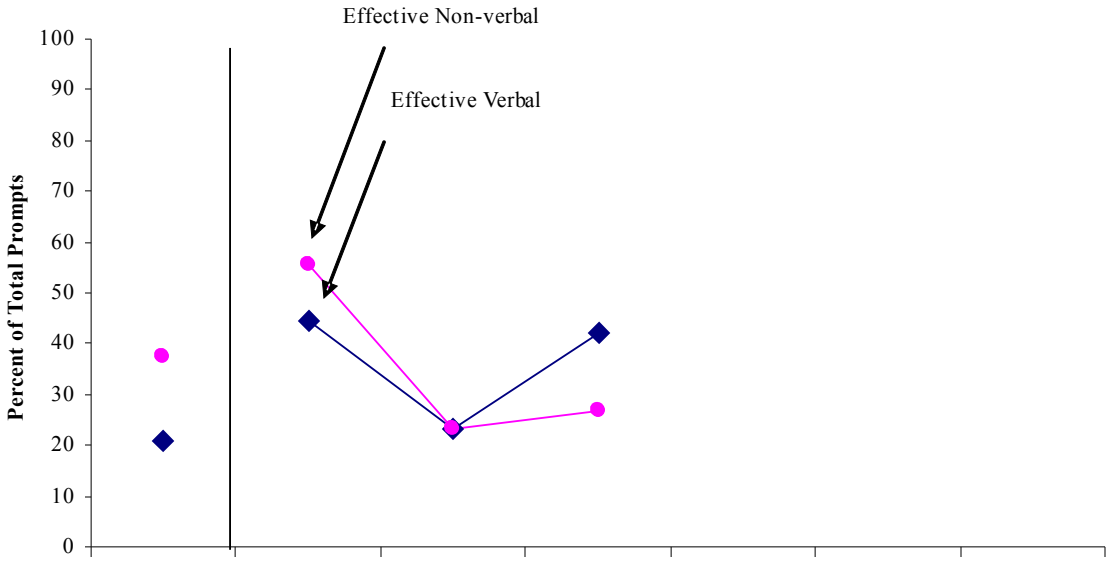
Figure 10. Dyad 5/Dyad 6 Parent Set-up Behavior.

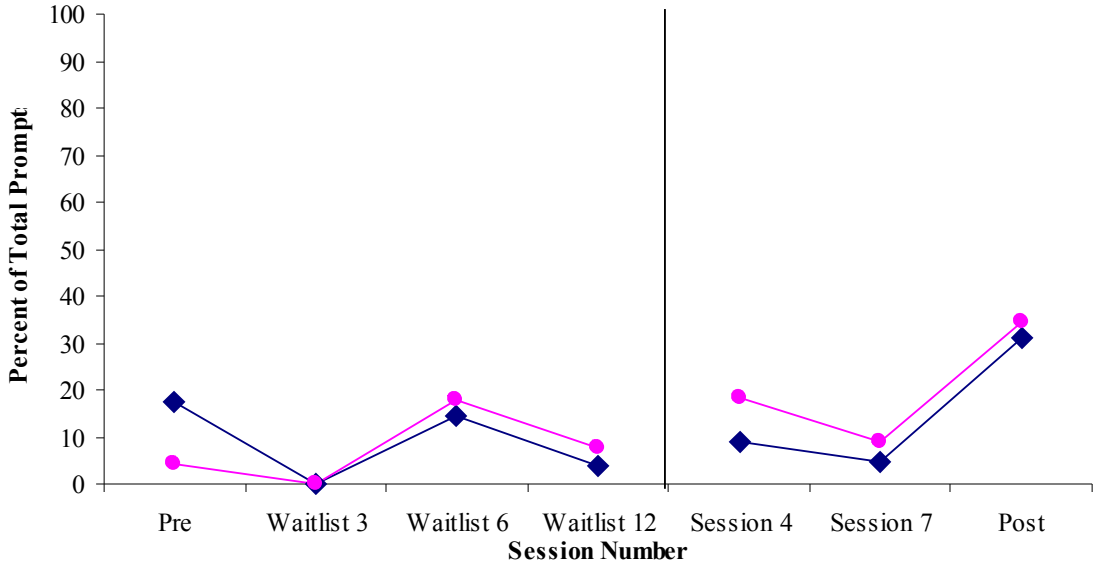
mean of 7.5% (range, 0.0% to 17.9%), and increased to a mean of 28.6% (range, 9.1% to 34.5%) only after treatment was implemented. An increase in trend was also demonstrated across treatment probes for parent 6.

The results did not show that the treatment resulted in an increase in parent use of effective non-verbal prompts relative to use of effective verbal prompts. Neither parent showed a clear differentiation of mean levels of effective verbal and non-verbal prompts.

Parent total effective and total ineffective prompt behavior. The results of the parent prompt behavioral observation for Dyad 5/Dyad 6 are presented in Figure 12. Total effective prompt behavior for parent 5 increased moderately from 58.3% during the baseline observation to a mean of 71.8% (range, 46.2% to 100.0%) after treatment was implemented. Total effective prompt behavior of parent 6 showed a slightly increasing trend, with a mean of 16.3% (range, 0.0% to 32.1%) during the baseline observations, and then demonstrated a stronger increasing trend after treatment was implemented, with a mean 35.5% (range, 13.6% to 65.5%), which verified moderate treatment effects. A visual inspection, however, indicates that the treatment showed an effect only during the last treatment probe for parent 6. Part two of the hypothesis was supported by parent 6 only, who showed an increasing trend across treatment probes.

A treatment effect for total ineffective prompt behavior was also moderately supported. Total ineffective prompt behavior for parent 5 decreased from 41.6% during the baseline observation to a mean of 28.2% (range, 0.0% to 53.8%) after treatment was implemented. For parent 6, total ineffective prompt behavior 6 showed a slightly decreasing trend, with a mean of 83.7% (range, 67.9% to 100.0%) during the baseline observations, and then demonstrated a stronger decreasing trend after treatment was


Effective Non-verbal
Effective Verbal
Percent of Total Prompts
100
90
80
70
60
50
40
30
20
10
0


Percent of Total Prompts
100
90
80
70
60
50
40
30
20
10
0
Pre
Waitlist 3
Waitlist 6
Waitlist 12
Session 4
Session 7
Post
Session Number

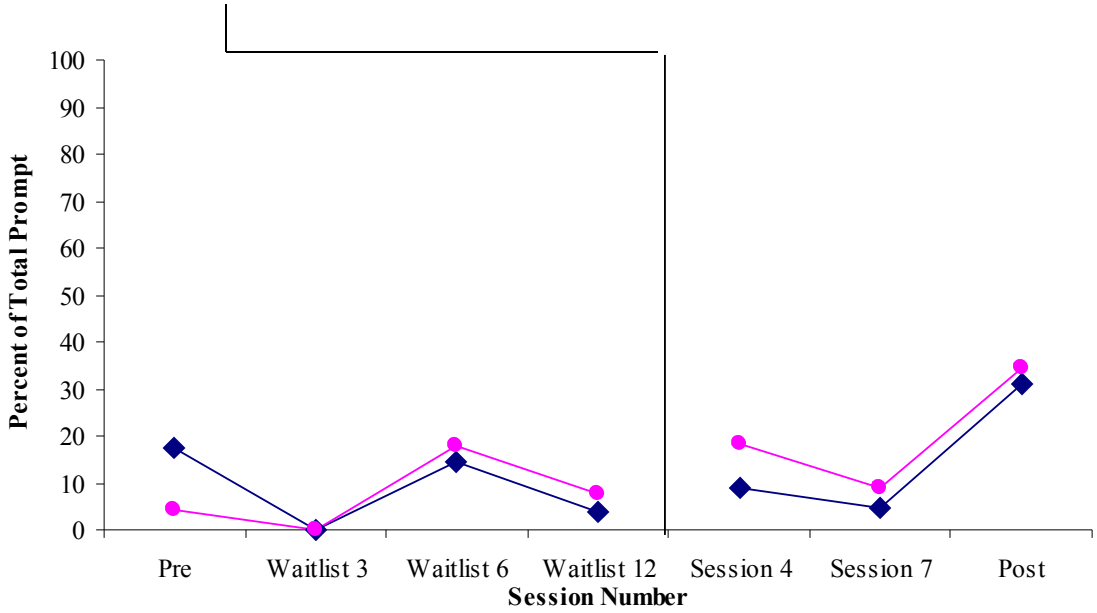


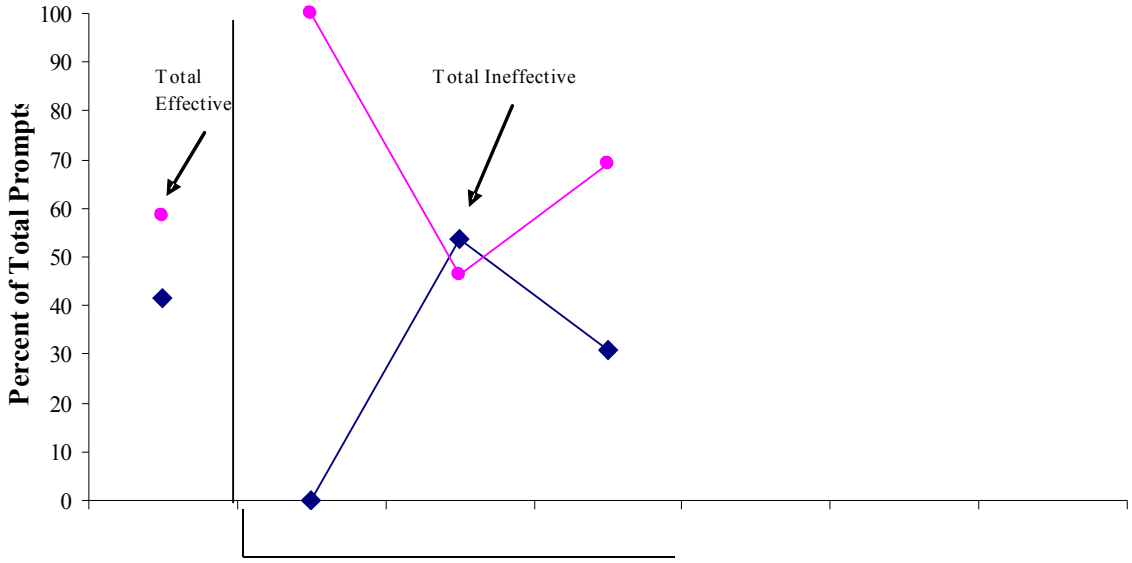
Figure 11. Dyad 5/Dyad 6 Effective Verbal and Non-Verbal Prompts.

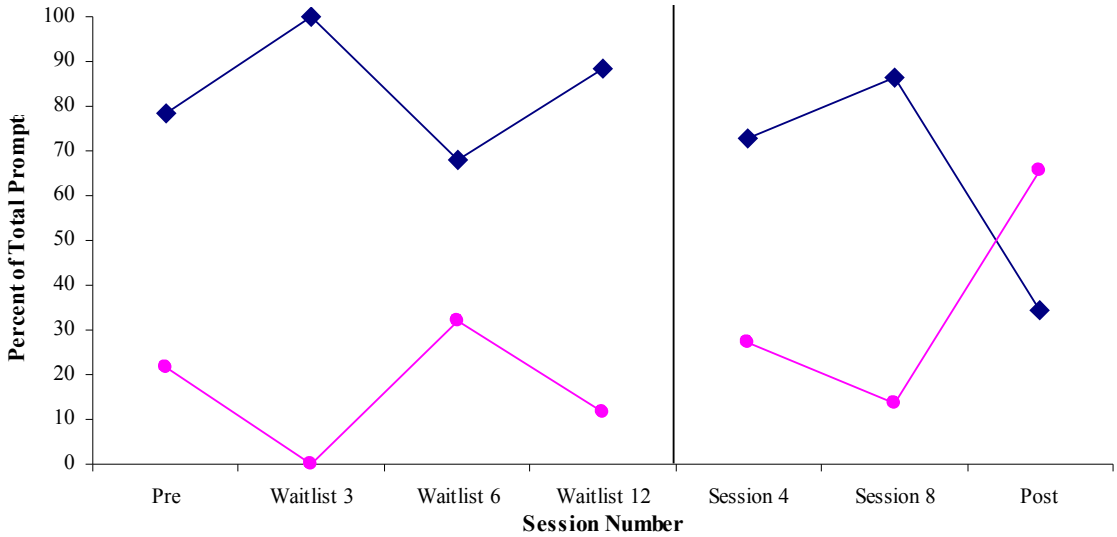
implemented, with a mean 64.5% (range, 34.5% to 86.4%), which verified moderate treatment effects. Again, a visual inspection indicates that the treatment showed an effect only during the last treatment probe. Part two of the hypothesis was also was supported by parent 6 only, who showed an decreasing trend across treatment probes.

Parent transition behavior. The hypothesis for transition behavior was supported by parent 6. Parent 5 did not use a transition object for transition from work or play during any of the eight opportunities to do so. Parent 6 used an object to transition her son to play twice during the baseline period. After treatment was implemented, she did not use transition objects to work or play during the first probe, however during the last two treatment probes, she used transition objects for transitions to both work and play.

Follow-up questionnaires. Both parent 5 and parent 6 returned follow-up questionnaires. Parent 5 reported that she works with her son 20 hours a week using the Home TEACCHing program methods. Areas of teaching reported were toilet training, giving choices, pretend play, and pre-academic skills (i.e. numbers, colors, shapes, matching). Parent 6 stated that her son spends approximately 4 hours a week working on independent work skills, play skills, and on communication.

When asked how her child benefited most from the program, Parent 5 reported that her child learned 1) how to finish one task before starting the next one 2) how to match and assemble objects and 3) how to pretend play. When asked how she, as a parent, benefited most from the program, parent 5 stated that she benefited most from learning 1) how to gain her son's attention 2) how to provide choices, and 3) how wording can lead to different responses from her child. Parent 6 reported that learning


Percent of Total Prompts
100
90
80
70
60
50
40
30
20
10
0
Total Effective
Total Ineffective


Percent of Total Prompts
100
90
80
70
60
50
40
30
20
10
0
Pre
Waitlist 3
Waitlist 6
Waitlist 12
Session 4
Session 8
Post
Session Number

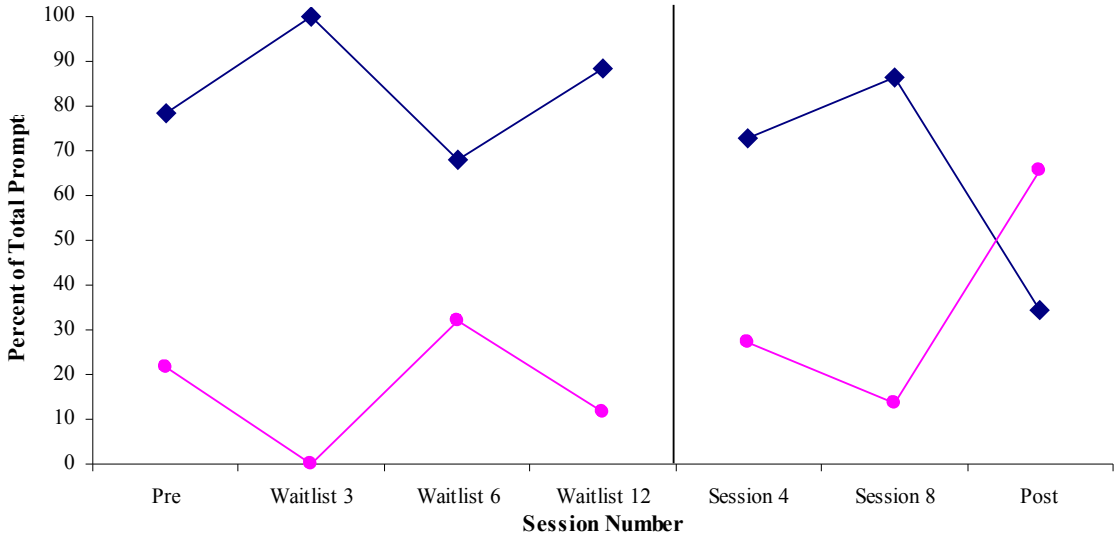


Figure 12. Dyad 5/Dyad 6 Total Effective and Ineffective Prompts.

about physical structure allowed her to teach her son. She also stated that being persistent and using a schedule, she was able to observe her son learning and staying calm due to clear expectations.

When asked about the types of changes they would make to the program, parent 5 stated "this is a hard question. I would have to say that I have been very pleased with everything that the clinician has taught me and my child." Parent 6 stated "I can't really think of anything but I am so thankful to have had the opportunity to participate in the program. The clinician was a Godsend." With regard to what she would like to see as a follow-up to these sessions, Parent 6 stated she would have liked to have a 6 month follow-up session.

