

**A Sibling-Mediated Social Skills Training Intervention for Children with
Asperger's Syndrome: Results from a Pilot Study**

A Thesis

Submitted to the Faculty

of

Drexel University

by

Jennifer Diane Hetzke

in partial fulfillment of the

requirements for the degree

of

Doctor of Philosophy

May 2004

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Dr. Lamia Barakat for being the most supportive and encouraging advisor and mentor a student could ever have. I credit you not only for introducing me to the program that served as the model for my own research, but also for demanding excellence in everything I have done along the way. You are an inspiration to me both personally and professionally, and for that I will always be grateful.

Thank you to the other members of my committee—Drs. James Herbert, Ludo Scheffer, James Stone, and Mary Lazar—for your interest in this project. Your insight and expertise with this particular population of children was invaluable.

This study would not have been possible without the involvement of four wonderful families who generously gave their time in order to help us better understand how to teach social skills to children with Asperger's Syndrome. Thank you to the children and parents who taught me so much over the course of this intervention.

To my two co-facilitators, Meredith Lutz and Ericka Anderson, thank you for all that you did to make this program a success. It was a pleasure working with the both of you, and I hope you enjoyed this as much as I did.

To my extended family at the Yale Child Study Center, especially Drs. Ami Klin and Bob Schultz, thank you for providing me with the knowledge and experiences that have enabled me to examine my data in a more informed manner. I can only hope that one day I, too, will be viewed as an expert in the field of autistic spectrum disorders.

I offer a special thanks to the cohort of predoctoral fellows who have supported me during the latter stages of this project—Mendy Boettcher, Leigh Josie, Kathryn Kurlakowsky, and Sam Song. Thank you for keeping me sane this year as I worked to finish this manuscript.

Thank you to my parents, Gary and Nadine Holman, for never letting me quit. It's been a long and interesting journey to finally get to this point, and I would never have been able to do it without the two of you believing in me. I'd like to extend my gratitude to my in-laws as well for their love and encouragement.

To my husband, Marc, thank you for making so many sacrifices in order to allow me to fulfill my dreams. We've overcome so many obstacles, each time coming out a little bit stronger for it. I can't wait to see what life has in store for us next. I love you.

Finally, thank you to my son, Jacob, who along with my husband serves as a constant reminder of what is truly important in life.

TABLE OF CONTENTS

LIST OF TABLES	vii
LIST OF FIGURES	viii
ABSTRACT	ix
1. INTRODUCTION AND LITERATURE REVIEW	1
a. History, Diagnosis, and Epidemiology	1
b. Individualized Social Skills Interventions	9
c. Technology-Based Interventions	19
d. Social Skills Groups.....	23
e. Siblings as Facilitators	31
f. Siblings' Needs	33
g. Rationale for the Present Study.....	42
2. METHODS	46
a. Participants.....	46
i. Michael	47
ii. David.....	48
iii. Beth.....	49
iv. Charlie.....	49
b. Measures	50
i. Social Functioning	50

	iv
ii. Emotional Functioning.....	56
iii. Other Variables.....	58
iv. Subjective Evaluation of Intervention Components.....	60
c. Procedures.....	61
i. Format of Sibling Support Group.....	64
ii. Format of Social Skills Group Intervention.....	65
iii. Level of Participation.....	67
d. Data Analyses.....	68
3. RESULTS.....	70
a. Baseline Social Skills Functioning.....	70
i. Michael.....	70
ii. David.....	72
iii. Beth.....	74
iv. Charlie.....	75
b. Social Skills Follow-Up.....	76
i. Michael.....	77
ii. David.....	79
iii. Beth.....	82
iv. Charlie.....	83
c. Sibling Emotional Functioning.....	85

d. Intervention Summary	87
i. Sibling Support Group	87
ii. Social Skills Group	88
4. DISCUSSION	92
a. Summary of Findings.....	92
b. Intervention Strengths and Weaknesses.....	93
i. Sibling Support Group	93
ii. Social Skills Training.....	94
iii. Participant Feedback.....	96
c. Evaluation of Social Skills Outcome Measures.....	98
i. Social Functioning Variables.....	98
ii. Emotional Functioning Variables	102
d. Limitations of the Present Study.....	104
e. Future Directions	108
f. Conclusions.....	111
TABLES	112
FIGURES.....	118
LIST OF REFERENCES.....	124
APPENDIX A: BEHAVIORAL OBSERVATION CODING.....	135
APPENDIX B: CHILD FEEDBACK FORM—SIBLING SUPPORT GROUP	136
APPENDIX C: CHILD FEEDBACK FORM—SOCIAL SKILLS GROUP.....	137

APPENDIX D: PARENT FEEDBACK FORM—SIBLING SUPPORT
GROUP AND SOCIAL SKILLS GROUP138

APPENDIX E: FACILITATOR EVALUATION FORM—SIBLING
SUPPORT GROUP139

APPENDIX F: FACILITATOR EVALUATION FORM—SOCIAL
SKILLS GROUP140

VITA.....141

LIST OF TABLES

1. Demographic Characteristics for All Participants	112
2. Tests and Variables Used to Assess Social, Emotional, and Cognitive Functioning and Sibling Responsibility	113
3. Data Completed and Intervention Sessions Attended for Each Participant.....	114
4. Baseline Social Skills Functioning of Participants and Their Siblings.....	115
5. Percent of Behaviors Observed Within Categories Across Time 1 (Baseline), Time 2, and Time 3	116
6. Mean Facilitator Ratings for Engagement, Participation, and Collaboration During Social Skills Group.....	117

LIST OF FIGURES

1. Timeline of Intervention and Data Collection	118
2. ASSQ Results for All Participants Across Time	119
3. SRS Results for All Participants Across Time	120
4. SSRS Results for All Participants Across Time	121
5. DANVA2 Results for All Participants Across Time	122
6. CBCL/YSR/TRF Results for All Participants Across Time.....	123

ABSTRACT**A Sibling-Mediated Social Skills Training Intervention for Children with Asperger's Syndrome: Results from a Pilot Study**

Jennifer Diane Hetzke

Lamia P. Barakat, Ph.D.

Social skills deficits are the hallmark feature of Asperger's Syndrome (AS), yet relatively little research has examined the effectiveness of interventions designed to improve social functioning in this population. The present study examined the effectiveness of a manualized social skills group intervention for children with AS, utilizing siblings as facilitators. Each session combined direct instruction with structured role-plays to target specific skills including nonverbal communication and conversation skills. A secondary goal was to examine the emotional functioning of non-affected siblings both before and after participation in a support group.

Four children with AS, ages 10-14, participated in the intervention along with their siblings, ages 8-16. Measures of social and emotional functioning were administered to children, parents, and teachers at baseline, upon conclusion of each component of the intervention, and at 3-month follow-up. Qualitative ratings were made of each child's engagement and participation, and participants and their parents provided feedback regarding their impressions of the intervention.

Although the small sample precluded statistical analyses, the results offer preliminary evidence in support of the intervention. All four children with AS demonstrated improvements on at least two parent-report measures of social functioning, the majority of which were maintained or even furthered at 3-month follow-up. Results from child and teacher data were mixed. Although the majority of ratings of sibling

emotional functioning remained average over time, one sibling consistently reported elevated levels of internalizing behavior problems. Subjective feedback offered overwhelming support in favor of both the sibling support group and the social skills group.

The tenuous results offer a promising foundation for expanded efforts to establish the efficacy of this approach and to compare its outcomes with those of other treatment protocols. The emphasis in future research and clinical endeavors should be to improve the manner by which social skills deficits are quantified and to link those measurements to the specific skills targeted for intervention. Careful consideration also needs to be given to the issue of generalization not only of the specific skills themselves, but also to the manner by which those skills translate to the more fluid context of naturalistic social interaction.

CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW

History, Diagnosis, and Epidemiology

Hans Asperger, an Austrian pediatrician, first described the constellation of behavioral symptoms of the disorder that now bears his name in a paper published in 1944 (Asperger, 1944/1991). Though he proposed no formal diagnostic criteria, Asperger coined the term “autistic psychopathy” to describe a sample of children who exhibited deficits in social and motor functioning as well as nonverbal communication. Specifically, these children presented as socially odd or emotionally detached, showed poor motor coordination and organization, and failed to appreciate the more subtle, nonverbal aspects of communication (Wing, 1998). However, because it was published in a German language journal, his work went largely unnoticed until the early 1990’s when Uta Frith published the first English translation of his original paper (Frith, 1991). A few years later, the American Psychiatric Association (ApA) and the World Health Organization (WHO) gave official recognition to the diagnosis of Asperger’s Syndrome by including it in the most recent editions of the Diagnostic and Statistical Manual (DSM-IV) and the International Classification of Diseases (ICD-10) as one of the Pervasive Developmental Disorders (ApA, 1994; WHO, 1993).

As implied by its classification as a Pervasive Developmental Disorder, Asperger’s Syndrome is characterized by significant delays across multiple domains of functioning, but specifically “severe and sustained impairment in social interaction...and the development of repetitive patterns of behavior, interests, and activities” that, in turn, lead to “clinically significant impairment in social, occupational, or other important areas of functioning” (ApA, 1994, p. 75). Attwood (2000) notes that the social difficulties that

are the hallmark of Asperger's Syndrome are most conspicuous when the individual attempts to interact with peers. One distinction that is often made between individuals with autism and those with Asperger's Syndrome is that the former tend not to actively seek peer interactions while the latter do so but in a clumsy and unsuccessful way (Prior et al., 1998; Tantam, 1988; Van Krevelen, 1971). Nonverbal communication is particularly impaired in individuals with Asperger's Syndrome as they fail to appreciate the more subtle aspects of language that are conveyed through body gestures and tone of voice (Klin & Volkmar, 1997). Not only do they have tremendous difficulty drawing inferences about another person's emotional state based on cues provided by facial expression or vocal prosody, they also tend not to use these cues when communicating with others (Capps, Yirmiya, & Sigman, 1992; MacDonald et al., 1989). Attempts at nonverbal communication by individuals with Asperger's Syndrome are often slow and erroneous. When attempts are made to communicate through nonverbal behavior, these individuals seem to verbally mediate their actions according to their knowledge of what is appropriate in a given situation but still produce only a partial expression of a typical response (Attwood, 2000). For example, a child who wants to convey happiness in response to a compliment from a peer recalls that the emotion generally involves a smile. Through verbal mediation, s/he may then produce a smile but fail to exhibit other behaviors associated with happiness such as raised eyebrows or friendly tone of voice.

Other features that are commonly observed in individuals with Asperger's Syndrome include idiosyncratic verbal communication, intellectualization of affect, motor clumsiness, and conduct problems (Klin & Volkmar, 1997). Asperger's Syndrome reportedly differs from other Pervasive Developmental Disorders such as autism in that

there are no delays in early language development or cognitive functioning. However, evidence from recent studies suggests that individuals with Asperger's Syndrome do, in fact, exhibit delays in more subtle areas of language and cognitive development (Klin & Volkmar, 1997). For example, parents of a very young child with Asperger's Syndrome may marvel at his or her precocious vocabulary while failing to notice that the child rarely uses his seemingly strong language skills in a social communicative manner (Landa, 2000). As the child begins to interact more regularly with peers during the preschool years, pragmatic language delays often lead to social and/or behavioral difficulties that, in turn, precipitate a referral for a developmental evaluation. Landa (2000) maintains that a careful developmental history along with a comprehensive speech and language assessment will often reveal subtle delays that were present prior to age three.

This latter finding raises the question of how Asperger's Syndrome differs from higher-functioning forms of autism (i.e., autism in which the individual has an IQ of 70 or higher) or other disorders with overlapping symptomatology (e.g., schizoid personality, nonverbal learning disability, semantic-pragmatic processing disorder). Indeed, this question has been the focus of much controversy within the field, with notable experts taking positions on both sides of the debate. For example, researchers within the field of neuropsychology have been trying to ascertain whether Asperger's Syndrome and high functioning autism can be differentiated on the basis of cognitive profiles. Klin, Volkmar, Sparrow, Cicchetti, and Rourke (1995) reviewed the neuropsychological data available for 40 children seen in their clinic or who were members of the Learning Disabilities Association of America (LDAA). Using a

modified version of the criteria drafted for the ICD-10, two investigators without prior knowledge of test scores classified children as having either Asperger's Syndrome (AS; $n=21$) or high functioning autism (HFA; $n=19$). When the two groups were compared, the AS group displayed significantly higher Verbal IQ and lower Performance IQ scores than the HFA group; no differences were observed, however, in terms of Full Scale IQ. Moreover, of the 22 cognitive domains reviewed, the two groups differed significantly in 11 areas including gross and fine motor skills (HFA>AS), visual motor integration (HFA>AS), vocabulary (AS>HFA), and verbal output (AS>HFA). The authors conclude, then, that Asperger's Syndrome and high functioning autism may be differentiated on the basis of a pattern of strengths and weaknesses identified in neuropsychological testing.

Miller and Ozonoff (2000) hold an opposing viewpoint and maintain that Asperger's Syndrome is merely an alternative name for high functioning autism. Their evidence stems from an investigation of neuropsychological functioning in a sample of 40 children recruited through the Autism Society of Utah and through word-of-mouth. Although the authors briefly mention consulting the DSM-IV and ICD-10, a diagnosis of Asperger's Disorder (AS; $n=14$) or high functioning autism (HFA; $n=26$) was made primarily on the basis of each child's performance on two interview or observational measures: the Autism Diagnostic Interview—Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994) and the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 1989). Each child was administered a comprehensive battery of tests including the Wechsler Intelligence Scale for Children—Third Edition (WISC-III; Wechsler, 1991), the Movement Assessment Battery for Children (MABC; Henderson & Sugden, 1992),

the Test of Visual-Perceptual Skills (TVPS; Gardner, 1982), the Tower of Hanoi (TOH; Borys, Spitz, & Dorans, 1982), and the Wisconsin Card Sorting Test (WCST; Heaton, Chelune, Talley, Kay, & Curtiss, 1993). Miller and Ozonoff (1991) found that most of the significant differences between the two groups were negated once they controlled for intellectual functioning using the Full Scale IQ as a covariate. Ultimately, only one variable remained statistically significant, fine motor ability as measured by the Manual Dexterity subtest of the MABC (HFA>AS).

It is important to note that the seemingly disparate conclusions of these two studies (i.e., Klin et al., 1995; Miller & Ozonoff, 2000) may be due in large part to the different diagnostic criteria used to assign subjects to groups. Indeed, this is a major and oft-cited limitation of existing research on Asperger's Syndrome. Interestingly, despite the fact that these researchers drew different conclusions from their findings, they also made concessions to the opposing side. For example, in their discussion Klin et al. (1995) acknowledge that Asperger's Syndrome and high functioning autism could be different phenotypical expressions of the same underlying etiology. Similarly, Miller and Ozonoff (2000) report what they believe to be a clinically (though not statistically) significant finding whereby the AS group showed a 15-point discrepancy between their mean VIQ and PIQ scores even after controlling for FSIQ; for the HFA group, the VIQ and PIQ scores differed by only 1 point. As a potential compromise between the two sides of the debate, one theory which is beginning to gain support posits that Asperger's Syndrome is an externally valid diagnosis that falls somewhere in the middle on a continuum of disorders characterized by social, language, and cognitive deficits (Folstein & Santangelo, 2000). What differentiates one disorder from another along the continuum

is the number of domains that are impaired as well as the degree to which those areas are impaired. Autism would fall at one end of the continuum while the other end might best be described in terms of what has been called the broader autism phenotype (BAP; Piven, Palmer, Jacobi, Childress, & Arndt, 1997). Individuals with BAP exhibit poor social functioning but not to the extent that their behaviors interfere with interpersonal relations or occupational functioning.

Given the lack of consensus over what does and does not constitute Asperger's Syndrome, it is not surprising to find that the prevalence rates reported by researchers tend to be quite varied. Klin and Volkmar (1997) maintain that without a universally accepted nosological system, researchers can offer little more than educated guesses as to the overall prevalence of Asperger's Syndrome in the general population. Nevertheless, in one of the most frequently cited studies, Ehlers and Gillberg (1993) attempted to determine prevalence rates in a large ($n=1519$) sample of schoolchildren between the ages of 7 and 16. Using what are now known as the Gillberg criteria (i.e., social impairments, restrictive interests, motor clumsiness, idiosyncratic language, deficits in nonverbal communication, and repetitive routines), they found that 3 to 7 children out of every 1000 met criteria for Asperger's Syndrome. However, Folstein and Santangelo (2000) counter that this estimate may be artificially inflated because some children with schizotypal disorder were erroneously counted as having Asperger's Syndrome due to the overlap in symptoms between the two disorders. In terms of gender, Asperger's Syndrome seems to be more common in males than in females, with reported male-female ratios ranging from as low as 2.3:1 to as high as 9:1 (Klin & Volkmar, 1997). Lastly, there is compelling evidence in the form of twin and family studies to suggest a

genetic basis for Asperger's Syndrome (Burgoine & Wing, 1983; Volkmar, Klin, & Pauls, 1998). Bauminger and Yirmiya (2001) note that since siblings of children with autism or Asperger's Syndrome share, on average, approximately 50% of the same genes they are at an increased risk of having some degree of developmental disability. Not only is there a higher incidence of pervasive developmental disorders and BAP in siblings of children with autism or Asperger's Syndrome, epidemiological studies also suggest that siblings may be at increased risk for other problems such as learning disabilities, lower cognitive and social-emotional functioning, and psychopathology (Bauminger & Yirmiya, 2001; Folstein & Santangelo, 2000).

Although a wealth of information has been published since the late 1980's, research on Asperger's Syndrome is still in its relative infancy. Additionally, the differences in diagnostic criteria used to include or exclude participants across the various studies limit the conclusions that can be drawn (Volkmar & Klin, 2000). As a result, many researchers have turned to the vast literature on autism in order to generate hypotheses and develop interventions for individuals with Asperger's Syndrome (Attwood, 2000; Ehlers et al., 1997). Hodgdon's (1995) visual strategies for improving communication and Gray's (1995) social stories are two examples of interventions which have been adapted for use with children with Asperger's Syndrome. Additionally, Klin and Volkmar (2000) note that the literature on learning disabilities, particularly Rourke's (1989; 1995) studies documenting social skills deficits in children with nonverbal learning disabilities, can also serve as a helpful starting point when developing interventions for children with Asperger's Syndrome.

Klin and Volkmar (2000) maintain that, “the most important component of the intervention program for individuals with [Asperger’s Syndrome] involves the need to enhance communication and social competence” (p. 350). These authors also emphasize the importance of early intervention since repeated negative social experiences can set the stage for feelings of inadequacy, isolation, and clinical depression in adolescence and adulthood. Following these recommendations, the present study investigated the effectiveness of a sibling-mediated social skills training intervention designed to improve nonverbal communication and reciprocal conversation skills in a sample of school-aged children with Asperger’s Syndrome. Given the paucity of intervention research specific to this population, relevant studies from the fields of autism and learning disabilities are reviewed and critically examined in terms of their strengths and limitations in the following sections. Every effort has been made to identify the specific diagnoses of the individuals who participated in each study; at times, however, samples may be described as having pervasive developmental disorders if no diagnosis was provided or mixed groupings were used. The rationale for using siblings as trainers in the present study was also established. In addition to contributing much-needed empirical data on the effectiveness of a theoretically derived intervention, the study also attempted to address one of the major limitations of earlier research by utilizing two supplemental instruments to substantiate a diagnosis of Asperger’s Syndrome in the target children. One of these measures is reported to have greater specificity for the types of social deficits seen in children with pervasive developmental disorders and will be discussed in further detail in the second chapter outlining the specific methodology of the study.

Individualized Social Skills Interventions

Over the years, a number of interventions targeting the social skills deficits present in children with pervasive developmental disorders have been developed. The pressure to find a miracle “cure” for the behaviors associated with autism and Asperger’s Syndrome has led to an explosion of treatments which have gained popularity largely through word of mouth among clinicians who specialize in working with these populations (Attwood, 2000). For example, many schools and private practitioners are using Carol Gray’s social stories and comic strip conversations as an intervention to teach social rules and the reasons for them to children with Asperger’s Syndrome (Gray, 1995; 1998). Unfortunately, these same treatments often lack empirical evidence to support their claims of efficacy (Attwood, 2000; Klin & Volkmar, 2000; Rogers, 2000). Even when formal research studies have been undertaken to investigate the efficacy of a particular program or technique, the typically small sample sizes preclude one from generalizing the findings to samples of similar children (Rogers, 2000). Nevertheless, a review of the literature reveals a number of studies that can serve as templates in the development and implementation of future interventions that target social skills deficits in children with pervasive developmental disorders. Although the studies reviewed vary along several dimensions including target ages of the children involved, methods of instruction, and outcome measures, most are based on principles of behavior therapy.

Based on her review of the literature, Landry (1999) notes that the interventions that have yielded the most promising results are ones that “use behavioral techniques and target the child’s deficient behaviors with systematic and skillfully implemented approaches by dedicated staff” (p. 357). Drawing upon his own 25 years of clinical

experience, Attwood (2000) expands upon this basic definition by highlighting three additional elements that he argues are essential to effective interventions for children with Asperger's Syndrome. First, children should have the opportunity to interact with normal peers who can serve as models of appropriate social and emotional behavior; this claim is strongly echoed by many other researchers (Laushey & Hefflin, 2000; Strain & Danko, 1995). Secondly, individuals who have regular contact with a child with Asperger's Syndrome should be educated on the nature of the disorder in order to better understand the accompanying social deficits. Given their average or above average verbal abilities, children with Asperger's Syndrome can be assumed to be normal; thus, their inappropriate social behaviors are often mistakenly judged by those around them to be willful attempts to gain negative attention. Interventions that include education for family, peers, and even the children themselves can help foster a greater awareness and sensitivity to what it is like to have Asperger's Syndrome. Lastly, Attwood (2000) maintains that specific instruction in advanced theory of mind tasks is critical to the success of any intervention in that it targets one particular cognitive deficit that has been proposed as a contributing factor to more overt social dysfunction. While many researchers (Baron-Cohen, 1995; Howlin, Baron-Cohen, & Hadwin, 1999; Ozonoff & Miller, 1995) concur that this is true when working with children with autism for whom impairments in the ability to take another person's perspective are a core deficit, evidence suggests that children with Asperger's Syndrome perform no differently than controls on theory of mind tasks (Bowler, 1992; Ozonoff, Rogers, & Pennington, 1991). These findings, coupled with Asperger's (1944/1991) original description of boys who had "an ability to engage in a particular kind of introspection and to be a judge of character" (p.

73) raise considerable question as to whether Attwood's (2000) third criterion for a successful intervention is as essential as he purports. Nevertheless, the first two proposed elements are supported through other research and should be incorporated into interventions for children with Asperger's Syndrome.

While the trend in intervention research with children with autism and Asperger's Syndrome has been to use adult facilitators (e.g., Baker, Koegel, & Koegel, 1998; Goldstein, Wickstrom, Hoyson, Jamieson, & Odom, 1988), such approaches have been criticized by Simpson, Myles, Sasso, and Kamps (1997) for their lack of naturalistic cues and consequences. As a result, many researchers have found that even when children do show improvements in social functioning with their adult facilitators, results rarely generalize to other individuals or settings (Stahmer, 1995; Thorp, Stahmer, & Schreibman, 1995). As mentioned earlier, social deficits tend to be most conspicuous when the child with autism or Asperger's Syndrome attempts to interact with his or her peers (Attwood, 2000).

Not surprisingly, many researchers are turning their attention to interventions that can address the specific deficits that prevent children from successfully engaging in positive interactions with their peers. Incidental teaching and peer-mediated techniques such as peer tutoring have been offered as alternatives that allow children with pervasive developmental disorders to learn from nondisabled peers who prompt and shape the targeted prosocial behaviors (Rogers, 2000). As these interventions are less artificial than those in which adults serve as social skills trainers, they are believed to facilitate greater generalization across settings and individuals. Moreover, an additional benefit of using peer-mediated approaches is that social relations with other classmates may also improve

for the nondisabled children who participate in the training program as these children receive specific instruction in how to initiate and respond to social overtures (Laushey & Heflin, 2000; Strain, 1987). Many authors are quick to note that the success of any peer-mediated intervention is largely dependent upon several factors including the skill level of the peer trainers, careful adult supervision of peer training experiences, and ongoing monitoring of outcome measures (Rogers, 2000). The age of the peer trainer may also be an important variable. In their study of six school-age children with autism, for example, Lord and Hopkins (1986) found that children exhibited significantly higher levels of social behavior in the presence of same-age peers than they did when only younger peers were present.

One of the longest-running studies of an intervention aimed at improving the social skills of children with autism has been under investigation for the past 20 years by Strain, Kohler, and colleagues at the University of Pittsburgh. These researchers have been examining the effectiveness of one peer-mediated strategy for increasing the frequency of initiations toward and responses to peers in preschoolers with autism and other pervasive developmental disorders (Hoyson, Jamieson, & Strain, 1984; Kohler & Strain, 1993; Odom & Strain, 1986). Their approach, the Early Childhood Social Skills Program (Kohler & Strain, 1993), involves training nondisabled children in inclusive preschool classrooms how to initiate five discrete “play organizers” with their classmates with autism: sharing, helping, giving, affection, and praise. In the first phase of the intervention, adults teach the selected peers through structured role-plays how to initiate an interaction centered around a normal play toy or activity. Once a level of mastery has

been achieved, peers are prompted to interact with a classmate with autism and reinforced for doing so. Over time, the reinforcements are faded and eventually extinguished.

It should be noted that the Early Childhood Social Skills Program is but one component of a more comprehensive curriculum—Learning Experiences: An Alternative Program for Preschoolers and Parents (LEAP)—aimed at improving the social, behavioral, and language functioning of children with pervasive developmental disorders in an inclusive setting. Since the intensive curriculum requires considerable time and financial resources, only a small number of children can be served at any given time; in fact, 18 years after its inception, only 51 children had participated in the program (Strain & Hoyson, 2000). Despite the limited data, these researchers and others who have replicated their work in other settings (e.g., Brady, Shores, McEvoy, Ellis, & Fox, 1987; Strain, Kerr, & Ragland, 1979) have found that this peer-mediated approach is successful in increasing the frequency of spontaneous social interactions in preschoolers and school-aged children with autism. Observational data from the 6 initial children enrolled in the LEAP program reveal that their mean levels of positive social interaction increased from 3% upon entry into the program to 23% at exit from the preschool and 24% at long-term follow-up in fifth grade (Strain & Hoyson, 2000). These numbers are particularly impressive when compared to the levels of positive social interaction observed in nondisabled peers from the LEAP program who averaged 28% upon entry, 23% at exit and 25% at follow-up in fifth grade. Unfortunately, one limitation of this intervention is that the behaviors did not generalize well to other peers who were not trained to initiate the play organizers.

Expanding on earlier peer-mediation research and using case study design, Laushey and Heflin (2000) attempted to answer the question of whether training multiple peers as tutors would lead to improved generalization of social skills. Their sample consisted of two 5-year-old boys—one diagnosed with autism and one with Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS; ApA, 1994)—in two separate kindergarten classrooms comprised of both disabled and nondisabled students. Using an ABAB experimental design, the authors first collected baseline data on the two boys over 4 weeks in a passive proximity condition. Trained observers recorded the frequency with which the two boys displayed any of the following target behaviors: (1) requesting an object and responding to the answer given, (2) appropriately getting another child's attention, (3) waiting his turn, or (4) looking at or in the direction of someone speaking to him. Each boy was observed for 10 minutes of free play center time on six separate occasions by two observers who used event recording to note the number of opportunities each had to demonstrate one of the target behaviors along with whether or not the child responded to the opportunity with the target behavior.