Treatment fidelity checks. Treatment integrity could not be collected for Dyad 5 or Dyad 6 due to time constraints of the research assistants.

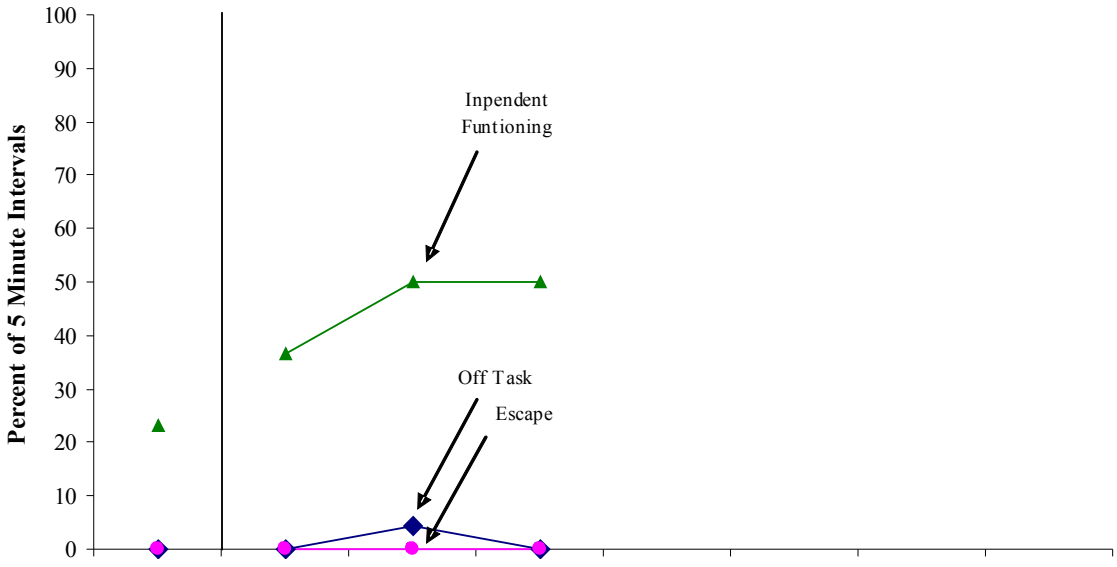
Dyad 7/Dyad 8

Participant characteristics. Dyad 7 consisted of a 32.3 month old Caucasian boy and his Caucasian mother. Dyad 8 consisted of a 39.1 month old African American boy and his African American mother.

Child behavior. Behavioral observations of child behavior for Dyad 7/Dyad 8 are presented in Figure 13. The results support both parts of the initial hypothesis. The independent functioning of child 7 clearly increased once treatment was implemented. Child 7 exhibited independent functioning for 23.3% of intervals during the baseline observation and for a mean if 45.6% (range, 36.7% to 50.0%) after treatment was implemented, with a clear increase in trend across all treatment probes. The independent functioning of child 8 showed a treatment response during the third and fourth treatment probes. His behavior increased from a relatively stable mean of 8.8% (range, 3.3% to 16.6%) during baseline observations, to a mean of 19.2% (range, 0.0% to 40.0%) only after treatment was implemented. Child 8 also showed a clear increase in independent functioning across all treatment probes.

Child 7's results could neither support nor disprove the initial hypothesis for escape and off-task behavior due to zero levels of escape behavior and near zero levels of off-task behavior across baseline and treatment probes. The results for Child 8, on the other hand, provide support for a moderate treatment effects for off-task behavior and a minimal effect for escape behavior. Child 8 engaged in escape behavior during a mean of 60.8% (range 20.0% to 100.0%) of intervals during baseline and during a mean of only

20.8% (range, 66.0% to 43.3%) of intervals after treatment was implemented. Visual inspection of the graph, however, indicates that escape behavior decreased dramatically after the first two baseline probes and did not significantly change after treatment was implemented. It is possible that merely exposure to the probe sessions rather than the actual treatment may have caused a decrease in escape behavior, however had treatment probes been extended; it is also possible that escape behavior would have remained low as exhibited in the final treatment probe. For off-task behavior, visual inspection of the graph indicates that child 8 showed a response to treatment during the last treatment probe. Prior to the last treatment probe, treatment probes shared a similar mean to baseline probes, however the trend was more stable compared to the variable trend during baseline probes. Overall, off-task behavior decreased from a mean of 51.4 (range, 32.0% to 60.0%) to a mean of 35.0 (range, 10.0% – 43.3%) after treatment was implemented.



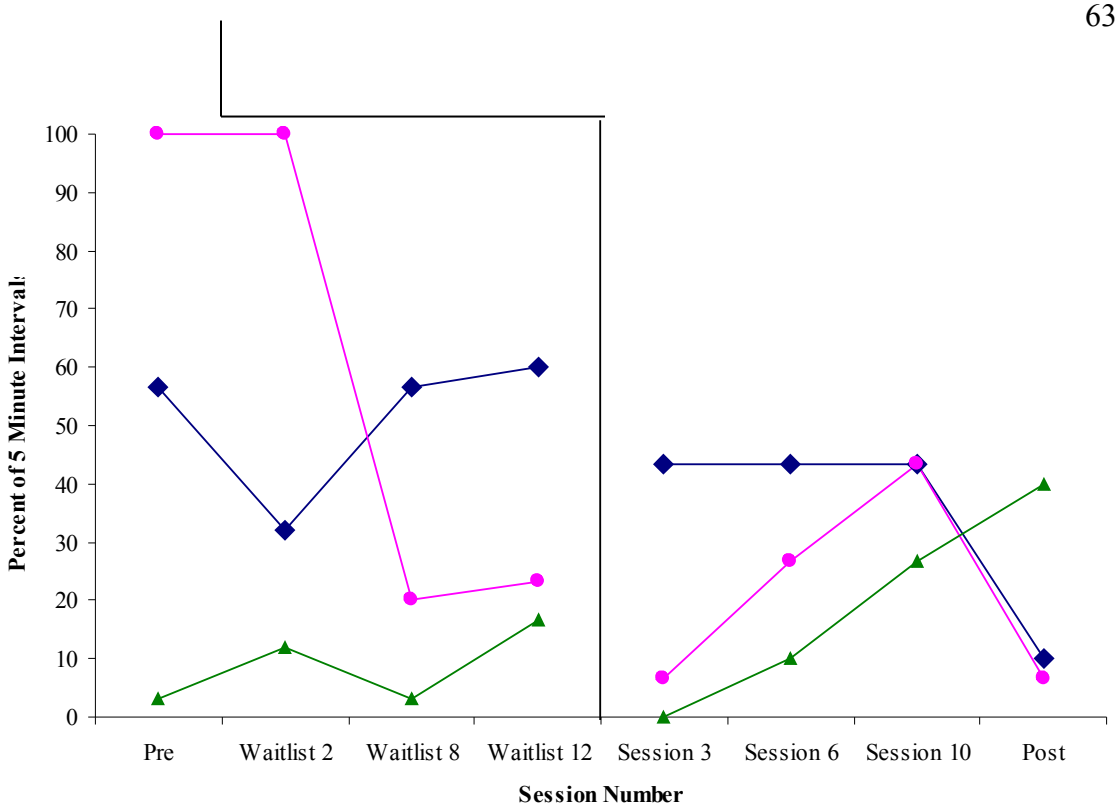


Figure 13. Dyad 7/Dyad 8 Child Behavior.

Parent set-up behavior. Parent set-up behavior graphs for Dyad 7 and 8 are presented in Figure 10. Similar to all participants in the study, the results showed clear treatment effects. Parent 7 increased from 6.7% during the baseline observation to a mean of 82.4% (range, 75.0% to 92.3%) after treatment was implemented. Parent 8 increased to a mean of 66.4% (range, 46.6% to 85.7%) of set-up components correctly implemented from a baseline mean of 18.1% (range, 12.5% to 26.7%), thus verifying the treatment effect.

Parent verbal and non-verbal prompt behavior. The results of behavioral observation measures for verbal and non-verbal prompt behavior are presented in Figure 15. The treatment was not associated with an increase in use of effective verbal prompts. Effective verbal prompt behavior for parent 7 decreased significantly from 45.5% during

the baseline observation to a mean of 23.3% (range, 20.0% to 27.3%) after treatment was implemented. For parent 8, effective verbal prompt behavior showed a decreasing trend and mean level of 17.2% (range, 0.0% to 37.5%) after treatment was implemented compared to the baseline mean of 21.8 (range, 18.5 to 23.1), with the exception of the final baseline probe in which verbal prompt behavior was 15.7% above the baseline mean. Part two of the hypothesis was supported by neither parent.

Treatment effects for effective non-verbal prompts were strong for parent 7 and minimal for parent 8. Parent 7 showed an overall increase from 21.2% during the baseline observation to a mean of 65.9% (range, 54.5% to 75.0%) after treatment was implemented. Effective non-verbal prompt behavior of parent 8 remained stable during

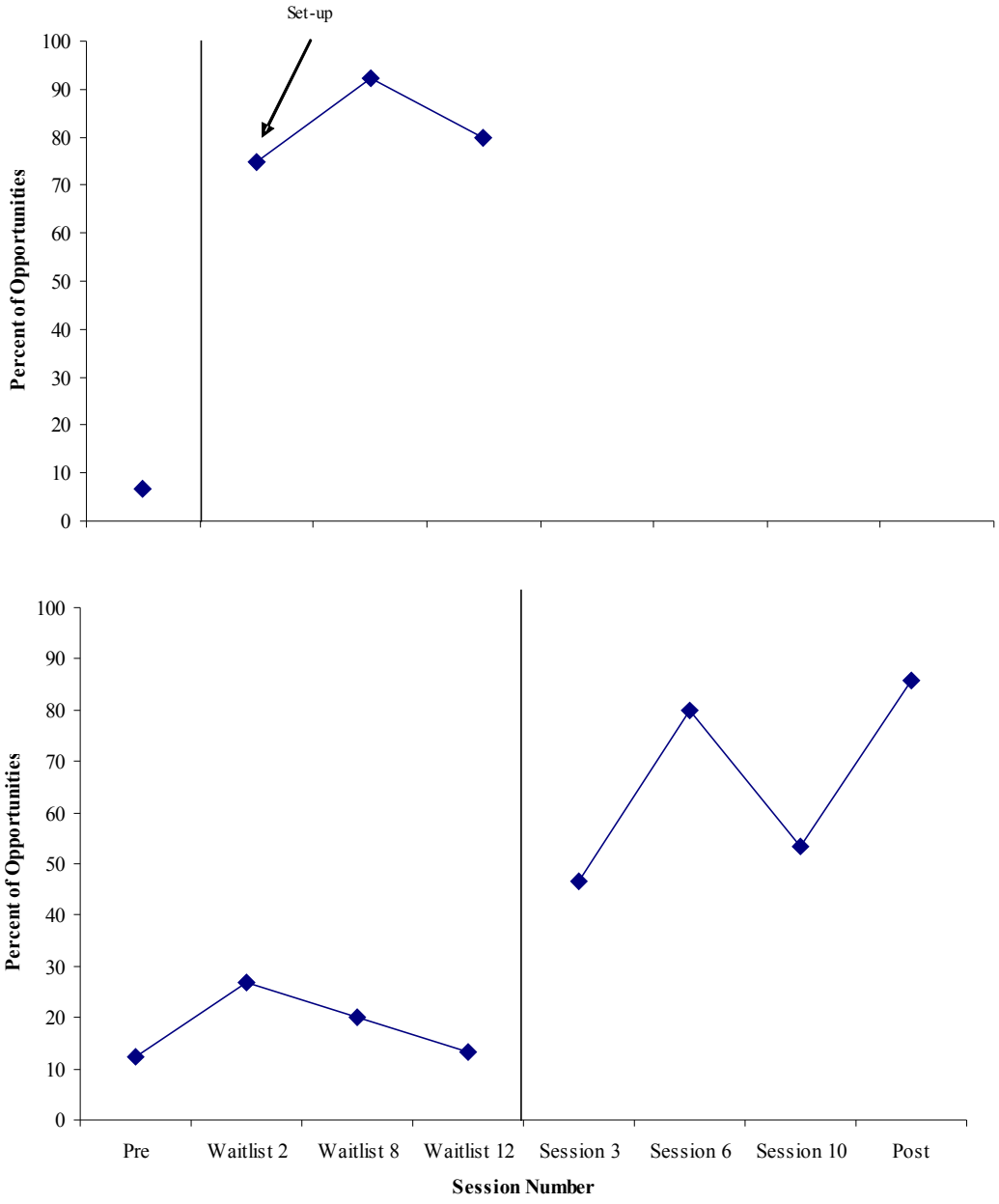


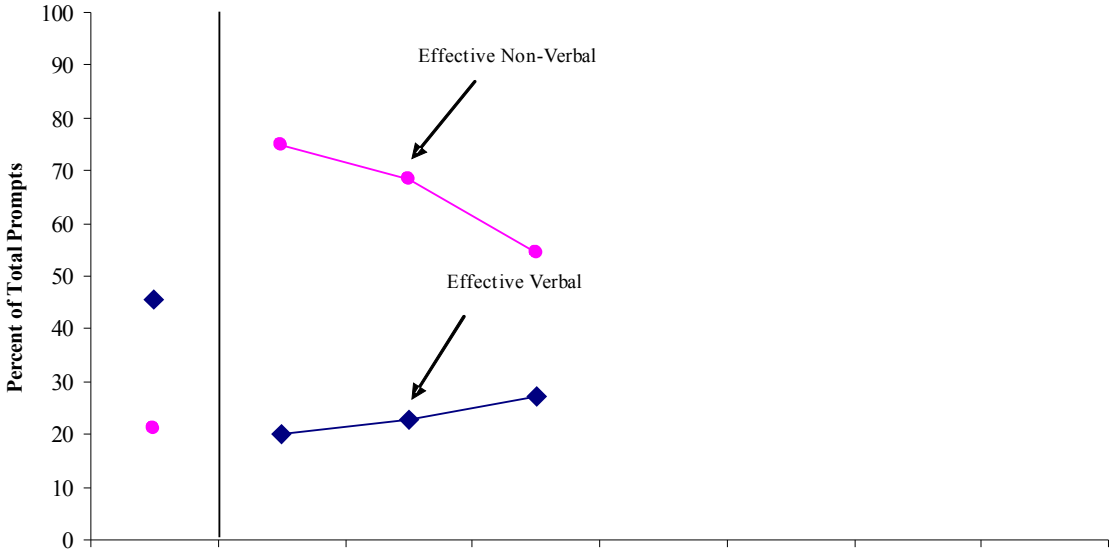
Figure 14. Dyad 7/Dyad 8 Parent Set-up Behavior.

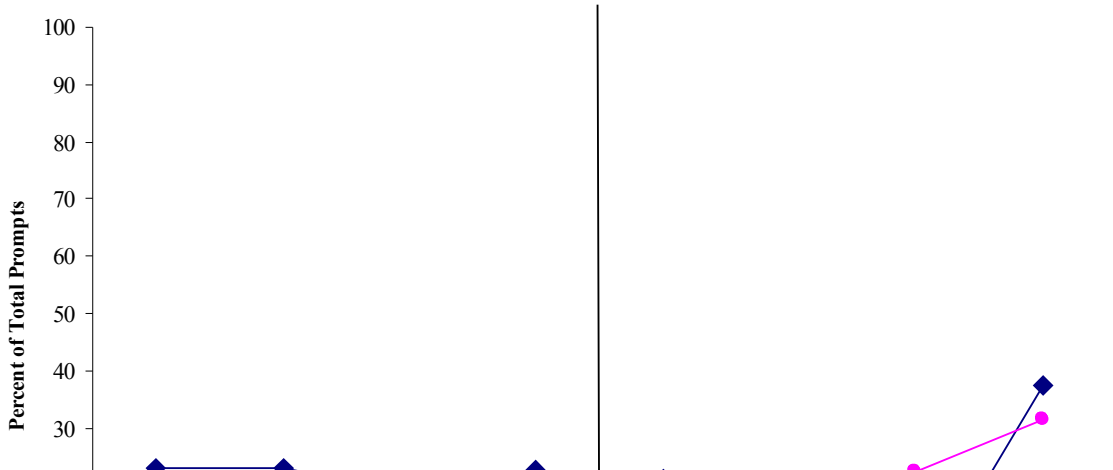
baseline, with a mean of 16.1% (range, 11.1% to 19.2%). It then increased to a mean of 20.4% (range, 10.0% to 31.3%) after treatment was implemented, with an increasing trend and change in level demonstrated during the final two treatment probes, providing some verification of treatment effects.