In the two treatment phases, all students were paired with a new “buddy” each day and allowed to play together during their center time. The authors provided training to all children (including the target boys) during the first treatment phase, emphasizing the fact that during center time each child was expected to stay with, play with, and talk to his or her respective buddy. In each treatment phase, as well as the intervening return to baseline condition during which students were not assigned to “buddy” pairs but rather observed in passive proximity, observational data were collected for each boy in the same manner as in the baseline condition (i.e., two observers, free play center time, event

recording, 10-minute intervals). At the end of the intervention, one boy had been observed for the maximum number of 20 sessions while absences and schoolwide assemblies resulted in 4 missed observation opportunities for the second boy, who was observed for only 16 sessions.

With an average interrater reliability of 92% (range = 77% - 100%), there seemed to be general agreement among the observers as to what behaviors fell into each category. At baseline, the two boys' percentage of appropriate social interaction ranged from 28% - 29%. Their rates increased to 66% and 75% during the first treatment phase, declined to 15% and 37% during the return to baseline condition, and then increased again in the second treatment phase to 75% and 90%. The authors concluded that training multiple peers as tutors was more effective than simple proximity in increasing the frequency of appropriate social skills. Additionally, the fact that the target children continued to show high rates of desired behavior during the treatment phases despite being paired with different peers on a daily basis provided evidence that the training of multiple peers as tutors can facilitate generalization across individuals. Moreover, follow-up data collected on one child the next year revealed rates of appropriate social behavior equal to those observed in the treatment phases. The authors note that the maintenance of behavior and generalization across settings further attest to the success of the intervention, particularly since the first grade teacher had not implemented the buddy system.

Although these studies have yielded favorable results that suggest that peer-mediated approaches can be effective in improving the social skills functioning of children with pervasive developmental disorders, their findings must be interpreted with

caution given their small sample sizes, lack of control groups, and sometimes questionable outcome measures (e.g., nonstandardized rating scales developed specifically for one study, qualitative observations in which target behaviors had vague operational definitions). However, stronger support was established when Odom et al. (1999) compared the treatment effects of 4 different social skills interventions using a sample of 98 kindergarten students in special education classrooms. The sample was not limited to children with pervasive developmental disorders; rather, the disabilities of the target children included mental retardation, language disorders, behavior disorders, and hearing or other health impairments. Since children were already enrolled in 22 separate classrooms, each classroom was randomly assigned to 1 of 5 possible treatment conditions. In the peer-mediation (PM) classrooms, nondisabled children were trained over the course of 10 sessions how to initiate social interactions with their disabled classmates (N=21) in a manner similar to that employed in the LEAP program. In the second set of classrooms, collectively referred to by the authors as the Environmental Arrangement (EA) group, teachers were asked to set aside 6-10 minutes each day during which small groups of disabled (N=17) and nondisabled peers could participate together in a structured play activity. For the Child Specific (CS) classrooms, children with disabilities (N=19) participated in daily social skills groups for the first 5 weeks of the intervention. Each session lasted approximately 5-10 minutes and involved the teacher presenting the target skill and then leading the children in role plays. Upon completion of the training, children were then allowed to participate in the same type of EA structured play activities with their nondisabled classmates. A fourth condition combined all the elements of PM, EA, and CS. Disabled (N=22) and nondisabled peers participated in 5

weeks of adult-facilitated social skills training and then played together in small structured play groups. Finally, 19 children were assigned to a control (i.e., no-treatment) condition.

Odom et al. (1999) assessed treatment outcome using multiple dependent measures. First, they used event recording to collect observational data on all children during the pretreatment, post-treatment, and follow-up phases of the intervention. In each treatment phase, children were observed for 6 5-minute periods of free play during which time observers recorded the number of initiations made by the child, the number of responses made to the overtures of another child, and the duration of any interactions between the child and another peer. Most observations occurred when the target child was playing solely with other disabled children, although 3 of the 6 post-treatment observations were conducted when the child interacted with both disabled and nondisabled classmates. Second, peer ratings were solicited by having each child sort photographs of his or her classmates into three categories: (1) not liked at all, (2) liked a little, and (3) liked a lot. Based on these ratings, a mean peer rating was calculated for each child. Lastly, teachers were asked to complete an objective measure of social and adaptive behavior, the California Preschool Social Competency Scale (CPSCS; Levine, Elzey, & Lewis, 1969).

Overall, Odom and colleagues (1999) found that children in the EA and CS groups showed statistically significant improvement in terms of the frequency of peer social interactions observed during post-intervention assessments; unfortunately, the EA group was not able to maintain these gains and returned to near-baseline levels of performance at follow-up the subsequent year. The CS group was also the only condition

to have a significant positive effect on teachers' objective ratings at post-intervention assessment. While these gains were maintained through long-term follow-up, it is important to note that teacher ratings for the EA and CM groups were also significantly higher the following year than they were at pretreatment, a finding that suggests that these interventions ultimately had a positive effect on participating children. With respect to peer ratings, significant improvement at post-treatment and follow-up was observed only in children in the EA group. One surprising finding relates to the relative lack of success of the CM group. Despite combining elements from the other three treatment conditions, the CM approach failed to yield statistically significant results on any outcome measure other than teacher ratings at long-term follow-up. The authors hypothesized that implementation may have required too much on the part of the teacher and, as a result, may have been delivered ineffectively.

Another limitation of the studies described above is the time commitment required on the parts of both children and interventionists (Rogers, 2000). Despite their reported effectiveness, such interventions are costly to implement and can only reach a small number of children at any given time. Landry (1999) recommends that researchers move beyond intense, individualized treatment approaches to examine whether similar results can be obtained through less expensive techniques that can be offered to a larger number of children and families. Technology offers some promise in that regard and is beginning to work its way into the intervention arena with video modeling and computer-based instruction yielding some positive results in early research.

Technology-Based Interventions

In an oft-cited study, Charlop and Milstein (1989) used video modeling to teach conversational skills to three school-aged boys with high-functioning autism. After watching a videotape in which two adults engaged in a scripted conversation about a toy, the boys then practiced their conversation skills with an adult facilitator. Not only were the boys able to acquire reciprocal conversation skills, but their improvements generalized to other people and were maintained 15 months post-intervention.

Taylor, Levin, and Jasper (1999) extended the video modeling literature in their unique adaptation of Charlop and Milstein's (1989) study. Rather than using two adults as models on the videotape, Taylor and colleagues (1999) recorded interactions between one adult facilitator and a sibling of each of the two male participants with autism during an unstructured play activity. Sibling pairs consisted of: (1) a six-year old boy with autism and his eight year-old sister, and (2) a nine-year-old boy with autism and his six-year-old brother. Each boy watched the tape involving his respective sibling, then interacted with the same adult in the same activity viewed on the tape (e.g., playing with a toy train). Both on tape with the sibling and during in vivo interactions with the target child, the adult facilitator would read from a prepared script of verbal comments derived from a prior sampling of spontaneous utterances made by nondisabled children who interacted with an adult in play situations analogous to those in the experiment. Whenever the child with autism gave an appropriate social response, the adult would give positive feedback in the form of verbal praise. In subsequent probe sessions, siblings took over the role of facilitator and provided the same verbal prompts from the tape but did not provide any reinforcement as the adult had done.

Observational data consisted of the number of scripted and unscripted play comments made during three different play activities that varied according to the interests of each boy. Scripted comments were those that had been presented on the tape while unscripted comments consisted of any spontaneous, full-sentence utterances made by the target child that were appropriate to the play situation. Overall, the authors reported an average interobserver reliability of 97% (range = 70% to 100%). The results from the Taylor et al. (1999) study were quite striking. For the younger boy, rates of appropriate scripted comments increased from 0% at baseline to 100% in probe sessions with the sibling. Increases in the frequency of scripted play comments across the three activities were also observed for the older boy as his mean number of scripted comments increased from 0, 2.5, and 0.6 at baseline to 8.3, 9.4, and 8.6, respectively, during probe sessions with his sibling. In terms of unscripted play comments, the older boy made 12 such utterances during postintervention sessions while none were recorded for the younger boy. The authors noted, however, that this variability may have been due in large part to differences in expressive language skills (e.g., the older boy spoke in sentences of 7-10 words while the younger boy averaged 3-4 words per sentence).

Although video modeling is intuitively appealing to many researchers and clinicians seeking a less costly and time-consuming method of teaching social skills, no study had compared its effectiveness with that of traditional in vivo interventions until Charlop-Christy, Le, and Freeman (2000) did so with a sample of five school-aged children with autism who were enrolled in an after-school behavior treatment program. For each child, the authors generated a set of one or two target behaviors (e.g., labeling emotions, independent play, spontaneous greeting, conversational speech, and social

play) he or she had not yet mastered according to standard assessments administered as part of the curriculum. Two exemplars for each selected behavior were then randomly assigned to one of two treatment conditions—video or in vivo modeling—in which therapists from the program who were familiar to the children served as models. Since each child had a different set of target behaviors, the situations presented for modeling and the locations in which observations were conducted varied across the five participants. For example, a boy whose goal was to increase the frequency of spontaneous greetings was trained via video modeling to say, “Hello. How are you?” as he entered the school; in vivo modeling was used to train him to say, “Good-bye. See you later,” as he departed. In all cases, the authors recorded the number of modeled presentations required for each child to achieve mastery for each of his or her respective target behaviors as well as whether or not the behavior generalized to another setting. Interobserver reliability was quite high (range = 90% to 100%).

Four of the five children achieved criterion for mastery with significantly fewer presentations in the video modeling condition (range = 2-4) than in the in vivo condition (range = 2-11), and the last child showed no difference in rate of acquisition between the two modes of instruction (Charlop-Christy et al., 2000). Moreover, all children generalized the target behaviors acquired through video modeling to other individuals, settings, and stimuli; in contrast, generalization was not observed for any of the behaviors trained using in vivo modeling. For instance, generalization probe sessions for the boy trained to initiate spontaneous greetings were conducted at the school store (i.e. an alternate setting) that was staffed by a teacher who had not served as a model during any of the training sessions (i.e. an alternate individual). While the boy readily acknowledged

the new adult by saying, “Hello. How are you?” upon entering the store, he failed to say anything upon leaving. Overall, these findings of increased speed of acquisition and improved generalization lend considerable support to the claim that video modeling is a more effective means of teaching social skills to children with autism. The authors also performed an efficiency analysis on each procedure and found that video modeling had the added advantage of being less expensive and time consuming than in vivo modeling; the former took a total of 170 minutes and \$58 to prepare while the latter required 635 minutes and \$127.

Opinions vary as to why video modeling evokes such high rates of social behavior in children with autism. Many hypotheses relate at least in part to the nature of the video stimulus itself. For example, Dowrick (1986) argued that video is novel from the usual environment of the child and, as such, is intrinsically motivating and rewarding. A similar explanation is offered by Charlop-Christy, Schreibman, Pierce, and Kurtz (1998), who noted that children with autism often repeat phrases or retell dialogue from television, videos, or commercials. Presumably, they argued, these forms of media are inherently appealing to these children. A similar argument might also be made, then, for the potential appeal of computer games. Not surprisingly, studies investigating the utility of computer-assisted instruction have recently been undertaken with samples of children with autism and have yielded some promising preliminary results (Bernard-Opitz, Sriram, & Nakhoda-Sapuan, 2001; Heiman, Nelson, Tjus, & Gilberg, 1995).

The studies reviewed provide evidence that video modeling can serve as an effective tool in training social skills in children with autism. Proponents of video modeling argue that this format of instruction has several unique advantages over in vivo

procedures (Thelen, Fry, Fehrenbach, & Frautschi, 1979). Video allows for greater control in that scenes and scripts can be rehearsed and recorded as many times as needed in order to get the perfect examples of target behavior. In addition, multiple settings can be depicted (e.g., home, school, bus, etc.) much more easily and realistically than they can in laboratories or clinics. Video modeling also reduces the time commitment required of the model in that he or she does not have to be present in every session with the individual(s) for whom the intervention is being implemented. Lastly, as videotapes are easily reproduced, they may be used with larger numbers of individuals at any given time. Despite these advantages, one major limitation of technology-based interventions is that they provide only limited opportunities for the target children to practice their skills with peers. Each of the video modeling studies reviewed used adults as the primary models, with school-age siblings playing a minor role in only one study (Charlop-Christy et al., 2000). Many clinicians and researchers agree, however, that effective social skills interventions for children with autism and Asperger's Syndrome should include ample opportunity to learn from and interact with peers, especially those without disabilities (Attwood, 2000; Laushey & Hefflin, 2000; Strain & Danko, 1995). To that end, social skills groups may offer a viable alternative by combining the peer involvement of individualized interventions with the reduced costs (both financial and time) associated with video modeling interventions.

Social Skills Groups

With school-aged children, social skills groups are immensely popular among educators and clinicians as evidenced by the number of curricula that are commercially available (e.g., Begun, 1995; McGinnis & Goldstein, 1990; Winner, 2000). They have

been used with children who have been diagnosed with a wide range of developmental and behavioral disorders including learning disabilities (Hazel, Schumacher, Sherman, & Sheldon, 1982; Schumacher & Ellis, 1982), Attention-Deficit/Hyperactivity Disorder, and mental retardation as well as with children who have social skills deficits secondary to treatments for medical conditions such as cancer or brain tumors (Barakat et al., 2003; Varni, Katz, Colegrove, & Doglin, 1993). This format is well-suited for instruction of more advanced social skills including reciprocal conversation skills, reading and interpreting nonverbal communication, understanding theory of mind, and making and maintaining friendships (Attwood, 2000). Although adults generally serve as facilitators in social skills groups, much of their success stems from opportunities to interact with peers.

Most social skills training curricula, regardless of the populations with whom they are implemented, incorporate some if not all three of the following fundamental processes: (1) instruction, (2) rehearsal, and (3) feedback (Gresham & Elliott, 1993; Ladd & Mize, 1983). At the outset of each training session, the target skill should be explained and its rationale discussed among the participants. For children with Asperger's Syndrome, this step—especially the rationale—is crucial and represents a major advantage of social skills groups over the individualized interventions previously discussed, which rarely included specific instruction as to why a particular behavior is important when interacting with peers. As Attwood (2000) notes,

“Children with Asperger syndrome are unusual in that they can be taught what to do in a given situation, but one cannot assume they understand why the action or comment is appropriate. They need to learn the theory as well as the practice.” (p. 93)

Children with Asperger's Syndrome are often described as lacking social common sense and need specific instruction to make explicit those rules of social interaction that seem to come intuitively to individuals without social deficits (Attwood, 2000). Direct instruction enables them to gain insight into why specific behaviors are appropriate or inappropriate in a given situation. More importantly, understanding the rationale for a specific skill may also facilitate generalization of the skill to novel situations outside the context of the intervention. In addition to verbal instruction, an intervention should provide some form of live or video modeling. This step supplements the verbal instructions by allowing participants to actually witness the proper execution of the behavior they are learning (Gresham & Elliott, 1993). Rehearsal requires participants to practice the behavior either verbally (reciting the specific steps needed in order to perform the skill), covertly (internalizing verbal rehearsal as self-talk), or overtly (e.g., engaging in structured role plays with a facilitator or another participant). Once rehearsal has been completed, corrective feedback is given. Gresham and Elliott (1993) specify that feedback should be both evaluative and informative. Not only should the facilitator let the participants know how well their performances compared to a standard expectation or level of performance, he or she should also provide detailed reasons for the evaluation. Though not included as one of the formal steps of a social skills intervention, continued practice to promote maintenance and generalization is often encouraged through the assignment of homework (Gresham & Elliott, 1993).

Though the literature is sparse, social skills groups have been implemented with varying degrees of success with individuals with autism or Asperger's Syndrome. In one of the earliest studies, Mesibov (1984) reported preliminary outcome data from a social

skills training program for adolescents and adults with autism. Specific goals for the program were as follows: (1) to increase the interpersonal skills and self-esteem of all participants, (2) to afford participants the opportunity to develop a long-term peer group, and (3) to provide a supportive atmosphere in which participants could enjoy positive interactions with peers. Fifteen participants (11 males and 4 females) between the ages of 14 and 35 attended weekly 90-minute sessions; groups met for an average of 10-12 weeks each fall and spring over a period of two years. Each session followed a similar format. For the first 30 minutes, each participant met individually with an adult facilitator who would present and teach the target skill for the week (e.g., attending and listening, maintaining topic in conversations, reading and conveying emotions through nonverbal communication). All participants then met as a group for the remaining 60 minutes to further discuss and then practice the skill through role-plays and interactive games. While this format allowed participants to interact with one another in a structured manner, informal opportunities for socialization were also built into the intervention in the form of group discussions over snacks at the beginning and joke time at the end of each session.

Data were collected over the course of the intervention through feedback forms completed by the interventionists, self-report rating scales completed by participants, anecdotal stories from parents and caregivers, and direct observations of participants' performance on specific tasks during role-plays (e.g., recording the number of interchanges in a conversation between a participant and an adult confederate affiliated with the study). Although this methodology yielded both qualitative and quantitative data, Mesibov (1984) reported only the former. Over the course of the intervention,

participants reportedly showed gains in their ability to perform the specific interpersonal skills taught during the sessions as well as improvements in self-concept and self-efficacy. In addition, parent reports suggested that these gains generalized to other people and settings. Subjectively, the finding that participants reported feeling excited and enthusiastic about the intervention and looked forward to each session was considered evidence of the effectiveness of the training program as a positive environment in which to foster peer relationships.

Influenced largely by the work of Mesibov (1984), Williams (1989) designed a similar pilot study to further investigate the potential utility of a long-term group social skills training program for children with autism. Participating children were enrolled in a primary school in England and attended a Resource Unit, a self-contained program in which teachers worked one-on-one with students to improve their academic and behavioral functioning with the ultimate goal to gradually transition them into mainstream classroom settings. To be eligible, children had to be at least 9 years of age and receiving a majority of their instruction in mainstream settings where they had opportunities to interact with nondisabled peers. Over a period of 4 years, a total of 10 children (all boys) between the ages of 9 and 16 were enrolled in the study. Groups met weekly for 45-minute sessions that took place after school in the Resource Unit; teachers and staff from the Resource Unit served as interventionists. A different skill was selected as the focus for each academic term, with much of the content being adapted from a prepared curriculum (Spence, 1980). Like Mesibov (1984), Williams (1989) used a combination of group discussion, recreational games, and role-plays to teach specific

skills such as recognizing emotions, holding conversations, using voice prosody, handling teasing, and responding appropriately to anger.

To evaluate the effectiveness of the program, pre- and post-intervention assessments were conducted by having the staff member most familiar with each boy complete the social behavior questionnaire included in the Spence (1980) manual. According to Williams (1989), the 24-items from this questionnaire assess a child's relationship with peers and staff as well as general social behavior. In most cases, the same staff member completed both assessments; however, a few participants had to be rated by a different person at Time 2 since the original rater had either retired or left the school. Despite the small sample size, participants showed significant improvement in their overall peer relationships. Additional analyses revealed significant improvement on specific items from the questionnaire including talking with peers, appropriate facial expressions, and fluency of speech. In sum, Williams (1989) provided quantitative evidence to further document Mesibov's (1984) qualitative claims regarding the effectiveness of group social skills training interventions for individuals with autism.

To date, there is only one published study of a group social skills training intervention for children with Asperger's Syndrome. Marriage, Gordon, and Brand (1995) recruited a sample of 8 boys with Asperger's Syndrome between the ages of 8 and 14 years. The boys participated in a two-part group intervention designed to improve both simple (e.g., making eye contact) and complex (e.g., recognizing when a listener is no longer interested in a topic of conversation) social skills. Phase 1 consisted of 8 weekly 2-hour training sessions that utilized a combination of teaching techniques and activities including the role plays, interactive games, and cooperative exercises that were

key components in previous research (e.g., Mesibov, 1984; Williams, 1989). Another important technique used by Marriage et al. (1995) during Phase 1 was the use of videotape as a means to give verbal and visual feedback to participants. To promote generalization of newly-acquired skills, weekly homework assignments were given at the end of each session then collected and discussed at the beginning of the next session. Lastly, the authors included a parent component during which parents provided one another with advice and moral support. Phase 2 commenced two weeks following completion of Phase 1. Designed largely to reinforce the learning that had taken place during Phase 1, the 6 weekly 1½-hour sessions were somewhat less structured but still followed the same general format.

The only objective outcome data collected in this pilot study came in the form of a 5-item questionnaire administered to parents at the beginning and end of Phase 1. Using a Visual Likert-type scale, parents were asked to rate their child's ability to hold a conversation with peers and adults, behave correctly in public, join activities with peers, and respond to criticism (Marriage et al., 1995). Overall, there was no significant change in scores on any of the items between pre- and post ratings. Nevertheless, the authors were encouraged by anecdotal evidence in the form of parent observations of improvements in children's abilities to maintain eye contact, verbalize feelings, initiate contact with others, and be aware of others and their interests. Additionally, subjective observations of the boys made by the authors over the course of the intervention suggested increases in self-confidence for some of the participants (e.g., two boys took a more active role in latter sessions).

Although the pilot studies reviewed thus far have yielded encouraging results regarding the effectiveness of individual and group social skills interventions for individuals with autism and Asperger's syndrome, there are a number of limitations which need to be addressed in future research. First and foremost, the lack of control groups clearly limits the conclusions that can be drawn based on any of these findings. Williams (1989) readily acknowledges this limitation, noting that the gains reported for his sample may have been no greater than what might occur normally through maturation. Secondly, the outcome measures employed by the various researchers rarely include objective, quantitative, standardized assessment tools. Many researchers concur that the field is lacking empirically-based instruments that are sensitive to the types of social deficits present in individuals with autism or Asperger's Syndrome (Constantino, Przybeck, Friesen, & Todd, 2000). Nevertheless, to eschew existing questionnaires and checklists in favor of pseudoscientific measures (e.g., Marriage et al., 1995) makes it difficult for researchers who attempt to validate findings by replicating studies with other samples. Admittedly, observational data play an important role in this type of research, but it should not form the primary foundation upon which conclusions are drawn (e.g., Taylor et al., 1999). One major obstacle to comparing observational data across studies is the fact that researchers develop their own operational definitions of social behaviors (e.g., initiations, responses, duration of interactions) and utilize different methodologies in order to observe and record these behaviors. Lastly, claims regarding the effectiveness of a particular intervention should not rest largely on the subjective impressions of the researchers involved (e.g., Marriage et al., 1995). Rather, the effectiveness of any social skills intervention should be objectively determined through the use of standardized

instruments administered across multiple informants (e.g., parents, teachers, target children, peers) as well as through quantitative data gathered via systematic, direct observation of the child.

These criticisms are not offered to detract from the significant gains that have been made over the past 20 years with respect to the development of social skills intervention programs. Perhaps most importantly, the field has moved from a model in which adults served as trainers to recognition of the profound impact peer-mediated strategies can have on fostering social skills in individuals with autism or Asperger's Syndrome. Recently, attention has begun to focus on the potential role that siblings may play in teaching social skills to their brothers and sisters.

Siblings as Facilitators

Within the context of the family system, children begin to acquire those social skills that will later form the foundation of successful peer relationships. While parents are frequently thought of as the primary models and teachers of early social skills, Cicirelli (1985) maintains that the importance of the sibling relationship should not be overlooked. Siblings' potential utility in intervention research is championed by Meyer (personal communication, October 12, 2001), who noted that, "What better way to promote what is likely to be the longest-lasting relationship that either child will have in his or her lifetime?"

Aside from one unpublished manuscript (Andron & Webber, 1998), Strain and Danko (1995) have been the only researchers to examine the role of social skills in sibling relationships where one child has autism. In their study, parents of three preschool-aged boys with autism were coached on how to encourage nondisabled siblings

to use techniques from the LEAP curriculum with their brothers. The authors used a modified version of the Child Interaction Code (Kohler, Strain, & Shearer, 1992) to record a variety of social behaviors exhibited by both members of each sibling pair over partial 10-second intervals. Children were observed at their homes as they engaged in 6-minute play sessions involving either gross motor (e.g., riding a bike), fine motor (e.g., doing puzzles), or cognitive (e.g., playing a board game) activities; each child was observed for an average of 40 sessions. According to Strain and Danko's (1995) coding system, behaviors were categorized as *initiations* if they started an interaction and were not precipitated by any behavior on the part of the other child in the preceding 10 second period, *responses* if they occurred in the interval immediately following a behavior by the other child, and *concurrents* if they occurred within the same interval as the most recently recorded overture (either initiation or response). All three classes of behaviors were also subtyped as either positive or negative. Using a withdrawal of treatment design, they found qualitative and quantitative improvements in interactions between the sibling pairs. Over the course of the intervention, the percentage of positive interactions for the three boys with autism increased from 3, 10, and 16 percent at baseline to 20, 31, and 57 percent during the training phase and finally 80, 100, and 100 percent at the end of the intervention. As expected, all three boys showed a marked decline in their percentage of positive interactions during the return to baseline conditions, with 2 of 3 boys displaying levels similar to those observed at the outset of the intervention.

Though limited to only observational data, this study suggests that siblings can play a vital role in facilitating the development of social skills in a brother or sister with autism. Further research is clearly needed in this area in order to substantiate this claim.

However, when including siblings in any type of intervention involving a brother or sister with a disability, it is important to be cognizant of their needs as well. Failure to do so may result in siblings feeling used or, even worse, resentful at having to endure yet another obligation simply because they have a brother or sister with a disability (D. Meyer, personal communication, October 12, 2001).

Siblings' Needs

Siblings of children with chronic illness or developmental disabilities present with a unique set of socioemotional concerns as a result of having a brother or sister with special needs. Several developmental theories posit that when one member of a family is affected by a disability, all other family members must go through their own process of adjustment to the disability (Bronfenbrenner, 1979; Turnbull, Summers, & Brotherson, 1984). Through their work over the years conducting recreational workshops for siblings of children with special needs, Meyer and Vadasy (1994) have developed a list of unique concerns that these children have above and beyond the normal ups and downs of sibling relationships. Siblings of children with special needs, they note, can experience overidentification, embarrassment, guilt, isolation, resentment, and increased responsibility. Lamorey (1999) maintains that it is the increased level of responsibility placed upon the sibling of a child with a disability that leads to parentification, a condition in which adult roles generally reserved for parents are transferred to the child. Parentification, in turn, prevents the child from going through the normal process of adjusting to the disability and results in negative emotional reactions.

Since not all children experience these negative reactions to having a brother or sister with a disability, researchers have sought to identify those variables that may put

children at increased risk. Based on their reviews of the literature, Cicirelli (1995) and Lamorey (1999) have identified the following eight factors which should be considered when assessing the impact of a child's disability on his or her sibling: (1) gender of the nondisabled sibling, (2) age of the nondisabled sibling, (3) relative birth order of the nondisabled sibling to the disabled sibling, (4) family size, (5) level of disability in the affected child, (6) family socioeconomic status, (7) parental stress, and (8) attitudes conveyed by the parents toward the child with the disability. Higher rates of negative reactions are reported for female siblings who take on more caretaking responsibilities and younger siblings who do not have the ability to understand and put the disability into perspective yet may be called upon to assume responsibility for their older sibling (Coleby, 1995; McHale & Gamble, 1989). The level of responsibility imparted upon nondisabled siblings is largely dependent upon family size and socioeconomic status such that the risk of negative reactions appears to be less in larger families and those with more financial resources in which the burden of care for the disabled child is shared among many siblings or transferred in part to hired help (Gath, 1974; McHale, Simeonsson, & Sloan, 1984). In terms of the level of disability of the affected child, Cicirelli (1995) concludes that better adjustment in siblings is correlated with higher levels of functioning in the disabled child. Lastly, parent adjustment to the disability is seen as perhaps the most important variable to consider when evaluating the potential risk for adjustment problems in siblings. Not surprisingly, poorest sibling adjustment is seen in children whose parents who have not yet come to terms with their child's disability and are experiencing their own range of negative emotions (McHale, Sloan, & Simeonsson, 1986).

Given the literature with children who have a brother or sister with a disability, it seems logical to assume that siblings of children with Asperger's Syndrome would experience problems in their own socioemotional functioning. However, such a conclusion has not been well-established. In a recent review of the autism literature, Bauminger and Yirmiya (2001) reported equivocal findings among studies examining siblings' self-concept, social adjustment, and depressive symptomatology. While some studies suggested elevated rates of social and/or emotional dysfunction in siblings of children with autism when compared to either the general population or siblings of children with other developmental disabilities such as Down Syndrome (Creak & Ini, 1960; Gold, 1993; Piven et al., 1990; Piven et al., 1997), others found no differences (DeMyer, 1979; Mates, 1990; Sullivan, 1979), and one study even reported significantly higher than average scores on the Piers-Harris Self-Concept Scale (Berger, 1980). While these discrepant findings may be related to methodological differences among the studies in terms of sample selection or measures used, Bauminger and Yirmiya (2001) highlight several factors that could be acting as moderating variables. Specifically, these authors suggest that the degree to which a sibling is affected by having a brother or sister with autism may be related to: (1) the overall cognitive functioning of the child with autism, (2) the gender of either child in the sibling pair, and (3) family size. Unfortunately, very few studies have examined the impact of these variables on the social and emotional functioning of siblings of individuals with autism.

To date, only one study has investigated the relationship between socioemotional functioning of normal individuals and the cognitive functioning of their siblings with autism. In their study of 67 adults who had a brother or sister with autism, Piven and

colleagues (1990) found that overall adjustment was associated with the cognitive and adaptive functioning of the individual with autism such that siblings of “higher functioning” individuals reported fewer problems. As a result, they maintained that one must consider the IQ or developmental level of the child with autism when evaluating the impact on the sibling’s socioemotional functioning.

Gold (1993) is one of the few researchers to examine the influence of gender on socioemotional functioning. In her study, she compared 22 siblings (11 boys and 11 girls) of boys with autism with 34 siblings (17 boys and 17 girls) of nondisabled boys on measures of social adjustment and depression. All participants were between the ages of 7 and 17 years ($M = 13$ years, 2 months) and resided at home with both parents; groups were similar with respect to family size, income, ethnicity, parents’ education, and age of non-participating sibling. Siblings completed the Children’s Depression Inventory (CDI; Kovacs, 1983) as well as a questionnaire designed by the author specifically for the study to assess: (1) the amount of caregiving and domestic work for which they and their siblings were responsible, and (2) perceived social support. Mothers and fathers were asked to complete the Child Behavior Checklist (CBCL; Achenbach & Edelbroch, 1981). Depression was operationally defined as the total score on the CDI while social adjustment was defined as the composite scores on two dimensions—Behavior Problems and Social Competence—from each parent’s CBCL. While there were no significant between- or within-groups differences for any of the CBCL scores, results from the CDI revealed significantly higher levels of depression in siblings of boys with autism than in siblings of nondisabled boys. Using the most conservative cutoff score on the CDI, 50% of the siblings of boys with autism fell into the range of clinical depression compared

with 26% of siblings in the comparison group. Within the experimental group, there were no differences with respect to gender; however, a main effect was found for age as 10 of the 11 siblings who reported clinical levels of depression were adolescents. This finding seems to contradict Cicirelli's (1995) contention that older siblings tend to show better adjustment than younger siblings who have not yet developed the cognitive skills needed to understand the disability.

Admittedly, the Gold (1993) study is limited in that it included only siblings of boys with autism. The author maintains that this decision was made for two reasons: (1) males tend to be diagnosed with autism at a far greater rate than females, and (2) family stress is greater in families in which the child with autism is male rather than female (Bristol, 1984). While one must be cautious in generalizing the results to families in which a girl has autism, the study itself generated some interesting findings regarding the gender-specific correlates of depression in brothers and sisters of boys with autism. For brothers, higher levels of depression were correlated with a belief that there is nothing good about having a sibling with autism. In contrast, depression in sisters was positively correlated with specific characteristics of the child with autism (i.e., age and length of time since diagnosis); additionally, girls who were younger than their brother with autism and those who had mothers who worked full-time also tended to show the highest levels of depression. Lastly, regardless of gender, siblings who reported that they had no one to talk to about having a brother with autism scored significantly higher on the CDI than did those who reported having some social support network in which to share their feelings.

Many of these correlates were identified in a similar study in which Rodrigue, Geffken, and Morgan (1993) gathered data on 19 siblings of children with severe autism

and compared their scores with those from two control groups: (1) 20 siblings of children with Down Syndrome, and (2) 20 siblings of nondisabled children. Unlike the Gold (1993) study, the target (i.e. nonparticipating) children in the Rodrigue et al. (1993) study were not all males. All three groups were matched according to multiple variables including the gender and ethnicity of the targeted child, gender and age of the sibling, birth order, family size, and socioeconomic status. Although the three groups were significantly different with respect to the chronological age of the target child, the authors noted that these individuals were comparable in terms of their developmental levels as measured by the Vineland Adaptive Behavior Scale (Sparrow, Balla, & Cicchetti, 1984). Like Gold (1993), Rodrigue and colleagues (1993) used the Social Competence score from the CBCL as an indicator of overall social functioning, but only mothers were asked to complete the form. The internalizing and externalizing composite scores from the CBCL were also used as a measure of the sibling's emotional functioning. Marital satisfaction was examined by having both parents complete the 15-item Marital Adjustment Scale (Locke & Wallace, 1959).

Analysis of the CBCL Social Competence scores revealed no significant between- or within groups differences (Rodrigue et al., 1993). By parent report, siblings of children with autism exhibited significantly more internalizing and externalizing behaviors than did siblings in either of the two comparison groups. It should be noted, however, that the CBCL Internalizing and CBCL Externalizing scores for all three groups fell within normal limits and did not suggest clinically elevated levels of problem behaviors; moreover, the findings are consistent with those reported in previous research (McHale et al., 1984; Morgan, 1988). Like Gold (1993), Rodrigue and colleagues (1993)

found that within the autism group, sibling age was significantly correlated with overall adjustment such that higher rates of both internalizing and externalizing behavior were reported for older siblings. In these studies as well as others (e.g., McHale et al., 1984), the authors hypothesized that this finding might be due to increased caregiving and domestic responsibilities among older siblings. Indeed, Gold (1993) found that siblings who were responsible for more household duties reported higher levels of internalizing behavior.

An alternative explanation posits that the introduction of a child with a developmental disability into an existing family system may bring about abrupt changes in family life (Gath, 1974). According to Dunn (1993), normally developing children are highly attuned to the relationships between members of their family and are extremely responsive to variations in emotion. As a result, they can sense when there is harmony and when there is discord in the marital relationship of their parents. Parents who have relatively poor coping strategies may experience higher levels of marital stress as a result of having a child with a developmental disability; in turn, their negative emotions are passed on to their children. This explanation may help explain another significant correlation reported by Rodrigue et al. (1993) whereby siblings described as being better adjusted came from families with the highest rates of marital satisfaction. Fisman and colleagues (1996) were quick to counter, however, that although marital satisfaction may be an important variable in determining sibling adjustment, high levels should not be considered a protective factor.

Regardless of the mechanism by which emotional difficulties arise in siblings of children with a disability, support groups may offer siblings the opportunity to work out

some of these issues. Meyer and Vadasy (1994) have developed a model curriculum that has been implemented and adapted for use with various populations both nationally and internationally. In most instances, groups are formed such that all participants have a brother or sister with the same disability or illness (e.g., epilepsy, autism, cancer). Geared largely toward children between the ages of 8 and 13 years, the Sibshops program combines recreational activities with more traditional activities in which an adult facilitator leads the group in a discussion on their thoughts and feelings about having a brother or sister with a disability or illness. Consistent with Attwood's (2000) recommendation, education also plays a key role in the Sibshops program. The facilitator should be someone knowledgeable about the disability around which the program is based and able to disseminate information in a manner that is appropriate for the developmental levels of the children in the group (Meyer & Vadasy, 1994).

Although the merit of such a program makes intuitive sense, its effectiveness as an intervention has not been examined empirically. A review of the literature reveals very few studies that have investigated the effectiveness of support groups for children who have a brother or sister with a disability. Lobato (1985) implemented a 6-week workshop for preschool-aged siblings of children with developmental disabilities and found that participants showed improvements not only in their factual knowledge about the disability but also in the number of positive remarks they made about themselves and their families; a corresponding decrease in the number of negative verbalizations was also reported. A few years later, McLinden, Miller, and Deprey (1991) attempted to replicate these findings in a sample of school-aged children. Six children with various disabilities participated in 6 weekly 1-hour support groups led by 2 school psychologists; parents of

5 others who were initially recruited refused to grant permission for their children to participate in the support group but agreed to serve as controls and complete pre- and postintervention measures including the Child Behavior Checklist (CBCL; Achenbach, 1991) and the Piers-Harris Children's Self-Concept Scale (Piers & Harris, 1969). The mean age of children in the experimental group was 9.17 years while that of the control group was 10.6 years. Although anecdotal evidence suggested that all siblings enjoyed participating in the group, quantitative data failed to indicate any substantial effect on emotional or behavioral functioning as there was little change on any of the measures from pre- to post-intervention. Nevertheless, the authors cautioned against concluding that support groups are unnecessary and suggested several factors (e.g., small sample size, group dynamics, selection of outcome measures) that may have limited their findings (McLinden et al., 1991).

In sum, there is still much to be learned about how siblings react to having a brother or sister with a pervasive developmental disorder. Research in this area is quite limited and has yielded discrepant results. Nevertheless, researchers have identified a number of potential variables that may mediate the emotional response of siblings (e.g., family size, cognitive functioning of the child with the pervasive developmental disorder, amount of caregiving responsibility, gender of either child in the sibling pair), and further research is needed to advance our understanding in these areas. Social support is another factor which has been associated with the emotional functioning of siblings, with higher levels of internalizing behavior problems being observed in children who reported that they had no one to talk to about having a brother or sister with a disability (Gold, 1993). Though few studies have attempted to examine the effectiveness of support groups for

siblings of children with pervasive developmental disorders, such interventions may offer promise by providing siblings with the opportunity to share their thoughts and feelings. Additionally, support groups may play an important role in reducing the amount of resentment siblings may feel when they are asked to participate in larger interventions that focus largely on their brother or sister with a disability (e.g., social skills training).

Rationale for the Present Study

Despite the fact that social skills deficits, particularly those related to nonverbal communication and conversation skills, are the hallmark feature of Asperger's Syndrome, relatively little research has examined the effectiveness of interventions designed to improve social functioning in this population. Existing research on autism and Asperger's Syndrome is characterized by several critical methodological flaws that have been enumerated at length by Landry (1999). Among the key concerns she raises are: (1) small sample sizes, (2) lack of control groups, (3) failure to identify the diagnostic criteria used to determine subject eligibility, and (4) few long-term measures of treatment outcome to assess maintenance and generalization. With respect to her last critique, it seems that there is a strong need to supplement traditional observational data with more objective, standardized outcome measures in order to substantiate claims of effectiveness and allow for the comparison of results across studies. Landry (1999) also recommended that researchers move beyond intense, individualized treatment approaches to examine whether similar results can be obtained through less expensive techniques that can be offered to a larger number of children and families. Many group social skills training programs have been developed and are being utilized in school and clinic settings, but these commercial interventions lack empirical evidence to support any claims of success.

The present study investigating the potential effectiveness of a manualized, social skills training curriculum for children with Asperger's Syndrome attempted to address some of the limitations of earlier research. Specifically, this study detailed the diagnostic criteria used to determine participant eligibility and assessed maintenance and generalization of skills through follow-up data collected three months post-intervention. Outcome was measured using a combination of semi-structured observations and standardized instruments.

The 6-week social skills training program incorporated the three requisite components of social skills interventions—instruction, rehearsal, and feedback—articulated by Gresham and Elliott (1993). During each training session, adult facilitators: (1) introduced and modeled a target social skill, (2) allowed children to practice the skill through structured role plays in dyads with their respective siblings, and (3) offered constructive performance feedback through group discussions with all participants. Although specific instruction in theory of mind was not incorporated into the curriculum, the proposed study met the remaining two of Attwood's (2000) three essential criteria. First, the inclusion of siblings as facilitators allowed the children with Asperger's Syndrome to interact with and learn from typically developing children. Second, all sibling facilitators participated in a sibling support group in the 3 weeks prior to the social skills intervention. This support group not only fulfilled the criteria related to education for family members as siblings received specific information about Asperger's Syndrome, it also afforded them a forum in which to discuss their feelings about having a brother or sister with Asperger's Syndrome.

Results from this study are needed to extend the limited existing literature regarding group social skills training interventions for children with Asperger's Syndrome. Additionally, the findings will be useful to clinicians who are in need of empirical data to support their selection of interventions when working with children with Asperger's Syndrome. For the present study, the following hypotheses were generated:

Hypothesis 1: When compared with baseline levels obtained at Time 1, children with Asperger's Syndrome will demonstrate improved performance on observational and standardized measures of social functioning immediately following a sibling-mediated group social skills training intervention (Time 2) as well as at follow-up three months later (Time 3).

Although limited to only a few studies, qualitative and quantitative preliminary research suggests that group social skills training interventions are effective in improving the social functioning of children with Asperger's Syndrome and high functioning autism (Marriage et al., 1995; Mesibov, 1984; Williams, 1989). According to Gresham and Elliott (1993), the most successful interventions appear to be those that include specific instruction, behavioral rehearsal, and performance feedback, and the manualized intervention developed for the present study incorporated all of these elements. Attwood (2000) further maintained that interventions for individuals with Asperger's Syndrome must include opportunities to interact with normal peers as well as education for family members who regularly interact with the child with Asperger's Syndrome. The rationale for the use of siblings as facilitators in the present study was supported by a number of

studies in the autism literature which have documented the effectiveness of nondisabled peers and siblings as facilitators in individualized social skills training programs (Laushey & Hefflin, 2000; Odom et al., 1999; Strain & Hoyson, 2000; Taylor et al., 1999). Additionally, sibling facilitators received education through a sibling support group which met in the weeks leading up to the social skills training.

Hypothesis 2: Siblings will show a decrease in internalizing behaviors following participation in a support group and social skills intervention; control siblings who do not participate in the support group or social skills intervention will not show a corresponding decline in internalizing behaviors between Time 1 and Time 2 or Time 3.

Education of family members of individuals with Asperger's Syndrome is one of the key components of any social skills intervention (Attwood, 2000). Through participating in a support group, siblings of children with Asperger's Syndrome had the opportunity to learn more about the nature of their brother's or sister's social deficits. Additionally, Gold (1993) found that siblings of boys with autism reported higher levels of depression if they did not have someone to talk to about their feelings. In the support group, siblings had an opportunity to share their feelings about having a brother or sister with Asperger's Syndrome with other children who have a sibling with the same disability. Though limited to a few studies with mixed results, the existing literature on the effectiveness of sibling support groups suggests that such a venue may be beneficial in increasing positive feelings and reducing negative feelings (e.g., Lobato, 1985).

CHAPTER 2: METHODS

Participants

Initially, children between the ages of 6 and 11 years were recruited through local support groups for parents of children with Asperger's Syndrome. Information about the study was disseminated via announcements made at support group meetings followed by telephone calls to determine interest and eligibility. Original eligibility criteria stipulated that each child have at least two siblings between the ages of 6 and 16 years who had not been diagnosed with a disorder associated with social deficits, with the goal to have one sibling participate in the social skills intervention with his/her brother or sister while the other served as a control and only completed pre- and postintervention measures. However, preliminary recruitment efforts yielded only two families who met these criteria, and one declined to participate due to concerns regarding distance from the intervention site. With only one family enrolled, eligibility criteria were modified to allow families with two children to participate. The age range for target children was also expanded to include those through the age of 14 years. Of the 12 additional families who expressed interest in the study, 4 were found to be ineligible because the sibling was either too young (N=1) or had been diagnosed with Attention-Deficit Hyperactivity Disorder (N=2) or Asperger's Syndrome (N=1), and 5 families declined to participate due to distance or other time constraints. The three remaining families were enrolled into the study, bringing the total number of participants to 4 and yielding an overall participation rate of 60% for eligible families. For each target child, a diagnosis of Asperger's Syndrome was documented through record review and supported by having one parent serve as informant for completion of the High Functioning Autism Spectrum Screening

Questionnaire (ASSQ; Ehlers, Gillberg, & Wing, 1999) and the Social Reciprocity Scale (SRS; Constantino, Przybeck, Friesen, & Todd, 2000). Scores from each instrument were compared with the respective clinical norms reported by its authors.

Data were collected for a total of 9 children from 4 different families: 4 children with Asperger's Syndrome (3 males and 1 female), 4 siblings who participated in the intervention (1 male and 3 females), and 1 male "control" sibling who only completed outcome measures. All participants were white and came from families in which both parents had at least some college education. Specific demographic characteristics for all 9 children are summarized in Table 1 and described below. All names have been changed to protect the identities and maintain confidentiality of the children. Each child is also identified by an alphanumeric code that reflects his or her role in the study (i.e. AS = child with Asperger's Syndrome; PS = participating sibling; NS = nonparticipating/control sibling) and the family from which he or she originated (i.e. Family 1, 2, 3, or 4). Codes were assigned to facilitate discussion of results across participants in the next sections.

Michael

Michael^{AS1}, age 10, was diagnosed with Asperger's Syndrome at 6 years of age. The middle of three siblings, he had an older sister Amy^{PS1}, age 12, and a younger brother Alex^{NS1}, age 9. The children resided with their parents in a household with a combined annual income of over \$125,000. Both parents had attended college but never graduated with an associates or bachelors degree. At the time of enrollment, Michael and his brother were both in 3rd grade while Amy was in 6th grade. Both boys were receiving speech and language therapy in conjunction with their special education programming;

Michael also repeated 2nd grade. Amy, in contrast, had no learning problems. None of the children were taking any prescription medications. In terms of previous interventions, none of the children had ever participated in social skills training or in a support group. On the WISC-III screener, Michael obtained an estimated Full Scale IQ score of 100, which falls within the average range.

Although Alex was closer in age to Michael, the relationship between the two boys was described by their mother as contentious. After some discussion, it was agreed that Amy would be the sibling who participated in the intervention while Alex served as the control. Parent data for all children was obtained with Michael's mother serving as respondent.

David

David^{AS2}, age 12, was diagnosed with Asperger's Syndrome at 5 years of age. The older of two children, he had a younger sister Felicia^{PS2}, age 8. The children resided with their parents in a household with an annual income of less than \$50,000. Both parents had graduate degrees, but only the father was employed. At the time of enrollment, David was in 6th grade while Felicia was in 2nd grade; neither child had ever repeated a grade. David was receiving speech and language therapy in conjunction with his special education programming. Felicia had no reported learning difficulties. Current medications reported for David included Prozac (15mg) as well as five different medications for asthma. In terms of previous intervention experience, he had attended 3 different social skills groups between 1998 and 2002, all of which were led by occupational therapists. Neither David nor Felicia had ever participated in any type of support group. On the WISC-III screener, David obtained an estimated Full Scale IQ

score of 150, which falls within the very superior range. David's mother served as respondent for all parent report measures.

Beth

Beth^{AS3}, age 13, was diagnosed with Asperger's Syndrome at 12 years of age. The younger of two children, she had an older brother Kevin^{PS3}, age 16. The children, whose parents were divorced in 1995, resided with their mother in a household with an annual income between \$50,000 and \$74,999. Both parents had graduate degrees and were employed as chemists. At the time of enrollment, Beth was in 7th grade while Kevin was in 10th grade. Both children were enrolled in gifted programs, and Beth was also receiving speech and language therapy through the school. Both children were taking prescription medication for allergies, and Beth was also on Zoloft. Beth had previously been enrolled in an 8-week social skills group run by an occupational therapist. She also attended a support group for children from divorced families in the past. Kevin, however, had no prior intervention experience. On the WISC-III screener, Beth obtained an estimated Full Scale IQ score of 130, which falls within the very superior range. Beth's mother served as respondent for all parent report measures.

Charlie

Charlie^{AS4}, age 14, was diagnosed with Asperger's Syndrome just a few months prior to the start of the intervention. The older of two children, he had a younger sister Kelly^{PS4}, age 13. The children resided with their parents in a household with an annual income between \$100,000 and \$124,999. Both parents had graduate degrees and were employed outside the home. At the time of enrollment, Charlie was in 9th grade at a public high school while Kelly was being home schooled as a 7th grade student. Neither

Charlie nor Kelly had ever received special education services or participated in any prior interventions such as social skills training or a support group. They were also not taking any prescription medications. On the WISC-III screener, Charlie obtained an estimated Full Scale IQ score of 131, which falls within the very superior range. Parent report data were obtained with Charlie's father serving as respondent.

Measures

The tests and variables that were used as outcome measures are summarized in Table 2.

Social Functioning

High-Functioning Autism Spectrum Screening Questionnaire (ASSQ)

The ASSQ (Ehlers et al., 1999) was developed as a screening instrument to be used in the preliminary identification of children whose behaviors warrant more comprehensive evaluation for pervasive developmental disorders. It consists of 27 items that require a respondent who is familiar with the child to rate the extent to which the child exhibits specific behaviors. Items survey a variety of behaviors including social interaction, communication problems, restrictive/repetitive behavior, motor clumsiness, and other associated behaviors. Originally normed on a sample of 1,401 children between the ages of 7 and 16 years, the instrument has undergone additional reliability and validity testing with favorable results. Although the authors caution that the instrument should not be used as a formal diagnostic tool, the ASSQ offers clinical utility in that it can be used to differentiate children with pervasive developmental disorders from those with other neurobehavioral disorders associated with social deficits (e.g., Attention-Deficit Hyperactivity Disorder, learning disabilities). The authors present data

on a number of alternative cutoff scores that can be used to maximize true positive and minimize false positive classifications. The most stringent cutoff score reported was for a raw score of 22, which resulted in a false positive rate of 3 percent. They also provide mean scores and standard deviations for a small sample of children ($n = 34$) with Asperger's Syndrome who were included as a validation sample; however, they emphasize that the ASSQ has not proven successful in discriminating Asperger's Syndrome from high functioning autism. Nevertheless, this early attempt at norming the instrument for individuals with Asperger's Syndrome yielded a mean score of 25.1 (SD = 7.3).

The ASSQ takes approximately 10 minutes to complete. One parent served as the respondent and completed the ASSQ for his or her children (i.e. the child with Asperger's Syndrome and the sibling(s)) at Time 1; follow-up data were collected from the same parent, but only for the child with Asperger's Syndrome. The total score was used as the dependent variable in all analyses.

Social Reciprocity Scale (SRS)

The SRS (Constantino et al., 2000) represents a preliminary attempt to develop a "standardized measure of children's reciprocal social behavior in naturalistic social settings" (p. 3). Unlike other instruments such as the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 1989) or the Childhood Autism Rating Scale (CARS; Schopler, Reichler, DeVellis, & Daly, 1980) commonly used in the assessment of autism, the SRS was designed to detect less overt social deficits than those traditionally seen in autism. The SRS offers an additional benefit over other measures in that it does not require the child to be observed by a trained clinician in a laboratory or office setting;

rather, a questionnaire is simply completed by a parent, guardian, or teacher who has had the opportunity to regularly observe the child over a period of six months.

The 65 items included on the SRS were selected following careful examination by a panel of experts including psychologists, psychiatrists, and educators. For each item, the respondent must rate the frequency with which the child displays specific behaviors that fall into one of seven general categories: (1) recognition of social cues, (2) interpretation of social cues, (3) response to social cues, (4) tendency to engage socially, (5) “core” autistic features, (6) language deficits, and (7) miscellaneous. The first four categories (a total of 35 items) relate specifically to reciprocal social behavior; the others include items related to other features associated with autism and pervasive developmental disorders. Although gathered on children only in the St. Louis area, preliminary data comparing the profiles of 158 consecutive child psychiatric patients seen in an outpatient setting with a random sample of 287 schoolchildren between the ages of 4 and 14 years suggest adequate reliability and validity (Constantino et al., 2000). More importantly, the distribution of scores for children with PDD-NOS (i.e. those whose social deficits were not sufficient to warrant diagnosis of autism) was significantly different from that of other clinical and nonclinical samples of children, with the highest mean being reported for the sample of children with PDD-NOS. As a result, the SRS shows promise as a measure which may have clinical utility in the present study since individuals with Asperger’s Syndrome often present with “subthreshold” levels of social deficits that are more similar to those observed in children with PDD-NOS than in children with autism. Although the instrument is still in its norming phase, scores from

the SRS can be compared to that reported for a preliminary subgroup of 19 children with PDD-NOS who obtained a mean score of 101.47 (SD = 23.64).

The SRS can be completed in approximately 15 minutes and generates a summary score that can be used as an indicator of overall social functioning. In the present study, one parent served as respondent and completed the SRS for the child with Asperger's Syndrome at Time 1, Time 2, and Time 3 as well as for each sibling at Time 1.

Social Skills Rating System (SSRS)

The SSRS (Gresham & Elliott, 1990) was originally developed as a screening instrument to assess children's social functioning both at home and in school. Parallel forms of the questionnaire in which respondents rate the frequency and importance of specified behaviors are available at preschool, elementary, and secondary levels for parents, teachers, and children themselves. In terms of social skills, all forms yield an overall Social Skills standard score as well as raw scores for the following subscales: Cooperation, Assertive, Self-Control, Responsibility (parent only), and Empathy (child only). Parent and teacher forms also yield a Problem Behaviors standard score along with Internalizing, Externalizing, and Hyperactive subscale raw scores. Lastly, the teacher form includes a 9-item assessment of academic functioning that is converted into an Academic Competence standard score. The SSRS was normed on a fairly representative sample of 4,170 children in both regular and special education settings, 1,027 parents, and 259 teachers. Data regarding reliability and validity are quite favorable, with teacher forms yielding the highest correlations followed by parent and self-report forms.

Total administration time for the SSRS varies according to the form used (i.e., preschool, elementary, or secondary) and the individual respondent (i.e., child, parent, or teacher). It is estimated that any one individual may require 15-25 minutes to complete the form. At Time 1, each child and his/her teacher completed their respective versions of the SSRS and parents completed separate forms for each child. Follow-up data were gathered at Time 2 and Time 3 only for the child with Asperger's Syndrome, who completed the SSRS along with his/her parent and teacher. In the present study, the standard score for the Social Skills Composite was used in the analyses.

Diagnostic Analysis of Nonverbal Accuracy 2 (DANVA2)

The DANVA2 (Dyssemia, Inc., n.d.) consists of four subtests that assess an individual's ability to identify emotions (i.e., happy, sad, angry, and fearful) conveyed nonverbally through facial expressions and voice prosody. Two subtests, Adult Facial Expressions and Child Facial Expressions, require the individual to view 24 photographs depicting male and female models exhibiting high and low intensities of emotion. In the other two subtests, Adult Paralanguage and Child Paralanguage, individuals are provided with audio recordings of male and female actors reciting the statement, "I am going out of the room now but I'll be back later" at high and low intensities of emotion. All four subtests are administered via computer and require the individual to identify the emotion being conveyed. Supplemental materials included with the DANVA2 include a reference list of 116 studies from which preliminary reliability and validity data have been compiled. Overall, the instrument shows adequate psychometric properties. These same studies were also used to derive the means and standard deviations for 14 discrete age groups that serve as the reference groups to which an individual's performance on each

subtest is compared. Total administration time for the DANVA2 is approximately 35 minutes. All children were given the test at Time 1, but only the child with Asperger's Syndrome was tested at Time 2 and Time 3. Standard scores for all 4 subtests were used in the analyses.