The results of parent 7 show that the treatment resulted in a strong increase in parent use of effective non-verbal prompts relative to use of effective verbal prompts, thus supporting the hypothesis that non-verbal prompts would increase relative to verbal prompts due to treatment. This effect, however, was not verified by parent 8.

Parent total effective and total ineffective prompt behavior. The results of the parent prompt behavioral observation for Dyad 7/Dyad 8 are presented in Figure 16. Total effective prompt behavior for parent 7 increased from 66.7% during the baseline observation to a mean of 89.1% (range, 81.2% to 95.0%) after treatment was implemented, providing support for the hypothesis. Total effective prompt behavior of parent 8 did not verify the treatment effect until the final treatment probe. Overall, the level stayed the same across baseline and treatment probes, with a mean baseline of 37.9 (range, 29.6 to 42.3) and mean treatment of 37.6% (range, 20.0% to 68.8%). Part two of the hypothesis was not supported by either parent.

The results of total ineffective prompt behavior showed a similar pattern as total effective prompts. Total ineffective prompt behavior for parent 7 decreased from 36.3% during the baseline observation to a mean of 10.8% (range, 5.1% to 18.2%) during treatment, showing clear support for the treatment, while total effective prompt behavior of parent 8 did not show a treatment effect until the final treatment probe. Overall, the


Percent of Total Prompts
100
90
80
70
60
50
40
30
20
10
0
Effective Non-Verbal
Effective Verbal


Percent of Total Prompts
100
90
80
70
60
50
40
30

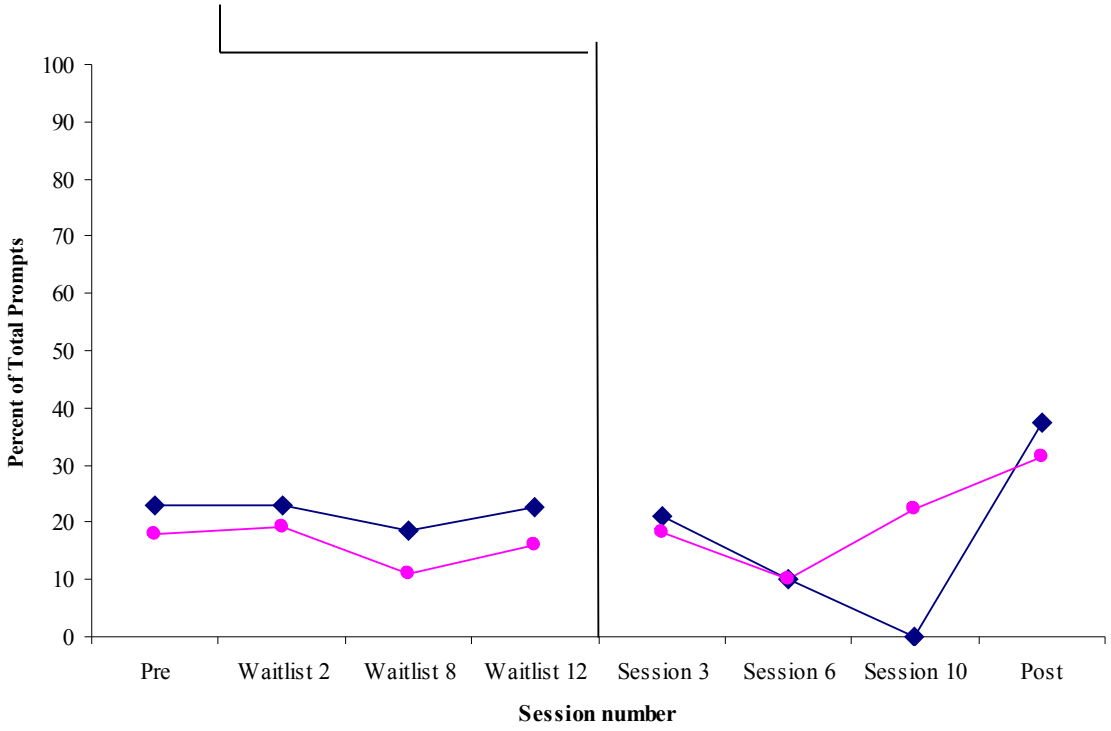


Figure 14. Dyad 7/Dyad 8 Effective Verbal and Non-Verbal Prompts.

level stayed the same across baseline and treatment probes, with a mean baseline of 62.1% (range, 57.7 to 70.4) and mean treatment of 63.9% (range, 31.3% to 80.0%). Part two of the hypothesis was not supported by either parent.

Parent transition behavior. The hypothesis for transition behavior was strongly supported by parent 7 and partially supported by parent 8. Parent 7 used a transition object for transition to work or play during six out of eight opportunities to do so. Parent 8 did not use an object to transition during any opportunities during baseline. Similar to her behavior across other behavioral measures, parent 8 demonstrated success only during the last treatment probe in which she appropriately transitioned her son to both play and work.

Follow-up questionnaires. Both parent 7 and parent 8 returned follow-up questionnaires. Parent 7 reported that before preschool, she spent two hours per day using the Home TEACCHing program methods. She reported making her own shoebox tasks and performing teaching sessions. She also made visual signs to use during self care and communication tasks. Parent 8 stated that she works approximately 1.5 hours twice a week using the Home TEACCHing program methods. Specifically, she reported engaging in activities with her son such as sorting colors, playing together, eliciting eye contact, and learning to ask for help.

Parent 7 reported that her child benefited most from feeling good about knowing what is expected of him and mastering shoebox tasks. Parent 8 reported that her child benefited most from learning how to start, continue, and finish a task before moving onto another activity. She also stated her son showed more desire to work and play than

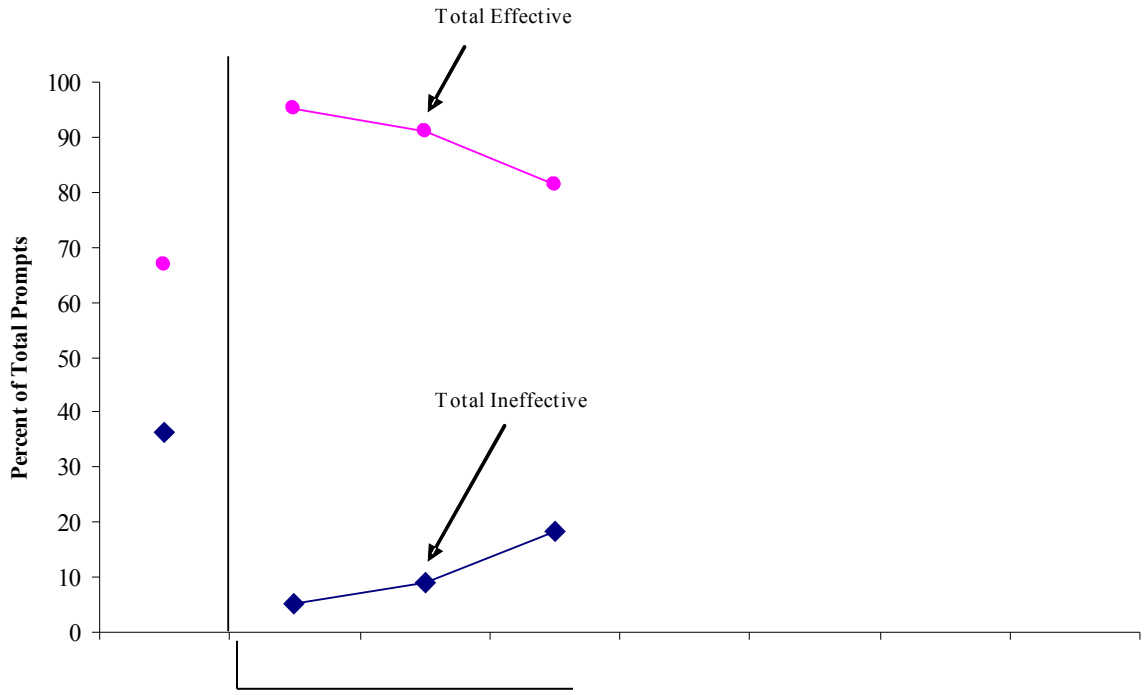

Total Effective
Total Ineffective
Percent of Total Prompts
100
90
80
70
60
50
40
30
20
10
0

Figure 16. Dyad 7/Dyad 8 Total Effective and Ineffective Prompts.

before the start of the program. When asked how they, as parents, benefited most from the program, parent 7 stated that she learned better ways to help her son communicate. She also stated that implementing skills she learned lead to a 50% reduction in his level of frustration. Parent 8 benefited most from learning how to teach her son and from an increased understanding of his needs as they relate to his diagnosis of autism.

Parents 7 and 8 reported differences in the types of changes they would make to the program. Parent 7 stated she would have liked more help with daily issues such as eating, sleeping, toilet training, and language development. She felt that less time could have been spent doing pre-academic tasks, since her child learned these tasks quickly and with ease, and more time could have been allotted to addressing these daily life issues. She also stated that she would have liked more time spent discussing her son's strengths and weaknesses, particularly addressing his weaknesses. Parent 8 stated "I wouldn't change anything. I had fun and met very nice people," however she also stated she wished she could have had more sessions.

With regard to what she would like to see as a follow-up to these sessions, parent 8 stated that she would have liked to have had a two week follow-up session.

Treatment fidelity checks. Treatment integrity was conducted once for Dyad 7 and twice for Dyad 8. During session twelve of Dyad 7 the results of the treatment integrity indicated that 94.7% (18 out of 19) of components were appropriately conducted. The clinician modeled, but did not explicitly explain to the parent how to engage their child during at least one play session. During session six and seven of Dyad 8 the results of the

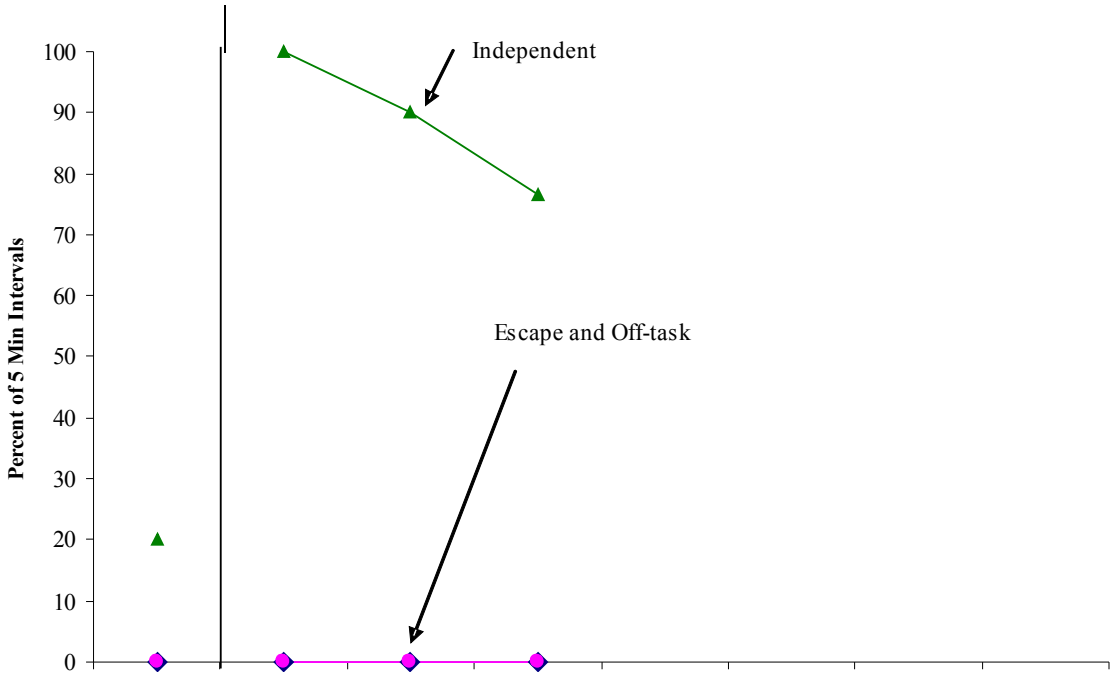
treatment integrity indicated that 100.0% (19 out of 19) of components were appropriately conducted.

Dyad 9/Dyad 10

Participant characteristics. Dyad 9 consisted of a 32.3 month old Caucasian boy and his Caucasian mother. Dyad 10 consisted of a 30.0 month old Caucasian boy. Due changes in the family's work arrangements, the same parent could not be present for both the baseline observation and treatment session observations, therefore parent behavioral observation measures could not be reported for Dyad 10. Because of the lack of comparison data, therefore, it is unclear whether the positive treatments effects for parent 9 behavior were the result of the treatment or passage of time. Formal dependent measures and information from the follow-up questionnaire are reported.

Child behavior. Behavioral observations of child behavior for Dyad 9 and Dyad 10 are presented in Figure 17. The results indicate that treatment was associated with a clear increase in level of independent functioning for child 9, but not for child 10. The independent functioning of child 9 increased from 20.0% during the baseline observation to a mean of 88.9% (range, 76.7% to 100.0%) after treatment was implemented. The independent functioning of child 10 increased from a mean of 33.1% (0.0% – 83.3%) during the baseline observation to a mean of 63.1% (range, 40.0% to 100.0%) after treatment was implemented. Due to the increasing trend in behavior during the final three baseline probes, it is uncertain whether the treatment resulted in increases in independent functioning. Visual inspection of the graph, however, does show less variability in behavior after treatment was implemented, which suggests that the

treatment may have resulted in more consistent responding in child 10. Visual inspection of the graph does not indicate an increasing trend in independent functioning across


Percent of 5 Min Intervals
100
90
80
70
60
50
40
30
20
10
0
Independent
Escape and Off-task

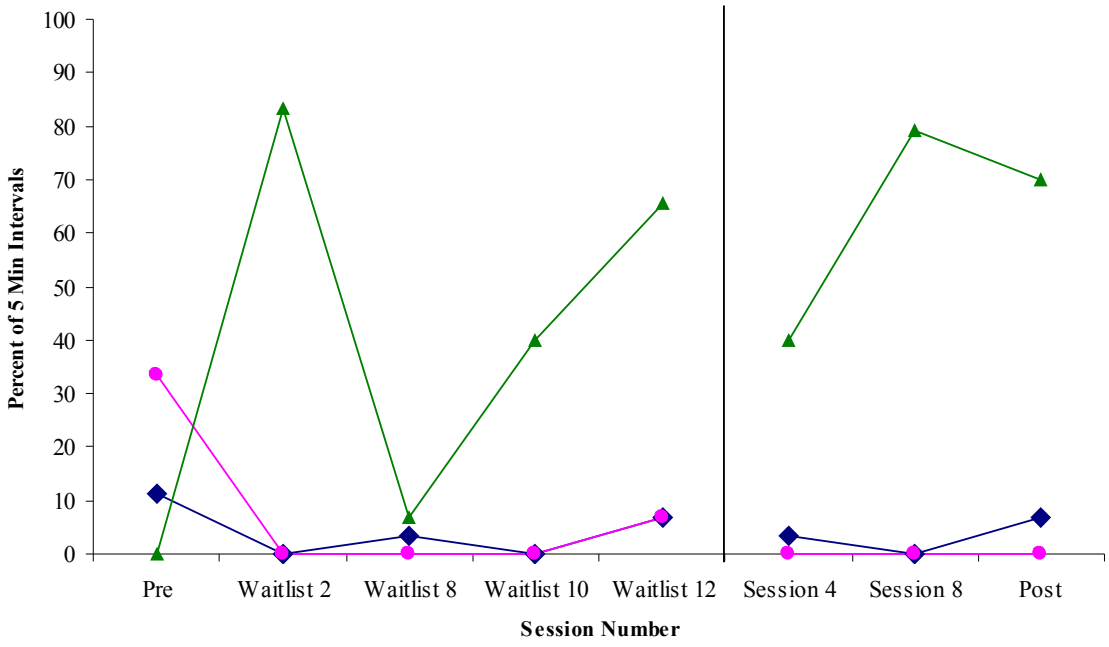


Figure 17. Dyad 9/Dyad 10 Child Behavior.

treatment probes for either child, therefore providing no support for part two of the hypothesis.

For both escape and off-task behavior, child 9 showed no change as a result of treatment due to the absence of these behavior during baseline and treatment probes. Child 10 also showed little change in escape and off-task behavior due to low baseline rates.

Parent set-up behavior. Parent set-up behavior for Dyad 9 is presented in Figure 18. The results showed that the treatment was associated with a clear increase in level and slight increase in trend of parent set-up behavior, supporting the initial hypothesis. Parent 9 increased from 62.5% during the baseline observation to a mean of 92.2% (range, 83.3% to 100.0%) after treatment was implemented.

Parent effective verbal and non-verbal prompt behavior. The results of the behavioral observation for Dyad 9 are presented in Figure 19. The treatment was associated with a moderate increase in use of effective verbal prompts. Effective verbal prompt behavior for parent 9 remained increased from 42.1% during the baseline to a mean of 54.1% (range, 40.0% to 66.7%) after treatment was implemented. The treatment was not, however, associated with an increase in use of effective non-verbal prompts. Effective non-verbal prompt behavior for parent 9 remained relatively stable after treatment was implemented. During baseline, effective non-verbal prompts were exhibited 31.6% during the baseline probe and at a mean of 35.5% (range, 33.3% to 40.0%) after treatment was implemented. Also, no increasing trend across treatment probes provides were exhibited for either behavior, thus failing to support part two of the

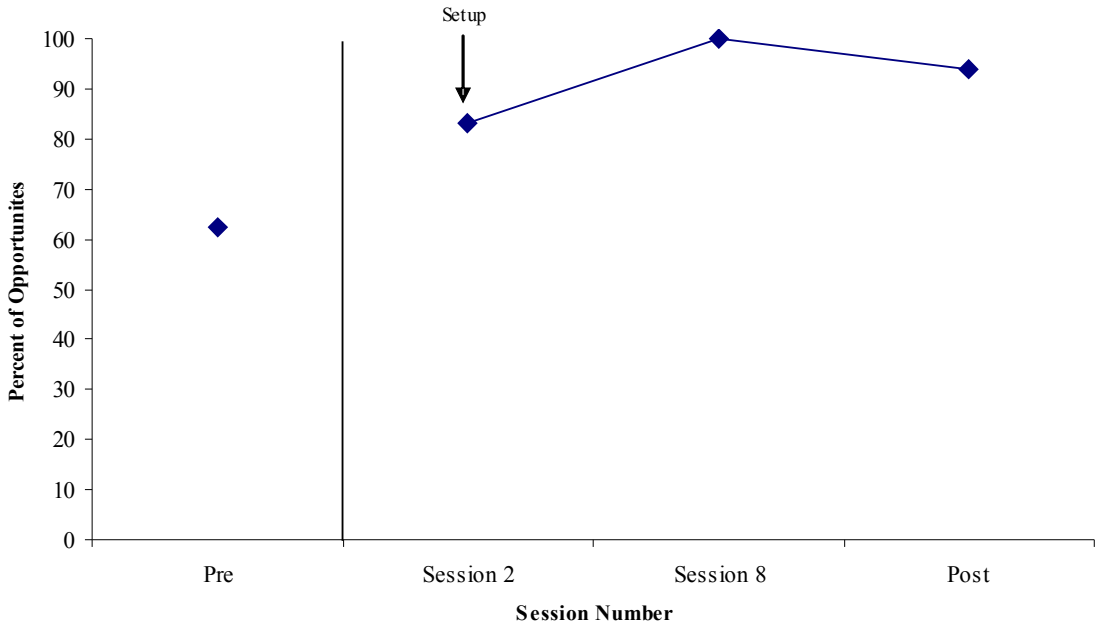


Figure 18. Dyad 9 Parent Set-up.

hypothesis. The differentiation between use of effective verbal prompts and effective non-verbal prompts by parent 9 does not support the initial hypothesis. At baseline, Parent 9 showed slightly higher usage of effective verbal prompts (42.1%) that effective non-verbal prompts (31.6%) and out of total prompts provided. This differentiation remained similar after treatment was implemented.

Parent total effective and total ineffective prompt behavior. The results of the behavioral observation are presented in Figure 20. A treatment effect for both total effective and total ineffective was clearly supported. Total effective prompt behavior for parent 9 increased from 73.7% during the baseline observation to a mean of 89.6% (range, 80.0% to 100.0%) after treatment was implemented. Total ineffective prompt behavior of parent 9 decreased from a 26.3% during baseline to a mean of 10.4% (range, 0.0% to 20.0%) after treatment was implemented. Visual inspection of the graph does not show trends to support part two of the hypotheses.

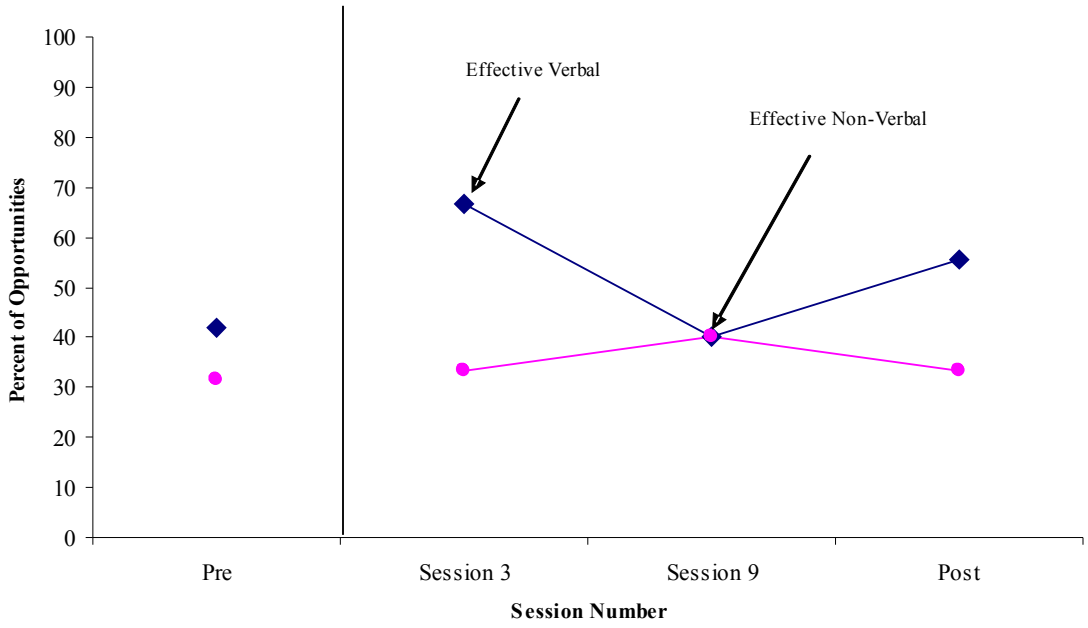


Figure 19. Dyad 9 Effective Verbal and Non-verbal Prompts.

occurred during baseline. Once treatment was implemented, zero out of two opportunities for appropriate transitions to work occurred and only one out of three opportunities for appropriate transitions to play occurred

Follow-up questionnaires. One parent returned the follow-up questionnaire. Parent 9 reported that she incorporates the Home TEACCHing program methods, specifically the left to right organization of a work routine and the concept of "first-then," into her family's day to day routine. She also stated that she has made shoebox tasks incorporating the names of her son's classmates so that he can learn their names.

Parent 9 reported that her child benefited most from gaining confidence from knowing when tasks are completed. When asked how she, as a parent, benefited most from the program, she stated that she learned a tremendous amount about autism and how

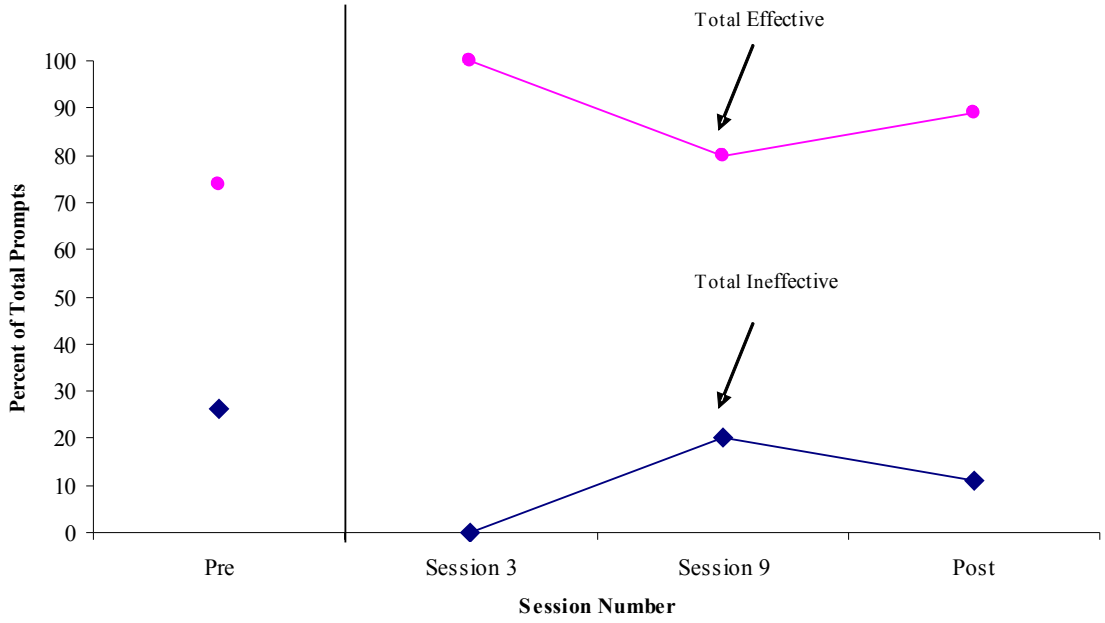


Figure 20. Dyad 9 Total Effective and Ineffective Prompts.

children with autism think. Parent 9 did not recommend any changes to the program and did not responded to the question regarding follow-up sessions. She stated the program "was perfect!"

Treatment fidelity checks. Treatment integrity data were collected for both Dyad 9 and Dyad 10. For Dyad 9 the results of the treatment integrity indicated that 89.5% (17 out of 19) of components were appropriately conducted. The clinician did not use a transition object to transition the child to work during the last "work/free play routine". Also, the clinician modeled, but did not explicitly explain to the parent how to engage their child during at least one play session. During session five of Dyad 10, the results of the treatment integrity indicated that 87.5% (14 out of 16) of components were appropriately conducted. The clinician did not review the homework about the previous

week. Also, the clinician modeled, but did not explicitly explain to the parent how to engage their child during at least one play session.

Formal dependent measures. It was hypothesized that the treatment group would exhibit clinically significant improvements in scores on standardized measures of developmental levels and adaptive functioning as compared to the waitlist group. Specifically, it was predicted that mean age equivalent scores on the Fine Motor, Visual Reception, Receptive Language, and Expressive Language of the *Mullen Scales of Early Learning* (*MSEL*) (Mullen, 1995) would be significantly greater for the treatment group as compared to the waitlist group and that mean age equivalent scores on the 14 adaptive behavior indexes of the *Scales of Independent Behavior – Revised (SIB-R)* (Bruininks et al., 1996), would be significantly greater for the treatment group as compared to the waitlist group. It was also hypothesized that scores on the problem behavior index of the *SIB-R* would significantly decrease in the treatment group compared to the waitlist group. It was not expected that overall scores on standardized measures will significantly change due to the short-term model of intervention. It was also hypothesized that the treatment group would exhibit a significant increase in score on the *TEACCH Training Quiz* (*TTQ*) (Grindstaff, 2002) a significant decrease in the Parent Stress subtest of the *Parenting Stress Index (PSI)* (Abidin, 1995) compared to the waitlist group.

One-tailed independent t-tests were conducted to evaluate the aforementioned hypotheses. The test was significant for group effects, with the treatment group showing significantly more improvement than those in the waitlist group on the Fine Motor subtest of the *MSEL*, $t(8) = -2.43$, $p = 0.02$, the Parent Stress subtest of the *PSI*, $t(8) = 2.17$, $p = 0.03$, the externalizing maladaptive behavior subscale of the *SIB-R*, $t(8) = -2.70$,

$p = 0.01$, and the generalized maladaptive behavior subscale of the *SIB-R*, $t(8) = -4.96$, $p = .0005$. In addition, there were measurable (three or more months difference), but not statistically, significant improvements shown by the treatment group compared to the waitlist group on subtests of the *MSEL* and *SIB-R* and on the Total Stress subtest of the *PSI*. On the Visual receptive subtest of the *MSEL*, the treatment group increased by a mean of 4.4 months from pre-test to post-test whereas the waitlist group did not increase ($M = 0.0$ months). On the *SIB-R*, the Social Interaction, Language Expression, and Eating/meal preparation subtests all showed measurable differences. On the Total Stress subtest of the *PSI*, the treatment group decreased by a mean of 23 points from pre-test to post-test whereas the waitlist group increased by 21.4 points. See Table 3 for individual and group Pre- and Post-treatment scores.

Table 3.
Individual and Group Pre- and Post-treatment Scores

		Child 1 (TX)		Child 3 (TX)		Child 5 (TX)		Child 7 (TX)		Child 9 (TX)		Treatment Group	
		Pre	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*
												M (SD)	*M* (SD)
Mullen	Visual Receptive*	24	27	12	24	21	21	11	20	20	18	17.6 (5.8)	22.0(3.5)
(age equiv in months)	Fine Motor**	16	28	21	23	15	18	20	24	20	28	18.4(2.7)	24.2(4.1)
	Expressive Lang.	20	27	15	20	22	20	4	6	16	20	15.4(7.0)	21.0(6.3)
	Receptive Lang.	25	27	18	23	19	25	14	11	14	19	18.0(4.5)	18.6(7.7)
SIB-R	Gross Motor	48	27	84	68	65	56	29	29	48	68	54.8(20.7)	49.6(20.3)
(age equiv in months)	Fine Motor	28	40	42	34	31	36	21	36	48	46	34.0(10.9)	38.4(4.8)
	Social Inter.*	29	38	16	30	25	34	16	30	23	42	21.8(5.7)	34.8(5.2)
	Lang. Comp	36	68	15	22	28	24	11	17	36	40	25.2(11.7)	34.2(20.8)
	Lang. Express*	22	36	17	21	22	26	6	6	18	24	17.0(6.6)	22.6(10.9)
	Eating/Meal Prep*	29	38	22	18	35	32	7	29	38	55	26.2(12.4)	34.4(13.6)
	Toileting	18	20	<10	10	20	14	<10	33	<10	<10	13.0(5.5)	17.2(9.8)
	Dressing	32	33	33	32	25	20	20	33	24	27	26.8(5.5)	29.0(5.6)
	Self Care	29	29	36	26	26	26	13	15	29	48	26.6(8.4)	28.8(12.0)
	Domestic	39	<20	51	39	<20	<20	<20	<20	26	70	30.8(13.9)	33.2(22.3)
	Time and Punct.	<28	34	38	42	42	42	<28	<28	<28	42	32.2(7.3)	37.4(6.8)
	Money and Value	<22	<22	32	32	32	28	<22	<22	<22	35	25.4(6.0)	27.4(6.3)
	Work Skills	27	<12	27	43	33	48	<12	12	73	66	34.2(23.2)	36.0(23.9)
	Home/Comm.Orient	25	25	30	25	36	25	12	17	30	47	26.6(9.0)	27.8(11.3)
	Internal. Mal. Bx*	4	4	-30	-4	-15	-15	-15	-19	-8	4	-12.8(12.4)	-6.0(10.7)
	Asocial Mal. Bx*	-4	8	8	0	-6	-9	-30	8	8	8	-4.8(15.5)	3.0(7.6)
	External. Mal. Bx**	0	5	-27	-18	-33	-17	2	-7	5	10	-10.6(17.9)	-5.4(12.7)
	General Mal. Bx**	-4	2	0	-14	-31	-23	-12	-8	-1	4	-9.6(12.9)	-7.8(11.2)
PSI Child		89	90	154	124	140	132	189	169	96	98	133.6(41.6)	122.6(31.3)
PSI Parent**		135	125	165	152	156	136	138	125	104	97	139.6(23.5)	127(20.1)
PSI Total Stress*		221	215	319	276	296	268	327	294	200	195	272.6(58.3)	249.6(42.4)
PSI Life Stress		10	2	5	6	16	22	4	10	19	19	10.8(6.6)	11.8(8.5)
TTQ (# correct)		19	22	12	20	12	9	13	18	16	30	14.4(3.0)	19.8(7.6)