Behavioral Observation Checklist

A structured observation form was created to record the number of initiations and responses made by the child with Asperger's Syndrome toward his or her sibling(s) during a videotaped play activity. This measure, reproduced in Appendix A, used a coding system similar to that described by Strain and Danko (1995). Verbalizations that started an interaction and were not precipitated by any behavior on the parts of other siblings in the preceding 10-second interval were coded as *initiations*; verbalizations that occurred in the 10-second interval immediately following an initiation from a sibling were coded as *responses*. Within these broad categories, behaviors were further distinguished along two dimensions—context and appropriateness. In terms of context, each comment or question was coded as *game-related* if it referenced some aspect of the activity in which the participants were engaged (e.g., asking for clarification of a rule) or as *social* if it did not include any specific mention of the activity (e.g., commenting that the room was warm). The appropriateness of each verbalization was also incorporated into the coding system, with those comments or questions that adhered to social norms with respect to nonverbal aspects of communication (e.g., prosody, tone, proximity) judged as *appropriate* while those that violated any such norm were coded as *inappropriate*.

All videotapes were reviewed and coded by this researcher as well as another graduate student with extensive experience recording observations of individuals with pervasive developmental disorder. Interrater reliability was calculated using the percent agreement method described in similar studies (Laushey & Heflin, 2000; Taylor, Levin, & Jasper, 1999). Separate scores were computed for each child at each data collection point by dividing the number of agreements (i.e., behaviors that were assigned to the same category by both raters) by the total number of agreements and disagreements, then multiplying by 100. Agreements and disagreements were also summed across sessions to derive an overall estimate of interrater reliability. Across all three sessions, the two raters averaged a moderate 82% agreement. Within-participant reliability estimates across sessions ranged from 89-94% for Michael^{AS1}, from 65-86% for David^{AS2}, from 79-85% for Beth^{AS3}, and from 76-84% for Charlie^{AS4}.

Data were collected at Times 1, 2, and 3. Percentage scores for the different dimensions (i.e. appropriate vs. inappropriate, initiations vs. responses, social vs. game-related) from the second rater were used in the analyses.

Emotional Functioning

Child Behavior Checklist/Teacher Report Form/Youth Self Report (CBCL/TRF/YSR)

The CBCL (Achenbach, 1991) is one of the most widely used instruments to assess emotional and behavioral functioning in children. Normed for use with children between the ages of 4 and 18, the CBCL consists of 113 items which survey a child's behavior across eight Problem Behavior subscales: (1) Aggressive Behavior, (2) Attention Problems, (3) Delinquent Behavior, (4) Social Problems, (5) Somatic Complaints, (6) Thought Problems, (7) Anxious-Depressed, and (8) Withdrawn. For

each item on the questionnaire, parents rate the frequency with which their child has displayed a given behavior during the previous six months. Responses to these items are also used to compute global scores in the areas of Internalizing, Externalizing, and Total Behavior Problems. The CBCL also provides a standardized measure of adaptive behavioral functioning, yielding a Total Competence score as well as subscale scores in the areas of Activities, Social, and School. Parallel forms of the CBCL are available for teachers (TRF) as well as for children between the ages of 11 and 18 (YSR). While the TRF and YSR yield the same global Competence and Problem Behavior scores as the CBCL, individual subscales vary somewhat across the instruments.

The current version of the CBCL was normed on a sample of 2,368 children selected to represent the national population of children with respect to SES, ethnicity, geographic region, and residential setting (i.e., urban, suburban, or rural). Cutoff scores indicating clinical significance were derived by comparing the profiles of a smaller sample of children referred for mental health services in the previous 12 months with that of the normative group. Reliability and validity data are somewhat mixed, with composite scores generally showing the highest coefficients (.89 and higher).

In the present study, data were collected only for siblings at Time 1, Time 2, and Time 3 as well as upon completion of the sibling support group. Children completed the YSR, parents completed a separate CBCL for each sibling participant, and teachers completed a TRF. No data were gathered for the child with Asperger's Syndrome. Each form takes approximately 15 minutes to complete. The Internalizing Behavior Problems T-scores from each respondent were used in analyses.

Other Variables

Wechsler Intelligence Scales for Children—Third Edition (WISC-3)

Since research suggests that the overall adjustment of siblings of individuals with autism is associated with the cognitive functioning of the individual with autism (Piven et al., 1990), the present study attempted to control for this potential confound by including a measure of intellectual functioning. The WISC-3 (Wechsler, 1991) is currently the most widely-used instrument in the assessment of cognitive functioning used with children between the ages of 6 and 16. Comprised of 10 core and 3 supplemental subtests, it provides a comprehensive evaluation of a child's verbal and nonverbal reasoning skills. For each subtest, the child's raw score is transformed to a scaled score; in turn, these scaled scores are used to derive 7 standard scores: Verbal IQ (VIQ), Performance IQ (PIQ), Full Scale IQ (FSIQ), Verbal Comprehension Index (VCI), Perceptual Organization Index (POI), Freedom from Distractibility Index (FDI), and Processing Speed Index (PSI).

When administered in its entirety, the total administration time for the WISC-3 is approximately 75 minutes. However, Sattler (1992) describes several options of shortened forms that can be used to estimate a child's intelligence and are appropriate for research purposes. He presents reliability and validity data for various combinations of 2, 3, 4, and 5 subtests, all of which are quite high, and advises that subtest selection ultimately be guided by clinical judgment. In the present study, an abbreviated battery consisting of 2 verbal (Information and Vocabulary) and 2 performance (Picture Completion and Block Design) subtests was administered; according to Sattler (1992), this combination has high reliability ($r_{tt} = .935$). Total administration time for the 4

subtests, which were administered only at Time 1, was approximately 25 minutes.

Results were used to generate an estimated FSIQ score.

Questions for Siblings Questionnaire

In addition to level of cognitive functioning, two other variables that have been associated with overall adjustment in siblings of children with autism are (1) amount of caregiving responsibility imparted on the sibling, and (2) perceived social support (Gold, 1993; McHale et al., 1984). To determine whether these variables factored into sibling adjustment in the present study, siblings completed the Questions for Siblings questionnaire developed by Gold (1993) for use in her study. A series of yes-no items is included to assess respondents' feelings about having a sibling with autism as well as whether or not they have any venues in which to discuss their feelings. Additional information regarding the amount of caregiving and domestic responsibility is gathered by having respondents rate how often they are required to engage in a number of specific household tasks (e.g., washing dishes, playing with the target sibling). Ratings range from 1 (Never) to 5 (Always) with higher scores reflecting higher levels of responsibility. In the Gold (1993) study, high internal consistency was documented in Cronbach alphas of .94 (Domestic Work) and .88 (Caregiving Work). The Questions for Siblings questionnaire takes approximately 5 minutes to complete and was administered at Time 1, Time 2, and Time 3. Responses to individual items were used to derive two summary scores, Caregiving Responsibility and Perceived Social Support.

General Information Form

Demographic data were gathered by having one parent complete a General Information Form (GIF) developed specifically for the present study. The GIF takes

approximately 10 minutes to complete and surveys traditional demographics such as age, race, and gender of all family members residing in the home. Other items address variables that have been linked to social or emotional functioning in previous research, such as family size and SES. Finally, respondents are asked to identify prior experience family members may have had with support groups and/or social skills interventions. The GIF was completed in its entirety at Time 1, with selected items re-administered at Time 2 and Time 3 to assess any changes that occurred over the course of data collection (e.g., medication changes, life stressors, enrollment in other social skills or support groups).

Subjective Evaluation of Intervention Components

Participant Evaluation Forms

Feedback from children who participated in the sibling support group and social skills intervention was solicited through brief evaluation forms, which are reproduced in Appendices B and C. In addition to providing an overall assessment of each session (i.e., a “thumbs up” or “thumbs down”), children were asked to rate the workshops along two dimensions: (1) how interesting, and (2) how helpful the workshops were using a 5-point Likert-type scale ranging from 1 (not at all interesting/helpful) to 5 (very interesting/helpful). Open-ended items also afforded children with the opportunity to identify those parts of the intervention they liked the best and those they liked the least. Similar information was obtained from parents upon completion of the intervention using the feedback form reproduced in Appendix D. Parents were asked to provide quantitative ratings of their overall satisfaction of each component of the intervention using a 5-point Likert-type scale ranging from 1 (Extremely Dissatisfied) to 5 (Extremely Satisfied).

Additionally, they were asked to identify the specific goals for each child coming into the intervention and indicate whether or not those goals had been met. Finally, parents were asked to identify the features they liked most about the intervention and offer suggestions for how the program might be improved

Interventionist Rating Scales

In order to collect more qualitative data regarding the sibling support group and social skills intervention, the adult facilitators involved in each component were asked to provide a brief assessment of each child's performance at each session using the evaluation forms reproduced in Appendices E and F. In both components of the intervention, ratings were made with respect to each child's overall level of engagement and participation. Engagement ratings reflected judgments of each child's general attentiveness and interest during the sessions while participation ratings were based upon contributions to group discussions as well as performance during the role-plays. During the social skills group, the co-facilitators were also asked to rate the extent to which each sibling pair was able to collaborate effectively in order to practice and perform the skits. All ratings were made using a 7-point Likert-type scale ranging from 1 (Poor) to 7 (High). Finally, interventionists were asked to describe any specific areas of strength or weakness they observed for participants in each session.

Procedures

See Figure 1 for a Graphic Overview of the Project Timeline

After obtaining informed consent from the parent and assent from each child, pre-intervention questionnaires were distributed to all participants. This introductory session was conducted on the Drexel University campus and lasted approximately 2 hours.

During this time, parents spent approximately 105 minutes completing the General Information Form; the High Functioning Autism Spectrum Screening Questionnaire, Social Reciprocity Scale and Social Skills Rating System for all children; and a Child Behavior Checklist for each non-affected sibling. Children spent approximately the same amount of time in a combination of activities including assessment, observation, and completion of pre-intervention behavioral measures. All children completed the Social Skills Rating System, and siblings completed the Youth Self Report and Questions for Siblings questionnaire. In terms of formal assessment, this researcher administered the DANVA2 to all children in each family as well as the WISC-3 screener to the child with Asperger's Syndrome. Lastly, the children were asked to participate in a 20-minute videotaped play session during which they played the cooperative "I Spy" board game. At the end of the introductory session, parents were asked to sign a Release of Information form so that the Social Skills Rating System and Teacher Report Form (siblings only) could be mailed to each child's teacher. For children in elementary school, forms were sent to the primary classroom teacher. Parents of children in middle school or high school who had more than one teacher were asked to provide the name of the professional they believed knew their child best. Total time required of teachers was approximately 20-35 minutes.

The intervention itself was conducted on the Drexel University campus and consisted of two manualized components: (1) a 3-week sibling support group, and (2) a 6-week social skills group. In the former, one sibling from each family attended weekly 1-hour sessions led by this researcher and devoted to issues related to having a sibling with Asperger's Syndrome. In addition to providing a forum in which siblings could

discuss their feelings, these sessions included education about Asperger's Syndrome, previewed the upcoming social skills intervention, and emphasized their role as facilitators. At the last session, parents and siblings were asked to complete the CBCL or YSR, and copies of the TRF were mailed to teachers as well. For each child, questionnaires were completed by the same parent and teacher who served as respondents for the baseline assessment. The social skills group met weekly for 6 weeks immediately upon completion of the sibling support group; each session lasted 90 minutes. The child with Asperger's Syndrome was accompanied to each session by the sibling who attended the support group. Nonverbal communication and conversation skills were the main focus of the group. Qualitative data regarding the effectiveness of each component of the intervention (i.e., the sibling support group and social skills training) were obtained by having parents, children, and interventionists complete their respective evaluation forms.

Post-intervention measures were administered twice—once immediately upon completion of the intervention and then again 3 months later. Each family was contacted via telephone and scheduled for its own follow-up sessions at Time 2 and Time 3, with both sessions held on the Drexel University campus. These follow-up sessions were somewhat briefer than the introductory sessions used to collect baseline data since neither the WISC-3 nor measures of sibling social functioning were administered. Total time for each session was approximately 1½ hours. During this time, the same parent who served as respondent during the baseline assessment completed an abbreviated form of the GIF; the ASSQ, SRS and SSRS for the child with Asperger's Syndrome; and a CBCL for each sibling. The child with Asperger's Syndrome completed the SSRS as well as the DANVA2 administered by this researcher, and each sibling completed the YSR.

Videotaped play sessions were also held during each follow-up session, with siblings playing the same “I Spy” game used during the baseline assessment. Lastly, teachers were forwarded either the SSRS for the child with Asperger’s Syndrome or the TRF for the siblings. At Time 2, teacher data were solicited from the same teacher who had completed the baseline assessment. However, follow-up at Time 3 occurred at the beginning of a new school year, so questionnaires were sent to different teachers for all children except Beth^{AS3}, who continued to have regular contact with the same individual who had completed all other ratings.

Format of Sibling Support Group

Much of the content and activities included in the sibling support group was adapted from Meyer and Vadasy’s (1994) Sibshop curricula. This researcher served as the facilitator for all 3 sessions. The first two sessions consisted largely of group discussions that allowed participants to get to know one another as individuals and to recognize the ways in which their experiences as siblings of individuals with Asperger’s Syndrome were similar to as well as different from one another. Several different exercises were incorporated into these sessions in order to facilitate the discussion among participants. For example, siblings worked in pairs to interview one another about their own strengths and weaknesses as well as those of their brother or sister. Another activity involved children taking turns generating their own endings to sentences fragments printed on cards in a “time capsule” (e.g., “*A time when I felt really scared...*”).

The last session was designed to set the stage for the upcoming social skills intervention with particular emphasis on the vital role the siblings would have in the success of the intervention. After a brief discussion of the general format of the social

skills group, siblings were led through a series of acting exercises in order to help them become more comfortable in front of the group. In the first activity, a competitive game of “Guesstures” had siblings working in teams of two to identify the word each person’s partner was trying to perform. In the follow-up exercise, siblings worked in pairs to role-play scenes for the other team to guess. At the end of this exercise, participants discussed the verbal and nonverbal elements upon which they based their responses.

Format of Social Skills Group Intervention

The format of each session was based on the literature and modeled after a similar program implemented as part of a pilot study at the Children’s Hospital of Philadelphia with a sample of children with brain tumors (Barakat et al., 2004). Two fellow graduate students from the Clinical Psychology doctoral program at Drexel University served as co-facilitators along with this researcher throughout the intervention. Each co-facilitator attended a 2-hour training session the week before the start of the social skills group. Training consisted of (1) a general rationale for the intervention, (2) an overview of the participants in terms of their performance on baseline measures, and (3) a review of the manual. Roles for each co-facilitator were also delineated in terms of how she could assume an active part during group discussions and supervise sibling pairs as they practiced their role-plays. Group leaders also met for approximately 20 minutes prior to the start of each social skills group to discuss the target skill for the week and identify the sibling pair(s) for whom each leader would assume primary responsibility.

The first session of the intervention began with an introduction to social skills training provided by the facilitators followed by a warm-up activity designed to help participants get acquainted with one another. Each participant introduced him/herself and

identified a favorite food, TV show, or hobby. The agenda for the rest of this session as well as all subsequent sessions was as follows: (1) facilitators introduced the target skill and led the group in a discussion of how it relates to social functioning, (2) facilitators modeled good and bad examples of the target skill and discussed them with the participants, (3) siblings role-played in pairs with scenarios provided by facilitators, and (4) pairs received performance feedback from facilitators and other participants. At the end of Sessions 1-5, homework was assigned so sibling pairs could continue to practice new skills at home; these assignments were reviewed with the group at the beginning of the next session.

The specific content and role-plays for each session varied from week to week. In the first two sessions, participants learned and practiced six major components of nonverbal communication (i.e., eye contact, facial expression, hand and arm gestures, body posture, tone of voice, and proximity). Sessions three and four focused on the conversation skills needed to make new friends, with specific emphasis on how to start, maintain, and end a conversation appropriately. Additional skills incorporated into these sessions included selecting topics for conversation based upon characteristics of the listener and recognizing the signs that someone is losing interest in the conversation. Session five emphasized the importance of giving and receiving compliments as tools in maintaining existing friendships. The training culminated during the last session as participants had the opportunity to apply the skills from previous weeks in the social context of a pizza and ice cream party. Visual aids were developed for each session and posted at every subsequent session to serve as reminders of the skills that had been taught. Each session was videotaped in order to allow this researcher to determine the

extent to which the manual was followed. In addition, the permanent record allowed for retrospective analysis and evaluation of specific components of the intervention

Level of Participation

Table 3 summarizes each child's attendance during the intervention as well as his or her completion of outcome measures at each data collection point. All siblings had perfect attendance in the sibling support group. In contrast, attendance rates varied across participants during the social skills training portion of the intervention, ranging from a low of just three sessions attended for Michael^{AS1} and Amy^{PS1} to perfect attendance for the sibling pairs of David^{AS2} and Felicia^{PS2} and Beth^{AS3} and Kevin^{PS3}. Kelly^{PS4} was also present for all six sessions, even when Charlie^{AS4} was unable to accompany her to Sessions 3 and 5 due to illness. As she was the only child not paired with her sibling, Kelly^{PS4} either role-played with one of the adults or observed the others. In either case, she was given copies of the scripts to take home and practice with Charlie^{AS4}.

In terms of data collection, David^{AS2}, Beth^{AS3}, and Kevin^{PS3} were the only children for whom all outcome measures were completed. Several factors resulted in missing data for the remaining children. Michael^{AS1}'s family repeatedly canceled their scheduled data collection session at Time 2 due to intense family stressors associated with taking in a teenage cousin, and attempts to obtain information through the mail proved unsuccessful as the family did not return the materials they were sent. Follow-up data from Time 3 were also incomplete not only because Amy^{PS1} did not attend this session, but also because the family unexpectedly had to leave before Michael^{AS1} and Alex^{NS1} had a chance to complete their behavioral questionnaires. Subsequent attempts

to obtain children's questionnaires through the mail also proved unsuccessful. Finally, teacher data were not available for Felicia^{PS2}, Charlie^{AS4}, or Kelly^{PS4}. Felicia^{PS2}'s teacher refused to complete any of the questionnaires, citing a general opposition to participating in research; Charlie^{AS4}'s teacher also failed to return questionnaires and did not return any of the telephone calls initiated to inquire as to why; and Kelly^{PS4} was being home-schooled by her mother.

Data Analyses

Data were analyzed using computer software from Statistical Product and Services Solutions (SPSS 12.0 for Windows). Preliminary analyses were run to gather descriptive statistics of the sample in terms of demographic and outcome variables. Given that the initial recruitment goal of 6 to 8 participants was not met, the proposed analysis using repeated measures MANOVA was not utilized due to power limitations. Rather, a more descriptive approach was taken in which results for each participant were examined separately as in other multiple case study designs with children with pervasive developmental disorders (Charlop-Christy et al., 2000; Laushey & Heflin, 2000; Taylor et al., 1999). As is common in studies involving small samples of children with pervasive developmental disorders, the major outcome variables were illustrated in graphs.

Hypothesis 1: When compared with baseline levels obtained at Time 1, children with Asperger's Syndrome will demonstrate improved performance on observational and standardized measures of social functioning immediately following a sibling-mediated group social skills training intervention (Time 2) as well as at follow-up three months later (Time 3).

The first hypothesis was tested by comparing each child's scores at baseline, Time 2, and Time 3 on those items listed under the Social Functioning domain in Table 1 (i.e. ASSQ Total Score; SRS Total Score; SSRS Social Skills Composite standard scores for parent, child, and teacher; DANVA2 Adult/Child Faces and Adult/Child Paralanguage standard scores; percent appropriate initiations and responses). The clinical significance of any appreciable changes across time was also discussed in terms of each score's qualitative description based upon the appropriate norms for each instrument.

Hypothesis 2: Siblings will show a decrease in internalizing behaviors following participation in a support group and social skills intervention; control siblings who do not participate in the support group or social skills intervention will not show a corresponding decline in internalizing behaviors between Time 1 and Time 2 or Time 3.

The second hypothesis could not be tested due to the fact there was only one nonparticipating sibling enrolled in the study. While a comparison between scores was still made for the one sibling pair, the overall impact of the intervention on the child who participated was assessed by comparing scores across time on the dependent variables listed under the Emotional Functioning domain in Table 1 (i.e. CBCL/TRF/YSR Internalizing scores).

CHAPTER 3: RESULTS

Baseline Social Skills Functioning

Prior to the start of the intervention, an assessment was made of each child's level of social functioning. Data were collected not only to establish a baseline of performance for each child with Asperger's Syndrome, but also to ensure that siblings participating in the intervention possessed adequate skills to serve as facilitators. For one family, a comparison was also made between the sibling who participated in the intervention and a control sibling. Baseline social skills data for all children are compared in Table 4.

Michael

Results from the three questionnaires (i.e. ASSQ, SRS, and SSRS) generally revealed higher levels of social functioning in both siblings as compared to Michael^{AS1}. On the ASSQ, Michael^{AS1}'s score of 37 was well above the cutoff score of 22 used by the authors to identify individuals with an autistic spectrum disorder. When compared with the norms for the smaller subgroup of individuals with Asperger's Syndrome, his score was nearly 2 standard deviations above the mean ($z = 1.63$). In contrast, scores for both siblings fell within normal limits and indicated adequate levels of social and communicative functioning. A similar pattern was observed on the SRS as Michael^{AS1}'s raw score of 76 was similar to that observed in a clinical sample of children with PDD-NOS, while those of his siblings (i.e. 6 for Amy^{PS1} and 9 for Alex^{NS1}) indicated no deficits in reciprocal social behavior. Taken together, Michael^{AS1}'s elevated scores on both the ASSQ and SRS substantiated the social skills deficits associated with his diagnosis of Asperger's Syndrome.

Results from parent, child, and teacher versions of the SSRS were somewhat mixed. Parent report revealed a stark contrast between Michael^{AS1}'s overall level of social functioning and that of his siblings. His below average score of 75 indicated that he displayed fewer prosocial behaviors than his same-age peers, while Alex^{NS1}'s average score of 113 and Amy^{PS1}'s above average score of 130 suggested that both siblings displayed the same or even more prosocial behaviors than their peers. The same trend was seen in teacher data as Michael^{AS1}'s score was again the lowest of the three children, although the magnitude of the discrepancy in scores across children was not nearly as dramatic. His standard score of 80, though slightly higher than that obtained from parent report, still fell within the below average range. Scores for both Alex^{NS1} and Amy^{PS1} were 26 points lower than those obtained from parent report, with teachers estimating Alex^{NS1}'s social skills to be in the low average range (Standard Score = 87) and Amy^{PS1}'s to be in the average range (Standard Score = 104). Self-report data from each child generally yielded the highest composite scores, with all three rating their social skills as above average. Interestingly, Michael^{AS1} and Amy^{PS1} rated themselves quite similarly, with both reports yielding standard scores of 130. Alex^{NS1} rated himself somewhat lower, with his responses corresponding to a standard score of 118.

Of the three children, Alex^{NS1} consistently obtained the highest score on each of the four subtests of the DANVA2. He obtained a superior score of 127 on the Child Faces subtest, followed by Child Paralanguage, Adult Paralanguage, and Adult Faces with average scores of 109, 106, and 100, respectively. Michael^{AS1}'s scores, though somewhat lower than those of his brother, followed the same pattern of performance. He obtained average scores of 103 and 98 on the Child Faces and Child Paralanguage

subtests, a low average score of 89 on Adult Faces, and a below average standard score of 80 on Adult Paralinguage. The variability in Amy^{PS1}'s profile was quite surprising given her performance on behavioral questionnaires. While she obtained average scores of 98 and 90 for the Adult Paralinguage and Child Faces subtests, her scores for Adult Faces and Child Paralinguage fell well below average. Moreover, her scores of 78 and 77 on these two subtests were 11 and 21 points lower than Michael^{AS1}'s scores on the same measures. An analysis of errors was made with respect to both the intensity of the stimulus (i.e. high vs. low intensity) and the model used in presentation (i.e. adult vs. child). In terms of stimulus intensity, Michael^{AS1} tended to make more errors (61%) when the stimulus was low intensity but did not demonstrate a difference across stimulus model as his error rate was evenly split between adults (50%) and children (50%). Alex^{NS1} exhibited the same 50%-50% split between adult and child models, while Amy^{PS1} made significantly more errors (82%) when the model was an adult. Alex^{NS1} and Amy^{PS1} were more consistent in the errors they made according to emotional intensity of the stimulus, with low intensity errors accounting for 56% of Alex^{NS1}'s and 45% of Amy^{PS1}'s total errors.

David

Once again, results from both the ASSQ and SRS revealed higher levels of social functioning in the sibling relative to the child with Asperger's Syndrome. On the ASSQ, David^{AS2}'s score of 39 exceeded the cutoff score of 22 for an autistic spectrum disorder and was comparable to that found in the subgroup of children with Asperger's Syndrome. By comparison, Felicia^{PS2}'s total score of 2 fell within normal limits and indicated adequate levels of social and communicative functioning. The contrast between the two

siblings was even more pronounced in their scores on the SRS. Whereas David^{AS2}'s raw score of 118 was similar to that observed in a clinical sample of children with PDD-NOS, Felicia^{PS2}'s raw score of 7 was significantly lower and, as such, revealed no deficits in reciprocal social behavior. Taken together, David^{AS2}'s elevated scores on both the ASSQ and SRS substantiated the social skills deficits associated with his diagnosis of Asperger's Syndrome.

David^{AS2}'s social skill deficits were further evidenced in his below average standard score of 70 on the parent version of the SSRS. In contrast, Felicia^{PS2} was rated as exhibiting more prosocial behaviors than other children her age, as reflected in her above average standard score of 129 on parent report. Both children rated themselves as somewhat more adept than their peers, responding in such a way that they both obtained high average standard scores of 114 on self-report. David^{AS2} rated himself as more skilled than did his mother while Felicia^{PS2} was a bit more conservative in her ratings. Although David^{AS2}'s teacher reported adequate levels of social functioning in the classroom (Standard Score = 93), a comparison between the two children could not be made with regard to teacher observations as Felicia^{PS2}'s teacher repeatedly failed to complete the questionnaires, citing a general opposition to participating in research.

David^{AS2} and Felicia^{PS2} performed comparably well across all but one of the DANVA2 subtests, obtaining scores that generally fell within the average range. David^{AS2} scored 4 and 11 points higher than his sister on the Child Faces and Child Paralanguage subtests, but the discrepancy was not clinically significant. The only noteworthy difference between the two children occurred on the Adult Faces subtest, where David^{AS2} earned a low average standard score of 82 while Felicia^{PS2}'s score of 96

fell within the average range. In terms of stimulus intensity, David^{AS2} tended to make more errors (70%) when the stimulus was low intensity but did not demonstrate a difference across stimulus model as his error rate was evenly split between adults (50%) and children (50%). Felicia^{PS2} also had difficulty with less salient items as low intensity stimuli accounted for 72% of her total errors. She was also more likely to make errors when the model was an adult (64%) as opposed to a child (36%).

Beth

As with previous participant families, results from both the ASSQ and SRS revealed higher levels of social functioning in the sibling relative to the child with Asperger's Syndrome. While Beth^{AS3}'s scores of 31 on the ASSQ and 98 on the SRS were comparable to those of children with an autistic spectrum disorder, Kevin^{PS3}'s social and communicative abilities emerged as adequate according to his scores of 10 and 28 on each respective instrument. It should be noted that Kevin^{PS3}'s scores were the highest among all siblings in the study, though still not of a magnitude approaching clinical significance. Nevertheless, he was judged by all three interventionists as being somewhat more awkward and aloof during the social skills training sessions, a matter which will be discussed in later sections.

Beth^{AS3}'s social skills deficits were further evidenced in her below average standard scores of 71, 79, and 74 across parent, teacher, and self-report versions of the SSRS. In contrast, her brother was consistently rated as exhibiting comparable or even more prosocial behaviors than other children his age. Moreover, Kevin^{PS3}'s scores across all three versions were between 18 and 36 points higher than those of his sister. Like Felicia^{PS2}, Kevin^{PS3} had a tendency to rate himself more conservatively than other

respondents; his self-report standard score was 92 compared to 107 and 114 for parent and teacher reports, respectively.

Beth^{AS3} and Kevin^{PS3} tended to perform similarly across three of the four DANVA2 subtests, earning standard scores that differed by just one point each on Adult Faces, Child Faces, and Adult Paralanguage. Both children obtained high average scores on Adult Faces, average scores on Child Faces, and low average scores on Adult Paralanguage. Beth^{AS3} obtained the higher score on the only subtest on which a discrepancy was observed, earning a high average score of 113 on the Child Paralanguage subtest as compared with Kevin^{PS3}'s low average score of 86. One other finding worth mention is that Kevin^{PS3} scored a full standard deviation higher on the two visual Faces tasks than on the auditory Paralanguage tasks. Like the other children with Asperger's Syndrome, Beth^{AS3} did not evidence a strong preference for one type of model over another as her errors were evenly split between adults (52%) and children (48%). On the other hand, Kevin^{PS3} made far more errors when the model was an adult (71%) as opposed to a child (29%). Stimulus intensity made slightly more of a difference for Beth^{AS3} as 62% of her errors were made to low intensity items as compared to 57% for Kevin^{PS3}.

Charlie

Once again, confirmatory evidence of the social skills deficits associated with Asperger's Syndrome was observed in Charlie^{AS4}'s elevated scores on both the ASSQ and SRS. His scores of 31 on the ASSQ and 120 on the SRS were comparable to those of children with an autistic spectrum disorder. In contrast, Kelly^{PS4}'s social and communicative abilities were judged to be adequate according to her scores of 2 and 6 on

each respective instrument. The contrast between the two children was further evidenced in their profiles across parent and self-report versions of the SSRS. Whereas both Charlie^{AS4} and his father rated his social skills as nearly two standard deviations below average compared to his same-age peers (i.e. parent and student SSRS Standard Scores = 70 and 75, respectively), Kelly^{PS4}'s skills were judged to be well above average (i.e. parent and student SSRS Standard Scores = 130 and 128, respectively). Teacher data were not available for either child because Charlie^{AS4}'s teacher repeatedly failed to return questionnaires, and Kelly^{PS4} was a home-schooled student.

The strengths reported for Kelly^{PS4} on the aforementioned questionnaires did not translate to her performance on the DANVA2. On the contrary, she performed in the low average range across all four subtests, earning scores ranging from 83 to 88. She and Charlie^{AS4} obtained the same scores on both Adult Paralanguage (Standard Score = 83) and Child Paralanguage (Standard Score = 88). However, Charlie^{AS4} obtained significantly higher scores across the two visual tasks, earning high average scores of 111 and 116, respectively, for the Adult Faces and Child Faces subtests. Charlie^{AS4} struggled more with the intensity of the stimulus than he did with the model, while the reverse was true for Kelly^{PS4}. Overall, 83% of Charlie^{AS4}'s errors were made when the stimulus was low in intensity as compared with 44% for Kelly^{PS4}. In terms of the model, 59% of Charlie^{AS4}'s errors were made when the model was an adult as compared to 67% for Kelly^{PS4}.

Social Skills Follow-Up

The first hypothesis generated for this study related to the impact of the sibling-mediated intervention on social functioning in children with Asperger's Syndrome. More

specifically, it was predicted that children with Asperger's Syndrome would demonstrate improved performance on standardized and observational measures of social functioning immediately following a sibling-mediated group social skills training intervention (Time 2) as well as at follow-up three months later (Time 3). Results for each of the four children for the various outcome measures are depicted in Figures 2 through 5 as well as in Table 5.

Michael

Although no intermediary scores were available for Time 2, parent report revealed improvement across all three outcome measures between baseline and 3-month follow-up. At Time 3, Michael^{AS1}'s ASSQ total score of 15 was 22 points lower than what was reported at baseline. The decline in scores is clinically significant in terms of its diagnostic implications. Whereas Michael^{AS1}'s baseline ASSQ score was considerably higher than either score recommended by the authors for use in diagnostic screening of autistic spectrum disorders, his follow-up score was nearly 1.5 standard deviations ($z = 1.38$) below the mean reported for a subgroup of children with Asperger's Syndrome. Similar findings were also observed on the SRS as Michael^{AS1}'s score went from 76 at baseline to 51 at the 3-month follow-up. Using the norms provided for the small sample of children with PDD-NOS, this represents a fairly significant decline of just over one standard deviation ($z = 1.07$). Comparable gains were also evident in higher scores on the SSRS as Michael^{AS1}'s score again increased by one standard deviation from a below average score of 75 at baseline to a low average score of 90 3 months after the intervention. Improvements did not appear to generalize, however, to the school setting. Both at baseline and again at follow-up, teachers rated Michael^{AS1}'s social skills as

considerably lower than those of his same-age peers, with both questionnaires yielding low average standard scores of 80.

Results from the DANVA2 were mixed, with only one subtest yielding any appreciable gains. On Child Faces, Michael^{AS1}'s standard score increased from an average score of 103 at baseline to a high average score of 119 at follow-up. In contrast, he demonstrated a decline in performance on Adult Paralanguage as his score dropped from a below average score of 80 at baseline to a well below average score of 70 at follow-up. His performance on the other two subtests remained stable and average over time, with scores deviating by just 5 or 6 points, respectively, on Adult Faces and Child Paralanguage. The relative percentages of errors falling into high or low intensity (32% and 68%, respectively) and adult or child model (42% and 58%, respectively) at Time 3 were also comparable to those obtained at baseline.

Michael^{AS1}'s ability to interact appropriately with his siblings improved dramatically from baseline to 3-month follow-up. At baseline, he presented as both moody and reactive and would often isolate himself by moving his chair or turning his back toward Amy^{PS1} and Alex^{NS1}. He made relatively few attempts to initiate interactions with his siblings; 28% of his behaviors were coded as initiations compared to 82% responses. The negative quality of Michael^{AS1}'s verbal behavior was reflected in only 17% of his behaviors judged by the raters as appropriate. His initiations and responses were fairly evenly split between social (57%) and game-related (43%). At Time 3, Michael^{AS1} presented as far more relaxed and even spontaneously commented that he seemed to be “doing better” than he had at baseline. While the marked change in demeanor was reflected in an appropriateness rating of 100% (62% initiations and 38%

responses), the difference may have been due in part to the fact that Amy^{PS1} was not present for this follow-up visit. Although parent report suggested that the two boys had a somewhat conflicted relationship, subjective impressions of the interactions between siblings over the course of the study suggested that it is actually Amy^{PS1} who antagonized Michael^{AS1} by trying to cajole him into complying with her expectations. For example, when Michael^{AS1} steadfastly refused to participate in the activity at baseline, Alex^{NS1} was able to ignore the escalating behavior and focus on the game. In contrast, Amy^{PS1} assumed a motherly tone that seemed to irritate Michael^{AS1} even more as she said, “*Come on, Bud. Don’t be that way. The sooner you read the card the sooner we can get home.*” Finally, it should be noted that the majority of comments during the Time 3 play session (90%) were related to the activity itself as opposed to being more social in nature.

David

Like Michael^{AS1}, David^{AS2} evidenced a substantial drop in scores over time on both the ASSQ and SRS. While his total scores for these instruments at baseline were 39 and 118, respectively, his ASSQ score dropped to 36 immediately after the intervention and 25 at 3-month follow-up and his SRS score dropped to 92 and 89 at these same intervals. While the magnitude of the decline in scores was comparable for Michael^{AS1} and David^{AS2}, David^{AS2}’s improvement was tempered by the fact that his scores remained quite high. In fact, even his lowest scores at the 3-month follow-up were still comparable to those reported by the authors of each instrument in their samples of children with autistic spectrum disorders. Nevertheless, the results are encouraging in that David^{AS2} was reported to exhibit fewer difficulties with regard to idiosyncratic communication and reciprocal social interaction. Parent report also revealed moderate gains on the SSRS

from baseline to post-intervention as David^{AS2}'s standard score increased from 70 to 81. Improvements were not maintained over time, however, as reflected in the decline in score at 3-month follow-up when parent SSRS yielded a standard score of 73. A similar pattern was observed in David^{AS2}'s own scores on the SSRS self-report. Although he consistently rated his skills as higher than his mother, he reported a slight increase in social functioning between baseline and Time 2 ($z = 0.53$). Once again, these improvements were not reflected in follow-up data. On the contrary, David^{AS2} evidenced a fairly substantial decline in his self-report of social functioning as his standard score dropped to its all-time low of 97. Interestingly, teacher data emerged as more consistent with David^{AS2}'s self-report than with parent report in that teachers consistently rated his social abilities as average. Scores increased only slightly over time from 93 at baseline to 97 and 101, respectively, at Time 2 and Time 3.

On two of the four DANVA2 subtests, David^{AS2} again made gains over the course of the intervention that were not maintained at 3-month follow-up. The most impressive change occurred on the Adult Paralanguage subtest as David^{AS2}'s standard score increased from 82 at baseline to 103 at Time 2. At 3 months post intervention, however, he obtained a standard score of 77, 5 points lower than his baseline score. Though not as dramatic given the high average and average nature of the scores, a similar pattern emerged on the Child Faces subtest as David^{AS2}'s scores fluctuated from 111 at baseline to a high of 119 at Time 2 before reverting back to 97 at Time 3. David^{AS2}'s scores remained average across the three trials of the Adult Faces subtest. Finally, he evidenced a decline of nearly one full standard deviation over time on the Child Paralanguage task, earning scores of 100, 95, and 86, respectively, at baseline, Time 2, and Time 3. Over

the course of the intervention, David^{AS2}'s ratio of high to low intensity remained relatively stable. At baseline, 70% of his errors were made to low intensity stimuli; at Time 2 and Time 3 these scores were 79% and 77%, respectively. David^{AS2} did exhibit a shift related to the model used in presentation where the proportion of errors made to child stimuli decreased from 50% at baseline to 43% at Time 2 and 38% at Time 3.

In contrast to Michael^{AS1}, David^{AS2} demonstrated a consistent decline in the percent of appropriate behaviors toward his sister. At baseline, he and Felicia^{PS2} both presented as timid and unsure of how to act in a new environment. They remained in close proximity to one another throughout the play session, often holding hands or exchanging eye contact. Overall, 95% of his behaviors, the majority of which were initiations, were judged as appropriate. At Time 2, David^{AS2} continued to demonstrate largely appropriate (78%) behavior toward his sister. Once again, he seemed to assume a more dominant role during the observation as reflected in initiation and response scores of 74% and 26%, respectively. Both at baseline and at Time 2, much of the interaction between the two siblings centered on the activity, with only 39% and 33% of all of David^{AS2}'s behaviors coded as social at each data collection point. At Time 3, however, he was observed to make far more overtures toward his sister as 50% of his behaviors were coded as social. Unfortunately, all of these initiations were judged to be inappropriate in that they were directed toward provoking Felicia^{PS2} in some manner. For example, David^{AS2} said, "Move!" as he pushed Felicia^{PS2} aside in order to obtain a closer look at one of the cards for the game. In the end, only 42% of his behaviors were coded as appropriate at Time 3, well below the 95% observed at baseline.

Beth

Results of the ASSQ, SRS, and SSRS revealed a general pattern in which Beth^{AS3} showed improved social functioning immediately following the intervention and was able to maintain those gains at the 3-month follow-up. In contrast to her high score of 31 on the ASSQ at baseline, she obtained significantly lower scores of 21 and 20, respectively at Time 2 and Time 3. Similarly, her scores on the SRS went from 98 at baseline to 80 at Time 2 and increased just slightly to a total of 82 at Time 3. In both cases, however, her scores across all time samplings remained consistent with the norms reported by the authors of each instrument for samples of children with either Asperger's Syndrome or PDD-NOS. Moreover, her scores on both parent and teacher versions of the SSRS, though increasing over time, remained in the below average range, a finding which indicates that her social functioning was still below that of her same-age peers. Self-report data revealed the most favorable results as Beth^{AS3}'s scores on the student version of the SSRS improved substantially from a below average score of 74 at baseline to a low average score of 87 at Time 2 and finally a high average score of 111 at Time 3.

The gains observed on behavioral questionnaires did not translate to improved performance on the DANVA2. On the contrary, Beth^{AS3}'s scores on all four subtests actually decreased between baseline and Time 2. While the decline was limited to just five points on the two paralinguistic tasks, the effect was more pronounced on the Adult Faces and Child Faces subtests. On the former, her scores went from 111 to 99; on the latter, they went from 102 to 81. While the downward trend continued on the Adult Faces subtest as she obtained a standard score of 93 at Time 3, her performance improved somewhat on the Child Faces subtest to a standard score of 88. Time 3 was also marked

by a significant decline in performance on the Child Paralinguage subtest as Beth^{AS3}'s score moved from the high average range at baseline (Standard Score = 113) to the average range at Time 2 (Standard Score = 108) to the low average range at Time 3 (Standard Score = 88). Her ratio of high to low intensity errors showed a moderate decrease over time, with her percent errors to high intensity stimuli going from 38% at baseline to 21% and 27% at Time 2 and Time 3, respectively. There was also a general trend in which she made fewer errors to children's faces over time. At baseline, 48% of her total errors were made to child stimuli as opposed to 43% at Time 2 and 27% at Time 3.

During the play session, Beth^{AS3} consistently demonstrated an ability to interact with her brother in a positive manner as her overall appropriateness ratings ranged from 96% at baseline to 100% at both follow-up sessions. Although the majority of her behaviors were instrumental as opposed to social, they were evenly split between initiations and responses both at baseline (49% initiations vs. 51% responses) and at Time 2 (41% initiations vs. 59% responses). Follow-up observations made at Time 3, however, revealed a tendency for Beth^{AS3} to assume a more assertive role in the relationship as 77% of her behaviors were coded as initiations during this session.

Charlie

Charlie^{AS4}'s pattern of scores on the ASSQ and SRS generally mirrored that of the other participants, but particularly David^{AS2} and Beth^{AS3} in that while his scores improved over time, his progress was tempered by the fact that he continued to score in a clinically significant range on both instruments at both follow-up intervals. His scores on the ASSQ at baseline, Time 2, and Time 3 were 31, 26, and 23, respectively; at those

same periods, he obtained scores of 120, 93, and 104 on the SRS. Parent and self-report scores on the SSRS remained relatively stable over time, with both respondents estimating his social functioning to be in the below average range at baseline and Time 2. Parent report revealed moderate improvement at the 3-month follow-up, with scores from Charlie^{AS4}'s father increasing from 70 to 86. The extent to which skills generalized to the school setting could not be assessed due to the fact that teacher questionnaires were not returned.

Charlie^{AS4}'s DANVA2 scores also tended to vary less than those of the other participants. He did quite well on the two faces subtests, obtaining average and high average scores across all three time periods. His performance on the two paralinguistic subtests was somewhat lower, with baseline scores falling in the low average range. He showed improvement, however, on the Child Paralinguistic subtest as his score increased from 88 at baseline to 100 at Time 2 and 104 at Time 3. Of the four children with Asperger's Syndrome, Charlie^{AS4} also demonstrated the least variability in terms of the proportions of errors he made over time. At each time period, he made significantly more errors to low intensity stimuli (i.e. 83% at baseline, 73% at Time 2, 78% at Time 3) but performed similarly regardless of whether an adult or child was used as the model.

As with the other children, the interactions between Charlie^{AS4} and Kelly^{PS4} pertained largely to some aspect of the game. This became more evident over time as the total percent of social overtures decreased from 35% at baseline to 31% at Time 2 and finally 14% at Time 3. Despite the decrease in purely social behavior, Charlie^{AS4} demonstrated progress in terms of the appropriateness of his behavior. In contrast to the 53% of behaviors coded as appropriate at baseline, Charlie^{AS4}'s overall scores of 70%

and 83% at Time 2 and Time 3, respectively, suggest that the quality of interactions between the two siblings had improved. Gains translated to both initiations and responses. Over the course of the three data collection points, the percent of Charlie^{AS4}'s behaviors coded as appropriate initiations increased from 43% to 52% while those coded as appropriate responses increased from 10% to 31%.

Sibling Emotional Functioning

The second hypothesis generated for this study predicted that siblings who participated in the intervention would demonstrate a decrease in internalizing behavior problems when compared with control siblings who did not participate in either the support group or the social skills training. Unfortunately, only one family with more than two children was enrolled in the study; a comparison between the two siblings revealed commensurate scores as well as a general stability in parent, teacher, and self-report scores over time. Given the lack of a control group, the results of those siblings who participated in the intervention are discussed below.

Results from the CBCL, YSR, and TRF Internalizing Behavior Problems index are summarized in Figure 6. Consistent with the findings from the controlled sibling pair, there was very little change in scores across respondents over time. On the CBCL, all four children obtained scores well within the average range at each data collection period. The range of scores was 50-55 at baseline, 51-58 following the sibling support group, 48-51 at Time 2, and 46-53 at Time 3. For each child, high and low scores on the CBCL differed by just 5 points for Amy^{PS1} (although Time 2 data were not available because the family did not attend the follow-up session immediately following the social skills intervention), 1 point for Kevin^{PS3}, and 3 points for Kelly^{PS4}. Parent report did reveal a

decline of just under one standard deviation ($z = 0.9$) for Felicia^{PS2} from baseline to 3-month follow-up. The change is not clinically significant, however, as her scores of 55 at baseline and 46 at Time 3 were both within the average range.

Similar consistency was also observed in self-report data collected from the siblings. Once again, Amy^{PS1}'s data are incomplete due to the fact that the family did not attend the Time 2 follow-up session or return the children's questionnaires at Time 3. With the exception of Kevin^{PS3}, children's scores were slightly lower than those obtained from parent report but still within the average range and consistent across time. Felicia^{PS2} and Kelly^{PS4}'s highest and lowest scores differed by just 4 and 8 points, respectively, and Amy^{PS1}'s decreased by just 1 point from baseline to immediately following the support group. Kevin^{PS3} endorsed the most symptoms of any respondent, earning a clinically significant score of 71 at baseline. While his scores declined somewhat following the support group and again at Time 2, his scores of 67 and 61 at each of these intervals were still above the average range. Moreover, 3-month follow-up revealed a slight increase in score as his self-report yielded a score of 64.

As mentioned previously, teacher data were not available for either Felicia^{PS2} or Kelly^{PS4}. Additionally, the validity of Kevin^{PS3}'s scores on the TRF were called into question as examination of his protocols indicated that his teachers responded "*Not at all*" to all 112 items on every form. As a result, Kevin^{PS3}'s scores at each time period were based upon a raw score of 0, which corresponded to a T-score of 38, well below those obtained from either parent or self-report data. Amy^{PS1}'s scores were more commensurate on both the CBCL and YSR in that scores remained average and stable

over time, ranging from 53 at baseline and following the support group to 51 at 3-month follow-up.

Given that the only support for internalizing behavior problems in this sample came in the form of elevated scores on Kevin^{PS3}'s YSR, the relationship between CBCL/YSR/TRF Internalizing scores and cognitive functioning of the child with Asperger's Syndrome was not examined. The impact of domestic and caregiving responsibility on emotional functioning was also not explored for the same reason. Nevertheless, results from the Questions for Siblings measure revealed some interesting findings with respect to individual differences in terms of overall responsibility. Not surprisingly, the three oldest children reported higher levels of domestic responsibility than Felicia^{PS2}. As a group, Amy^{PS1}, Kevin^{PS3}, and Kelly^{PS4} reported that the frequency with which they assumed responsibility for household chores was somewhere between once in a while and half of the time (range = 2.23 - 2.94). In contrast, Felicia^{PS2}'s mean domestic responsibility score of 1.65 suggests that she was not required to take as active of a role in household chores. In terms of caring for their brothers or sister, children generally reported low levels of responsibility in that 3 of 4 children reported mean scores lower than 2. With a mean caregiving responsibility score of 2.53, Amy^{PS1} proved to be the only exception although this is not surprising given that her brother was the youngest child with Asperger's Syndrome included in this sample.

Intervention Summary

Sibling Support Group

All four children who participated in the sibling support group were rated by the facilitator as active participants in that no child obtained an engagement or participation

score lower than 5 in any session. The third session in which children were involved in an acting exercise yielded the highest ratings as all children obtained ratings of 7 for both engagement and participation.

Children's ratings of the sibling support group were also quite high. Using the 5-point Likert-type scale described earlier and reproduced in Appendix B, children reported mean scores for interestingness and helpfulness of 4 and 3, respectively. They also unanimously endorsed the sibling support group with a "Thumbs Up" as opposed to a "Thumbs Down." Specific aspects of the support group cited as particularly interesting or helpful included being able to work in a group, learning new ways to handle interpersonal conflicts with siblings, and having the opportunity to discuss what it is like to have a brother or sister with Asperger's Syndrome.

Parents also expressed an overall satisfaction with the sibling support group. Of the three parents who completed evaluation forms for this portion of the intervention using the 5-point Likert-type scale reproduced in Appendix D, two gave satisfaction ratings of 4 while the other rated it as a 5. Anecdotally, all three parents reported that their goal was to have the participating sibling develop an increased understanding of the social difficulties associated with Asperger's Syndrome as well as a better appreciation of how those difficulties impact the sibling relationship. Upon conclusion of the sibling support group, all three reported that their goal had been met.

Social Skills Group

Mean engagement and participation ratings for each child by session are summarized in Table 6 along with mean collaboration ratings for each pair. With the exception of Michael^{AS1} and David^{AS2}, children generally received engagement and

participation ratings that were at or above the average score of 4 used on the 7-point Likert-type scale. Michael^{AS1} obtained below average ratings for both engagement and participation for 2 of the 4 sessions he attended, while David^{AS2} was rated as below average along both dimensions in 4 of 6 sessions attended and for engagement only during 1 additional session. Kevin^{PS3} was the only other child to earn a below average rating, but this occurred for participation only in 1 of the 6 sessions he attended. Sibling pairs also seemed to work well together, with most earning collaboration scores of 4 or more. Again, Michael^{AS1} and Amy^{PS1} proved to be the main exception to the rule, earning collaboration ratings of 2.5, 3.0, and 3.5. David^{AS2} and Felicia^{PS2} also had trouble working together in the first session and obtained a mean collaboration rating of 3.5.

Ratings tended to remain relatively stable over time. Five children (Michael^{AS1}, Amy^{PS1}, Beth^{AS3}, Charlie^{AS4}, and Kelly^{PS4}) had high and low mean scores for both engagement and participation that differed by 1.5 points or less. Felicia^{PS2} and Kevin^{PS3} were consistent in terms of their engagement but showed moderate variability in their level of participation across sessions. Felicia^{PS2}'s mean participation scores ranged from a low of 4.0 in Session 1 to a high of 6.0 in Session 6, while Kevin^{PS3}'s ranged from a low of 2.5 in Session 1 to a high of 5.5 in Session 2. David^{AS2} showed similar variability in his overall level of participation and even greater variability in terms of his engagement during the sessions. In contrast to the inattentive and highly distractible behavior exhibited in the first 5 sessions, he was judged by both facilitators to be highly engaged in Session 6. The majority of children (75%) were consistently rated at or above average in terms of both their engagement and participation and, thus, presented with

limited opportunity for improvement in scores. Three of the four pairs, however, evidenced a general trend in which their ability to work together improved from Session 1 to Session 6. In the only exception, Charlie^{AS4} and Kelly^{PS4} obtained a high baseline collaboration score of 6.0 that was maintained over time.

Another pattern that emerged from subjective interventionist ratings was a general tendency for siblings to be rated either the same as or more highly than their brother or sister with Asperger's Syndrome. This pattern was observed in all three sessions for Michael^{AS1} and Amy^{PS1}, in three of four sessions for Charlie^{AS4} and Kelly^{PS4}, and in five of six sessions for David^{AS2} and Felicia^{PS2}. David^{AS2} obtained a higher engagement rating than Felicia^{PS2} in Session 6 (i.e., 5.5 compared to 4.0), and Charlie^{AS4} was rated slightly higher than Kelly^{PS4} for participation in Session 1 (i.e., 6.5 compared to 6.0). As mentioned previously, there was some concern as to Kevin^{PS3}'s effectiveness as a facilitator that was further reflected in an atypical pattern of ratings between him and his sister. Unlike what was observed in other pairs, Kevin^{PS3} actually obtained lower scores for engagement in Sessions 1, 2, and 5 as well as for participation in Sessions 1, 5, and 6. Although the magnitude of the discrepancy was usually small (i.e., 1 point or less), a striking contrast was observed in Week 1 when Beth^{AS3} obtained a mean participation rating of 5.5 while Kevin^{PS3} obtained a mean rating of 2.5.

As with the sibling support group, children and their parents were asked to provide evaluative feedback regarding their experience with the social skills groups. Both groups expressed overwhelming approval for the intervention, with all but one child giving the intervention a "Thumbs Up" and all parents reporting high levels of satisfaction. Using the 5-point Likert-type scale reproduced in Appendix C, mean scores

among the three children with Asperger's Syndrome who completed their evaluations were 3 for interestingness and 3.3 for helpfulness. Sibling ratings tended to be slightly higher for interestingness (mean = 4.3) but lower for helpfulness (mean = 2.7). Role-plays were typically identified as an enjoyable aspect of the intervention while homework was mentioned by two of three children with Asperger's Syndrome as the aspect they liked the least. Charlie^{AS4} also commented on the fact that the intervention did not address more "subtle" aspects of socialization. Of the three parents who completed evaluation forms and rated this part of the intervention using the 5-point Likert-type scale reproduced in Appendix D, two gave satisfaction ratings of 4 while the other rated it as a 5. David^{AS2}'s mother expressed a desire for him to "increase his knowledge of body language and conversation skills" and reported that she felt this goal had been met through the social skills training program. Beth^{AS3}'s mother concurred that the program had satisfied her goal of helping Beth^{AS3} learn more about social skills. Finally, Charlie^{AS4}'s father explained that his goal of social skill development had not been met due to what he described as Charlie^{AS4}'s "resistance" to developing social skills, not to the failure of the program. The involvement of siblings was consistently identified as the feature parents liked most about the intervention. Anecdotally, David^{AS2}'s and Beth^{AS3}'s mothers also reported feeling that the experience had instilled their children with greater confidence.

CHAPTER 4: DISCUSSION

Summary of Findings

The findings from this pilot study offer preliminary evidence in support of the potential effectiveness of a manualized, sibling-mediated social skills group intervention for children with Asperger's Syndrome. From baseline to Time 2, all four children with Asperger's Syndrome demonstrated improvement on at least two measures of social functioning, the ASSQ and the SRS. More importantly, the majority of these improvements were maintained or even furthered at 3-month follow-up, with one child evidencing dramatic improvement on the ASSQ in that his score at Time 3 no longer fell within the range of clinical significance. Results from other outcome measures of social functioning including observations made during the play session were more inconsistent and less dramatic. Generalization of skills also proved to be quite limited in that teacher SSRS scores remained largely stable over time. Though tenuous given the limitations discussed later in this section, the favorable results nevertheless provide a promising foundation for expanded efforts (1) to establish the efficacy of this approach, and (2) to compare its outcomes with those of other treatment protocols. Additionally, they provide a basis for recommendations as to how future interventions can improve upon the methods utilized in the present study. The following section highlights some of the major strengths and weaknesses of the present study that should be considered when planning future social skills interventions.