*Measurable differences **Significant group differences

Table 3. continued
Individual and Group Pre- and Post-treatment Scores

		Child 2 (WL)		Child 4 (WL)		Child 6 (WL)		Child 8 (WL)		Child 10 (WL)		Waitlist Group	
		Pre	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*
												M (SD)	*M* (SD)
Mullen	Visual Receptive*	18	16	31	30	5	10	11	14	23	18	17.6(10.1)	17.6(7.5)
(age equiv in months)	Fine Motor**	18	18	28	27	10	12	17	15	23	27	19.2(6.8)	19.8(6.9)
	Expressive Lang.	9	15	32	36	13	16	5	6	17	31	12.4(11.6)	20.8(12.4)
	Receptive Lang.	9	14	31	31	6	7	1	7	15	27	15.2(10.4)	17.2(11.2)
SIB-R	Gross Motor	15	25	31	23	21	29	22	23.0	37	37	25.2(8.7)	27.4(5.9)
(age equiv in months)	Fine Motor	17	25	40	38	27	34	23	28	36	40	28.6(9.4)	33.0(6.4)
	Social Inter.*	13	16	34	34	18	16	12	18	16	36	18.6(8.9)	24.0(10.1)
	Lang. Comp	13	15	40	46	11	15	9	<6	6	36	15.8(13.8)	23.4(16.9)
	Lang. Express*	<6	11	32	30	15	16	6	<6	19	28	15.4(11.0)	18.0(10.8)
	Eating/Meal Prep*	14	16	29	29	7	11	13	22	16	29	15.8(8.1)	21.2(7.9)
	Toileting	18	14	31	33	14	20	10	18	<10	21	16.4(8.9)	21.2(7.1)
	Dressing	18	15	20	24	18	20	34	34	18	34	21.6(7.0)	25.4(8.5)
	Self Care	13	15	36	29	9	13	11	15	18	21	17.4(10.9)	18.6(6.5)
	Domestic	<20	<20	<20	36	<20	<20	<20	34	34	34	22.0(6.7)	28.4(8.6)
	Time and Punct.	<28	<28	56	56	34.0	<28	<28	<28	50	56	38.8(13.4)	38.6(15.9)
	Money and Value	<22	<22	32	32	32	32	<22	<22	40	43	29.2(8.2)	29.8(9.2)
	Work Skills	12	12	18	30	<10	30	<12	18	12	24	12.6(3.1)	22.8(7.8)
	Home/Comm.Orient	9	9	30	30	25	17	17	21	30	42	22.2(9.1)	23.8(12.7)
	Internal. Mal. Bx*	-3	-14	-4	-11	-19	-19	1	-5	-3	4	-5.6(7.7)	-9.0(8.9)
	Asocial Mal. Bx*	-9	-9	0	-14	8	-25	1	-6	0	8	0.0(6.0)	-9.2(12.0)
	External. Mal. Bx**	4	-1	0	-8	-1	-10	-1	-8	-5	-8	-0.6(3.2)	-7.0(3.5)
	General Mal. Bx**	-6	-12	-4	-16	-8	-24	-3	-11	-8	-8	-5.8(2.3)	-14.2(6.2)
PSI Child		141	136	127	115	125	107	132	131	122	99	129.4(7.4)	117.6(15.7)
PSI Parent**		151	146	97	95	106	96	95	127	140	144	117.8(25.9)	121.8(25.2)
PSI Total Stress*		292	428	224	210	231	203	227	258	262	243	247.2(293)	268.6(92.5)
PSI Life Stress		29	26	0	0	2	0	4	8	14	12	9.8(12.0)	9.2(10.7)
TTQ (# correct)		20	26	8	13	13	11	2	2	24	24	13.4(8.9)	15.2(9.9)

*Measurable differences **Significant group differences

In sum, these results suggest that the Home TEACCHing Program was effective at improving fine motor skills, and at decreasing parent reports of parent stress, total stress, and child externalizing maladaptive behavior, and child general maladaptive behavior. They also suggest the program was effective at improving visual receptive and parent reports of social interaction skills, and at decreasing parent reports of internalizing maladaptive and asocial maladaptive behavior to a measurable, though not statistically significant level.

Reliability

The primary investigator and a research assistant independently scored responses during 35.8% of sessions. Reliability was collected for a total of 19 out of 53 five minute work sessions across all behavioral measures. A scored interval-by-interval method was also used for variables in which scored intervals occurred in less than 30% of total intervals, an unscored interval-by-interval method was used for variables in which scored intervals occurred more than 70% of total intervals, and a point-by-point reliability was used for variables in which scored intervals occurred between 30% and 70% of total intervals. Reliability was collected for at least 20% of work sessions and averaged across sessions for each parent/child dyad. Table 4 displays reliability scores for each parent/child dyad and averages across all dyads.

Table 4
Reliability Scores Across Parent/child Dyads

Behavior	Dyad #										
	1	2	3	4	5	6	7	8	9	10	average
Parent											
Effective Verbal Prompt	93.1	90.6	75.0	85.7	100.0	50.0	83.3	85.7	96.0	90.3	85.0
Effective Nonverbal Prompt	96.6	86.7	96.7	50.0	90.9	100.0	88.9	100.0	100.0	91.7	90.2
Ineffective Prompt	80.0	80.6	66.7	96.7	80.0	96.4	95.0	80.0	80.0	93.3	84.9
Set-up	100.0	90.5	86.6	86.7	90.0	86.6	93.3	100.0	87.5	89.3	91.1
Child											
Off Task	100.0	99.1	90.0	100.0	71.4	100.0	100.0	100.0	100.0	100.0	96.1
Escape	100.0	100.0	100.0	100.0	90.0	100.0	100.0	100.0	100.0	100.0	99.0
Independent Functioning	100.0	91.7	100.0	83.3	92.9	100.0	91.7	100.0	92.3	94.1	94.6

CHAPTER IV

DISCUSSION

Purpose of the Current Investigation

Evaluating comprehensive home treatment programs for very young children with autism has important implications. These therapies serve families that may be unable to access clinic services or, they can extend clinic or school intervention to home settings, thereby allowing children to receive more generalized services. It is also important to determine if the benefits of home programs outweigh the time commitment and stress such programs may have on parents. More generally, outcome research on comprehensive early intervention programs is needed to meet accountability standards in the fields of education and psychology and to help parents navigate the multitude of treatment options available to them.

The purpose of the current investigation was to evaluate the efficacy of the Home TEACCHing program, a low-cost and short-term comprehensive home-based intervention exclusively for children with autism three years of age and younger and their families. Ten children and their parents were matched based on age and functioning level to form five pairs. Each matched pair was randomly assigned to a treatment or waitlist group and was compared at both pre-treatment and post-treatment on formal dependent measures of child adaptive functioning, maladaptive behavior, and developmental levels and on parent knowledge and parent stress. Direct behavioral measures of child and

parent behavior were also collected and compared across matched pairs using a multiple baseline probe design.

The study attends to some of the methodological and design concerns of early intervention research in autism. It differs from many previous studies in its use of a control group in which participants were randomly assigned, which reduces the possibility of extraneous reasons for treatment effects. It also uses a treatment fidelity measure and manual to ensure accurate and uniform implementation of the treatment program. Data were coded by individuals independent of the research team, and who were unaware of group assignment and research aims. These precautions minimized the risk of potential examiner bias on the study results. Multiple measures of outcome including direct measurements of primary goals were also used to ensure a comprehensive review of treatment efficacy. The robust design used in the current study meets many of the stringent research standards set forth by the Clinical Psychology Division of APA (Division 12). It is a promising pilot study that, with follow-up, could add to the growing literature needed to demonstrate the TEACCH program as an empirically-supported treatment.

Study Findings

Behavioral observation measures. A multiple baseline design (MBL) with only two tiers is considered a complete design that can provide adequate conclusions of treatment effects (Hersen & Barlow, 1984). The current study replicated the two tiered MBL design three times (a matched parent/child dyad pair formed each MBL design), providing the stage for even stronger evidence about the impact of treatment. Parent data from two waitlist families and child data from one waitlist family were incomplete due to

missing data and because one parent was unable to attend all treatment sessions, therefore parent data two matched dyad pairs (Dyad 3/Dyad 4 and Dyad 9/Dyad 10) and the child data from one matched pair (Dyad 3/Dyad 4) were excluded from the MBL analysis. Data from the treatment families of the excluded matched dyad pairs, however, were reported. Overall, the results showed robust support for increases in child independent functioning, parent set-up behavior, and parent use of non-verbal and total effective prompts, and decreases in parent use of total ineffective prompts.

Treatment effects for independent functioning were replicated in three matched pairs, Dyad 1/Dyad 2, Dyad 7/Dyad 8, and Dyad 9/Dyad 10. A slight, but clear response to treatment was also demonstrated in child 3. Child 6 also showed treatment effects, however, these effects were not replicated by child 5, the matched pair. One possible explanation for the lack of replication across Dyad 5/Dyad 6 was anecdotally reported by the clinician. The clinician stated that child 5 suffered from significant health problems over the course of treatment. Visual inspection of the graph shows a clear increase in independent functioning after treatment was implemented, but then a decrease over the course of treatment, which may be linked to the reported health problems.

The fact that only one out of the four matched pairs, and only two out of the total ten children assessed did not show a definitive treatment effect for independent functioning provides good support for the efficacy of the treatment program on increasing child independent functioning. These results carry several important implications for the children participating in the program. First of all, The Home TEACCHing program work sessions incorporated activities focused on skills that very young typically developing children are expected to complete independently and in a variety of contexts such as basic

communication and play. The results suggest that the children participating in the study improved in their ability to perform these skills independently.

Secondly, the independent functioning variable in the current study was defined as completing activities independently, but also completing a work routine independently. TEACCH strategies emphasize using a child with autism's tendency to form routines to facilitate learning by teaching them to follow positive work routines as independently as possible (Mesibov et al, 2005). In other words, children are primarily taught "how to learn" by learning a work routine, and then the work routine is used to teach new skills. Work routines are easily generalizable to a wide variety of activities and settings, which can facilitate rich and broad learning and independence. Hume and Odom (2007) showed that three children with autism increased in independent behavior in classroom and employment settings with the use of work systems. In the Home TEACCHing program, children were taught to use a work routine at a table top, resembling an academic setting, but also in other places in the home such as in the bathroom, where a work routine can be used to teach skills and increase independence in self care. Work systems are also easily adapted to fit a child's developmental and cognitive level, and their interests, which means that work routines can be used across and individual's lifespan. In addition, they allow children with autism to show their skills to others. It is possible, for example, that the improvements that were found on the fine motor and visual receptive subtests of the *Mullen Early Learning Scales* (Mullen, 1995) were also a reflection of an improvement in the participants' ability to sit at a table and work. The items used to measure fine motor and visual reception skills for young children are largely table based and manipulative, whereas the language subtests are not, therefore improved work behavior

may have explained why children improved in fine motor and visual receptive skills and not in language skills.

A final implication of gains in independent functioning demonstrated in the current study is the importance of avoiding over-reliance on adult prompts. According to Mesibov et al. (2005), teaching only compliance is insufficient when treating children with autism because children who are successful at a skill only by relying on adult provided prompts and cues do not show a sufficient understanding of the skill or concept to be able to use it in a variety of contexts. It is important, therefore, to facilitate age appropriate independence in order to safeguard children with autism from the limitations that may occur if they are over reliant on adult prompting.

No treatment effects for escape or off-task behavior were replicated across any matched dyad pairs, although a number of single parent/child dyads showed treatment effects. Matched pair Dyad 1/Dyad 2 and Dyad 9/Dyad 10 did not show treatment effects due low levels of escape and off-task behavior at baseline, thus leaving little or no room for improvement. Child 5 and 8 did show treatment effects, however, these effects were not replicated by their matched pair, also due to low baseline measures. Child 3 showed clear treatment effects for both escape and off-task behavior. Although no treatment effects for escape or off-task were replicated across any matched pairs in the current study, the results suggest that the lack of effects were not necessarily due to a failure in the treatment, but to a lack of necessary evidence. In fact, three of the four children who showed high rates of escape and off-task behavior during baseline responded to the treatment, which is a promising finding. The fourth child initially showed high rates of these inappropriate behaviors during baseline, however these rates decreased to near zero

levels towards the end of baseline, indicating that an extraneous factor, such as the structure or increasing familiarity of the assessment protocol present during baseline may have led to a reduction in escape and off task behavior. In order to conclusively determine the effects of the treatment program on these behaviors, a future study should be conducted using a MBL design across participants with initial high, stable levels of escape and off-task behavior during baseline. The treatment can then be systematically implemented and effects observed across participants.

All three matched dyad pairs and both parents 3 and 9 showed clear treatment effects for parent set-up behavior. After the treatment was implemented, each parent was able to correctly set-up between 60% to 90% components of physical structure that comprised the work and play areas, with six out of eight parents showing an increasing trend across treatment probes. Two components that were commonly coded as incorrectly implemented were due to coding and protocol errors rather than true behavioral errors. One component stated that the finished basket should be located no more than six inches from the table. "Six inches" is a stringent measurement that was not directly taught to parents. The component could have also been miscoded by the research assistant due to difficulty determining exact measurements from a video recording. The second commonly missed component stated that all toys should be stored in the toy basket prior to beginning work and play sessions. This component was also not explicitly taught to parents; therefore it should have been excluded from the analysis. Additional commonly missed components were 1) ensuring that tasks were not stacked on the shelves and 2) placing one task so it was located in the front of the child on the table at the start of the work sessions. These two components were directly taught and are

important goals of the TEACCH program. Having tasks clearly laid out on shelves is thought to provide organization and predictability needed to help young learners with autism to understand what kind and how much work they are expected to complete. Placing a task on the work table at the start of a work session is also thought to ease the transition to work, which can be difficult for many children with autism. Providing more training for parents concerning these two specific components may even further improve parent set-up behavior.

The clear treatment effects for parent set-up behavior are not surprising given that parents are required to complete fairly simple concrete one-step directions that are clearly and repeatedly modeled by the clinician. When engaging in set-up behavior, parents are also not required to make quick judgments based on their child's behavior as they are asked to do when delivering prompts. Nevertheless, this finding is not insignificant. Arranging and understanding the impact of physical structure is considered a fundamental element of the TEACCH program (Mesibov et al., 2005). For young children with autism, the physical structure of settings, including the use of furniture and boundaries, and organization of materials provides visual cues that are thought to limit distraction, reduce anxiety, and increase understanding of expectations and independence (Mesibov et al., 2005). It would be interesting to study the effects of the physical structure used in the Home TEACCHing program on child responding. Future studies could manipulate aspects of physical structure of the work and play areas to examine both the influence of different aspects of physical structure and the presence versus absence of physical structure on child behavior.

Slight treatment effects were replicated for verbal prompts across only one matched pair and moderate effects were demonstrated by parent 9, whereas treatment effects for non-verbal prompts were replicated across two out of the three matched pairs and parent 3. Two possible explanations for these results exist. First of all, it is possible that the treatment was not as successful at increasing parent's use of effective verbal prompts as compared to non-verbal prompts. A second, and perhaps more likely explanation, however, is that as parents improved in using non-verbal prompts, they relied less on verbal prompts. An inspection of the differentiation between use of effective verbal prompts and effective non-verbal prompts supports the second explanation. Matched pair Dyad 1/Dyad 2 as well as three single parents showed a differentiation in the use of non-verbal versus verbal prompts, with higher rates of non-verbal prompts used after treatment was implemented. This finding is in line with the goals of the TEACCH program. Given that many individuals with autism tend to be visual as opposed to auditory learners (Quill, 1997), when training parents and professionals in TEACCH strategies, an emphasis is placed on relying on visual prompts and cues, or at least supplementing verbal prompts and cues with visual ones (Mesibov et al., 2005). Using non-verbal prompts over verbal ones may also decrease the likelihood that prompt dependence develops, given that verbal prompts are often more difficult to fade (Ball, 2008). Finally, relying on visual prompts can also lead to a decreased need for the presence of other individuals, which has can cut programming costs and increase independence.

The most robust finding in the current study is the demonstration that the treatment program increased the percent of total effective prompts and decreased the

percent total ineffective prompts delivered out of total prompts delivered across all three matched Dyad pairs and both single parents. Providing effective prompts is a pivotal skill needed for parents to ensure responding and learning from their children. It is impressive that all eight parents learned this skill. Less use of ineffective prompts is also important because it likely contributes to decreased frustration for children and parents themselves, and may result in conservation of time and resources.

Finally, the results of the study indicate that the treatment's effects on increasing parent's ability to appropriately transition their child by using transition objects were mixed. It was clear that parent's use of transition objects increased after the treatment was implemented as compared to baseline levels (only one parent used a transition object during two out of eight baseline probe opportunities). The results, however, indicated an overall inconsistent use of transition objects. Some parents, for example, used objects to transition their child to the work area on a consistent basis, but not to the play area. Some parents used objects to transition their child to work and play, however not consistently across treatment probes. Two parents did not use objects to transition their child to either work or play during any treatment probe. A review of the videotapes indicated that parents who did not use objects relied on verbal prompts, or relied on full physical prompts, in which they picked up their child and placed them in the work or play area.

One possible explanation for these inconsistent results is that some parents may not have fully understood the function of transition objects, which may have influenced their implementation of them. TEACCH strategies promote the use of visually based schedules to communicate the sequence of upcoming activities and events. According to Mesibov et al. (2005), a main reason for using schedules is to facilitate transitions, which

are difficult for individuals with autism, by increasing understanding of expectations and reducing confusion during changes in activities and location. Visual schedules also promote independence. Promotion of independence and successful transitions is thought to result from the use of a *visual* rather than language-based medium of providing information, which often leads to more success for individuals with autism who, as previously cited, tend to be visually–based thinkers and learners.

With very young learners, concrete objects are often used as beginning steps towards a schedule. Objects may then be replaced by more symbolic or abstract visual mediums, such as pictures or written words, depending on the learning profile of the individual with autism. Very young children, such as those participating in the Home TEACCHing program, however, are also often easily directable through physical prompts and can sometimes transition from one area to another which is in close proximity with minimal problems. More verbal young children with autism may also respond fairly well to simple verbal cues. Sometimes is not until transitions and schedules become longer and require more sequencing, and until children are expected to be more independent, that difficulties in transitions are readily apparent and lead to behavior problems. It is possible therefore that some parents who participated in the current study did not fully understand the extent of reasons to use visual schedules and their long-term benefits. Another explanation of inconsistent use of transition objects is that a number of parents did not use transition objects until the last treatment probe, after hands-on training began, suggesting that the method of training (i.e. need for hands-on training), rather than the treatment itself, was responsible for effective implementation.

In sum, the target behaviors analyzed in the current study reflect some of the core concepts of TEACCH strategies including the use of physical structure, routines, and visual prompts and cues by parents to promote independent functioning, attending, understanding, learning, and behavior management in children with autism. These target behaviors, however, reflect only some of many possible behavioral skills that are targeted by the strategies. Future studies may want to directly examine the effects of the strategies on other important behaviors that are central concepts and aims of the program, such as language and communication skills, imitation, joint attention, generalizing skills into the home, and specific pre-academic skills. Many of these other skills have been described as pivotal skills that enable children to access further learning from their environment, and as vital goals of early intervention programs and outcomes measures for research studies (Rogers & Vismara, 2008).

Formal Dependent Measures. The results of the current study suggest that the Home TEACCHing Program was highly effective in improving fine motor skills and decreasing parent reports of parent stress and child maladaptive behavior. The results also suggest that the treatment led to measurable improvements in visual receptive skills, parent reports of child social interaction behavior, and parent reports of child asocial and internalizing behavior.

These gains are impressive given that treatment was limited to 1.5 hours a week for twelve weeks. Moreover, given the limitation of a very small sample size, finding any statistically significant result is considerably difficult, therefore the results that were obtained in the current study are telling. It is possible that with a larger sample size, even

more improvements in the treatment group compared to the waitlist group would have been found. Verification of this possibility awaits further research.

One question raised by these results concerns why effects were found for some variables and not others. On the *Mullen Early Learning Scales (*Mullen, 1995*)*, for example, significant improvements were found for the fine motor subtest and measurable improvements in the visual receptive subtest, but not for the expressive or receptive language subtests. One possible explanation for this finding concerns the focus of the Home TEACCHing Program communication curriculum. While expressive and receptive language skills are explicit goals of the TEACCH program for many verbal students, for very young and low-verbal individuals, communication training often begins with using concrete *objects* or *pictures* rather than spoken language alone, again reflecting the value of using visual strengths of individual with autism to compensate for weaknesses (See Mesibov et al., 2005 for a review of the TEACCH approach to communication and language skills). Specifically, receptive communication is taught by associating objects or pictures with predictable events and expressive language involves teaching children to exchange objects or pictures with caregivers. Once a visual form of communication becomes meaningful for an individual, the next step involves focusing more specifically on verbal language. Given that children participating in the Home TEACCHing Program are very young, and given the time needed to build the foundation necessary for explicitly teaching verbal language, it is not surprising that the verbal language skills measured by the *Mullen Early Learning Scales* did not improve in the treatment group of the current study compared to the waitlist group, as verbal language per se was not an explicit focus. In addition, as previously mentioned, improvements that

were found on the fine motor and visual receptive subtests versus language based subtests may have been a reflection of an improvement in the participants' ability to sit at a table and work.

The finding that parent stress decreased significantly in the treatment group compared to the waitlist group is also very important. A large body of research indicates that stress levels among parents of children with autism are elevated compared to parents of typically children and those with other clinical conditions (e.g. Sanders & Morgan, 1997; Sivberg, 2002; Weiss, 2002). It is well recognized that stress can lead to a number of deleterious effects on the well-being of individuals experiencing stress, and it can have negative effects on those who interact or depend on the individual. Robbins, Dunlap & Plienis (1991), for example, found a significant negative correlation between maternal stress level and child developmental progress. Methods of reducing parent stress, therefore, are clearly warranted and are vital to the sustainability of parent efforts to function effectively for themselves and their families. The findings of the current study reinforce previous findings that support from professionals aids in adaptation to stress (e.g. Farran & Sparling, 1988), and that parents who participate in TEACCH-based psychoeducational treatment programs improve in mental health (Bristol, Gallagher, & Holt, 1993). It would be interesting to conduct future research on the Home TEACCHing program to determine what factors mediate the reduction in parent stress demonstrated by the current study. For example, some researchers have found that *perceived* social support can be more beneficial that actual support provided (e.g. Gill & Harris, 1991). Others have looked at self-efficacy (Hastings & Brown, 2002) and stigma perception (Gray, 2002) as factors influencing stress levels. It is possible that other

contributions of the Home TEACCHing program led to the reduction in parent stress. Examining these factors would add to the current literature and enhance efforts to reduce stress among parents of children with autism.

A final interesting finding based on formal measures was that the treatment resulted in a statistically significant reduction in parent reports of general and externalized maladaptive behavior indexes, and a measurable reduction in internalized and asocial maladaptive behavior indexes. These findings were present despite the fact that no treatment session was focused exclusively on behavior problems. One possible explanation for this finding is that the TEACCH strategies used in the current program, as in all intervention programs, adapt teaching strategies and environments to individual differences in learning styles in people with autism. These adaptations are thought to reduce the mismatch between unique learning styles and typical teaching strategies, and therefore to prevent and reduce behavior problems. TEACCH strategies such as the use of physical structure, schedules, work systems, and other visually based methods also enhance meaning and predictability, reduce confusion, and tap into the strengths of individuals with autism, which can lead to a prevention of behavior problems (Mesibov et al., 2005). A number of studies support the clinical finding that using schedules can decrease behavior problems (e.g. Dooley, Wilczenski, & Torem, 2001). The current study supports the finding that the TEACCH methodology results, at the very least, in parent reports of reduction in behavior problems, and possibly in actual behavior reduction. Future studies should conduct a focused examination on the effects on the program on actual problem behavior, and perhaps even examine what specific components of the program lead to behavior reduction.

Follow–up. Follow-up questionnaires were provided to parents three months after the termination of the Home TEACCHing program (See Appendix B). Nine out of ten parents returned the questionnaire. Parents reported spending an average of six and a half hours, ranging from one to twenty hours, a week teaching their child using the methods they learned during the Home TEACCHing program. Parents reported focusing on a variety of skills areas, such as self-help, academic, play, social skills, independent work, with the most commonly reported skill being communication.

When asked how they felt their child benefited most during the Home TEACCHing program, almost all parents discussed aspects of work systems. According to Mesibov et al. (2005) work systems are organizational systems that provide visually based expectations and strategies for approaching activities that are meaningful to individuals with autism. They reduce confusion children with autism have about sequencing the beginning, middle, and end of activities because these concepts are laid out in concrete and visual ways. They are also presented in a predictable way which helps to reduce anxiety. According to responses of the follow-up questionnaire, the children enrolled in the Home TEACCHing program learned the concept of a work routine. Parents stated that their children learned the expectations of sitting and completing activities, and learned the concept of starting, completing, and finishing tasks. One parent specifically commented on how the organization of the materials benefited her son. As discussed previously, learning to sit and work independently is a basic foundational concepts and behavior required to learn. They also allow individuals with autism to experience a feeling of satisfaction and success when tasks are completed (Mesibov et al., 2005). Two parents mentioned how it was beneficial to observe their

child respond and succeed, indicating that not only does the child, but those involved in the child's care and education can experience similar satisfaction.

Another important theme emerged from the follow-up questionnaire when parents were asked how they benefited most from participating in the Home TEACCHing program. A number of parents discussed benefiting from learning more about autism. Specifically, they stated that they learned how individuals with autism think and how their child's strengths and weaknesses related to autism. Understanding their child's diagnosis will undoubtedly help most parents care for, cope with, advocate for, and teach their child, which are vital considering that parents are often the individuals who spend the most time with their children throughout their lifespan. Moreover, it is important for parents not only to understand the diagnostic features of the diagnosis, but also to understand the unique way in which they think and understand the world. This holistic approach to autism facilitates the design of effective teaching approaches based on their individualized strengths and weaknesses (Mesibov et al., 2005).

Finally, the follow-up questionnaire asked parents to comment on what they would change about the Home TEACCHing program. Most parents stated that the program was very positive and had no suggestions of changes. One parent, however, stated that they felt some of the strategies used in the program were too basic for their child and that it was not flexible in adapting to their child's developmental level. Another mentioned wishing there was less focus on pre-academic tasks and more focus on self-help skills. A third mentioned she would have liked to talk more about her son's strengths and weaknesses so that she could work more on his weaknesses. It is possible that a more thorough assessment of the child's functioning and the family's expectations

at the start of the program could facilitate an even more individualized approach to working with families.

Limitations.

There were several limitations were present in the current study. Although the use of a multiple probe design was advantageous in that it allowed for a decrease in reactivity and testing effects, and circumvented problems with impracticality and costliness of conducting the research, the design also had a number of weaknesses. Only one baseline probe, for example, was collected for treatment families. An extended baseline of at least three probes to show baseline stability would have allowed for stronger conclusions to be made about treatment effects. It is possible that extraneous factors could have influenced responding of treatment group families once the treatment was implemented. Extending baseline probes to demonstrate baseline stability would have eliminated this possibility. The shortened baseline period used in the study, however, was necessary to avoid delaying access to treatment, which is an important ethical consideration.

Also, for clear verification of treatment effects, it must be shown that as treatment is applied to the first participant, little change is noted in the baseline responses in second participant (Cooper, Heron, & Howard, 1987). Again, to ensure shortened wait times, treatment was implemented with the second participant at a set timeframe rather than according to stability of baseline responding. Although relatively stable baseline responding occurred in most waitlist participants, baseline responding was unstable for two children, therefore reducing the credibility of conclusions made from their data. For example, escape behavior for the children 6 and 8 showed a dramatic decreasing trend

across the first three baseline probes and began to level out during the final baseline probe. It was concluded that no treatment effects were demonstrated due to the probability that the influence of another variable, such as exposure to the materials and structure of the videotaping sessions or to the research assistant caused a decrease in mean levels of escape behavior rather than the treatment. Without a stable baseline, however, a convincing conclusion cannot be made.

A final limitation of the multiple probe design was the limited number of probes that were collected, and which may have masked the strength of treatment effects. Problems with sleeping, eating, sickness, or other factors can cause any child, or parent, to deteriorate in their performance on any given day. It is possible that these variations in behavior may have caused the results of a probe session to be misrepresentative of a true behavioral repertoire. For example, the second treatment probe for child 5 showed a significant decrease in independent functioning and increases in off task and escape behavior compared to the first and third treatment probes. Parent 5 also showed a significant decrease in use of effective prompts and increase in use of ineffective prompts during the second probe compared to the first and third treatment probes. These results may have been more of a reflection of a behavioral variation, such as the reported health problem of child 5, that is unrepresentative of the child and/or parent's true behavior, and thus may have resulted in an unwarranted tempering of the strength of treatment effects. More frequent probes may have avoided the masking of treatment effects. Future studies may also want to consider recording possible extraneous factors that influence the performance of participants during behavioral assessments.

Another limitation of the current study is attributed to problems in the standardization of the behavioral observation assessment protocol and coding system. First of all, lack of standardization in how parents were asked to work with their children during videotaping assessments may have influenced results. Each parent during each videotaping assessment was given a standardized basket of tasks, with same number and types of tasks. They were not, however, asked to complete the tasks in any particular order. Given that the tasks ranged in level of difficulty, some children may have been presented with easier or more difficult tasks compared to their matched dyad or compared to previous probes, which would have influenced the ability to accurately compare child behavior across the dyads and across time. For example, child 1 may have been asked by their parent to complete three difficult tasks that were above his skill level during a probe while child 2 was asked to complete three easy tasks. Or, child 1 could have been presented with easy tasks during one probe session, and then presented with difficult tasks during the next probe session.

Secondly, for several dyads, a number of factors related to the timing of videotaping assessments occurred that could have decreased the accuracy of behavioral assessments. For example, there was no clearly set criterion for when the five minute timer for videotaping was to begin. Research assistants conducting the videotaping were told to begin timing once the transition to work was complete. On several occasions, however, there was a time lag between when transitions were complete and when the parent and child dyads actually began work sessions due reasons such as parents rearranging tasks on shelves, parents talking to their children or vice versa, tasks accidentally falling on the floor, or siblings interrupting the session. For such

interferences, the timer was not stopped, thus reducing the possible number of 10 second intervals parents and children could demonstrate target behavior. Such interferences also occurred in the middle and end of videotaping sessions and were not accurately accounted for. It would have been better had there been an exact criterion used to signal the beginning of the 5 minute timing, and a rule for how to account for interruptions. For example, to avoid lags, the five minute timer could have begun once the first work task was placed in front of the child. To account for interruptions, the five minute timer could have been stopped during interruptions or coders could have discounted these intervals when calculating percent of intervals in which behavior did or did not occur. These are minor yet important adjustments that can easily be addressed in future replications of the study.

As previously mentioned in the discussion of parent set-up behavior, minor deficiencies in the behavioral coding system (stringent measurement criteria, components that should have been exclude from analysis) also limited the accuracy of behavioral observation measurements. Furthermore, other situations arose during the coding of videotapes that were not present when initially creating and piloting behavioral definitions. For example, it was not until after a number of videotapes were coded that the research assistant noticed a child working independently, but also making a few mistakes. The original definition of independent functioning did not address mistakes, because it was assumed that the children would be prompted by parents when making mistakes, therefore they would not meet the definition of independent functioning. Once this error in the operational definition was noted, due to time constraints, videotapes that had already been coded could not be recoded. It is possible, therefore, that inaccuracies

exist in the results. Very few such problems, however, existed in the current study and are not believed to have greatly influenced the overall results. Future studies can easily circumvent problem in definitions by spending more time and resources testing behavioral definitions and by recoding data when necessary changes in definitions are warranted.

The manner in which dyads were matched with one another also could have been improved upon. Children were primarily matched according to their date of referral to the Home TEACCHing program, their age, and according to whether or not referring clinicians described them as more or less delayed in their functioning. It would have been even better to also have matched children according to their scores on standardized assessments, such as the *Child Autism Rating Scale* (Schopler et al., 1988) or the *Mullen Early Learning Scales* (Mullen, 1995), which would have allowed for a better comparison of improvements made by treatment families compared to waitlist families on behavioral measures.

Closing

The current study represents an initial piloting of a new intervention. Despite the small number of subjects, its strong design and detailed qualitative analyses provides high-quality support for the findings that suggest that the Home TEACCHing Program is an effective approach to the treatment of children with autism ages three years and younger on a number of important domains. This promising evidence calls for future, more comprehensive studies on the program.

A number of additional aims of future research are important to address in addition to those already discussed. For example, it is important to determine how the

length of treatment is related to outcome. It is possible that fewer sessions would be just as beneficial or that more sessions would have lead to greater improvement. As mentioned, dyad 8, for example, did not show strong treatment effects until the final treatment probe, indicating that this dyad may have benefited from further sessions. Child 8 also scored in the "severely autistic" range on the *Child Autism Rating Scale* (Schopler et al., 1988) on pre-test; therefore it is possible that session length needed for positive outcomes is dependent on measures of functioning at entry or on initial and on-going responses to treatment. Looking at the interaction between autism severity, adaptive behavior, language functioning, and IQ and other developmental measures and treatment length on outcome is an area of future research. Given that time and financial resources are limited, and that an increasing number of families are in need of services, the answers to these questions are invaluable.