Intervention Strengths and Weaknesses

Sibling Support Group

The impact of the sibling support group on children's emotional functioning was difficult to assess given that all siblings except Kevin^{PS3} scored within normal limits across the CBCL, YSR, and TRF. Despite the fact that scores on this standardized outcome measure did not change much over time, the sibling support group received unequivocal support from both children and their parents. Interestingly, this same pattern of high qualitative ratings in the face of negligible objective data was previously reported by McLinden and colleagues (1991). Children's subjective report of their positive experience in the sibling support group may have been attributable at least in part to the fact that it allowed them to connect with one another prior to the start of the social skills training. It also provided siblings with the psychoeducation that Attwood (2000) maintained is a critical to the success of a peer-mediated social skills intervention. Additionally, it afforded them the opportunity to practice performing in front of a group, a task that proved to be challenging for the two teenage siblings who presented as more self-conscious than their younger counterparts. Rogers (2000) noted that the success of a peer-mediated social skills intervention is largely dependent upon the skill and training of the peers themselves. Since role-plays comprised a key component of the social skills intervention, the goal in having the siblings practice their acting skills in the small group format was to reduce their anxiety a priori, thus enabling them to be more comfortable and effective in their performances with their brothers or sisters. Subjectively, it seemed that this goal was met as both Kevin^{PS3} and Kelly^{PS4} evidenced less reluctance to perform

before the group during the social skills training than they had initially in the sibling support group.

Social Skills Training

Despite the overwhelming positive feedback from parents and children regarding the social skills group, examination of facilitator ratings revealed some general trends that will be important to consider when planning for a similar intervention. A comparison of ratings across age and gender revealed a pattern in which engagement and participation scores increased with age and were usually higher in females than in males. Siblings also tended to be rated as more engaged during the sessions, although this pattern was reversed for Beth^{AS3} and Kevin^{PS3}. The relative ages of children within each dyad did not seem to impact the collaboration ratings as facilitators assigned average or above average ratings both to pairs in which the child with Asperger's Syndrome was younger (i.e., Beth^{AS3} and Kevin^{PS3}) and older (i.e., David^{AS2} and Felicia^{PS2}; Charlie^{AS4} and Kelly^{PS4}). However, Michael^{AS1} and Amy^{PS1}'s inability to work together effectively was consistently identified as a major barrier to participation. For his part, Michael^{AS1} was extremely shy and reluctant to speak in front of the others. Amy^{PS1}, in contrast, was quite outgoing but related to her brother in a way that was described by interventionists as condescending and counterproductive. As the oldest and only female among the three siblings in her family, it may be that she had assumed this "mothering" behavior in response to demands placed upon the family unit. Indeed, of the four siblings in the present study, she reported the highest levels of domestic and caregiving responsibility, presumably as a result of her own mother's pursuit of a professional degree that required her to take night classes. In terms of the impact of the conflict on the group dynamic

during the intervention, other group members were largely unaffected by the tension between Michael^{AS1} and Amy^{PS1}.

Another issue that arose over the course of the six sessions and proved to be a major obstacle in terms of the delivery of instruction related to David^{AS2}'s restlessness and distractibility. Not only did his behavior require the constant attention of one interventionist, thus minimizing her ability to assume responsibility for part of the training, but the disruptive nature of his actions compromised the overall coherence of the lessons as discussions had to be stopped and resumed when redirection was needed. His difficulties became even more apparent during the party in Session 6. After eating pizza and ice cream, several children began a spontaneous game of foosball. Those who could not participate in the game, including David^{AS2}, stood nearby the table. Before long, however, David^{AS2} began to make advances toward the foosball table and ignored the requests of the players not to get too close. He persisted in his efforts and eventually interrupted the game altogether by removing all of the extra balls from the table.

In addition to the variability across the dyads in terms of siblings' ability to collaborate during the role-plays, groups differed widely with respect to the amount of support they needed in performing the skits. Although scripts for each role-play were developed as part of the manual, the two older pairs (i.e., Beth^{AS3} and Kevin^{PS3}, Charlie^{AS4} and Kelly^{PS4}) took creative liberties with their performances, often modifying the dialogue or ad-libbing in a more improvisational style. This accommodation was made after Charlie^{AS4} repeatedly challenged the authenticity of the scripts in the first session, describing them as "stilted" or not appropriate for the proposed scenario. Although the opportunity to revise the scripts was extended to all groups, Michael^{AS1} and

David^{AS2} needed the structure of the script to allow them to focus their energy on practicing the nonverbal aspects of the interaction.

Retrospective review of the videotapes from each session revealed that the aforementioned accommodation proved to be the only major deviation from the manual. Group discussions followed the topic outline developed for each session, and the facilitators were able to effectively share responsibility for the instruction portion each week. Discussions flowed smoothly, with children assuming a more active role over time. Participants had ample opportunity to rehearse role-plays as dyads under the supervision of one of the interventionists before performing them for the group. These practice periods not only enabled the dyads to ask questions and “work out the kinks” before presenting the scenes to the group, they also provided a more relaxed atmosphere in which participants could devote more of their energy to applying the skill being taught that week. Participants also responded favorably to the “Thumbs Up/Thumbs Down” format for giving evaluative feedback to each other and were willing to offer verbal explanations for their decisions. The humor of the nonverbal cue often seemed to soften the impact of a negative appraisal, thus allowing the recipient to be more accepting of the feedback.

Participant Feedback

With the exception of David^{AS2}, parents and children reported a positive overall experience with both the sibling support group and the social skills training. The inclusion of siblings was identified as a primary factor in two families’ decision to participate. David^{AS2}’s mother noted that her son was far more willing to attend the sessions in this study than other social skills groups because he knew that his sister would

be accompanying him. Charlie^{AS4}'s mother was similarly intrigued by the sibling component but more for the potential benefit to Kelly^{PS4} than to Charlie^{AS4} himself. At the 3-month follow-up session, several parents relayed anecdotal information regarding ways in which they felt the intervention had had an impact on their family. Both David^{AS2}'s and Beth^{AS3}'s mothers noted that their children seemed more confident at the start of the new school year. David^{AS2}'s mother also reported improvements in the sibling relationship. During the sibling support group, Felicia^{PS2} revealed that she was reluctant to invite friends to her house for fear that David^{AS2} would embarrass her by insisting that she and her friend listen to him as he gave a discourse on human anatomy, his area of circumscribed interest. The other siblings suggested that she develop a scripted statement to use when he attempted to hone in on her time with a friend, and the children practiced this statement within the context of the support group. At follow-up, David^{AS2} and Felicia^{PS2}'s mother reported that Felicia^{PS2} had successfully implemented the strategy at home and was able to assert herself in an appropriate manner. Although David^{AS2} initially resisted the tactic, he eventually stopped the behavior. In turn, Felicia^{PS2} reportedly became more receptive to his requests to pursue other activities of mutual interest, such as board games, at times when she was not entertaining a friend.

Parents were also asked to identify ways in which they felt the program could be improved. Their comments were largely related to logistical factors, with several parents suggesting holding the sessions in "more convenient locations" in the suburbs, perhaps in conjunction with parent support meetings through the local ASCEND group. One parent also suggested holding an informational session for parents prior to the social skills group to provide advice on ways in which they could support the goals of the program at home.

Evaluation of Social Skills Outcome Measures

Social Functioning Variables

The social and communication deficits of all four children were documented in elevated baseline scores on both the ASSQ and SRS. Scores on these instruments were within or above the normative ranges reported by their respective authors using clinical samples of children with autistic spectrum disorders. The severity of the social deficits was also evident in the stark contrast in scores between each child and his or her sibling(s). Although all but one child had follow-up scores on both instruments at Time 2 and Time 3 that remained within the clinically significant range, the observed decreases were promising in that they suggested that skills learned and practiced in this short-term intervention may have translated into observable changes in behavior that generalized beyond the context of the intervention setting (although not to school).

Both the ASSQ and SRS were selected for their potential specificity for the types of social deficits observed in children with Asperger's Syndrome. In contrast to more traditional measures like the SSRS that emphasize overt social behaviors such as *"Politely refuses unreasonable requests from others"* or *"Accepts friends' ideas for playing,"* the ASSQ and SRS include a number of items assessing more subtle nuances of interpersonal interactions such as *"Invents idiosyncratic words and expressions"* and *"Is able to understand the meaning of other people's tone of voice or facial expressions."* The validity of the ASSQ and SRS was supported in the present study by contrasting the clinically significant scores on these instruments to the more moderately low scores obtained from the SSRS. Parent report generally yielded the lowest scores on the SSRS, with most parents estimating their child's social abilities to be between 1 and 2 standard

deviations below the mean. Teacher report was slightly higher, followed by self-report data from each child. It is important to note that two of the three children for whom complete SSRS data were available rated themselves not only significantly higher than their parents, but also within or even above the average range relative to their peers at most time periods. This finding suggests that the children within this sample may have been motivated to respond in a manner whereby they minimized their vulnerabilities in order to appear more socially competent than they really were. Alternatively, it may be that children lacked the self-awareness needed to accurately report their level of social functioning. Overall, the discrepancy in scores across respondents as well as across instruments highlights the importance of assessing social functioning through the use of multiple informants and measures.

The DANVA2 was included as part of the assessment battery in order to quantitatively examine the more subtle deficits in nonverbal communication described by many researchers in their work with individuals with Asperger's Syndrome (Capps et al., 1992; Klin & Volkmar, 1997; MacDonald et al., 1989). Unfortunately, concerns regarding the sensitivity and specificity of this instrument to these types of deficits were raised when children in the present study obtained average scores at baseline on three of the four subtests (the exception being Adult Paralanguage). While it is possible that the children themselves represent an atypical sample in which their ability to appreciate nonverbal aspects of communication was intact, observations of the co-facilitators during the intervention suggested otherwise. For example, David^{AS2} repeatedly failed to appreciate the nonverbal cues other group members directed toward him when he behaved inappropriately. The inconsistency in scores across subtests and variability in

change over time cast further doubt as to the overall utility of the DANVA2 as an outcome measure. Furthermore, the downward trend in scores observed across several participants seemed to contradict the small to moderate improvements observed across other behavioral measures.

Despite these limitations, a closer examination of the results from the DANVA2 revealed some interesting findings that may have important implications for future research. First of all, the children in this sample generally obtained higher standard scores on those subtests that used children as models rather than adults (Figure 5). Although this pattern was not observed in every instance, comparisons between scores on Child Faces and Adult Faces subtests revealed higher scores for the former for all children except Beth^{AS3}. The magnitude of this effect was even more pronounced in the area of vocal prosody as children's scores on the Child Paralanguage subtest were often considerably higher than those on Adult Paralanguage. Taken together, these findings suggest that children with Asperger's Syndrome may be more attuned to emotions conveyed through the faces and voices of their peers than they are to recognizing the same feelings in adults. This proposed explanation, in turn, would support the future use of peer or sibling models in social skills training programs.

Another important finding from the DANVA2 relates to the types of errors children made with respect to the intensity of emotion being conveyed through facial expression or tone of voice. As a group, children tended to make significantly more errors on stimuli of low rather than high intensity. The ratio of low intensity to high intensity errors was most pronounced on the two faces tasks, with children making approximately 75% of their errors on items categorized as low intensity. Intensity of

emotion proved to be less of a factor when trying to identify emotion through tone of voice in that children were more equal in terms of the errors they made to both obvious and more subtle expressions of emotion. At each time period, approximately 60% of children's errors on the two paralinguistic tasks were made on items categorized as low intensity. Conversely, nearly 40% of the errors children made on the prosody task were to stimuli for which the emotion was intended to be obvious. This is in stark contrast to the analogous visual tasks on which only 25% of the errors made involved expressions of high intensity emotion. In sum, these findings suggest that future interventions addressing deficits in nonverbal communication among higher functioning individuals with autism or Asperger's Syndrome need to emphasize the more subtle nuances of facial expression and vocal prosody.

Finally, the play session provided an opportunity to examine the extent to which skills generalized to a more naturalistic context. While observational data proved helpful for at least two of the participants by documenting a trend toward improved appropriate behavior toward their siblings, the choice of the "I Spy" game for the activity proved detrimental in that it focused children's attention on the act of searching for hidden objects as opposed to providing a context for social interaction. This unfortunate effect was reflected in a ratio of approximately 2 game-related comments for every 1 social comment in most sessions. Given the amount of social interaction that occurred during the unstructured context of the party during the last social skills group, it may have been more revealing to collect additional observational data while the siblings shared a snack.

In sum, the outcome measures used to assess social functioning varied in terms of their ability to detect change over time. The ASSQ and SRS yielded the most substantial

change in scores from baseline to post-intervention, followed by the SSRS, the DANVA2 (which proved useful in documenting the difficulties children with Asperger's Syndrome have in appreciating more subtle expressions of emotions), and the informal play session. While this pattern may reflect actual differences in the sensitivities of the various instruments to the types of social deficits associated with Asperger's Syndrome, it is important to consider the extent to which scores may have been influenced by other factors. For example, the fact that the greatest evidence of improved social functioning following the intervention came from parents' subjective ratings of their children's behavior suggests that scores may have been biased as a result of effort justification. As a group, parents reported extremely high levels of satisfaction with the intervention and, as a result, may have been motivated to recognize the efforts of the researcher by reporting lower levels of atypical behavior on the ASSQ and SRS following the social skills training. The principle behind effort justification might also reconcile the fact that the intervention received such overwhelming qualitative feedback from families even though children evidenced little change on more objective outcome measures such as the DANVA2.

Emotional Functioning Variables

Three of the four participating siblings obtained average scores across all time periods on the CBCL/YSR/TRF Internalizing Behavior Problems index, a finding which suggests that they were not experiencing any major symptoms of anxiety or depression. While this finding is consistent with that of early researchers (DeMyer, 1979; Mates, 1990; Sullivan, 1989), it contradicts more recent studies (Gold, 1993; Piven et al., 1997). One explanation for the lack of any significant findings over time in the present study

may be related to the selection of the CBCL/YSR/TRF as opposed to another instrument such as the CDI used in the Gold (1993) study. Whereas the CBCL/YSR/TRF asks the rater to respond to items based on observations made over the previous 6 months, the CDI considers only the 2 weeks prior to the evaluation and, thus, may be more sensitive to changes that occur over a relatively brief period of time. Moreover, the fact that most ratings were based upon observations made during overlapping 6-month time frames limits the potential for detecting change over time. Additionally, the apparent lack of internalizing features in this group may substantiate the claim made by Piven et al. (1990) that overall adjustment may be associated with the cognitive and adaptive functioning of the affected siblings. As the children with Asperger's Syndrome included in this study had IQ scores in the average and very superior ranges, the negative impact of their social disability on their siblings' emotional functioning may have been minimized. Also, siblings reported relatively little caregiving responsibility for their brothers and sisters with Asperger's Syndrome and few responsibilities at home, factors that have previously been associated with fewer symptoms of depression (Gold, 1993). Unfortunately, the range in scores across participants on this outcome variable was too limited to further examine the relationship between emotional characteristics and demographic variables such as age, gender, or perceived social support that have been identified as potential mediators in earlier research.

The only sibling to exhibit clinically significant levels of internalizing behavior problems was Kevin^{PS3}, and this occurred only on the YSR (Figure 6). Although the elevated scores were not corroborated by either parent or teacher report, they warrant mention as they provide further documentation of the idiosyncratic nature of his social

and emotional functioning as compared to the other siblings in the group. His scores on all baseline measures of social functioning were within normal limits, but they were somewhat higher than those observed in other siblings. Initial impressions of Kevin^{PS3} in the support group were that he was socially awkward, but these were tempered by the fact that he was the oldest as well as the only male sibling to take part in the intervention. During the social skills groups, however, he vacillated between an aloof demeanor and awkward attempts to make the group laugh. He had a tendency to intellectualize, often citing references to historical or literary figures seemingly without an appreciation of the fact that many of the children in the group were too young to know the individual whom he had referenced. Taken together, these observations suggest that Kevin^{PS3} may have fallen into what Piven and colleagues (1997) described as the broader autism phenotype (BAP). Consequently, it is possible that his own eccentric behaviors adversely impacted his relationships with peers, thus contributing to his elevated levels of depression. Regardless of whether or not this is true, his effectiveness as an instructor and model of appropriate social interaction was questionable.

Limitations of the Present Study

In response to one of the criticisms leveled by Landry (1999), the present study attempted to distinguish itself from earlier research by detailing the specific criteria by which a diagnosis of Asperger's Syndrome was substantiated in the sample. While the ASSQ and SRS proved to be valuable outcome measures, their diagnostic utility was limited in the sense that neither has been adequately normed for use with this population. Interestingly, this same limitation holds true even for the ADOS, the "gold standard" in diagnosis of individuals with autistic spectrum disorders, which provides cut-off scores

that differentiate autism from PDD-NOS but does not have scoring criteria specific for Asperger's Syndrome. Ultimately, the distinction between Asperger's Syndrome and high functioning autism in the present study proved less relevant than the documentation of social and communication deficits revealed by each of these instruments. Although all children were enrolled in the study with an established diagnosis of Asperger's Syndrome from either a clinical psychologist or a developmental pediatrician, they evidenced a pattern of performance on the brief WISC-III screener that more closely resembled that of a group of individuals with high functioning autism described by Klin et al. (1995) than a group with Asperger's Syndrome. Specifically, Michael^{AS1} performed significantly better on the two nonverbal subtests than he did on the two verbal measures, while the other three obtained comparable scores across all four subtests. Extrapolating from these limited sets of scores, none of the children exhibited the $VIQ > PIQ$ discrepancy described by Miller and Ozonoff (2000) in their sample of children with Asperger's Syndrome.

In addition to the lack of diagnostic clarification, the present study was characterized by other methodological flaws frequently encountered by those within the field of pervasive developmental disorders. The sample itself was inherently biased from the beginning given the manner by which participants were recruited. Only parents who were involved in local support groups received information about the study, thus limiting the potential sample to children whose families took a more active approach to dealing with the social disability. The sample was further restricted by the location in which the intervention took place in that families who expressed interest but could not arrange transportation or accommodate a lengthy travel time ultimately declined to participate in

the study. These socioeconomic selection factors were reflected in demographic characteristics for the final sample that are not representative of the general population (e.g., both parents in 3 of 4 families held graduate degrees). The small sample size and heterogeneity of children's skill levels naturally limited the conclusions that can be drawn from the results. Although the four children in this sample demonstrated some improvement over the course of the intervention in terms of their social functioning, one cannot presume that other children would benefit from a similar treatment. Additionally, the lack of a control group for either hypothesis means that one cannot with certainty attribute the change in behavior to the intervention. Without experimental rigor and no ability to statistically test outcome, it is arguable that any observed effects could be due to other factors such as time, dynamic variables associated with the extra focus and attention that comes from participating in a treatment study, or simply chance. Additionally, parents and children may have been motivated to respond in a way that would enable the research to obtain favorable results.

Another limitation of the present study relates to the translation of discrete skills into the more fluid context of naturalistic social interaction. The intervention focused on a fairly small subset of skills identified in the literature as areas of weakness in children with Asperger's Syndrome. While the tentative results of this study suggest that these children do, in fact, have the capacity to learn these skills, the more important question is the extent to which they were able to apply these skills in novel social contexts. One of the participants, Charlie^{AS4}, even recognized the distinction between these two issues, noting that although he already knew the concepts that were taught in the lessons, "*...social skills are a very subtle art that I have not learned.*" The play session was an

attempt to gather observational data in that regard, but the choice of an activity that centered on a game restricted the opportunities for purely social interaction between siblings. An attempt was made to assess generalization through collecting data from teachers, but the selection of the SSRS as the sole outcome measure of social functioning sent to teachers may have contributed to the limited change observed in participants over time. As mentioned previously, this instrument may not be particularly sensitive to the types of social deficits present in children with pervasive developmental disorders. In the present study, it revealed far fewer changes in social functioning than other measures more specific for use with children autistic spectrum disorders. A teacher version of the SRS is available that, in retrospect, would have been useful to include in assessments of generalization of skills to the school setting. Nevertheless, the fact that teacher SSRS results were largely insignificant may also reflect a failure of children to generalize the skills they had acquired similar to that reported in previous studies (Stahmer, 1995; Thorp, Stahmer & Schreibman, 1995). Alternatively, the fact that Time 3 data collection coincided with the beginning of a new school year may have led the new teacher from whom updated information was requested to consult with the previous respondent in order to offer a more “accurate” estimation of the child’s behavior.

One of the major challenges in working with this population is that their learning style tends to be situation-specific; that is, they tend to learn a skill in one context but do not develop an appreciation or understanding of how the skill can be applied in novel settings. This principle was observed in Session 2 by one of the interventionists, who noted that David^{AS2} was able to demonstrate appropriate use of facial expressions in the role-plays with his sister but often exhibited a mismatch between affect and facial

expression in more casual conversation (e.g., saying he was happy while having a somber expression on his face). Similarly, Charlie^{AS4}'s ability maintain appropriate eye contact was repeatedly identified as an area of weakness in observations from interventionists, yet he was able to demonstrate this skill within the context of role-plays on nonverbal communication. Homework assignments were included in each session in an effort to extend the learning experience beyond the setting of the social skills group itself, with several assignments requiring participants to practice skills in school (e.g., compliment a classmate or teacher). Participants were asked to record their completion of homework assignments in a journal that was reviewed each week, and most children provided adequate documentation at each session. Assignments were kept brief, however, so as not to interfere with actual school homework. As a result, it is possible that the amount of practice expected or completed outside the weekly 90-minute sessions was not sufficient to translate into appreciable change in skill performance.

Future Directions

Following these early encouraging results, the next step would be to replicate the intervention in a better controlled study that includes a wait list condition to control for the effect of time or maturation. Similarly, the question of whether the improvements in social functioning observed in the present study were simply the result of effort justification could be explored by randomly assigning participants to treatment groups with varying expectations for improvements (i.e. high vs. low expectancy). Regardless of the design of the study, recruitment efforts should be expanded to ensure a more representative sample, perhaps by including schools or clinical settings that specialize in the diagnosis of pervasive developmental disorders. Groups may be more effective if

participants are more closely matched with respect to age and overall levels of cognitive and social functioning, so participants should be carefully screened at the outset to establish the relative homogeneity of the sample. Characteristics of the sibling facilitators will also need to be considered, with particular attention given to how issues such as gender, relative birth order, and overall level of cognitive and social functioning may influence their ability to serve as models and collaborate effectively with their brother or sister with Asperger's Syndrome.

Although the format of the social skills groups worked well in this the present study, several modifications may be helpful in addressing some of the limitations described earlier. First, interventions need to move beyond the stage of teaching discrete skills to incorporating more naturalistic activities that require participants to put their skills to use in a more ecologically valid manner. One suggested method for promoting ecological validity would be to ask participants and their parents to identify real life situations that could be developed into role-plays. It would also be helpful to observe participants in a variety of naturalistic settings prior to the outset of the social skills training to identify the specific skills and/or situations that are particularly problematic. Second, there is a need to emphasize more subtle facets of social interaction and nonverbal communication. These broad goals are not likely to be realized, however, within the context of a 6-week intervention, so longer or more circumscribed programs should be developed. Third, opportunities for generalization of skills can be built into the training sessions themselves by mixing up the sibling pairs to allow children with Asperger's Syndrome to role-play with someone other than their own brother or sister. Sibling pairs could also be grouped for larger role-plays. Finally, it is recommended that

future studies continue to use videotape to document each session in order to facilitate subsequent review and modification of instruction as necessary.

Quantitative evidence in support of the inclusion of a sibling support group was limited, yet the potential merits for this component are evident in the form of subjective evaluations made by participants as well as the facilitator. It is hoped that more appreciable gains in emotional functioning would be observed with a larger and more representative sample and inclusion of measures more sensitive to change over time. Regardless, the benefits of providing siblings with education and practice prior to their involvement as facilitators in a social skills training program outweigh the cost in terms of time needed to complete this portion of the intervention.

The present study also illustrated the ongoing controversy surrounding the distinction between Asperger's Syndrome and high functioning autism. While the debate continues, it will be important to consider the extent to which the differential matters in terms of a child's ability to benefit from this type of social skills group intervention. On the one hand, researchers must continually strive to ensure that their samples are as homogeneous as possible in terms of their diagnostic classification in order to allow for comparisons across studies. In clinical practice, however, what matters more is not the child's score on the ADOS or the ADI-R (both of which have become required for publication), but rather his or her scores on more specific measures such as the ASSQ and SRS used in the present study.

Finally, the present study has implications for clinical practice in that it provides tentative evidence in support of a manualized social skills program that is cost-effective in terms of both the limited number of materials needed as well as the number of children

who can receive treatment at any given time. Clinicians have a plethora of social skills curricula at their disposal, yet the majority of these lack empirical evidence to support their use. The results of the present study could be extended by collaborating with other clinicians to offer the program to more families on a much broader scale.

Conclusions

This pilot study offers preliminary evidence in support of a unique social skills intervention that relies largely on siblings as the models of nonverbal and communication skills for their brothers or sisters with Asperger's Syndrome. Participants and their families reported overwhelming satisfaction with the program, some of which is corroborated by improvements in social functioning observed across several relatively new instruments. While this intervention is by no means offered as a cure for Asperger's Syndrome, it represents a building block toward helping individuals with social disabilities navigate the complex world of social interaction with greater confidence and competence.