Also, conducting a study that breaks apart components of the Home TEACCHing program would demonstrate which aspects of the program are responsible for change. At this point, the findings are reflective of the comprehensive treatment as a whole package. Finding the key elements that are responsible for change could allow for a reduction in time and resources spent by focusing on effective components and eliminating those that do not contribute to outcome. For example, it would also be interesting to examine what kind of parent training was most effective in the current study. The clinician used a combination of didactic training, modeling, and hands-on training. As mentioned, two parents did not show treatment effects until the last treatment probe, which was the only probe taken after parents started working hands-on with their children. It is possible that these two parents learned more effectively when taught with hands-on training as

opposed to modeling only. These components could be systematically varied to determine which form of training, alone or in combination, is most effective.

No direct measurement of follow-up was conducted in the current study. Although follow-up questionnaires were distributed three months post-treatment, they did not address specific outcomes, thus the issues of maintenance and generalization were not addressed. Both short-term and long-term follow-up measures need to be examined in order to determine the maintenance of skills gained and to determine if a continued gain in skills occurred, which would demonstrate if the aim of having parents take over treatment for their children was met. It would also be interesting to specifically determine whether participation in the program leads to increased responsiveness to school and other future interventions. Future researchers should consider including follow-up measurements to examine these questions.

Researchers should also continue to examine when and for whom certain intervention configurations and methodologies are most beneficial. Finding the characteristics of young children with autism that appear to influence their response to treatments is an important research question with significant clinical implications, however, according to Wolery and Garfinkle (2002), fewer than 20% of autism early intervention review papers mentioned any moderating variables, and none conducted analyses to determine whether certain characteristics accounted for outcomes. In the current study, for example, anecdotal reports from the clinician also revealed that child 6 and 8 out of all eight children were the most challenging to treat due to sensory-perceptual difficulties, rigidity, and social anxiety. It is possible that these characteristics explained why these children and their parents showed a delayed response to treatment

on a number of variables. It is also important to examine what parent and family variables account for responsiveness to home based services so that initial assessments of these characteristics can be considered when recommending intervention approaches. Conditions such as parent beliefs about diagnosis and treatment, exposure to other forms of intervention, levels of social support, and other time commitments may influence their efforts to learn and implement home based treatments. Controlled studies addressing these questions are scant in the literature, and are in vital need of attention.

Finally, an increasing number of early intervention models are available to families which vary widely in methodological approach and in philosophical assumptions. Future researchers should aim to compare intervention programs such as The Home TEACCHing program to other treatment models using designs in which all variables other than methodology are well controlled for. Although the current study showed that the Home TEACCHing program has a number of benefits, more may be found, and the important question remains of whether its' benefits are above and beyond those of other early intervention methods.

REFERENCES

Abidin, R. (1995). *Parenting Stress Index: Professional Manual. 3rd Ed.* Lutz, FL: Psychological Assessment Resources, Inc.

Aldred, C., Green, J. & Adams, C. (2004). A new social communication intervention for children with autism: Pilot randomized controlled treatment study suggesting effectiveness. *Journal of Child Psychology and Psychiatry, 45(8),* 1420-1430.

American Psychological Association. (1995). *Template for developing guidelines: Interventions for mental disorders and psychosocial aspects of physical aspects of physical disorders.* Washington, DC: Author.

American Psychological Association. (2000). *Diagnostic and statistical manual of mental disorders-text revision* (4th ed., text revision). Washington, DC: American Psychiatric Association.

American Psychological Association. (2006). Evidence-based practice in psychology. *American Psychologist, 61,* 271-285.

Anderson, S., Avery, D., DiPietro, E., Edwards, G., & Christian, W. (1987). Intensive home-based early intervention with autistic children. *Education and Treatment of Children, 10,* 352-366.

Bailey, D., Aytch, L., Odom, S., Symons, F., & Wolery, M. (1999). Early Intervention as We Know It. *Mental Retardation and Developmental Disabilities Reviews, 5,* 11-20.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press, 1998).

Ball, J. (2008). *Early Intervention and Autism: Real-Life Questions, Real-Life Answers*. Arlington, TX: Future Horizons.

Bayley, N. (1993). Bayley Scales of Infants Development-II. San Antonio, TX: Psychological Corporation.

Berliner, D. (2002). Education research: The hardest science of all. *Educational Researcher, 31,* 18-20.

Brinkerhoff, J. & Vincent, L. (1986). Increasing parental decision making at the individualized educational program meeting. *Journal of the Division for Early Childhood, 11,* 46-58.

Bristol, M., Gallagher, J., & Holt, K. (1993). Maternal depressive symptoms in autism: Response to psychoeducational intervention. *Rehabilitation Psychology, 38(1),* 3-10.

Bruininks, R., Woodcock, R., Weatherman, R., & Hill, B. (1984). *Scales of Independent Behaviour*. Park Allen, TX: The Riverside Publishing.

Bruininks, R., Woodcock, R., Weatherman, R., & Hill, B. (1996). *Scales of Independent Behaviour - Revised*. Park Allen, TX: DLM Teaching Resources.

Bruinsma, Y., Koegel, R. & Koegel, L. (2004). The Effect of Early Intervention of the Social and Emotional Development of Young Children (0-5) with Autism. In: Tremblay RE, Barr RG, Peters RDev, eds. Encyclopedia on Early Childhood Development [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development; 2004:1-6. Available at http://www.excellence-earlychildhood.ca/documents/Bruinsma-KoegelANGxp.pdf. Accessed [9/1/06].

Casto, G. & Mastropieri, M. (1986). The efficacy of early intervention programs: A meta-analysis. *Exceptional Children, 52,* 417-424.

Chambless, D., & Hollon, D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*, 7-18.

Chakrabarti, S. & Fombonne, E. (2001). Pervasive developmental disorders in preschool children. *Journal of the American Medical Association*, *285(24),* 3093–9.

Charman, T. & Howlin, P. (2003) Research into early intervention for children with autism and related disorders: Methodological and design issues. *Autism, 7(2),* 217-225.

Chorpita, B. (2003). The frontier of evidence-based practice. In A. E. Kazdin & J. R Weisz (Eds.), *Evidence-Based Psychotherapies for children and adolescents* (pp. 42-59). New York, NY: Guildford.

Cohen, H., Amerine-Dickens, M., & Smith, T. (2006). Early Intensive Behavioral Treatment: Replication of the UCLA Model in a Community Setting. *Journal of Developmental & Behavioral Pediatrics, 27,* S145-S155.

Cooper, J., Heron, T., & Howard, W. (1987). *Applied Behavior Analysis*. Englewood Cliffs, NJ: Prentice Hall.

Dawson, G., & Osterling, J. (1997). Early Intervention in autism. In M.J. Guralnick (Ed.), *The effectiveness of early intervention* (pp. 307-326). Baltimore, MD: Paul H. Books.

Diggle, T., McConachie, H., & Randle, V. (2003). Parent-Mediated Early Intervention for Young Children with Autism Spectrum Disorder (Cochrane Review), In The Cochrane Library, Issue 3, 2003. Oxford: Update Software.

Dooley, P., Wilczenski, F., & Torem, C. (2001). Using an activity schedule to smooth school transitions. *Journal of Positive Behavioral Interventions, 3,* 57-61.

Education for All Handicapped Children Act of 1975, 20 U.S.C. section 1400 et seq.

Education of the Handicapped Amendments of 1986, 20 U.S.C. section 1400 et seq.

Eikeseth, S., Smith, T., Jahr, E., & Eldevik, S. (2002). Intensive behavioral treatment at school for 4- to 7-year-old children with autism: a 1-year comparison controlled study. *Behavior Modification, 26,* 49-68.

Eisenhart, M. & Towne, L. (2003). Contestation and change in national policy on "scientifically based" education research. *Educational Researcher, 32,* 31-38.

Eldevik, S., Eikeseth, S., Jahr, E., & Smith, T. (2006). Effects of low-intensity behavioral treatment for children with autism and mental retardation. *Journal of Autism and Developmental Disorders*, *36*, 211-224.

Farran, D. & Sparling, J. (1988) Coping Styles in families of handicapped children. In E.D. Hibbs (ed.). *Children and Families: Studies in prevention and Intervention*, pp.351-366. Madison, CT: International Universities Press.

Fenske, E., Zalenski, S., Krantz, P., & McClannahan, L. (1985). Age at intervention and treatment outcome for autistic children in a comprehensive intervention program. *Analysis and intervention in Developmental Disabilities, 5,* 49-58.

Fombonne, E. (2005) The changing epidemiology of autism. *Journal of Applied Research in Intellectual Disabilities, 18(4),* 281-294.

Gill, M. & Harris, S. (1991). Hardiness and Social Support as Predictors for Psychological Discomfort in Mothers of Children with autism. *Journal of Autism and Developmental Disorders, 21 (4),* 407-416.

Gillett, J. & LeBlanc, L. (2007). Parent-implemented natural language paradigm to increase language and play in children with autism. *Research in Autism Spectrum Disorders, 1(3), 247-255.*

Gray, D. (2002). "Everybody just freezes. Everybody is just embarrassed." Felt and enacted stigma among parents of children with high functioning autism. *Sociology of Health and Illness, 24(6),* 743-749.

Gresham, F., Beebe-Frankenberger, M., & MacMillan, D. (1999). A selective review of treatments for children with autism: Description and methodological considerations. *School Psychology Review, 28(4),* 559-575.

Grindstaff, J. (2002). Further evaluation of TEACCH's experiential training programs: Change in participants' knowledge, attributions and use of structure. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 62(11-B), 5374.*

Guralnick, M. (1997). *The effectiveness of early intervention*. Baltimore, MD: Brookes.

Harris, S., Handleman, J., Gordon, R., Kristoff, B., & Fuentes, F. (1991). Changes in cognitive and language functioning of preschool children with autism. *Journal of Autism and Developmental Disorders, 21(3),* 281-290.

Harris, S., Wolchik, S., & Weitz, S. (1981). The acquisition of language skills by autistic children: Can parents do the job? *Journal of Autism and Developmental Disorders, 11,* 373-384.

Hastings, R. & Brown, N. (2002). Behavior problems of children with autism, parental self-efficacy, and mental health. *American Journal of Mental Retardation, 107(3),* 222-232.

Hersen, M. & Barlow, D. (1976). *Single case experimental designs: Strategies for studying behavior change.* New York, NY: Pergamon Press.

Holmes, D. (1997) *Autism through the lifespan: The Eden model.* Bethesda, MD: Woodbine House.

Howard, J., Sparkman, C., Cohen, H., Green, G., & Stanislaw, H. (2005). A comparison of intensive behavior analytic and eclectic treatments for young children with autism. *Research in Developmental Disabilities, 26,* 359-383.

Hoyson, M., Jamieson, B., & Strain, P. (1984). Individualized group instruction of normally developing and autistic-like children: The LEAP curriculum model. *Journal of the Division of Early Childhood, 8,* 157-171.

Hume, K., & Odom, S. (2007) Effects of an individual work system on the independent functioning of students with autism. *Journal of Autism & Developmental Disorders, 37,* 1166-1180.

Interagency Autism Coordinating Committee. (2003, November). IACC autism research matrix. Retrieved on October 1, 2004, from http://www.nimh.nih.gov.proxy.libraries.rutgers.edu/autismiacc/CongApprCommRep.pdf

Jocelyn L., Casira, O., Beattie, D., Bow, J., & Eneisz, J. (1998). Treatment of Children with Autism: A Randomized Controlled Trail to Evaluate a Caregiver-Based Intervention Program in Community Day-care Centers. *Developmental and Behavioral Pediatrics, 19 (5),* 326-337.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child, 2,* 217-250.

Kasari, C. (2002). Assessing Change in Early Intervention Programs for Children with Autism. *Journal of Autism and Developmental Disorders, 32(5),* 447-461.

Koegel, R.; Bimbela, A. & Schreibman, L. (1996). Collateral effects of parent training on family interactions. *Journal of Autism and Developmental Disorders, 26,* 347-359.

Koegel, R., Schreibman, L., Britten, K., Burke, J., & O'Neill, R. (1982). A comparison of parent training to direct child treatment. In R. L. Koegal, A. Rincover, & A. Egel (Eds.), *Educating and understanding autism children* (pp. 260-279). San Diego, CA: College Hill.

Lonigan, C., Elbert, J., & Johnson, S. (1998). Empirically supported psychosocial interventions for children: An overview. *Journal of Clinical Child Psychology, 27,* 138-145.

Lord, C., Wagner, A., Rogers, S., Szatmari, P., Aman, M., Charman, T., et al. (2005). Challenges in Evaluating Psychosocial Interventions for Autistic Spectrum Disorders. *Journal of Autism and Developmental Disorders, 35(6),* 695-708.

Lovaas, O. (1987). Behavioral treatment and normal education and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology, 55,* 3-9.

Mahoney, G., & O'Sullivan, P. (1990). Early intervention practice with families of children with handicaps. *Mental Retardation, 28,* 169-176.

Mahoney, G., & Perales, F. (2005). Relationship Focused Early Intervention with Children with Pervasive Developmental Disorders and Other Disabilities: A Comparative Study*, Journal of Developmental and Behavioral Pediatrics, 26 (2),* 77-85.

Marcus, L., Lansing, M., Andrews, C., & Schopler, E. (1978). Improvement of Teaching Effectiveness in Parents of Autistic Children. *Journal of the American Academy of Child Psychiatry, 17,* 625-639.

McCollum, L. (2002). Influencing the Development of Young Children with Disabilities: Current Themes in Early Intervention. *Child and Adolescent Mental Health Volume, 7,* 409.

Meisels, S. & Shonkoff, J. (1990). *Handbook of early Childhood Intervention.* New York, NY: Cambridge University Press.

Mesibov, G. (1998). The TEACCH approach to working with people with autism and their families. *Spotlight on Topics in Developmental Disabilities, 1,* 6-10.

Mesibov, G., Schopler, E., & Hearsey, K. (1994). Structured Teaching. In E. Schopler, & G. Mesibov (Eds.), *Behavioral issues in autism* (pp. 195-207). New York, NY: Plenum Press.

Mesibov, G., & Shea, V. (unpublished manuscript). Evidence-based practice, autism, and the TEACCH Program.

Mesibov, G., Shea, V., & Schopler, E. (2005). *The TEACCH approach to autism spectrum disorders.* New York, NY: Kluwer Academic/Plenum.

Mullen, E. (1995). *Mullen Scales of Early Learning.* Circle Pines, MN: American Guidance.

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.

Ozonoff, S., Williams, B. & Landa, R. (2005). Parental report of the early development of children with regressive autism: The delays-plus-regression phenotype. *Autism, 9(5)*, 461-486.

Panerai, S., Ferrante, L. & Zingale, M. (2002). Benefits of the Treatment and Education of Autistics and Communication Handicapped Children (TEACCH) programme as compared with a non-specific approach. *Journal of Intellectual Disability Research, 46,* 318-327.

Powers, L., Singer, G., Stevens, T. & Showers, J. (1992). Behavioral parent training in home and community generalization settings. *Education Training Mental Retardation, 27,* 13-27.

Quill, K. (1997). Instructional considerations or young children with autism: The rationale for visually cued instructions. *Journal of Autism and Developmental Disorders, 21,* 697-714.

Robbins, F., Dunlap, G. & Plienis, A. (1991). Family characteristics, family training and the progress of young children with autism. *Journal of Early Intervention, 15,* 173-184.

Rocha, M., Schreibman, L. & Stahmer, A. (2007). Effectiveness of training parents to teach joint attention in children with autism. *Journal of Early Intervention, 29(2), 154-172.*

Rogers, S. (1998). Empirically supported comprehensive treatments for young children with autism. *Journal of Clinical Child Psychology, 27(2),* 167-178.

Rogers, S. & Vismara, L. (2008). Evidence-based comprehensive treatments for early autism. *Journal of Clinical Child and Adolescent Psychology, 37(1),* 8-38.

Salt, J., Shemilt, J., Sellars, V., Boyd, S., Coulson, T., & McCool, S. (2002). The Scottish Centre for Autism preschool treatment programme. II: The results of a controlled treatment outcome study. *Autism, 6,* 33-46.

Sanders, J. & Morgan, S. (1997). Family stress and adjustment as perceived by parents of children with autism or Down syndrome: Implications for intervention. *Child & Family Behavior Therapy, 19,* 15-32.

Schopler, E. (1994). A statewide program for the Treatment and Education of Autistic and related Communication Handicapped CHildren (TEACCH). *Child and Adolescent Psychiatric Clinics of North Carolina, 3 (1),* 91-103.

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.

Schopler, E., Reichler, R., Bashford, A., Lansing, M., Marcus, L. (1990) *Psychoeducational Profile Revised.* Vol. 1 (PEP-R). Austin, TX: Pro-Ed

Schopler, E., Reichler, R., DeVellis, R., Daly, K. (1988). *The Childhood Autism Rating Scale*. Los Angeles: Western Psychological Services.