Table 1
Demographic Characteristics for All Participants

Child	Age	Gender	Current Grade	Current Special Ed	Current Related Services	Grade Repeated	Previous Intervention Experience	Current Medications	Parent Marital Status	Total Household Income	Parent Education
Michael^a	10	Male	3	Yes	Speech	Yes (2nd)	None	None	Married	More than \$125,000	Both some college
Amy	12	Female	6	No	None	No	None				
Alex	9	Male	3	Yes	Speech	No	None				
David	12	Male	6	Yes	Speech	No	Yes	Prozac; asthma meds	Married	Less than \$50,000	Both graduate degrees
Felicia	8	Female	2	No	None	No	None	None			
Beth	13	Female	7	Yes (gifted)	Speech	No	Yes	Zoloft; allergy meds	Divorced	\$50,000-\$74,999	Both graduate degrees
Kevin	16	Male	10	Yes (gifted)	None	No	No	Allergy meds			
Charlie	14	Male	9	No	No	No	None	None	Married	\$120,000-\$124,999	Both graduate degrees
Kelly	13	Female	7	No	No	No	None	None			

^a Names and demographic information for children with Asperger's Syndrome appear in bold

Table 2

Tests and Variables Used to Assess Social, Emotional, and Cognitive Functioning and Sibling Responsibility

Domain	Tests and Variables	Respondent				
		Child with AS	Participant Sibling	Control Sibling	Parent	Teacher
Social Functioning	High-Functioning Autism Spectrum Screening Questionnaire <i>Total Score</i>				AS: T1/T2/T3 Sibs: T1 only	
	Social Reciprocity Scale <i>Summary Score</i>				AS: T1/T2/T3 Sibs: T1 only	
	Social Skills Rating System <i>Social Skills Composite</i>	T1/T2/T3	T1	T1	AS: T1/T2/T3 Sibs: T1 only	AS: T1/T2/T3 Sibs: T1 only
	Diagnostic Analysis of Nonverbal Accuracy 2 <i>Adult/Child Faces & Paralanguage</i>	T1/T2/T3	T1	T1		
	Behavioral Observation Checklist <i>Percent Appropriate Initiations</i> <i>Percent Appropriate Responses</i>	T1/T2/T3				
Emotional Functioning	Child Behavior Checklist/Youth Self Report/Teacher Report Form <i>Internalizing Behavior Problems</i>		T1/T2/T3 & post sib-grp	T1/T2/T3 & post sib-grp	T1/T2/T3 & post sib-grp	T1/T2/T3 & post sib-grp
Cognitive Functioning	Wechsler Intelligence Scales for Children—Third Edition (Screener) <i>Full Scale IQ</i>	T1				
Sibling Responsibility	Questions for Siblings <i>Summary Scores</i>		T1/T2/T3	T1/T2/T3		
Demographics	General Information Form <i>Responses to Individual Items</i>				T1/T2/T3	

Table 3
Data Completed and Intervention Sessions Attended for Each Participant

Child	Outcome Measures Completed ^a											Attendance									
	Baseline			Post Support Group			Time 2			Time 3			Sibling Group Session #			Social Skills Training Session #					
	P	C	T	P	C	T	P	C	T	P	C	T	1	2	3	1	2	3	4	5	6
<i>AS Group</i>																					
Michael	Y	Y	Y	Not Applicable	--	--	--	Y	--	Y	Not Applicable	Y	--	Y	Y	--	Y	Y	--	--	
David	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	
Beth	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	
Charlie	Y	Y	--		Y	Y	--	Y	Y	--		Y	Y	--	Y	Y	--	Y	Y	--	Y
<i>Siblings</i>																					
Amy	Y	Y	Y	Y	Y	Y	--	--	--	Y	--	Y	Y	Y	Y	Y	--	Y	Y	--	--
Felicia	Y	Y	--	Y	Y	--	Y	Y	--	Y	Y	--	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kevin	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kelly	Y	Y	--	Y	Y	--	Y	Y	--	Y	Y	--	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Control</i>																					
Alex	Y	Y	Y	Y	Y	Y	--	--	--	Y	--	Y	Not Applicable								

^a P = Parent Data; C = Child Data; T = Teacher Data

Table 4
 Baseline Social Skills Functioning of Participants and Their Siblings

Measure	Family 1			Family 2		Family 3		Family 4	
	Michael AS1	Amy PS1	Alex NS1	David AS2	Felicia PS2	Beth AS3	Kevin PS3	Charlie AS4	Kelly PS4
High-Functioning Autism Spectrum Screening Questionnaire <i>Total Score</i>	37	2	3	39	2	31	10	31	2
Social Reciprocity Scale <i>Total Score</i>	76	6	9	118	7	98	28	120	6
Social Skills Rating System (Parent) <i>Social Skills Composite Standard Score</i>	75	130	113	70	129	71	107	70	130
Social Skills Rating System (Student) <i>Social Skills Composite Standard Score</i>	130	130	118	114	114	74	92	75	128
Social Skills Rating System (Teacher) <i>Social Skills Composite Standard Score</i>	80	104	87	93	N/A	79	114	N/A	N/A
Diagnostic Analysis of Nonverbal Accuracy 2 <i>Adult Faces Standard Score</i>	89	78	100	100	100	111	112	111	86
Diagnostic Analysis of Nonverbal Accuracy 2 <i>Child Faces Standard Score</i>	103	90	127	111	100	102	101	116	88
Diagnostic Analysis of Nonverbal Accuracy 2 <i>Adult Paralanguage Standard Score</i>	80	98	106	82	96	88	87	83	83
Diagnostic Analysis of Nonverbal Accuracy 2 <i>Child Paralanguage Standard Score</i>	98	77	109	100	96	113	86	88	88

Table 5
Percent of Behaviors Observed Within Categories Across Time 1 (Baseline), Time 2, and Time 3

General Category	Behavior Type	Subjective Judgment	Michael ^{AS1}			David ^{AS2}			Beth ^{AS3}			Charlie ^{AS4}		
			Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Initiation	Social	Appropriate	0	N/A	6	15	11	0	19	0	17	12	8	5
		Inappropriate	16	N/A	0	11	16	50	0	0	0	18	15	8
	Game Related	Appropriate	3	N/A	56	44	47	21	30	41	60	31	32	47
		Inappropriate	9	N/A	0	0	0	8	0	0	0	19	11	3
Response	Social	Appropriate	0	N/A	4	9	3	0	8	3	0	0	4	1
		Inappropriate	41	N/A	0	4	3	0	4	0	0	5	4	0
	Game Related	Appropriate	14	N/A	34	17	17	21	39	56	23	10	26	30
		Inappropriate	17	N/A	0	0	3	0	0	0	0	5	0	6

Table 6
Mean Facilitator Ratings for Engagement, Participation, and Collaboration During Social Skills Group

Child	Engagement by Week						Participation by Week						Collaboration by Week					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Michael^a	2.0	--	4.0	2.5	--	--	2.5	--	4.0	2.5	--	--	2.5	--	3.0	3.5	--	--
Amy	6.5	--	6.0	6.0	--	--	6.5	--	6.0	6.0	--	--						
David	2.5	2.0	2.0	3.5	3.0	5.5	2.0	2.5	3.0	4.0	3.5	4.0	3.5	5.0	5.0	4.5	4.5	4.5
Felicia	4.0	4.5	5.0	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	6.0						
Beth	5.0	5.5	6.0	5.0	6.0	5.5	5.0	5.5	5.0	4.5	6.0	5.5	4.0	5.5	5.0	5.5	6.0	5.5
Kevin	4.0	5.0	6.0	5.0	5.5	5.5	2.5	5.5	5.0	4.5	5.0	5.0						
Charlie	6.0	5.5	--	5.5	--	5.5	6.5	5.5	--	5.5	--	6.0	6.0	6.0	--	5.0	--	6.0
Kelly	6.0	6.0	7.0	5.5	5.5	6.0	6.0	5.5	7.0	5.5	6.0	6.0						

^a Names and scores for children with Asperger's Syndrome appear in bold

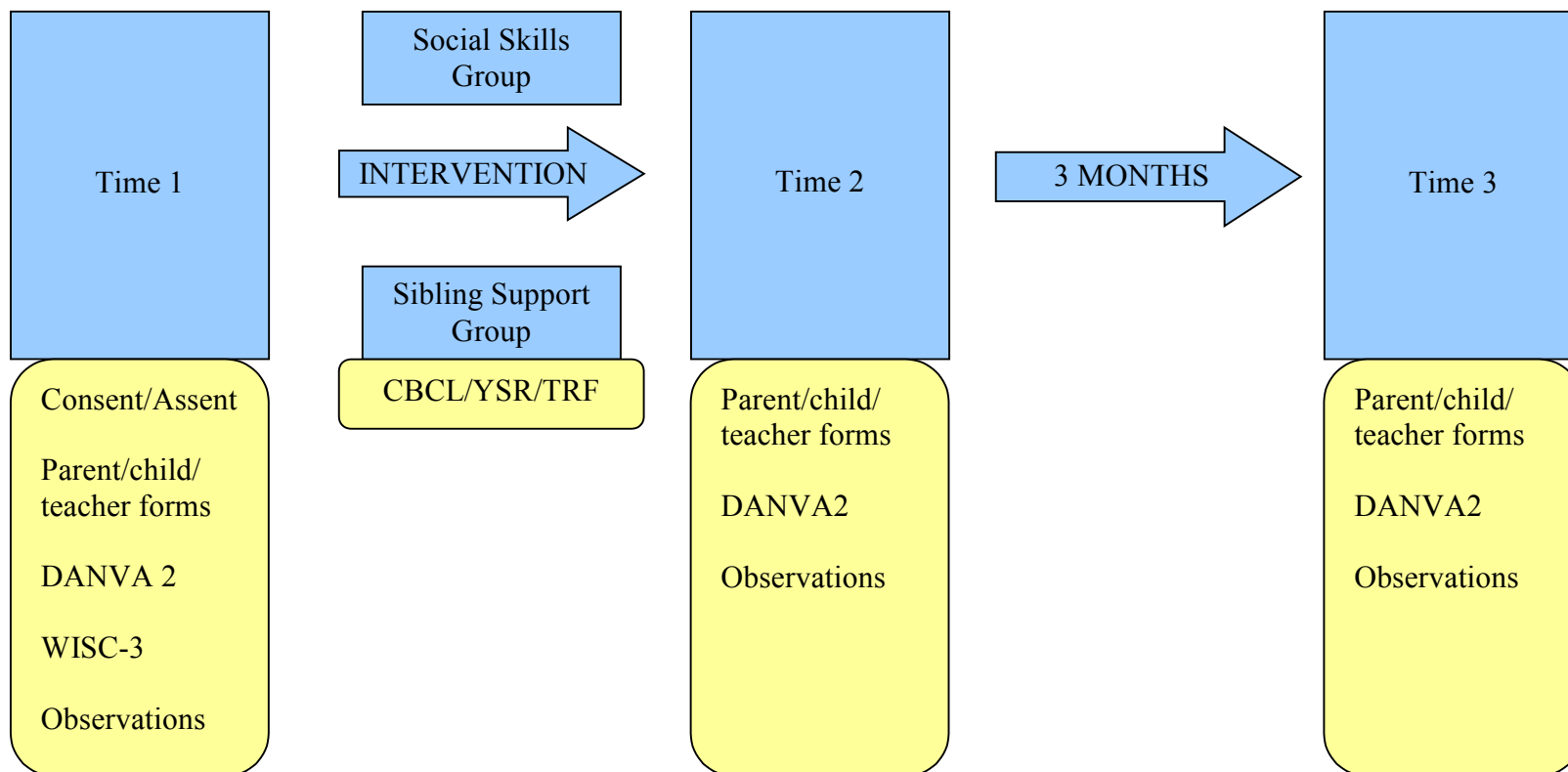


Figure 1
Timeline of Intervention and Data Collection

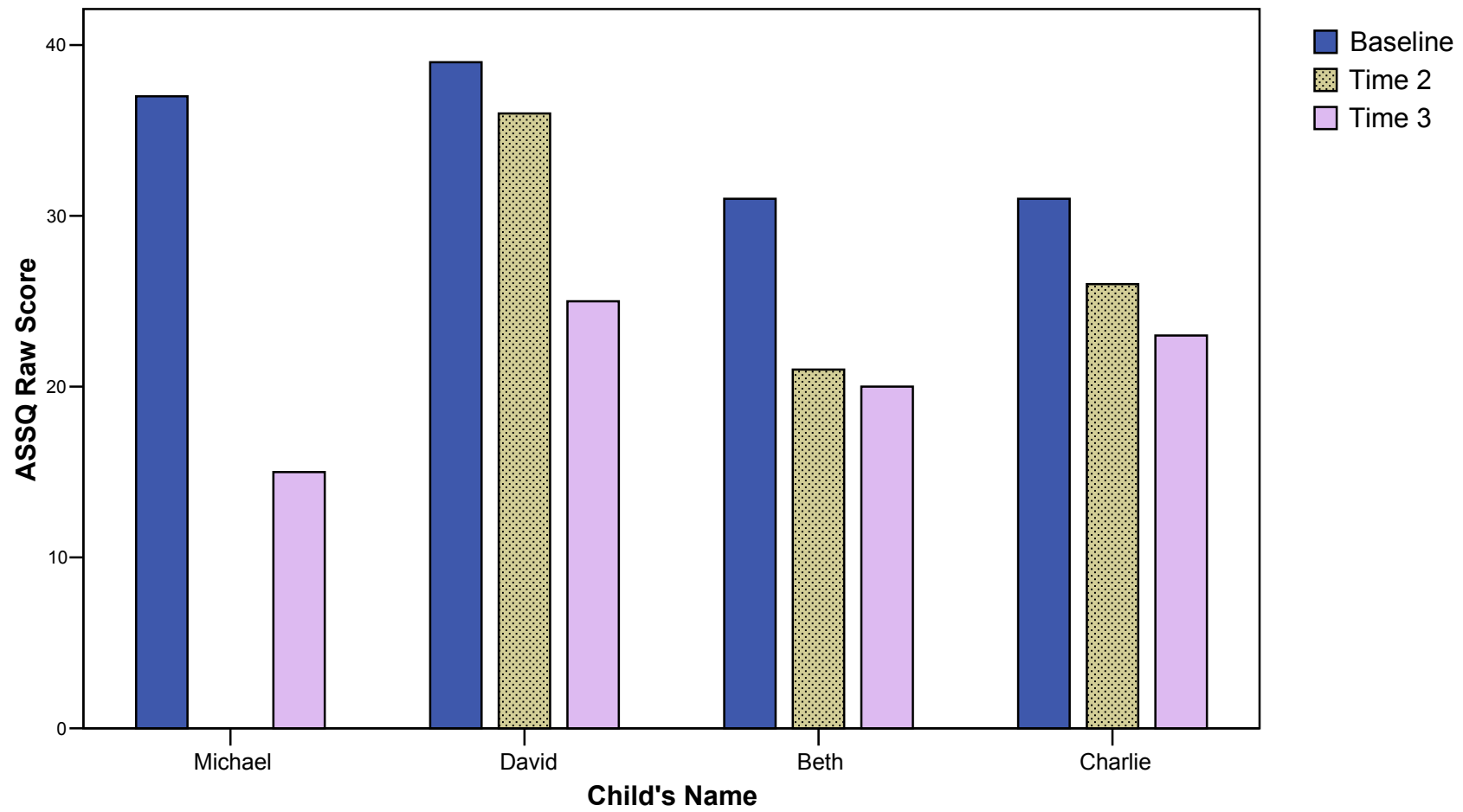


Figure 2
ASSQ Results for All Participants Across Time

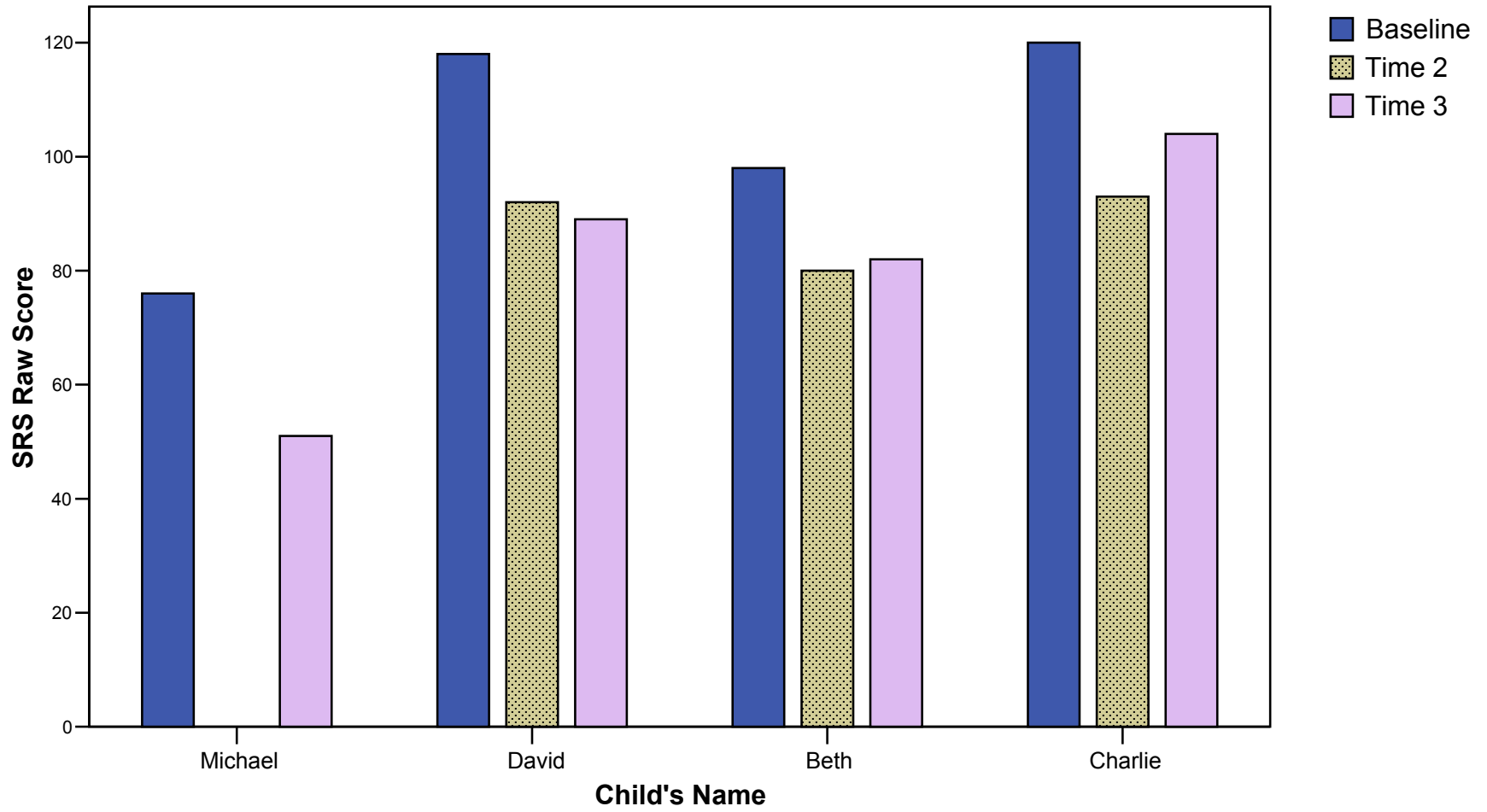


Figure 3
SRS Results for All Participants Across Time

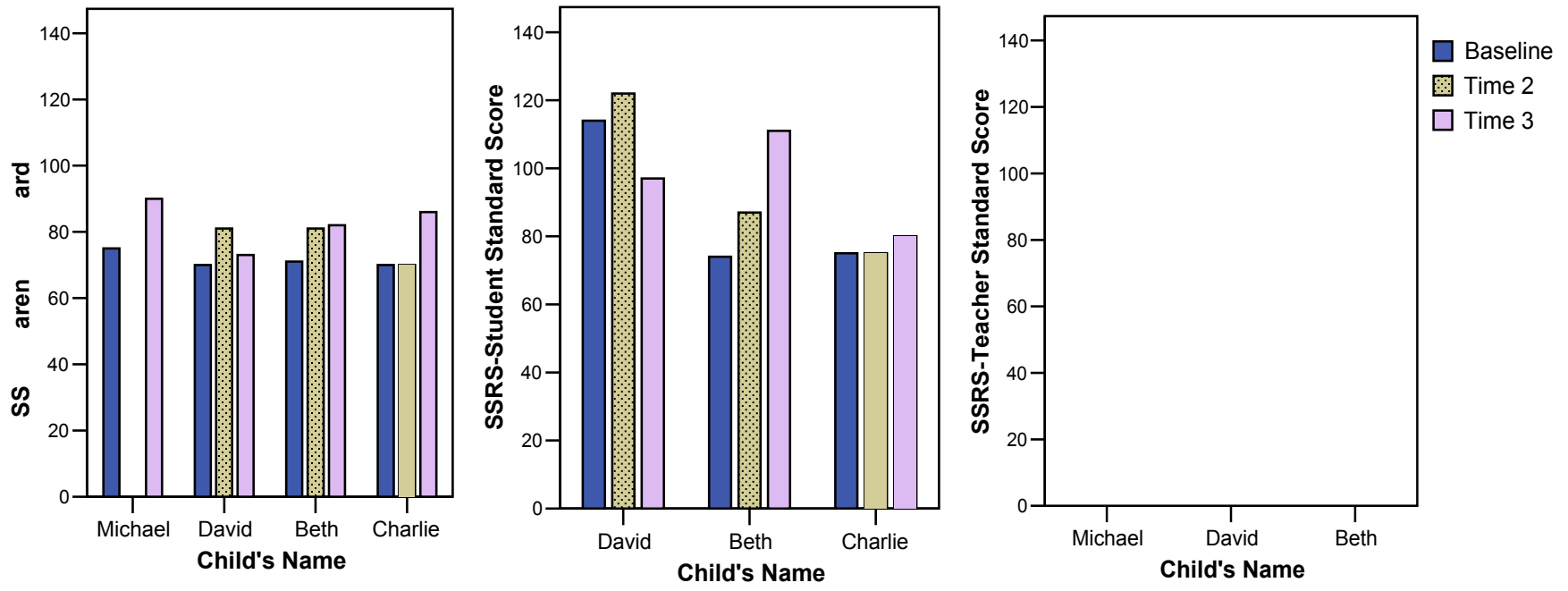


Figure 4
SSRS Results for All Participants Across Time

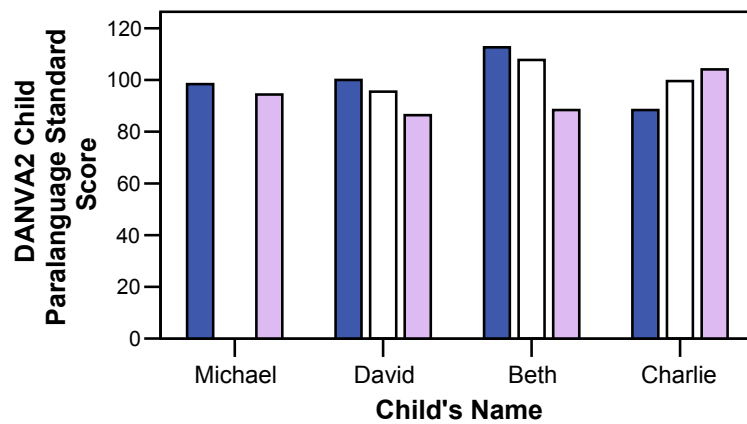
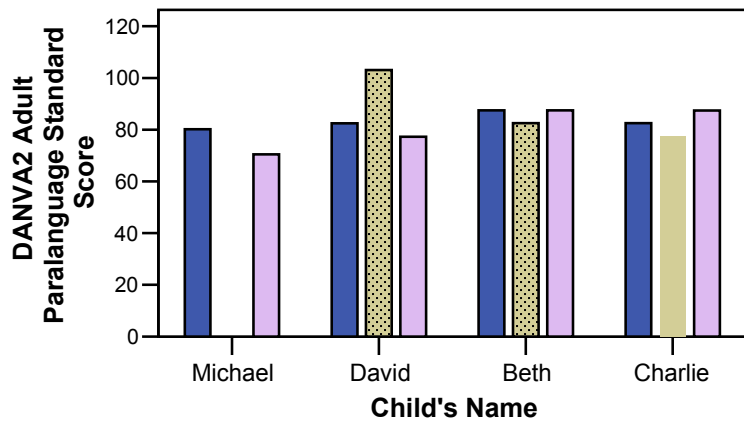
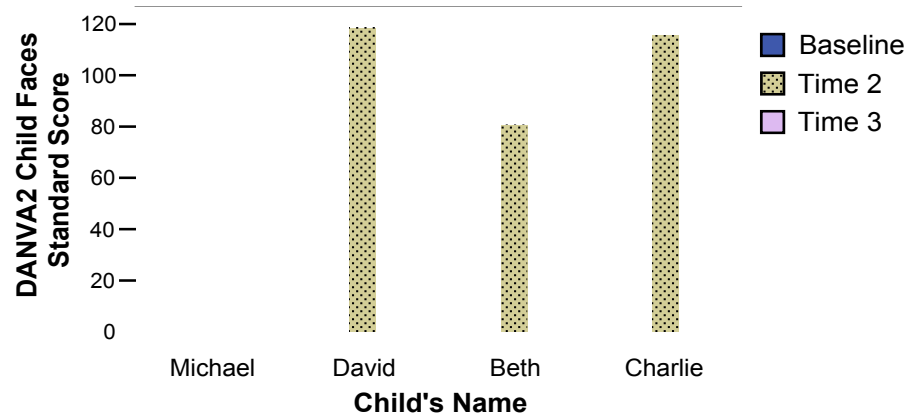
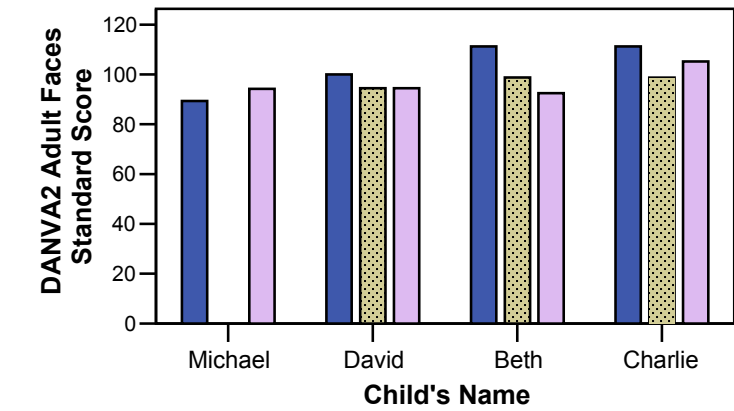


Figure 5
 DANVA2 Results for All Participants Across Time

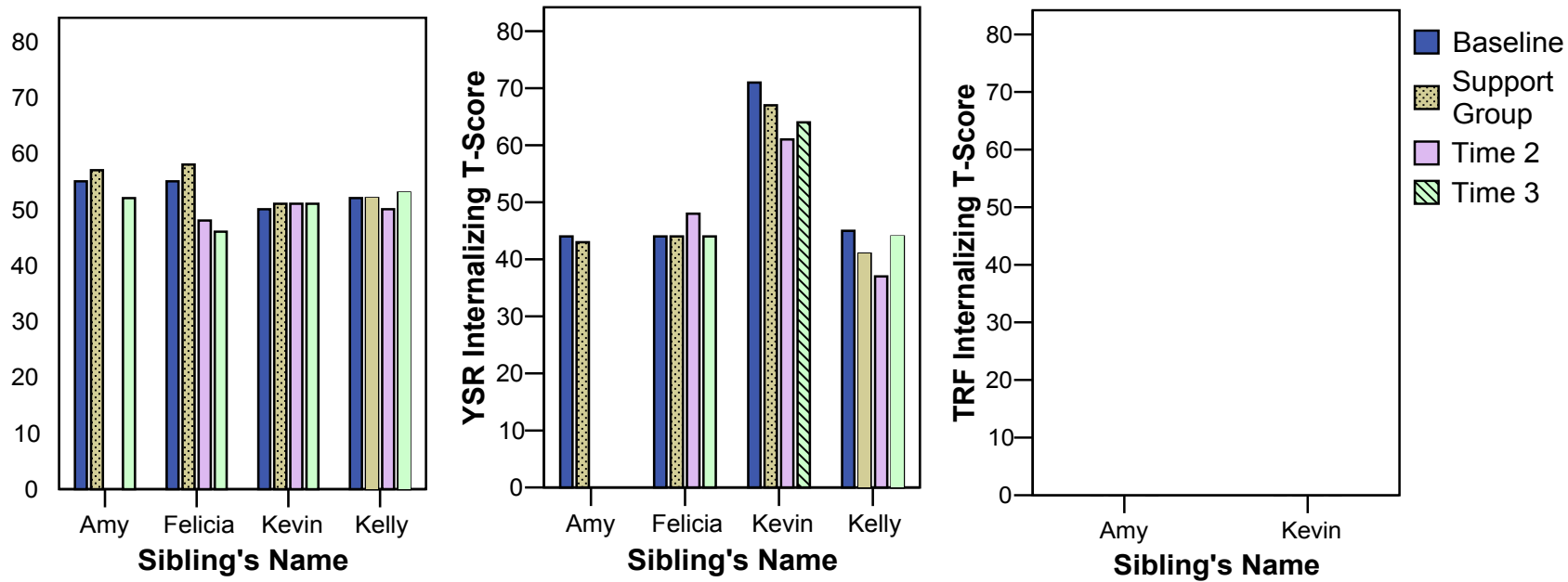


Figure 6
CBCL/YSR/TRF Results for Participating Siblings Across Time

LIST OF REFERENCES

- Achenbach, T.M. (1991). Manual for the Child Behavior Checklist-4-18 and the 1991 Profile. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M. & Edelbrock, C. S. (1981). Behavioral problems and competencies reported by parents of normal and disturbed children aged four through sixteen. *Monograph of the Society for Research in Child Development*, 46 (1, Serial No. 188).
- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)*. Washington, DC: American Psychiatric Association.
- Andron, L. & Webber, E. G. (1998). From solitary perseveration to social relatedness: Facilitating social interaction for children, adolescents, and adults with autism—A family-centered approach. Unpublished manuscript. Los Angeles: University of California.
- Asperger, H. (1991). Autistic psychopathy in childhood. (U. Frith, Trans., Annot.). In U. Frith (Ed.), *Autism and Asperger syndrome* (pp. 37-92). New York: Cambridge University Press. (Original work published 1944).
- Attwood, T. (2000). Strategies for improving the social integration of children with Asperger syndrome. *Autism*, 4(1), 85-100.
- Baker, M. J., Koegel, R. L., & Koegel, L. K. (1998). Increasing the social behavior of young children with autism using their obsessive behaviors. *Journal of the Association for Persons with Severe Handicaps*, 23(4), 300-308.
- Barakat, L. P., Hetzke, J. D., Foley, B., Carey, M. E., Gyato, K., & Phillips, P. C. (2003). Evaluation of a social-skills training group intervention with children treated for brain tumors: A pilot study. *Journal of Pediatric Psychology*, 28(5), 299-307.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT Press.
- Bauminger, N. & Yirmiya, N. (2001). The functioning and well-being of siblings of children with autism: Behavioral-genetic and familial contributions. In J. A. Burack, T. Charman, N. Yirmiya, & P. R. Zelazo (Eds.), *The development of autism: Perspectives from theory and research*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Begun, R. W. (1995). *Ready-to-Use Social Skills Lessons & Activities for Grades 4-6*. West Nyack, NY: The Center for Applied Research in Education.

- Berger, E. W. (1980). *A study of self-concept of siblings of autistic children*. Unpublished doctoral dissertation, University of Cincinnati.
- Bernard-Opitz, V., Sriram, N., & Nakhoda-Sapuan, S. (2001). Enhancing social problem solving in children with autism and normal children through computer-assisted instruction. *Journal of Autism and Developmental Disorders*, 31(4), 377-384.
- Borys, S. V., Spitz, H. H., & Dorans, B. A. (1982). Tower of Hanoi performance of retarded young adults and nonretarded children as a function of solution length and goal state. *Journal of Experimental Child Psychology*, 33, 87-110.
- Bowler, D. M. (1992). "Theory of Mind" in Asperger's syndrome. *Journal of Child Psychology and Psychiatry*, 33, 877-893.
- Brady, M. P., Shores, R. E., McEvoy, M. A., Ellis, D., & Fox, J. J. (1987). Increasing social interactions of severely handicapped autistic children. *Journal of Autism and Developmental Disorders*, 17, 375-390.
- Bristol, M. M. (1984). Family resources and successful adaptation to autistic children. In E. Schopler & G. B. Mesibov (Eds.), *The effects of autism on the family* (2nd ed., pp. 289-310). New York: Plenum Press.
- Bronfenbrenner, U. (1979). Toward an experimental ecology of human development. *American Psychologist*, 32, 513-531.
- Burgoine, E. & Wing, L. (1983). Identical triplets with Asperger's syndrome. *British Journal of Psychiatry*, 143, 261-265.
- Capps, L., Yirmiya, N., & Sigman, M. (1992). Understanding of simple and complex emotions in non-retarded children with autism. *Journal of Child Psychology and Psychiatry*, 33, 1169-1182.
- Charlop, M. H. & Milstein, J. P. (1989). Teaching autistic children conversational skills using video modeling. *Journal of Applied Behavior Analysis*, 22, 275-285.
- Charlop-Christy, M. H., Le, L., & Freeman, K. A. (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders*, 30(6), 537-552.
- Charlop-Christy, M. H., Schreibman, L., Pierce, K., & Kurtz, P. F. (1998). Childhood autism. In R. Morris & T. R. Kratochwill (Eds.), *The practice of child therapy* (3rd ed., pp. 271-302). Boston, MA: Allyn and Bacon.

- Cicirelli, V. G. (1985). Sibling relationships throughout the life cycle. In L. L'Abate (Ed.), *The handbook of family psychology and therapy* (Vol. 1, pp. 177-214). Homewood, IL: Dorsey.
- Cicirelli, V. G. (1995). *Sibling relationships across the lifespan*. New York: Plenum.
- Coleby, M. (1995). The school-aged siblings of children with disabilities. *Developmental Medicine and Child Neurology*, 37, 415-426.
- Constantino, J. N., Przybeck, T., Friesen, D., & Todd, R. D. (2000). Reciprocal social behavior in children with and without pervasive developmental disorders. *Journal of Developmental and Behavioral Pediatrics*, 21, 2-11.
- Creak, M. & Ini, S. (1960). Families of psychotic children. *Journal of Child Psychology and Psychiatry*, 1, 156-175.
- DeMyer, M. K. (1979). *Parents and children with autism*. New York: Wiley.
- Dowrick, P. W. (1986). *Social survival for children: A trainer's resource book*. New York: Brunner & Mazel.
- Dunn, J. (1993). *Young children's close relationships: Beyond attachment*. Newbury Park, CA: Sage.
- Dyssemia, Inc. (n.d.) *Instruction Manual for the Receptive Tests of the Diagnostic Analysis of Nonverbal Accuracy 2 (DANVA2)*. Retrieved September 18, 2002, from <http://www.dyssemia.com/through2.htm>
- Ehlers, S. & Gillberg, C. (1993). The epidemiology of Asperger syndrome: A total population study. *Journal of Child Psychology and Psychiatry*, 34(8), 1327-1350.
- Ehlers, S., Gillberg, C. & Wing, L. (1999). A screening questionnaire for Asperger syndrome and other high-functioning autism spectrum disorders in school age children. *Journal of Autism and Developmental Disorders*, 29, 129-141.
- Ehlers, S., Nyden, A., Gillberg, C., Dahlgren Sandburg, A. Dahlgren, S.O., Hjelmquist, E., et al. (1997). Asperger syndrome, autism, and attention disorder: A comparative study of the cognitive profiles of 120 children. *Journal of Child Psychology and Psychiatry*, 38, 207-217.
- Fisman, S., Wolf, L., Ellison, D., Gillis, B., Freeman, T., & Szatmari, P. (1996). Risk and protective factors affecting the adjustment of children with chronic disabilities. *Journal of the American Academy of Child and Adolescent Psychiatry*, 150, 891-895.

- Folstein, S. E. & Santangelo, S. L. (2000). Does Asperger syndrome aggregate in families? In A. Klin, F. R. Volkmar, & S. S. Sparrow (Eds.), *Asperger syndrome*. New York: Guilford.
- Frith, U. (1991). *Autism and Asperger syndrome*. Cambridge: Cambridge University Press.
- Gardner, M. F. (1982). *Test of visual-perceptual skills (non-motor)*. Burlingame, CA: Psychological and Educational Publications.
- Gath, A. (1974). Sibling reactions to mental handicap: A comparison of brothers and sisters of Mongol children. *Journal of Child Psychology and Psychiatry*, 15, 187-198.
- Gold, N. (1993). Depression and social adjustment in siblings of boys with autism. *Journal of Autism and Developmental Disorders*, 23, 147-163.
- Goldstein, H., Wickstrom, S., Hoyson, M., Jamieson, B., & Odom, S. L. (1988). Effects of sociodramatic play training on social and communicative interaction. *Education and Treatment of Children*, 11, 97-117.
- Gray, C. (1995). Teaching children with autism to “read” social situations. In K. A. Quill (Ed.), *Teaching children with autism: strategies to enhance communication and socialization* (pp. 219-242). New York: Delmar Publishers Inc.
- Gray, C. (1998). Social stories and comic strip conversations with student’s with Asperger’s Syndrome and high-functioning autism. In E. Schopler, G. Mesibov, & L. J. Kuncie (Eds.), *Asperger syndrome or high functioning autism?* New York: Plenum.
- Gresham, F. M. & Elliott, S. N. (1990). *Social Skills Rating System*. Circle Pines, MN: American Guidance Service.
- Gresham, F. M. & Elliott, S. N. (1993). Social skills intervention guide: Systematic approaches to social skills training. *Special Services in the Schools*, 8(1), 137-158.
- Hazel, J. S., Schumacher, J. B., Sherman, J. A., & Sheldon, J. (1982). Application of a group training program in social skills and problem-solving skills to learning disabled and non-learning disabled youth. *Learning Disability Quarterly*, 5, 398-408.
- Heaton, R. K., Chelune, G. J., Talley, J. L., Kay, G. G., & Curtiss, G. (1993). *Wisconsin Card Sorting Test Manual: Revised and expanded*. Odessa, FL: Psychological Assessment Resources.

- Heiman, M., Nelson, K. E., Tjus, T., & Gilberg, C. (1995). Increasing reading and communication skills in children with autism through an interactive multimedia program. *Journal of Autism and Developmental Disorders*, 25, 459-480.
- Henderson, S. E. & Sugden, D. A. (1992). *Movement Assessment Battery for Children*. Kent, England: Psychological Corporation.
- Hodgdon, L. (1995). Solving social-behavioral problems through the use of visually-supported communication. In K. A. Quill (Ed.), *Teaching children with autism: strategies to enhance communication and socialization* (pp. 265-286). New York: Delmar Publishers Inc.
- Howlin, P., Baron-Cohen, S., & Hadwin, J. (1999). *Teaching children with autism to mindread: A practical guide*. Chichester: Wiley.
- Hoyson, M., Jamieson, B., & Strain, P. S. (1984). Individualized group instruction of normally-developing and autistic-like children: The LEAP curriculum model. *Journal of the Division of Early Childhood Education*, 8, 157-172.
- Klin, A., Volkmar, F. R., Sparrow, S. S., Cicchetti, D. V., & Rourke, B. P. (1995). Validity and neuropsychological characterization of Asperger syndrome. *Journal of Child Psychology and Psychiatry*, 36, 1127-1140.
- Klin, A. & Volkmar, F. R. (1997). Asperger's Syndrome. In D. J. Cohen & F. R. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (2nd ed., pp. 94-122). New York: John Wiley & Sons.
- Klin, A. & Volkmar, F. R. (2000). Treatment and intervention guidelines for individuals with Asperger Syndrome. In A. Klin, F. R. Volkmar, and S. S. Sparrow (Eds.), *Asperger Syndrome*. New York: Guilford.
- Kohler, F. W., Strain, P. S., & Shearer, D. D. (1992). The overtures of preschool social skill intervention agents: Differential rates, forms, and functions. *Behavior Modification*, 16, 525-542.
- Kohler, F. W. & Strain, P. S. (1993). The Early Childhood Social Skills Program: Making friends during the early childhood years. *Teach Exceptional Children*, 25, 41-42.
- Kovacs, M. (1983). *The Children's Depression Inventory: A self-rated depression scale for school-aged youngsters*. Unpublished manuscript, University of Pittsburgh School of Medicine, Pittsburgh.

- Ladd, G. & Mize, J. (1983). A cognitive-social learning model of social skill training. *Psychological Review*, *90*, 127-157.
- Lamorey, S. (1999). Parentification of siblings of children with disability or chronic disease. In N. D. Chase. (Ed.), *Burdened children: Theory, research, and treatment of parentification*. Thousand Oaks, CA: Sage Publications.
- Landa, R. (2000). Social language use in Asperger Syndrome and high functioning autism. In A. Klin, F. R. Volkmar, and S. S. Sparrow (Eds.), *Asperger Syndrome*. New York: Guilford.
- Landry, S. H. (1999). Issues in developing effective interventions. In S. H. Broman & J. M. Fletcher (Eds.), *The changing nervous system*. New York: Oxford University Press.
- Laushey, K. M. & Heflin, L. J. (2000). Enhancing social skills of kindergarten children with autism through the training of multiple peers as tutors. *Journal of Autism and Developmental Disorders*, *30*(3), 183-193.
- Levine, S., Elzey, F. F., & Lewis, M. (1969). California preschool social competency scale. Palo Alto, CA: Consulting Psychologist Press.
- Lobato, D. (1985). Brief report: Preschool siblings of handicapped children: Impact of peer support and training. *Journal of Autism and Developmental Disorders*, *15*, 345-350.
- Locke, H. J. & Wallace, K. M. (1959). Short marital adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living*, *14*, 251-255.
- Lord, C. & Hopkins, J. M. (1986). The social behavior of autistic children with younger and same-age nonhandicapped peers. *Journal of Autism and Developmental Disorders*, *16*, 249-262.
- Lord, C., Rutter, M. L., Goode, S., Heemsbergen, J., Jordan, H., Mawhood, L., et al. (1989). Autism Diagnostic Observation Schedule: A standardized observation of communicative and social behavior. *Journal of Autism and Developmental Disorders*, *19*, 185-212.
- Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview—Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, *24*, 659-685.

- MacDonald, H., Rutter, M., Howlin, P., Rios, P., Le Couteur, A., Evered, C., et al. (1989). Recognition and expression of emotional cues by autistic and normal adults. *Journal of Child Psychology and Psychiatry*, *30*, 865-877.
- Marriage, K. J., Gordon, V., & Brand, L. (1995). A social skills group for boys with Asperger's syndrome. *Australian and New Zealand Journal of Psychiatry*, *29*, 58-62.
- Mates, T. E. (1990). Siblings of autistic children: Their adjustment at home and in school. *Journal of Autism and Developmental Disorders*, *20*, 545-553.
- McGinnis, E. & Goldstein, E. (1990). *Skillstreaming in early childhood: Teaching prosocial skills to the preschool and kindergarten child*. Champaign, IL: Research Press.
- McHale, S. M. & Gamble, W. C. (1989). Sibling relationships of children with disabled and nondisabled brothers and sisters. *Developmental Psychology*, *25*, 421-429.
- McHale, S. M., Simeonsson, R. J., & Sloan, J. (1984). Children with handicapped brothers and sisters. In E. Schopler & G. B. Mesibov (Eds.), *The effects of autism on the family* (pp. 327-342). New York: Plenum Press.
- McHale, S. M., Sloan, J., & Simeonsson, R. J. (1986). Sibling relationships of children with autistic, retarded, and nonhandicapped brothers and sisters. *Journal of Autism and Developmental Disorders*, *16*, 399-413.
- McLinden, S. E., Miller, M. E., & Deprey, J. M. (1991). Effects of a support group for siblings of children with special needs. *Psychology in the Schools*, *28*, 230-237.
- Mesibov, G. B. (1984). Social skills training with verbal autistic adolescents and adults: A program model. *Journal of Autism and Developmental Disorders*, *14*, 395-404.
- Meyer, D. J. & Vadasy, P. F. (1994). *Sibshops: Workshops for siblings of children with special needs*. Baltimore: Paul H. Brookes.
- Miller, J. N. & Ozonoff, S. (2000). The external validity of Asperger Disorder: Lack of evidence from the domain of neuropsychology. *Journal of Abnormal Psychology*, *109*, 227-238.
- Morgan, S. B. (1988). The autistic child and family functioning: A developmental family-systems perspective. *Journal of Autism and Developmental Disorders*, *18*, 263-280.
- Odom, S. L., McConnell, S. R., McEvoy, M. A., Peterson, C., Ostrosky, M., Chandler, L., et al. (1999). Relative effects of interventions for supporting the social

competence of young children with disabilities. *Topics in Early Childhood Special Education, 19*, 75-92.

- Odom, S. L., & Strain, P. S. (1986). A comparison of peer-initiation and teacher-antecedent interventions for promoting reciprocal social interaction of autistic preschoolers. *Journal of Applied Behavior Analysis, 19*, 59-71.
- Ozonoff, S. & Miller, J. N. (1995). Teaching theory of mind: A new approach to social skills training for individuals with autism. *Journal of Autism and Developmental Disorders, 25*, 415-433.
- Ozonoff, S., Rogers, S., & Pennington, B. F. (1991). Asperger's syndrome: Evidence of an empirical distinction from high-functioning autism. *Journal of Child Psychology and Psychiatry, 32*, 1107-1122.
- Piers, E. V. & Harris, D. E. (1969). *The Piers-Harris Children's Self-Concept Scale (The Way I Feel About Myself)*. Los Angeles: Western Psychological Services.
- Piven, J., Gayle, J., Chase, J., Fink, B., Landa, R., Wrozek, M., et al. (1990). A family history study of neuropsychiatric disorders in the adult siblings of autistic individuals. *Journal of the American Academy of Child and Adolescent Psychiatry, 29*, 177-183.
- Piven, J., Palmer, P., Jacobi, D., Childress, D., & Arndt, S. (1997). Broader autism phenotype: Evidence from a family history study of multiple-incidence autism families. *American Journal of Psychiatry, 154*, 185-190.
- Prior, M., Leekam, S., Ong, B., Eisenmajer, R., Wing, L., Gould, J., et al. (1998). Are there subgroups within the autistic spectrum? A cluster analysis of a group of children with autistic spectrum disorder. *Journal of Child Psychology and Psychiatry, 39*, 893-902.
- Rodrigue, J. R., Geffken, G. R., & Morgan, S. B. (1993). Perceived competence and behavioral adjustment of siblings of children with autism. *Journal of Autism and Developmental Disorders, 23*(4), 665-674.
- Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. *Journal of autism and developmental disorders, 30*(5), 399-409.
- Rourke, B. P. (1989). *Nonverbal learning disabilities: The syndrome and the model*. New York: Guilford.
- Rourke, B. P. (1995). Treatment program for the child with NLD. In B. P. Rourke (ed.), *Syndrome of nonverbal learning disabilities: Neurodevelopmental manifestations*. New York: Guilford.

- Sattler, J. M. (1992). *Assessment of children: Revised and updated third edition*. San Diego, CA: Jerome M. Sattler, Publisher, Inc.
- Schopler, E., Reichler, R. J., DeVellis, R. F., & Daly, K. (1980). Toward objective classification of childhood autism: Childhood Autism Rating Scale (CARS). *Journal of Autism and Developmental Disorders*, *10*, 91-103.
- Schumacher, J. B. & Ellis, E. S. (1982). Social skills training of LD adolescents: A generalization study. *Learning Disability Quarterly*, *5*, 409-414.
- Simpson, R. L., Myles, B. S., Sasso, G. M., & Kamps, D. M. (1997). *Social skills for children with autism* (2nd ed.). Reston, VA: Council for Exceptional Children.
- Sparrow, S. S., Balla, D. A., & Cicchetti, D. V. (1984). *Vineland Adaptive Behavior Scales: Survey Form manual*. Circle Pines, MN: American Guidance Service.
- Spence, S. (1980). *Social skills training with children and adolescents*. Windsor: NFER-Nelson.
- Stahmer, A. C. (1995). Teaching symbolic play skills to children with autism using pivotal response training. *Journal of Autism and Developmental Disorders*, *25*, 123-142.
- Strain, P. S. (1987). Comprehensive evaluation of young autistic children. *Topics in Early Childhood Special Education*, *7*(2), 97-110.
- Strain, P. S. & Danko, C. D. (1995). Caregivers' encouragement of positive interaction between preschoolers with autism and their siblings. *Journal of Emotional and Behavioral Disorders*, *3*(1), 2-12.
- Strain, P. S. & Hoyson, M. (2000). The need for longitudinal, intensive social skill intervention: LEAP follow-up outcomes for children with autism. *Topics in Early Childhood Special Education*, *20*, 116-122.
- Strain, P. S., Kerr, M. M., & Ragland, E. U. (1979). Effects of peer-mediated social initiations and prompting/reinforcement procedures on the social behavior of autistic children. *Journal of Autism and Developmental Disorders*, *9*, 41-54.
- Sullivan, R. C. (1979). Siblings of autistic children. *Journal of Autism and Developmental Disorders*, *16*, 399-413.
- Tantam, D. (1988). Annotation: Asperger's syndrome. *Journal of Child Psychology and Psychiatry*, *29*(3), 245-255.

- Taylor, B. A., Levin, L., & Jasper, S. (1999). Increasing play-related statements in children with autism toward their siblings: Effects of video modeling. *Journal of Developmental and Physical Disabilities, 11*(3), 253-264.
- Thelen, M. H., Fry, R. A., Fehrenbach, P. A., & Frautschi, N. M. (1979). Therapeutic videotape and film modeling: A review. *Psychological Bulletin, 86*, 701-720.
- Thorp, D. M., Stahmer, A. C., & Schreibman, L. (1995). Effects of sociodramatic play training on children with autism. *Journal of Autism and Developmental Disorders, 25*, 265-282.
- Turnbull, A. P., Summers, J. A., & Brotherson, M. J. (1984). *Working with families with disabled members: A family systems approach*. Lawrence: University of Kansas, Kansas University Affiliated Facility.
- Van Krevelen, D. A. (1971). Early infantile autism and autistic psychopathy. *Journal of Autism and Child Schizophrenia, 1*(1), 82-86.
- Varni, J. W., Katz, E. R., Colegrove, R., & Dolgin, M. (1993). The impact of social skills training on the adjustment of children with newly diagnosed cancer. *Journal of Pediatric Psychology, 18*(6), 751-767.
- Volkmar, F. R. & Klin, A. (2000). Diagnostic issues in Asperger syndrome. In A. Klin, F. R. Volkmar, & S. S. Sparrow (Eds.), *Asperger syndrome*. New York: Guilford.
- Volkmar, F. R., Klin, A., & Pauls, D. (1998). Nosological and genetic aspects of Asperger syndrome. *Journal of Autism and Developmental Disorders, 28*(5), 457-463.
- Wechsler, D. (1991). *Wechsler Intelligence Scale for Children* (3rd ed.). New York: The Psychological Corporation.
- Williams, T. I. (1989). A social skills group for autistic children. *Journal of Autism and Developmental Disorders, 19*, 143-155.
- Wing, L. (1998). The history of Asperger syndrome. In E. Schopler, G. B. Mesibov, & L. J. Kuncie (Eds.), *Asperger syndrome or high-functioning autism?* (pp.11-28). New York: Plenum.
- Winner, M. G. (2000). *Inside Out: What Makes the Person with Social-Cognitive Deficits Tick?* San Jose, CA: M. G. Winner.

World Health Organization. (1993). *International Classification of Diseases: Tenth revision*. Chapter V. Mental and behavioral disorders (Including disorders of psychological development). Geneva.

APPENDIX A

Behavioral Observation Coding

ID/TIME _____

RATER _____

Domain	Behavior Class	Qualitative Judgment	
		<i>Appropriate</i>	<i>Inappropriate</i>
Social Overtures	Initiations		
	Responses		
Game Related Comments	Initiations		
	Responses		

APPENDIX B

CHILD FEEDBACK FORM SIBLING SUPPORT GROUP

1. How **interesting** were the workshops to you?

1	2	3	4	5
Not at all Interesting		Average		Very Interesting

2. How **helpful** were the workshops for you?

1	2	3	4	5
Not at all Helpful		Average		Very Helpful

3. Did you learn anything new through your participation in the support group?

Yes No

If yes, what did you learn?

4. What did you like most about the sibling support group?

5. What did you like the least about the sibling support group?

6. Overall, what rating would you give the sibling support group?

Thumbs
Up

Thumbs
Down

APPENDIX C

CHILD FEEDBACK FORM SOCIAL SKILLS GROUP

1. How **interesting** were the workshops to you?

1	2	3	4	5
Not at all Interesting		Average		Very Interesting

2. How **helpful** were the workshops for you?

1	2	3	4	5
Not at all Helpful		Average		Very Helpful

3. Did you learn anything new through your participation in the social skills group?

Yes No

If yes, what did you learn?

4. What did you like most about the social skills group?

5. What did you like the least about the social skills group?

6. Overall, what rating would you give the social skills group?

Thumbs
Up

Thumbs
Down

APPENDIX D

PARENT FEEDBACK FORM SIBLING SUPPORT GROUP AND SOCIAL SKILLS TRAINING

1. Please rate your **overall** satisfaction with the social skills training program.

1	2	3	4	5
Extremely Dissatisfied		Average		Extremely Satisfied

2. Please rate your **overall** satisfaction with the sibling support group.

1	2	3	4	5
Extremely Dissatisfied		Average		Extremely Satisfied

3. What goals or expectations did you have **for your child with Asperger's Syndrome** coming in to the social skills training?

4. Were those goals or expectations met? Yes No

5. What goals or expectations did you have **for the child who participated in the sibling support group and social skills training**?

6. Were those goals or expectations met? Yes No

7. What did you like best about participating in the study?

8. How could we improve the sibling support group and/or social skills training to better meet the needs of families?

APPENDIX E

**FACILITATOR EVALUATION FORM
SIBLING SUPPORT GROUP**

Week #: _____

Topic: _____

Child's First Name: _____

Overall Level of Engagement:

1	2	3	4	5	6	7
Poor			Average			Excellent

Overall Level of Participation:

1	2	3	4	5	6	7
Poor			Average			Excellent

Strengths:

Weaknesses:

APPENDIX F**FACILITATOR EVALUATION FORM
SOCIAL SKILLS TRAINING**

Week #: _____

Topic: _____

Child's First Name: _____

Overall Level of Engagement (C=Child/S=Sibling):

1	2	3	4	5	6	7
Poor			Average			Excellent

Overall Level of Participation (C=Child/S=Sibling):

1	2	3	4	5	6	7
Poor			Average			Excellent

Overall Level of Collaboration/Cooperation Between Siblings:

1	2	3	4	5	6	7
Poor			Average			Excellent

Strengths:

Weaknesses:

VITA

JENNIFER DIANE HETZKE

EDUCATION

- June, 2004:** Drexel University, Philadelphia, PA
(Anticipated) *Doctor of Philosophy in Clinical Psychology*
- June, 1996:** Northeastern University, Boston, MA
Master of Science in Applied Educational Psychology
- May, 1993:** University of Missouri, St. Louis, MO
Bachelor of Arts in Psychology, Summa Cum Laude

PROFESSIONAL AND CLINICAL EXPERIENCE

- 07/03-06/04:** Predoctoral Psychology Fellow
Yale Child Study Center, New Haven, CT
- 09/00-06/02:** Clinical Psychology Practicum Student
Vanguard School, Paoli, PA
Developmental Neuropsychology, Ardmore, PA
Clinical Neuropsychology Associates, Philadelphia, PA
- 09/96-08/99:** School Psychologist
LeRoy Central School District, LeRoy, NY

RESEARCH EXPERIENCE

- 09/99-06/02:** Research Assistant
Drexel University, Philadelphia, PA
Children's Hospital of Philadelphia, Philadelphia, PA

PUBLICATIONS

Barakat, L.P., Hetzke, J.D., Foley, B., Carey, M.E., & Phillips, P.C. (2003). Evaluation of a social skills group intervention with children treated for brain tumors: A pilot study. *Journal of Pediatric Psychology, 28*(5), 299-307.

PRESENTATIONS AT PROFESSIONAL CONFERENCES

Barakat, L.P., Hetzke, J.D., Foley, B., Carey, M.E., & Phillips, P.C. (2001). *A social skills training intervention with children treated for brain tumors*. Poster presented at the 8th Florida Conference on Child Health Psychology, Gainesville, FL.

Barakat, L.P., Hetzke, J.D., Foley, B., Carey, M.E., & Phillips, P.C. (2000). *Social skills functioning in children treated for brain tumors: Pre-intervention ratings from parents, teachers, and children*. Poster presented at the 12th Annual Sigma Xi Research Symposium, Drexel University, Philadelphia, PA.