Schreibman, L., Koegel, R., & Koegel, L. (1989). Autism. In M. Hersen (Ed.). *Innovation in Child Behavior Therapy* (pp. 395-428). New York, NY: Springer-Verlag.

Shea, V. (2004). A perspective on the research literature related to early intensive behavioral intervention (Lovaas) for young children with autism. *Autism, 8(4),* 349-367.

Sheinkopf, S. & Siegel, B. (1998). Home-Based behavioral treatment of young children with autism. *Journal of Autism and Developmental Disorders, 28(1),* 15-23.

Short, A. (1984). Short-term treatment outcome using parents as co-therapists for their own autistic children. *Journal of Child Psychology and Psychiatry, 25(3),* 443-458.

Sivberg, B. (2002). Family System and coping behaviors. *Autism, 6,* 397-409.

Smith, T., Buch, G., & Gamby, T. (2000). Parent-directed, intensive early intervention for children with pervasive developmental disorder. *Research in Developmental Disabilities, 21,*297-309.

Smith, T., Groen, A. & Wynn, J. (2000). Randomized Trial of Intensive Early Intervention for Children with Pervasive Developmental Disorder. *American Journal of Mental Retardation, 105(4),* 269-285.

Smith, T., Lovaas, N. W., & Lovaas, O. I. (2002). Behaviors of children with high functioning autism when paired with typically developing versus delayed peers: A preliminary study. *Behavioral Interventions, 17,*129-143.

Society of Clinical Psychology (1995). Task force on promotion and dissemination of psychological procedures. *The Clinical Psychologist, 48,* 1-17.

Stevens, M., Washington, A., Rice, C., Jenner, W., Ottolino, J., Clancy, K., & Whitney, J. Community Report from the Autism and Developmental Disabilities Monitoring (ADDM) Network. Prevalence of the Autism Spectrum Disorders (ASDs) in Multiple Areas of the United States, 2000 and 2002.
retrieved on October 8, 2008 from:
http://www.cdc.gov/ncbddd/autism/documents/AutismCommunityReport.pdf

Strain, P. Kohler, F., & Goldstein, H. (1996). Learning experiences: An alternative program: Peer-mediated interventions for young children with autism. In E. Hibbs & P. Jensen (Eds.). *Psychosocial treatments for child and adolescent disorders* (pp. 573-586). Washington, DC: American Psychological Association.

Swallows, G. & Graupner, T. (2005). Intensive Behavioral Treatment for Children with Autism: Four-Year Outcome and Predictors. *American Journal of Mental Retardation, 110 (6),* 417-438.

Thompson, L., Lobb, C., Elling, R., Herman, S., Jurkiewica, T., & Hulleza, C. (1997). Pathways to family empowerment: Effects of family-centered delivery of early intervention services. *Exceptional Children, 64,* 99-114.

Tonge, B., Brereton, A., Kiomall, M., MacKinnon, A., King, N., & Rinehart, N. (2006). Effects on Parental Mental health of an Education and Skills Training Program for Parents of Young Children with Autism: A Randomized Controlled Trial. *Journal of American Academy of Child & Adolescent Psychiatry, 45(5),* 561 – 569.

Wehman, T. (1998). Family-centered early intervention services: Factors contributing to increased parent's involvement and participation. *Focus on Autism and Other Developmental Disabilities, 13(2),* 80-86.

Weiss, M. (2002). Hardiness and social support as predictors of stress in mothers of typical children, children with autism, and children with mental retardation. *Autism, 6,* 115-130.

Werle, M., Murphy, T., & Budd, K. (1993). Treating chronic food refusal in young children: home-based parent training. *Journal of Applied Behavior Analysis, 26,* 421-433.

Wiggins, L. Baio, J., Rice, C. (2006). Examination of the time between first evaluation and first autism spectrum diagnosis in a population-based sample. *Journal of Developmental Behavioral Pediatrics, 27(2 Suppl),* S79–87.

Wolery, M. & Garfinkle, A. (2002). Measures in intervention research with young children who have autism. *Journal of Autism and Developmental Disorders, 32(5),* 463-478.

Woodcock, W. & Johnson, M. (1977). *Woodcock-Johnson Psycho-Educational Battery*. Itasca, IL: Riverside Publishing.

APPENDIX A

TEACCH Training Quiz

Answer the following questions with your "first impression" of the correct answer. Keep open-ended responses very brief (a single sentence or even a phrase is sufficient.) Please take no more than 15 minutes to complete the quiz.

1. Children with autism learn best when material is presented _____ rather than _____ .

2. Children with autism have difficulty understanding _____ but tend to pay attention to _____ .

3. Ashley, a child with autism, eats a peanut butter sandwich for lunch each day. One day, Ashley refuses to eat the sandwich without jelly and becomes so upset that she cries inconsolably. What characteristic of autism best explain Ashley's behavior?
   _____

4. Josh enjoys labeling the color or bears as part of his home program; yet when he and his family stop at the mall, he cannot label the colors of bears in the toy store. What characteristic of autism would account for Josh's difficulty?
   _____
   _

   _____ .

5. Children with autism are often preoccupied with _____ behaviors or _____ interests, which may interfere with their learning.

6. The physical structure of a home is important because it makes _____ clearer and minimizes _____ .

7. An individual work system should communicate four pieces of information to a child with autism. What are these four pieces of information?

   _____
___

   _____ .

8. Academic, domestic or vocational tasks can sometimes appear confusing or overwhelming to the student with autism. How can these tasks be modified so that the student is able to carry them out independently?

   _____
____

   _____ .

9. What is the most important communication goal for children with autism (regardless of functioning level?)

   _____
_ .

10. The student's need for structure does not _____ over time; rather, the structure should be _____ not his natural environment.

11. The primary goal of implementing structure in home is to facilitate the student's _____ .

12. Specific tasks can be targeted based upon the student's _____ and _____ .

13. Children with autism typically have difficulty knowing how to use their play time; it is appropriate to apply _____ to even these periods of time.

14. What is the "iceberg" model for understanding behavior problems in children with autism?

    _____

    .

15. Many behavior problems can be _____ by implementing a structured teaching approach.

16. Larry, a child with autism, has a temper tantrum each time he is asked to leave the play area. You believe that he is genuinely confused by your request, not merely "stubborn." What can you do to reduce the frequency and/or severity of this behavior problem?

    _____

    _

    _____

    .

APPENDIX B

The Home TEACCHing Program Follow-up Questionnaire

Thank you for taking the time to answer these questions as fully as possible. Your feedback will help us improve the Home TEACCHing program.

1. What do you feel benefited your child most during Home TEACCHing program?

2. What did you as a parent benefit the most from participating in the Home TEACCHing program?

3. If you could, what would you change about the Home TEACCHing program? What would like to have had more of? less of?

4. What would you like to see as a possible follow up to these sessions?

5. Approximately how many hours a week do you spend teaching your child using methods you learned during the Home TEACCHing program. Please describe the kind of teaching you do with your child.

Thank you for your time!

APPENDIX C

Behavioral Observation Codes

PARENT SETUP BEHAVIOR CODE

Work session set up: defined as the placement of the following items/objects in the proper arrangement according to the following criteria before the child is transitioned to the work area:

1) Auditory distractions and visual distractions are minimized (i.e. tv, radio, toys/objects etc.); N/A if no distractions present
2) Work table: table is set up in a location with no other movable items/objects within approximately 3 feet of any side of table (other than items listed below), except walls and/or large furniture (i.e. couch, desk)
3) Chair placement: facing one side of the table
4) Chair placement: pulled out 1-2ft away from the table's edge for easy access to child
5) Shelving: located no more than 6 inches from the table
6) Shelving: located catty corner left of the chair, lengthwise along the table
7) Shelving: edge of shelf is located within child's reach
8) Finished basket: located catty corner right of the chair (across from shelves).
9) Finished basket: edge of basket is touching edge of table
10) Task arrangement: tasks are placed on the shelf side-by-side.
11) Task arrangement: tasks are not stacked
12) Task arrangement: at least one task is located within the child's reach on the shelf
13) Task arrangement: one task is located in front of the child, on the table, within 3 inches of reach
14) Rug is placed to define the play area within 3-6 feet from work table
15) Toy basket: located on rug or within 1 foot of rug
16) Toy basket: all toys are stored in the basket

PARENT PROMPT BEHAVIOR CODE

Effective Verbal Prompt: any instance of the parent providing a clear verbal instruction (using a verb- "in the box" does not count but "put in the box counts) for an action to take place (e.g., "look", "let's try this one") to the child that results in compliance with instruction within 3 seconds of prompt. An effective prompt is limited to approximately 3 consecutive prompts and includes prompts for orienting or attending behavior (e.g. Are you ready?). Does not count if the child does not change behavior due to prompt. (e.g., parent says "come here" when child is already moving in his/her direction). *Count the interval in which the prompt is given, not in which the child complies.

Effective Non-verbal Prompt: any instance of the parent providing a clear visual, gesture or model instruction provided to the child that results in compliance with instruction within 3 seconds of prompt. An effective prompt is limited to approximately 3 prompts.
Visual prompt: any instance of the parent using a visual card or item/activity to direct an action by the child to take place (e.g.
parent places piece of task in child's hand; parent taps/touches the place where a task item belongs).
Gesture prompt: any instance of motioning or pointing to direct for an action by the child to take place (e.g. pointing at the hole
in which an item is supposed to be placed), including the use of sign language.
Modeling prompt: any instance of parent performing an action to direct the child to perform the same action.

Total Ineffective Prompt: Effective verbal and effective non-verbal prompts combined

Total Ineffective Prompt: any physical prompt (taking a child's body part to engage in an instruction) or any verbal, visual, gesture or model guidance provided to the child that does not result in compliance by the child within 3 seconds of prompt or any instruction that is repeated consecutively more than approximately 3 times. Id the child makes an error, count as ineffective.

PARENT SETUP BEHAVIOR CODE

Appropriate Transition to Work : defined as the parent placing or holding an object that represents work in the child's hand (e.g. piece of a task for a move to the work area).

Appropriate Transition to Play : defined as the parent placing or holding an object that represents play in the child's hand (e.g. piece of a task for a move to the play area).

CHILD BEHAVIOR CODE – WORK SESSION

Off task: defined as any instance of the child removing attention from the task or activity for more than 3 seconds (within one interval). Removal of attention includes a shift of gaze and/or body parts from task/activity to another task, item, person, activity, or own body (e.g. stimming).

Escape: defined as any attempts to leave or leaving of the designated work area (e.g. walking more than 1 foot from area, sliding out of chair onto floor or under table, and sitting on the floor or parents lap). Excludes when child leaves the area to get a piece of a task that has fallen to the ground or to go to the bathroom, get a drink, etc. (more than one request for food or bathroom will be considered escape). All intervals in which the child continues to escape are counted.

Independent functioning: defined as one or more of the following actions:

1) the child initiates or reaches for tasks on the shelf without prompting (without prompting excludes when helped due to inability to reach task due to size, though initiation must be unprompted)
2) the child places tasks on the work table or on the floor in front of his/her body without prompting
3) the child completing tasks for more than 3 seconds without prompting.
4) the child pushes/throws tasks toward or places them in the finished basket without prompting (without prompting excludes when helped due to inability to reach task due to size, though initiation must be unprompted)

Behavioral Observation Scoring Method

PARENT SET-UP BEHAVIOR:

Work session set-up: each item scored separately as present (+) or absent (-); (+) = 1 and (-) = 0. Total scored as percent of components present out of total number of components scored.

PARENT PROMPT BEHAVIOR:

Effective Verbal Prompt: scored as number of occurrences out of total number of prompts in a 5-minute observation.

Effective Non-verbal Prompt: scored as number of occurrences out of total number of prompts in a 5-minute observation.

Total Effective Prompt: scored as number of occurrences off effective verbal and effective non-verbal prompts out of total number of prompts in a 5-minute observation.

Total Ineffective Prompt: scored as number of occurrences out of total number of prompts in a 5-minute observation.

PARENT TRANSITION BEHAVIOR:

Appropriate Transition to Work: scored as present (+) or absent (-); (+) = 1 and (-) = 0.

Appropriate Transition to Play: scored as present (+) or absent (-); (+) = 1 and (-) = 0.

CHILD BEHAVIOR:

Off task: scored as percent of 10-second partial intervals in a 5-minute observation.

Escape Attempts: scored as percent of 10-second partial interval in a 5 minute observation.

Independent functioning: scored as percent of 10-second partial interval in a 5 minute observation.

Hypotheses

PARENT SET-UP BEHAVIOR:

Work session set-up: it was hypothesized that total scores of percent of components present would increase in the treatment group compared to the waitlist group and across time due to treatment.

PARENT PROMPT BEHAVIOR:

Effective Verbal Prompt: it was hypothesized that the number of occurrences out of total number of prompts would increase in the treatment group compared to the waitlist group, but will decrease as compared to use of effective other prompts across time due to treatment.

Effective Non-verbal Prompt: it was hypothesized that the number of occurrences out of total number of prompts would increase in the treatment group compared to the waitlist group and across time due to treatment.

Total Effective Prompt: it was hypothesized that the number of occurrences of effective verbal and effective non-verbal prompts out of total number of prompts would increase in the treatment group compared to the waitlist group and across time due to treatment.

Total Ineffective Prompt: it was hypothesized that the number of occurrences out of total number of prompts would decrease in the treatment group compared to the waitlist group and across time due to treatment.

PARENT TRANSIOTION BEHAVIOR:

Appropriate Transition to Work: it was hypothesized that number of appropriate transitions to work would increase in the treatment group compared to the waitlist group.

Appropriate Transition to Play: it was hypothesized that number of appropriate transitions to work would increase in the treatment group compared to the waitlist group.

CHILD BEHAVIOR:

Off task: it was hypothesized that percent of 10 second partial intervals would decrease in the treatment group compared to the waitlist group and across time due to treatment.

Escape Attempts: it was hypothesized that percent of 10 second partial intervals would decrease in the treatment group compared to the waitlist group and across time due to treatment.

Independent Functioning: it was hypothesized that percent of 10 second partial intervals would increase in the treatment group compared to the waitlist group and across time due to treatment.

APPENDIX D

Home TEACCHing Program Treatment Fidelity Form

Directions: Record occurrence (+), non-occurrence (-), or NA for each treatment component.

Family Name: _____ **Manual Session Number:** _____

Date: _____ **Observer:** _____

Treatment Component	Comments	Score (+/-)
1. The clinician reviews homework and answers any questions about the previous week.		
2. The clinician introduces the current topic.		
3. The clinician set-up the work/free play areas and materials.		
4. The clinician demonstrates three 'work/free play routines' with the child.		
5. For each 'work/free play routine,' the clinician teaches the child to complete self-contained tasks while sitting at the small table.		
6. For each 'work/free play routine,' the clinician transitions the child to the free play area.		
7. For each 'work/free play routine,' the clinician teaches the parent how to engage the child during free play.		
8. After approximately five minutes of the first two free plays, the clinician transitions the child back to the work area.		
9. The clinician and parents spend appropriately 20-30 discussing the session topic.		
10. The clinician provides parents with homework for the following session.		

11. The clinician will briefly review the session and discuss the following week's agenda.		
12. The clinician completes a Home Teaching Session Log.		
13. The clinician answers any additional questions or concerns the parents may have.		

APPENDIX E

Home TEACCHing Program Intervention Log

Initial Assessment Date:_____ Family Code:_____

Directions: Please indicate the number of hours the child spent in the following interventions settings since the first assessment. "Other" can include interventions such as special diets, play groups or other interventions (i.e. PECS training)

Intervention	Number of hrs per week	Number of weeks
Home TEACCHing Sessions		
OT		
Speech		
Daycare/Preschool		
Respite Care		
Other		
Other		
Other		

APPENDIX F

Overview of the Home TEACCHing Program Manual

Below is a list of session topics included in the manual. Each session topic corresponds to a section in the manual that includes a description of the content area. A homework page for parents to fill out during the week between sessions and a session log for the clinician to complete at the end of the session are also provided at the end of each session. The manual also includes an appendix with fact sheets about autism and the TEACCH program, a structured teaching checklist, and a resources page.

Session 1: Introduction to Structured Teaching

Session 2: Understanding Communication

Session 3: Enhancing Communication at Home

Session 4: TEACCHing Curriculum and Tasks

Session 5: Understanding Physical Structure

Session 6: Understanding Transitions

Session 7: Transitions in the Home

Session 8: Work Systems

Session 9: Work Systems in the Home

Session 10: Structured Play

Session 11: What is the IEP?

Session 12: Self- care

APPENDIX G

Home Teaching Session Log

Session #_____
Date:_____
Child:_____

Summary of Session:

Things to work on this week:

Plans for next session and date: