2009

Elucidating The Social Skills Deficits In Children With Asperger's Disorder: A Comparative Study

Lindsay Scharfstein
University of Central Florida

ELUCIDATING THE SOCIAL SKILLS DEFICITS IN CHILDREN WITH ASPERGER'S DISORDER: A COMPARATIVE STUDY

by

LINDSAY SCHARFSTEIN
B.A. University of Maryland, 2005

A thesis submitted in partial fulfillment of the requirements
for the degree of Masters of Science in Clinical Psychology
in the Department of Psychology
in the College of Sciences
at the University of Central Florida
Orlando, Florida

Fall Term
2009

Major Professor: Deborah C. Beidel

ABSTRACT

Children with Asperger's Disorder are considered to have impairments in social interaction, but to date few studies have empirically addressed this issue. This study examined the existence of social skills deficits in children with Asperger's Disorder, children with social phobia, and children with no psychological disorder. Using direct observation of social skills during role-play tasks, blinded observers rated an overall impression of social effectiveness and three specific categories of social skill: pragmatic behavior (e.g., effort to maintain conversation, latency to respond), speech and prosodic behavior (e.g., vocal inflection, voice volume), and paralinguistic conversational behaviors (e.g., facial orientation, motor movement). Children with Asperger's Disorder did not display predicted social skills deficits when compared to typically developing children. When compared to children with social phobia, children with Asperger's Disorder were rated as significantly more socially effective and were rated as more skilled on the molecular conversational behaviors that create an overall impression of social effectiveness. These results suggest that children with Asperger's Disorder display adequate social skill during brief social interactions. Furthermore, the social skills deficits present in children with social phobia are not the same deficits found in children with Asperger's Disorder. Implications of the findings are discussed.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

Social Skills

Social skills can be defined as specific conversational behaviors that result in positive social interactions (Elliot & Gresham, 1987; Gresham, 1986). Across various literatures, the specific behaviors that comprise social skills have been operationalized in different ways, but usually include both verbal and nonverbal behaviors. In one of the earliest attempts to define social skill, Kazdin, Matson, and Esveldt-Dawson (1984) distinguished between molecular and molar social behaviors. Molecular social skill included behaviors such as eye contact, vocal intonation, and facial expression, whereas molar social skill includes overall appropriateness of the response, giving compliments, and responding to provocation. Other skills identified by various researchers include the number of words spoken, motor movements, overall social skill (Kazdin, Esveldt-Dawson, & Matson, 1982; Kazdin, Esveldt-Dawson, & Matson, 1983), giving and receiving positive social reinforcement (Charlesworth & Hartup, 1967; Hartup & Coates, 1967; Hartup, Glazer, & Charlesworth, 1967; Keller & Carlson, 1974), greetings, asking for and giving information, extending an offer of inclusion, giving help, referential communication, facial expression recognition, and perspective taking (Gottman, Gonso, & Rasmussen, 1975). This list is by no means exhaustive and illustrates how differently the construct is conceptualized and operationalized. Despite these differences, most researchers agree that molecular social skills consist of specific conversational behaviors such as eye contact or voice volume whereas molar social skills represent the combination of molecular skills to create an overall impression of social effectiveness.

Not surprisingly, impaired social skills can exert a negative impact on interpersonal functioning and friendships (Krasny, Williams, Provencal, & Ozonoff, 2003; Rubin, Daniels-

Beirness, & Bream, 1984), especially during developmental stages when children are expected to engage in successful peer interactions. Many children suffer from impaired social skills, impeding their ability to establish and maintain satisfying peer relationships. A lack of friends or close relationships is in turn associated with low self-esteem (Rubin, Dwyer, Booth-LaForce et al., 2004), and may be a contributing factor to depressed mood (Barnhill, 2001). Additionally, children who are deficient in social skills and who are poorly accepted by peers have a high incidence of school maladjustment and school dropout, juvenile delinquency, child psychopathology, and adult mental health difficulties (Elliot & Gresham, 1987).

When compared to people with no disorder, impaired social skills are often present among individuals with various psychological disorders, including adults with schizophrenia (Mueser, Bellack, Douglas, & Morrison, 1991) or social phobia (Beidel, Rao, Scharfstein, Wong, & Alfano, in preparation), and children with social phobia (Beidel, Turner, & Morris, 1999), autism spectrum disorders (Weiss & Harris, 2001), and attention-deficit/hyperactivity disorder (ADHD) (Nijmeijer, Minderaa, Buitelaar, Mulligan, et al., 2008). However, few studies have compared the presence or type of social skill deficits across the groups. Thus, it is not clear whether impaired social skill is merely a by-product of general psychological dysfunction or if certain skill deficits are specific to each disorder. Identifying the deficits apparent in each group is important for understanding psychopathology and for determining optimal remediation efforts. Specifically, without knowing the exact deficits displayed by each group, clinicians may attempt to use interventions that are inappropriate. Furthermore, without a thorough understanding of the nature of social skills deficits in a particular group, the development of targeted interventions may be weak or ineffective. Recently, much research has focused on two groups of individuals

who suffer from social skill deficits: children with social phobia and children with Asperger's Disorder.

Children with Social Phobia

Social phobia is characterized by a pervasive, irrational fear of one or more social or performance situations in which an individual may embarrass him or herself or may be under the scrutiny of others (American Psychiatric Association, 2000). Social phobia is an early onset disorder, most often having its onset in mid to late adolescence (Grant, Hasin, & Blanco et al., 2005), although children as young as 8 have been diagnosed with this disorder (Beidel et al., 1999). Approximately 5% of youth in the general population have social phobia (Beidel & Turner, 2007), often avoiding social and performance situations, or enduring them with great distress. Situations that create distress for children with social phobia include speaking, eating, writing, or reading in front of others, talking on the telephone, and engaging in basic social interactions (e.g. asking to join groups, initiating conversations with peers). Deficits in these skills can result in significant impairment in social, academic, and in adolescents, occupational functioning. Functional impairments include fewer friendships, increased feelings of loneliness, and limited social relationships (Beidel et al., 1999). In addition, youth with social phobia are at an increased risk for school refusal, depression, and substance use disorders (Beidel & Morris, 1995; Vasey, 1995; Vernberg, Abwender, Ewell, & Beery, 1992).

Social skills impairment in youth with social phobia has been relatively well studied (Beidel et al., 1999; Beidel, Turner, & Young et al., 2007; Francis, Last, & Strauss, 1992; Spence, Donovan, & Brechman-Toussaint, 1999). Compared to children with no psychiatric disorder, impaired social skills (e.g., lack of eye contact, muffled speech, longer speech latency, inappropriate tone or low voice volume, and lack of spontaneous speech) are characteristic of

children and adolescents with social phobia (Beidel et al., 1999; Beidel, et al., 2007; Spence, et al., 1999).

Typically in social phobia research, social skills are assessed using an analogue task in which children engage in role play social interactions with peers. Compared to children with no psychiatric disorder, children with social phobia are less socially skilled and have significantly longer speech latencies during a structured role play assessment when rated by blinded observers (Beidel et al., 1999). A similar pattern of results occurs in adolescents with social phobia using the same method (Beidel et al., 2007). In addition to behavioral observation, Spence et al. (1999) used several other assessment strategies to assess social behavior. Specifically, children with social phobia were rated as being less socially competent and less socially skilled than nonanxious children, according to both parental and self-report. The children also were less likely to select assertive responses than nonanxious children on the Children's Assertive Behavior Scale (CABS; Michelson & Wood, 1982), suggesting they would behave less assertively during social interactions. While engaged in a role play assessment, children with social phobia responded to social prompts with fewer words than nonanxious children, indicating a relative poverty of verbal content. Furthermore, during school observations, children with social phobia were rated by observers as receiving fewer positive responses and more negative and ignore responses from peers than the comparison group (Spence et al., 1999). Collectively, these findings suggest that children with social phobia exhibit poor social skills and experience difficulty in peer interactions. Based on these noted deficits and a much larger literature based on adults with social phobia, several empirically supported social skills training programs have been developed (Beidel, Turner, & Young, 2006; Spence, Donovan, & Brechman-Toussaint, 2000).

Children with Asperger's Disorder

Deficient social abilities are known to exist in children with Asperger's Disorder, but they have received little empirical attention. A pervasive developmental disorder, Asperger's Disorder is characterized by circumscribed interests, pedantic language, and social skills deficits, with no history of cognitive or language delays before age 3 (APA, 2000). Individuals with Asperger's Disorder often exhibit deficient nonverbal communication, fail to engage in spontaneous interaction with others, fail to engage in reciprocal social or emotional interactions, and experience an inability to attain developmentally appropriate friendships, resulting in impairment in social and other important areas of functioning (APA, 2000). Despite the aforementioned difficulties, children with Asperger's Disorder often desire close friendships and positive social interactions **(**Eisenmajer, Prior, Leekam et al., 1996).

Social skills interventions aimed at increasing social functioning have been developed for children with Asperger's Disorder without a thorough understanding of their specific social skill deficits. This lack of attention may explain why the current interventions have been only moderately successful. Therefore, it is necessary to take a step back and examine the specific socially deficient behaviors in children with Asperger's Disorder. It is clear that these youth have difficulty in social interaction; yet to date, these difficulties have been most commonly described in global terms and only minimally inform researchers and clinicians regarding the specific behaviors that comprise these global labels.

Consistent with the global descriptions of their inadequate social interaction, assessment of social skills deficits in children with Asperger's Disorder has utilized primarily self, parental, and teacher reports of social impairment, rather than direct observation of specific conversational behaviors. For example, the social skills scale of the Social Skills Rating System (SSRS;

Gresham & Elliot, 1990), often used to assess the social skills of children with Asperger's Disorder, consists of items assessing molar social behavior including *co-operation* (sharing, assisting others, complying with rules and instructions), *assertion* (requesting information from others, introducing one self, responding to the behaviors of others), and *self-control* (appropriately managing teasing, engaging in turn-taking, developing compromises). When compared to typically developing children, children with Asperger's Disorder were rated as significantly less assertive (Koning & Magill-Evans, 2001; Macintosh & Dissanayake, 2006) and significantly less co-operative (Macintosh & Dissanayake, 2006). However, a molar skill such as co-operation consists of many molecular conversational behaviors (e.g., smiling, taking turns) and the presence/absence of these individual behaviors are not assessed by the SSRS. Therefore, teaching co-operation will be difficult without identification of the specific molecular skills that comprise this complicated social behavior. Similarly, on the Social Competence Scale (SCS) of the Child Behavior Checklist (CBCL; Achenbach, 1991), social skills deficits were inferred from parent ratings of whether children with Asperger's Disorder have fewer friends and less contact with peers than typically developing children (Koning & Magill-Evans, 2001). Limited peer relationships and peer contact may tell us a problem exists, but does not identify the exact nature of the problem. Furthermore, it is important to keep in mind that some children may know the requisite social skills for successful peer interaction, but have little interest in social engagement. Therefore, the SCS's emphasis on friendship may not be appropriate for evaluating social skill in children who do not desire social interaction.

In contrast to self or parent report which assesses broad social skill constructs, one particular social skills deficit, social perception, has been directly assessed in children with Asperger's Disorder. Social perception is considered to be a core deficit in this diagnostic group.

To assess social perception, the Child and Adolescent Social Perception task (CASP: Magill-Evans, Koning, Cameron-Sadava, & Manyk, 1995) consists of 10 videotaped scenes depicting youth engaging in typical social interactions. The audio in the scenes is altered such that the words are unintelligible but the vocal tone and prosodic features (i.e., form of speaker production that indicates speaker meaning) are retained. Following each scene, children described what happened, how each character was feeling, and how they knew the character was feeling that emotion (i.e., which nonverbal cues were used to identify the character's emotion). On this task, children with Asperger's Disorder scored lower than typically developing children on identifying emotions and nonverbal cues, including body (e.g., gestures), situational (e.g., a birthday present), and voice cues (e.g., tone) (Koning & Magill-Evans, 2001). Children with Asperger's Disorder used facial cues (e.g., expression) more often than other nonverbal cues, suggesting that facial cues are the primary means by which they infer the emotions of other children during social interactions. The ability to accurately detect the emotions of peers based on their nonverbal cues is crucial for identifying whether other children are receptive to communication, a basic element of social skill. Yet, social skills are much broader than social perception; therefore, therapist attention to other skills (e.g., latency to respond, effort to maintain the conversation, appropriateness of response) is also necessary.

As noted above, although seldom used, Bauminger, Shulman, and Agam (2003) directly observed children with Asperger's Disorder during recess and snack times when they were interacting spontaneously with typically developing, autistic, and PDD classmates. Typically developing children were observed with typically developing classmates only in their regular school setting (i.e., not recess or snack times). Children with Asperger's Disorder spent half as much time interacting with peers and exhibited significantly fewer positive (e.g., eye contact

with smile, sharing) and low-level social behaviors (e.g., looking, proximity) than typically developing children (Bauminger et al., 2003). In a second study (Bauminger, Solomon, Aviezer et al., 2008), children with high functioning autism spectrum disorder (HFASD; a group that combined children with either Autistic Disorder or Asperger's Disorder) and typically developing children were observed interacting with a close friend during two experimental scenarios (construction game and drawing). Children with HFASD exhibited lower frequencies of goal-directed behaviors, sharing, positive affect, positive social orientation, social conversation, cohesiveness, harmony, responsiveness, and affective closeness than typically developing children. They also exhibited higher frequencies of parallel play compared to typically developing children. These findings illustrate clear differences between the groups on both the duration of social interaction and the frequency of specific social behaviors (e.g., looking, sharing, smiling, positive affect) displayed.

In a more recent investigation (Paul, Orloski, Marcinko, & Volmar, 2009), trained observers assessed the conversational behaviors of children with Asperger Syndrome during ten consecutive 3-minute segments of interaction during a structured diagnostic interview. Using a 3-point Likert scale, observers rated the appropriateness of thirty conversational behaviors categorized into three main groupings: pragmatic behaviors (i.e., topic management and reciprocity), speech and prosodic behaviors (i.e., the form of speaker production), and paralinguistic behaviors (i.e., physical behaviors that accompany speech). Children with Asperger Syndrome demonstrated significantly poorer pragmatic (e.g., more irrelevant detail, inappropriate topic shifts, unresponsive partner cues, little reciprocal exchange), speech and prosodic (e.g., unusual intonation), and paralinguistic conversational behaviors (e.g., inappropriate gaze) than typically developing children. Not only do these findings suggest that

children with Asperger's Disorder suffer from impaired social skills, they also indicate specific conversational behaviors that can be targeted for change.

To summarize, studies assessing the social abilities in children with Asperger's Disorder reveals that a behavioral observation strategy maximizes the potential for researchers to evaluate a wide range of molecular social behaviors. As depicted in Appendix A, however, studies of children with Asperger's Disorder have largely used questionnaires and tasks of social perception. This hampers our knowledge of social skills deficits in several ways. First, parental report (Koning & Magill-Evans, 2001; Lopata, Thomeer, Volker, & Nida, 2006; Luteijn, Luteijn, Jackson, Volkmar, & Minderaa, 2000; Macintosh & Dissanayake, 2006) is limited because parents do not have a common baseline by which to anchor their child's behavior. Therefore, parental ratings may be biased due to the settings used for comparison (e.g., how they interact when their parent is present) and with whom the child is compared (e.g., their siblings or relatives, a popular child in class). Second, many of the questionnaires used to assess social skills in children contain items that do not reflect a traditional understanding of social skill (e.g., 'has difficulties in concentrating, e.g., on games,' on the CSBQ). Therefore, scores on such measures do not directly inform our understanding of social skill. In addition, most parental report scales do not assess nonverbal social skills (e.g., eye contact, affect) which are crucial to positive social interactions. Third, some scales assess complex molar behaviors (e.g., co-operation, assertion, self-control), rather than identifying the specific molecular skills that are the building blocks for the complex behaviors necessary for successful social engagement. In contrast, direct behavioral observation allows for a more objective assessment of social behaviors in a controlled, albeit analogue setting. Therefore, the study of social skills deficits in children with Asperger's

Disorder may benefit from a careful examination of specific social behaviors in a controlled study.

The Current Study

Collectively, the literature examining social skill deficits in children with Asperger's Disorder is limited. First, the specific social skill deficits in children with this disorder are unclear. Second, even when impaired social skills have been reported, the question of whether these deficiencies are unique to children with this disorder or are found among children with various psychological disorders remains unaddressed. To better understand the nature of social skills in children with Asperger's Disorder, the use of a standardized behavioral assessment, as well as a psychological comparison group is necessary. A direct social comparison of children with Asperger's Disorder to another diagnostic group with impaired social skill will inform researchers and clinicians about the specificity of skill deficits found in this population. Without a clear understanding of the particular deficits, intervention programs could be expensive and ineffective. To this end, the current study assessed specific social skills in children with Asperger's Disorder as compared to children with social phobia (a psychiatric control group) and children with no psychological disorder.

The following hypotheses were proposed:

H1: Children with Asperger's Disorder will exhibit deficient social skills as compared to typically developing children and their deficits will be different from deficits among children with social phobia.

H2: There will be a significant negative correlation between observer ratings of social skills and all measures of social anxiety (i.e., observer ratings of social anxiety and self-ratings of

anxiety), such that individuals rated high on social anxiety will be rated as exhibiting impaired social skills.

H3: There will be a significant positive correlation between observer ratings of social anxiety and self-ratings of social anxiety.

H4: Blinded observer ratings of molecular conversational behaviors will predict group membership better than a rating of overall social effectiveness.

CHAPTER TWO: METHODOLOGY

Participants

The study sample was composed of 90 children: thirty children meeting DSM-IV criteria for a diagnosis of Asperger's Disorder (26 males, 4 females), thirty children meeting DSM-IV criteria for a diagnosis of social phobia (23 males, 7 females), and thirty typically developing children (22 males and 8 females), not meeting criteria for any current psychiatric diagnosis. Children ranged in age from 7 to 13 years (*M*s = 10.57, 10.00, and 10.60 years, respectively). Regarding race/ethnicity, twenty-seven of the children with Asperger's Disorders were Caucasian (90.0%), 1 was Latino/Latina (3.3%), and 2 did not endorse any specific racial category (6.7%). Eighteen of the children with social phobia were Caucasian (60.0%), 1 was Latino/Latina (3.3%), 7 were African American (23.3%), 3 were Asian/Pacific Islander (10.0%), and 1 identified as Other (3.3%). The typically developing group consisted of 11 Caucasian (36.7%), 6 Latino/Latina (20.0%), and 9 African American children (30.0%), and 4 children identified themselves as belonging to the Other racial category (13.3%). The groups did not differ significantly on age or gender ($p > .05$). Groups were significantly different on race/ethnicity ($\chi^2(df = 10) = 36.718$, $p < .001$). See Table 1 for demographic characteristics.

Children with Asperger's Disorder were being evaluated for participation in a treatment study examining the effectiveness of a social skills training program. Children with social phobia were being evaluated for participation in treatment trials examining social skills training. It should be noted that only pre-treatment data were used in this study. The typically developing group consisted of children who were recruited through Anxiety Disorders Clinic protocols as normal control participants (i.e., no current DSM-IV diagnoses).

Materials

To determine a diagnosis of Asperger's Disorder, parents were interviewed with the Autism Disorders Interview-Revised (ADI-R; Rutter & LeCourteur, 1995; see Appendix 6) by a licensed clinical psychologist. The ADI-R is a semi-structured interview that has good interrater reliability, reporting ranges from .88-.96 (Lord, Rutter, & Le Couteur, 1994). To be included, participants had to meet criteria for Asperger's Disorder (not autistic disorder or PDD-NOS). Participants meeting criteria for both Asperger's Disorder and high social anxiety (a score of 14 or above for males and 18 or above for females on the Social Phobia and Anxiety Inventory for Children, SPAI-C; Beidel, Turner, & Morris, 1995), were included in this study, since a diagnosis of Asperger's Disorder is always considered primary. Fourteen (46.67%) children with Asperger's Disorder scored above the cut-off criteria on the SPAI-C.

To determine the presence of social phobia, children and their parents were interviewed using the Anxiety Disorders Interview Schedule for Children and Parents (ADIS-C/P, Silverman & Albano, 1996; see Appendix 6). This diagnostic interview assesses DSM-IV anxiety disorders as well as other psychiatric disorders. It has high interrater reliability (Silverman, 1994), reporting ranges from .85 to 1.0 (Kendall, 1994; Kendall & Southam-Gerow, 1996). A licensed clinical psychologist, a postdoctoral fellow in clinical psychology, or a doctoral student in clinical psychology conducted the semi-structured interview first with parents and then independently with children. Diagnoses were established based on the information from both sources. Children were included in the typically developing group if they did not meet diagnostic criteria for any current Axis I diagnoses, as assessed by the child and parent report on the ADIS-C/P. Twenty percent of all interviews were audiotaped and scored by a second interviewer to

determine interrater agreement. Interrater reliability for the diagnosis of social phobia was k = 0.78.

In addition to the interview, all participants completed the Social Phobia and Anxiety Inventory for Children (SPAI-C; Beidel, et al., 1995), a 26 item self-report scale that assesses social phobia symptom severity. Each item was rated using a 3-point Likert scale. The SPAI-C has good two-week test-retest reliability of .85 and 10-month test-retest reliability of .63 and differentiates children with social phobia from normal controls (Beidel et al., 1995).

Procedure

Behavioral Assessment Task (BAT)

To assess social skill during social interactions, each child participated in a structured role-play (Beidel et al., 1999; see Appendix B), consisting of 5 brief scenarios requiring interaction with a same-age peer (i.e., offering help, receiving help, giving compliment, receiving compliment, assertiveness). Each child was instructed to imagine a specific situation and to react as he/she would if it were really happening. The experimenter described a situation (e.g., "you've been working hard to memorize a poem to recite in English Literature class. You finish reciting the poem in front of the class and return to your seat. The boy/girl sitting next to you says…") and a same-age peer (who did not meet diagnostic criteria for a DSM-IV disorder) initiated the interaction by reading a scripted line provided on an index card (e.g., "you did a great job"). The participant responded accordingly. The peer then read a second scripted line (e.g., "you remembered every word and you looked so calm and cool") to which the participant responded accordingly. This sequence was repeated until all 5 scenes were presented. A practice scene was presented first to allow for questions and clarification of the procedure. Peers were instructed to

maintain eye contact and allow approximately ten seconds for the participant to respond to a remark before speaking again.

Blinded Observer's Ratings: Each BAT was videotaped and coded by trained observers (undergraduate research assistants) who were naïve to group membership. Two blinded observers were used to establish interrater reliability. Each rater was first trained to achieve interrater reliability (i.e., Pearson's *r*, at least $r = .80$ on all ratings) with the author. Raters were first trained how to code each social behavior using 5 videotaped social interactions. Clarification was provided for all rated behaviors, as necessary. Raters then coded a set of 10 tapes to achieve interrater reliability. To ensure that interrater reliability on all social behaviors were generalizeable to all videotaped social interactions and not limited to the initial set of 10 tapes, raters coded a set of 5 tapes and interrater reliability was again achieved. To establish interrater reliability between raters, a set of 10 tapes composed of a sample similar to that in this study (4 children with Asperger's Disorder, 3 children with social phobia, and 3 typically developing peers) was coded (*r* values ranging from .864 to 1.00).

During videotaped social interactions, coders rated the social behaviors of children engaging in the 5 role-play scenarios. Scores for all 5 scenes were summed to establish a total score for each behavioral category.

Social Anxiety and Overall Social Effectiveness: Blinded observers rated social anxiety using a 4- point Likert scale, ranging from 1 (*not at all anxious*, operationalized as "no overt signs of anxiety, smiles, appears interested and/or enjoys the interaction") to 4 (*severely anxious*, "consistent, gross, motor signs of anxiety; also could be manifested as extreme inhibition"; see Appendix C). Overall social effectiveness was rated on a 4- point Likert scale, ranging from 1 (*not effective at all*, "no response or one word response, does not ask questions, mumbling,

barely audible speech") to 4 (*effective*, "no awkwardness, carries part of the conversation, may self-disclose, voice strong and clear").

Molecular conversational behaviors: Molecular conversational behaviors that comprise social effectiveness were identified by the author (see Appendix 5) based on clinical experience with children with Asperger's Disorder. Conversational behaviors were rated on a 4- point Likert scale, ranging from 1 (*skill absent or inappropriate)* to 4 (*skill present and appropriate),* and were categorized into three groupings based on the research of Paul and colleagues (2009) and supported statistically based on correlational analyses (See Table 2). *Pragmatic conversational behaviors*, defined as topic management and reciprocity of the conversation, included ratings of effort to maintain the conversation, appropriateness of response, affect, latency to first utterance, and the number of words spoken. *Speech and prosodic conversational behaviors*, defined as the form of speaker production, included ratings of voice volume and vocal inflection. *Paralinguistic conversational behaviors*, defined as the physical behaviors that accompany speech, consisted of ratings of facial orientation while speaking, facial orientation while the peer is speaking, motor movement, posture stiffness, and posture awkwardness. Note: latency to first utterance, when the peer finishes each scripted line to when the participant began to speak, was timed in seconds, and the number of words spoken during the interaction was tallied; scores for both variables were converted into z-scores. Scores for all 5 role-play scenarios were summed to establish a total score for each behavioral category.

Interrater Reliability: Each coder rated half of the tapes (45 tapes per coder). Twenty percent (18 tapes) of all assessments were rated independently by the other coder to determine interrater reliability. High interrater reliability was achieved for social anxiety (r = .860), overall social effectiveness (r = .839), pragmatic conversational behaviors (i.e., effort to maintain the

conversation, *r* = .860; appropriateness of response, *r* = .865; affect, *r* = .803; latency to first utterance, *r* = .945; number of words spoken), speech and prosodic conversational behaviors (voice volume, *r* = .827; vocal inflection, *r* = .848), and paralinguistic conversational behaviors (*r* = .994, facial orientation while speaking, *r* = .894; facial orientation while peer is speaking, *r* = .938; motor movement, *r* = .967; posture-stiffness, *r* = .850; posture- awkwardness, *r* = .932).

Self-Ratings of Anxiety: Participants rated their level of anxiety using a pictorially adapted version of the Self Assessment Manikin (SAM; Bradley & Lang, 1994; see Appendix 6). Five pictures illustrating various levels of distress were converted to a 5- point Likert scale, ranging from 1 (*little or no anxiety*) to 5 (*extreme anxiety*). Directly following all 5 role-play scenarios, participants were asked to use the SAM scale to describe how anxious or nervous they felt during the interaction.

CHAPTER THREE: RESULTS

Because the groups were significantly different on race, all statistical analyses were conducted initially covarying for race. The results were not different when race was entered as a covariate. Therefore to maximize power, the results presented below do not include race as a covariate. As noted above, analyses were conducted using the conversational behavior categories established based on groupings identified in a correlation matrix of all social skill variables (See Table 2) which mirrors the theoretical conceptualization proposed by Paul et al. (2009).

Group Differences on Social Skill

To determine social abilities in children with Asperger's Disorder and to assess for differences in social skill among groups, a series of univariate analyses of variance (ANOVAs) was conducted by total score for a) overall social effectiveness, b) pragmatic conversational behaviors (i.e., effort to maintain the conversation, appropriateness of the response, affect, latency to first utterance, and the number of words spoken), c) speech and prosodic conversational behaviors (i.e., voice volume, vocal inflection), and d) paralinguistic conversational behaviors (i.e., facial orientation while speaking, facial orientation while peer is speaking, motor movement, posture-stiffness, posture-awkwardness). The independent variable, group membership, included three groups: Asperger's Disorder, social phobia, and typically developing. Significant F scores were followed by Scheffe tests to determine where differences occurred. The means and standard deviations for the three groups are reported in Table 3. See Table 4 for the results of ANOVAs for each of the 5 role-play scenarios (i.e., offering help, receiving help, giving compliments, receiving compliments, assertiveness).

Across all social situations, there was a significant main effect for group on observer ratings of overall social effectiveness ($F(2, 87) = 10.177$, $p < .001$), pragmatic conversational

behaviors ($F(2, 87) = 9.764$, $p < .001$), and speech and prosodic conversational behaviors ($F(2, 87) = 12.569$, $p < .001$). Scheffe tests revealed that across social scenarios, children with Asperger's Disorder and typically developing children were rated as more socially skilled than children with social phobia ($p = .005$ and $p < .001$, respectively). In addition, when compared to children with social phobia, children with Asperger's Disorder and typically developing children were rated as exhibiting significantly more appropriate pragmatic conversational behavior ($p = .012$ and $p < .001$, respectively) and speech and prosodic conversational behavior ($ps = .003$ and $p < .001$, respectively). Ratings for children with Asperger's Disorder and typically developing children were not significantly different. There was no significant difference among the three groups for paralinguistic behaviors ($F(2, 87) = 2.647$, $p = .077$).

Number of Scenes with No Response to Either Prompt

A chi square analysis examined differences among groups on the number of scenes where the child did not respond to either of the confederate's prompts. There were no significant group group differences on the number of scenes in which there was no response given, $\chi^2(df = 6) = 7.438$, $p = .282$ (see Table 3).

Within-group Differences on Blinded Observer Ratings of Social Skill for children with Asperger's Disorder who Report Low or High Anxiety on the SPAI-C

As noted earlier, fourteen (46.67%) children with Asperger's Disorder scored above the cut-off criteria on the SPAI-C (a score of 14 or above for males and a score of 18 or above for females), indicating the presence of significant social anxiety. To determine whether children with significant social anxiety might be more likely to exhibit skills deficits, a series of independent samples t-tests was conducted to determine differences in observer ratings of social skills. To control for experiment-wise error rate, Bonferroni correction for multiple correlations

was employed. Using the Bonferonni method, each correlation was tested at the .002 level (*p* value Bonferroni Corrected, .05/25 = .002).There were no significant differences between blinded observer ratings of social skills between children with Asperger's Disorder who were high or low on self-reported social anxiety on the SPAI-C (*p*s > .05). The means and standard deviation are reported in Table 5.

Correlations between Overall Social Effectiveness and Conversational Behaviors

To determine the relationship between observer ratings of overall social effectiveness (a molar behavior) and observer ratings of conversational behaviors (i.e., molecular skills such as pragmatic behaviors, speech and prosodic behaviors, paralinguistic behaviors), Pearson (r) correlation coefficients were computed. The correlations found are displayed in Table 6.

There was a significant positive correlation between observer ratings of overall social effectiveness and pragmatic conversational behaviors ($r = .865$, $p < .001$), speech and prosodic behaviors ($r = .865$, $p < .001$), and paralinguistic behaviors ($r = .390$, $p < .001$), indicating that all components, but particularly the first two, contributed to the overall impression of social skill.

Group Differences on Social Anxiety

To assess for differences in social anxiety among groups, a series of ANOVAs was conducted for a) self-ratings on the Self Assessment Manikin (SAM), b) scores on the Social Phobia and Anxiety Inventory for Children (SPAI-C), and c) observer ratings of social anxiety. The independent variable, group membership, included three groups: Asperger's Disorder, social phobia, and typically developing. Significant F scores were followed by Scheffe tests to determine where differences occurred (See Table 7).

There was a significant main effect for group on SAM ratings ($F(2, 87) = 9.472$, $p < .001$), SPAI-C ratings ($F(2, 85) = 23.547$, $p < .001$), and observer ratings of social anxiety ($F(2,$

87) = 9.641, $p < .001$). Scheffe tests revealed that children with social phobia were rated as more anxious in social encounters than children with Asperger's Disorder and typically developing children as measured by self- reported on the SAM (ps = .002 and .001, respectively) and SPAI-C (ps < .001 and .001, respectively), as well as blinded observer ratings of social anxiety (p = .028 and $p < .001$, respectively).

Correlations between Measures of Social Anxiety

To determine the strength and direction of the relationship between measures of social anxiety (i.e., self-ratings of social anxiety on the SAM and scores on the SPAI-C and observer ratings of social anxiety), a series of Pearson correlations were conducted. Correlations were first conducted with all participants and then by group to determine whether there were different relationships within one group compared to another. To control for experiment-wise error rate, Bonferroni correction for multiple correlations was employed. Using the Bonferonni method, each correlation was tested at the .0041 level (p value Bonferroni Corrected, .05/12 = .0041).These correlations are displayed in Table 8.

Collapsed across group, there were significant positive correlations between observer ratings of social anxiety and SAM ratings (r = .346, p = .001), between self ratings on the SAM and scores on the SPAI-C (r = .452, $p < .001$), and between observer ratings of social anxiety and scores on the SPAI-C (r = .250, p = .019). There were no significant correlations between ratings of social anxiety (i.e., observer ratings, SPAI-C, and SAM) by group (ps > .05).

Correlations between Social Skill and Social Anxiety

Pearson (r) correlation coefficients were used to determine the magnitude and direction of the relationship between social anxiety (i.e., observer, SAM, and SPAI-C ratings) and blinded observer ratings of social skill (i.e., overall social effectiveness, pragmatic conversational

behaviors, speech and prosodic behaviors, paralinguistic behaviors). The correlations found are displayed in Table 9 through 11.

Blinded Observer Ratings of Social Skill and Social Anxiety

Collapsed across group, there were significant negative correlations between observer ratings of social anxiety and the following social skills: overall social effectiveness (r = -.587, p < .001), pragmatic conversational behaviors (r = -.550, p < .001), speech and prosodic behaviors (r = -.626, p < .001), paralinguistic behaviors (r = -.375, p < .001). The correlations found are displayed in Table 9.

Blinded Observer Ratings of Social Skill and SAM Ratings

There were significant negative correlations between self-ratings on the self assessment manikin (SAM) and the following social skills: overall social effectiveness (r = -.296, p = .005), pragmatic conversational behaviors (r = -.255, p = .015), speech and prosodic behaviors (r = -.293, p = .005). There were no significant correlations between self-ratings on the SAM and paralinguistic behaviors (r = -.094, p > .05). The correlations found are displayed in Table 10.

Blinded Observer Ratings of Social Skill and SPAI-C Scores

There were significant negative correlations between SPAI-C scores and the following social skills: overall social effectiveness (r = -.286, p = .007), pragmatic conversational behaviors (r = -.227, p = .033), speech and prosodic behaviors (r = -.230, p = .031). There were no significant correlations between SPAIC-C scores and paralinguistic behaviors (r = -.111, p = .301). The correlations found are displayed in Tables 11.

Predicting Group Membership with Blinded Observer Ratings of Social Skill

A discriminant function analysis was conducted to determine the ability of the social skill variables in which there group main effects (i.e., pragmatic conversational behaviors, speech and

prosodic conversational behaviors) to differentiate the three groups. Of the 90 cases available for analysis, the overall number of cases classified correctly was 46 or 51.1%. Seven (23.3%) of the 30 children with Asperger's Disorder were classified correctly, 17 (56.7%) of the 30 children with social phobia were classified correctly, as were 22 (73.3%) of the 30 typically developing children. Seventeen (56.7%) children with Asperger's Disorder were misclassified as belonging to the typically developing group and 6 (20.0%) were misclassified as belonging to the social phobia group.

A discriminant function analysis also was conducted to determine the ability of the overall social effectiveness rating to predict group membership. Of the 90 cases, the overall number of cases classified correctly was 37 or 41.1% of the sample. Of the 30 cases in the Asperger's Disorder group, 2 (6.7%) were classified correctly. In the social phobia group, 17 of the 30 cases (56.7%) were classified correctly. Of the 30 cases in the typically developing group, 18 (60.0%) were classified correctly. Nineteen (63.3%) children with Asperger's Disorder were misclassified as belonging to the typically developing group and 9 (30%) were misclassified as belonging to the social phobia group.

CHAPTER FOUR: CONCLUSIONS AND FUTURE RESEARCH

Discussion

The purpose of this study was to elucidate the specific pattern of social skills deficits in children with Asperger's Disorder. To our knowledge, this is the first study to use a standardized behavioral observation to directly assess the social abilities of children with Asperger's Disorder under the same assessment conditions as typically developing children and including a psychiatric population characterized by impaired social skills (children with social phobia). During brief structured scenarios designed to represent situations children may experience in their lives (i.e., offering and receiving help, giving and receiving compliments, responding to a bully), children with Asperger's Disorder did not differ significantly from typically developing children on an overall impression of social effectiveness. When specific conversational behaviors were examined (i.e., pragmatic behavior, speech/prosody behaviors, paralinguistic behaviors), children with Asperger's Disorder did not differ significantly from typically developing children. These findings suggest that children with Asperger's Disorder have adequate social skills for brief, structured social interactions.

These findings may appear inconsistent with previous research (e.g., Bauminger et al., 2003; Bauminger et al., 2008; Koning & Magill-Evans, 2001; Lopata, Thomeer, Volker, & Nida, 2006; Luteijn et al., 2000; Macintosh & Dissanayake, 2006; Paul et al., 2009), that reported social skills deficits in children with Asperger's Disorder when compared to typically developing peers. However, one important difference between the results of this investigation and previous research may reflect differences in the method of social skill assessment. For example, Bauminger et al. (2003; 2008) examined the *quantity* of social behaviors categorized as positive social interactions (e.g., eye contact, smiles, sharing objects, giving help), negative social

interactions (e.g., teasing, physical or verbal aggressiveness, controlling, avoidance), low-level social interactions (e.g., looking, proximity, imitation), and social responses (i.e., the child responds to peers verbally or nonverbally). In contrast, the current study examined the *quality* of specific social skills such as pragmatic (e.g., effort to maintain the conversation, appropriateness of the response), speech and prosodic (e.g., voice volume, vocal inflection), and paralinguistic conversational behaviors (e.g., facial orientation, motor movement, posture-awkwardness). One interpretation of the different outcome is that children with Asperger's Disorder may use the basic molecular social skills in an appropriate way, but less frequently than typically developing children. If replicated these data would suggest that social skills training programs may not need to spend an inordinate amount of time teaching *how* to engage in social interaction. Instead, focus on *how often* and *when* children with Asperger's Disorder engage in appropriate social behaviors is necessary to enhance their overall impression of social skill.

Another explanation for the inconsistency between the results of the current study and previous research is the length of the interaction. During brief role play interactions (lasting less than 1 minute), children with Asperger's Disorder did not demonstrate deficits in conversational behaviors. This behavior sample may have been too short to detect the skill deficits of children with this disorder. In support of this explanation, one group of investigators (Tager-Flushber, Paul, & Lord, 2005) noted that individuals with autism spectrum disorders show more marked impairment as the length of the interaction increases. Furthermore, Paul et al. (2009) demonstrated that when engaged in a 30-minute structured clinical interview with an adult, children with Asperger's Disorder exhibited significantly more inappropriate pragmatic (e.g., more irrelevant detail, inappropriate topic shifts, unresponsive partner cues, little reciprocal exchange), speech and prosodic (e.g., unusual intonation), and paralinguistic conversational

behaviors (e.g., inappropriate gaze) than typically developing children. The current investigation also focused on the *quality* of conversational behaviors but did not elucidate similar areas of impairment when children interacted with a same-aged peer for a brief period of time. Given that children with Asperger's Disorder often experience more difficulty interacting with and maintaining relationships with same-age children, it would be important to determine whether the deficits identified by Paul et al. (2009) are the same or different deficits exhibited during extended interactions with peers. To summarize, the discrepancy between the results of the current study and previous research utilizing direction observation may reflect fundamental differences in methodology (e.g., peer versus adult interaction, ratings of skill quality versus quantity).

Molar social behaviors also were assessed during the role play interactions**.** Molar social behaviors (e.g., assertiveness) are comprised of several molecular conversational behaviors presented in a particular manner (e.g., firm vocal tone, eye contact, brief latency to respond). With respect to the manner in which molar social skill was operationalized for the study, the social behavior of children with Asperger's Disorder was indistinguishable from children without a psychological diagnosis when offering or receiving help, giving or receiving compliments, and responding assertively to a bully. This indicates that children with this disorder have both the molecular and molar skills necessary to respond appropriately during everyday social situations. These findings are discrepant with studies that have assessed social skills using questionnaires, in which children with Asperger's Disorder were rated as less socially skilled on various molar social behaviors (e.g., co-operation, assertion, self-control) compared to typically developing children (Koning & Magill-Evans, 2001; Macintosh & Dissanayake, 2006). Perhaps children with Asperger's Disorder interacted differently during the brief, structured role play

interaction than how parents perceive that they typically behave during situations that elicit these complex behaviors (e.g., helping, assertion). Children with this disorder may *have* the requisite skills, but do not use these skills when appropriate. In addition, having the basic social skills necessary for brief interactions may not directly relate to the frequency of peer contact or the ability to engage in developmentally appropriate friendships, an area of social behavior in which children with Asperger's Disorder appear less competent in (Koning & Magill-Evans, 2001). Furthermore, it is still unclear the extent to which children with this disorder desire peer interaction and relationships. Collectively, the research suggests that children with Asperger's Disorder may know what to say during basic, structured interactions. More research is necessary to determine whether children with Asperger's Disorder have appropriate social skill during longer, unstructured interactions (e.g., recess, waiting for the school bus, at a birthday party) and whether they know when to use the skills in their repertoire (e.g. which social cues indicate a child that is "open" or "closed" to a conversation, when to change the topic of conversation).

Understanding the nature of the social skills in children with Asperger's Disorder and the specificity of their pattern of skill deficits is useful information for researchers and clinicians in the use of effective treatments for this population. Approximately 47% of children with Asperger's Disorder in this sample reported experiencing high levels of anxiety in social situations (a score of 14 or above for males and a score of 18 or above for females on the SPAI-C). When examined further, there were no significant differences in social effectiveness in children with this disorder at different levels of social anxiety were not present, suggesting that children with Asperger's Disorder appear socially skilled during basic social interactions across various gradations of self-reported social anxiety. To determine the ability of observer ratings of social skills (overall social effectiveness, pragmatic conversational behaviors, speech and

prosodic conversational behaviors) to differentiate the three groups, discriminant analyses was conducted. Interestingly, a majority of the children with Asperger's Disorder (ranging from 56.7%- 63.3%) was misclassified as belonging to the typically developing group. These results are consistent with the results of this study in which observer ratings of social behavior in children with Asperger's Disorder did not differ significantly from the social behavior of typically developing children.

To determine whether children with this disorder have a unique set of social abilities or display the same deficits as other psychiatric populations identified as having impaired social skills, the social skills of children with Asperger's Disorder were directly compared to the social skills of children with social phobia. Compared to children with social phobia, children with Asperger's Disorder displayed more social effectiveness and more appropriate pragmatic and speech and prosodic social behavior. Notably, the results suggest that children with Asperger's Disorder do not suffer from the same deficits in basic social skills as children with social phobia. Therefore, existing social skills training programs for children with social phobia may be inappropriate and ineffective for use with children with Asperger's Disorder. More research is needed to uncover specific characteristics of social skill that are deficient in children with this disorder.

During the role play interaction, overall social effectiveness and specific conversational behaviors that were conceptualized as comprising an overall impression of social effectiveness, were rated. Correlations were conducted to determine the relationship between ratings of each behavior category (i.e., pragmatic, speech and prosodic, and paralinguistic conversational behaviors) and ratings of overall social skill. The results revealed that there was a significant, positive relationship between each conversational behavior category and overall social

effectiveness, suggesting that as ratings of social effectiveness increase, ratings of molecular social skills categories increase. Stated differently, ratings of children's' overall social effectiveness are consistent with ratings of the appropriateness of their specific conversational skills. One caveat to consider when interpreting these results is that the coders rated overall social effectiveness as well as the conversational behaviors for each category for each child. Thus, internal validity may have been compromised (e.g., halo effect, such that high ratings of overall social effectiveness may have biased ratings of conversational behaviors). To reduce the impact of this bias, future studies should have a different coder rate overall effectiveness than the coder who rated specific conversational behaviors.

Social anxiety among groups was assessed during the role play interaction (i.e., self report on the SAM, Self Assessment Manikan, observer ratings) as well as by questionnaire (SPAIC; Social Phobia and Anxiety Inventory for Children). During the role play interaction, children with social phobia rated themselves (SAM) and were rated by blinded observers as experiencing more social anxiety than children with Asperger's Disorder and typically developing children. Similarly, children with social phobia reported experiencing more social anxiety on the SPAI-C than did children with Asperger's Disorder or typically developing children. In addition, the mean score of 24 for children with social phobia was above the cutoff criteria on the SPAI-C (i.e., a score of 14 or above for males and a score of 18 or above for females indicates a high likelihood of social phobia), supporting the validity of the SPAI-C to detect clinical levels of social anxiety. In contrast, the mean scores for children with Asperger's Disorder and typically developing children were below the cutoff (Ms = 12.84 and 9.29, respectively), suggesting that as a group, the likelihood of meeting diagnostic criteria for social phobia is low.

The relationships among all measures of social anxiety were examined (i.e., observer ratings of social anxiety, self-ratings on SAM and SPAI-C). When all children were included in the analysis, the results of the correlations revealed that as self- ratings of social anxiety on the SAM increase, observer ratings of social anxiety and self-ratings on the SPAI-C increase. In contrast, when examined based on group membership, the relationships among measures of social anxiety were nonsignificant. These findings speak to the level of difficulty researchers and clinicians have in measuring psychopathology in children, as well as difficulty professionals (e.g., teachers) have in identifying anxious children. Perhaps children were not able to retrospectively recall the level of anxiety they experienced during the role-plays (SAM) or the anxiety they experience across various social situations (SPAI-C). In addition, blinded observers may have experienced difficulty with rating social anxiety along a single rating scale and may benefit from coding several elements that create an overall impression of social anxiety during the behavioral assessment. Finally, physiological assessment would provide an objective and empirical assessment of psychological distress when engaged in social encounters.

Although the results of the current study suggest that basic social skills are part of the social repertoire in children with Asperger's Disorder, this disorder is characterized by pervasive deficits in rewarding social interaction and an inability to attain developmentally appropriate friendships; thus, additional strategies (e.g., same observer ratings during unstructured interactions; use of more objective ratings) are necessary to delineate specific targets for treatment. Perhaps utilizing unstructured interactions (e.g., while children are playing board games) as part of the behavioral observation may allow for the assessment of the social abilities in children who did not respond during analog, scripted interactions. This may minimize the anxiety related to being the "center of attention" and to reduce the unnaturalness associated with

a laboratory setting. Also, children in the typically developing group may have responded to more social prompts than they would have in real-life, since the consent process describes that they were participating in the research because they are friendly and do not experience difficulty making friends. To discern the degree to which typically developing children respond to social prompts, future studies should deemphasize the well-developed social abilities of these children prior to the social interaction task.

Limitations of the Current Study

This investigation is not without limitations. First, this study evaluated the social behaviors of children during structured, analogue social interactions. In the current study, social behaviors of children were assessed via scripted role-play scenarios. Children were asked to imagine social scenarios that were read to them by an experimenter and to respond to a peer who read scripted responses. During each role-play scenario (e.g., helping a peer), regardless of the target child's response to the first social prompt (e.g., "Do you want to use my phone to call your parents?"), the peer read the second scripted line (e.g., "I guess I ought to call my dad"), sometimes leading to awkward and ineffective responses. Thus, this method may have minimized the ability of children to display the entire range of their social abilities. As a result, the structured nature of this task may have constrained responses and we may have only captured children's abilities to engage with peers during brief social interactions, a small yet important aspect of social behavior.

In contrast to previous findings (Bauminger et al., 2003; Bauminger et al., 2008; Koning & Magill-Evans, 2001; Lopata, Thomeer, Volker, & Nida, 2006; Luteijn et al., 2000; Macintosh & Dissanayake, 2006), social skills ratings for children with Asperger's Disorder did not differ significantly from ratings of social skills in typically developing children. In fact, the results of

this study suggested that children with Asperger's Disorder possess the basic social skills necessary to engage effectively in brief, peer-initiated interactions. In order to enhance treatment effectiveness for this population, future investigations are necessary in order to identify which elements of social interaction are impaired. Unstructured interactions, including riding on the school bus, before and after class, lunch, recess, birthday parties, are a frequent and potentially challenging part of social engagement. Perhaps children with Asperger's Disorder do not suffer from inadequate basic social skills, but experience difficulty with understanding the nuances of social behavior (e.g., how to know when the other person is bored with the conversation) during extended interactions. In order to detect the presence or absence of these skills, behavioral observation during peer interactions in an unstructured format may be the logical follow-up to uncovering which aspects of social behavior are impaired in children with Asperger's Disorder.

APPENDIX A: STUDIES ASSESSING SOCIAL SKILLS

Appendix A: Studies Assessing Social Skills

Children with social phobia (SP)			
Authors	**Participants**	**Measures**	Results
1. Beidel et al., 1999	SP(n=50), controls(n =22);age 7-13	• Structured Role Play Procedure	Observation Observers rated children with SP as less socially skilled, and having significantly longer speech latencies than controls
2. Beidel et al., 2007	SP(n=63), controls(n=43); age 13-16	• Structured Role Play Procedure	Observation Observers rated children with SP as less socially skilled, and having significantly longer speech latencies than controls
3. Spence et al., 1999	SP(n=27); 27 controls; age 7 – 14	Social Skills Questionnaire-Parent;Pupil (SSQ-P; SSQ-PU; Spence, 1995) Social Competence Questionnaire-Parent; Pupil (SCPQ-P; SCPQ-PU; Spence, 1995) Children's Assertive Behavior Scale (CABS; Michelson & Wood, 1982) Revised Behavioral Assertiveness Task for Children (BAT-CR; Ollendick, 1981) School observation	Questionnaires -Children with SP were rated by parental and self-report as being less socially skilled and less socially competent than controls. -Children with SP selected fewer assertive responses than controls on the CABS Observations -Children with SP responded to prompts with fewer words than nonanxious children during the BAT-CR -During school observations, children with SP children were rated by observers as receiving less favorable outcomes from social interactions than the comparison group
Children with Asperger's Disorder (AD)			
1. Bauminger, 2002	HFA (n=15); age 8 – 17	Social Skills Rating System-Teacher Version (SSRS-T; Gresham & Elliot, 1990) School Observation	Questionnaire -At posttreatment, teachers rated children as more assertive and cooperative Observation -At posttreatment, children initiated more responses, low-level and positive interaction
2. Bauminger et al., 2003	HFA(n=16), TYP(n=17); age 8 –17	• School observation	Observation -Youth with HFA spent less time with peers and exhibited fewer low-level and positive interactions than controls
3. Bauminger et al., 2008	HFASD(n=44), TYP(n=38), ages 7-12	• Friendship Observation Schedule (FOS; Bauminger, et al. 2005) • Dyadic Relationship Q-Set (DRQ; Park & Waters, 1989)	Observation -Children with HFASD exhibited fewer goal-directed behaviors, sharing, positive affect, positive social orientation, social conversation, cohesiveness, harmony, responsiveness, and more parallel play when interacting with a friend than TYP
3. Koning & Magill-Evans, 2001	AS(n=21),TYP males(n=21); age 12 – 15	Child and Adolescent Social Perception Measure (CASP; Magill-Evans et al. 1995) Social Skills Rating System-Child; Parent; Teacher Version (SSRS-C; SSRS-P; SSRS-T; Gresham & Elliot, 1990) Child Behavior Checklist (CBCL; Achenbach, 1991)	Questionnaires -Parents and teachers rated children with AS as less responsible and self-controlled -Parents reported that adolescents with AS had fewer friends and less contact with peers than TYP adolescents. -Teachers rated youth with AS as less cooperative than TYP. Social Perception Task -Youth with AS received lower ratings on emotional score, nonverbal, body situational, and voice cues score.
4. Lopata, et al., 2006	AD(n = 21); age 6 – 13	• Behavior Assessment System for Children-Parent (BASC-PRS; Reynolds & Kamphaus, 1992, 1998) • Behavior Assessment System for Children-Teacher Rating Scale (BASC-TRS; Reynolds & Kamphaus, 1992, 1998)	Questionnaires -At posttreatment, both parents and staff rated children with AD as significantly improved on social skills.
5. Luteijn et al., 2000	HFA(n=95), PDD-NOS (n= 240),ADHD (n =181);age 4-18	Children's Social Behavior Questionnaire (CSBQ; Luteijn et al., 2000)	Questionnaire -Parents rated youth with AD as having more social contact and insight problems than youth with ADHD or PDDNOS
6. Macintosh & Dissanayake, 2006	HFA(n=20),AD (n=19),TYP (n =17);age 4-10	SSRS-P SSRS-T	Questionnaires -Teachers and parents rated children with HFA and AD as less co-operative and assertive by parents and teachers, and having less self-control than controls
7. Paul et al., 2009	AS(n=15), HFA/PDD-NOS(n=14) TYP(n=26); age12 – 18	Behavioral observation	Observation Observers rated children with AS as exhibiting more pragmatic, speech and prosodic, and paralinguistic conversational difficulties than children with TD.

APPENDIX B: BEHAVIORAL ASSESSMENT TASK (BAT) SCRIPT

Appendix B: Behavioral Assessment Task (BAT) Experimenter Script

We are going to do role plays today, and after we are done, I am going to ask you to look at this sheet. We call this little guy "SAM" and what I want you to do is to point to the picture of SAM that best describes how you felt when you were doing the role plays. So if you felt very nervous, you would point to the picture of the very nervous SAM (point to #5), and if you did not feel nervous at all, you would point to picture number #1 (point to #1). So, SAM #1 is like eating an ice cream cone where you are not nervous at all and SAM #5 is like being chased by a bear where you are really, really nervous.

"Today we are going to do some little skits, called role-plays. I am going to describe situations and (actor's name) is going to say some things that someone your age may or may not say to you in real life. What I want you to do is to respond just how you would in real life, and if you wouldn't say anything in real life, that's OK too. We are going to do a practice scene first and if you have any questions, you can ask me at that time."

Practice Scene:

Imagine that you are at the movies and you are buying some popcorn. You pay the cashier and receive you popcorn. There is a boy/girl standing behind you and he/she says:

Actor: How's the popcorn?

Actor: I would really like to have some, can I have a taste?

Scene 1:

You are riding your bike in front of your house. A boy/girl is standing next to his/her bike and it looks like he/she had a crash and is looking down at a flat tire. You approach him/her. He/she looks at you, and with a sad voice, he/she says:

Actor: How am I going to get this darn bike home?

Actor: I guess I ought to call my dad.

Scene 2:

In gym class, you are learning how to play basketball and how to shoot free throws. You are having trouble making some shots from the free throw line. Another boy/girl who is a good basketball player says:

Actor: Would you like for me to help you with your free throws?

Actor: Well, it was hard for me to learn at first. Would you like for me to give you some pointers?

Scene 3:

A boy/girl who sits next to you in math class is having some trouble with his/her math test. He/she's been working hard to get his/her grade up. The class gets back the most recent test with grades on them. He/she gets a big smile on his/her face and says:

Actor: I finally got an A!

Actor: I've been studying so hard.

Scene 4:

You've been working hard to memorize a poem to recite in English Literature class. You finish reciting the poem in front of the class and return to your seat. The boy/girl sitting next to you says:

Actor: You did a great job.

Actor: You remembered every word and you looked so calm and cool.

Scene 5:

You are reading a comic book during recess. Pretty soon another kid takes your comic and says.

Actor: I'm going to read it myself.

Actor: Go find another one.

COMPLETE the practice scene and Scenes 1-5

After completing Scenes 1-5, pick up the SAM and ask the participant to point to the picture that best describes how he/she felt during the role-play.

APPENDIX C: OBSERVER RATING FORM: SOCIAL ANXIETY

Appendix C: Observer Rating Form: Social Anxiety

4 **Severely anxious**: Uncomfortable, gross motor signs of anxiety exhibited consistently (hand wringing, or turning, leg shaking, fidgety). Also could be manifested as extreme inhibition ("frozen with fear")

3 **Moderately anxious**: Clear signs of discomfort, awkward, some gross motor movements as above, but less extreme and/or less consistent than above.

2 **Mildly anxious**: Occasional signs of anxiety, which consist primarily of facial apprehension (furrowed brow, eyes wide open), or awkward body movement (slight hand wringing, awkward seating position).

1 **Not at all anxious**: No overt signs of anxiety, smiles at conversational partner, appears interested and/or enjoys the interaction.

Rate each scene separately

Scene 1	4	3	2	1
Scene 2	4	3	2	1
Scene 3	4	3	2	1
Scene 4	4	3	2	1
Scene 5	4	3	2	1

Score (Average of all scenes)

_____

APPENDIX D: OBSERVER RATING FORM: OVERALL SOCIAL EFFECTIVENESS

Appendix D: Observer Rating Form: Overall Social Effectiveness

1 **Not effective at all**: Looks awkward, no response or one word response, does not ask questions, mumbling, barely audible speech.

2 **Minimally effective**: Clearly awkward, answers questions but mainly gives two or three word responses, and no further participation in conversation.

3 **Moderately effective**: Only mild awkwardness, able to respond to questions fully, some degree of fluidity, and moderate effort to keep conversation going, voice volume moderate.

4 **Effective:** No awkwardness, carries part of the conversation, may self-disclose, appears to enjoy the interaction, voice strong and clear.

Rate each scene separately

Scene 1	4	3	2	1
Scene 2	4	3	2	1
Scene 3	4	3	2	1
Scene 4	4	3	2	1
Scene 5	4	3	2	1

Score (Average of all scenes)

_____

APPENDIX E: OBSERVER RATING FORM: MOLECULAR CONVERSATIONAL BEHAVIORS

Appendix E: Observer Rating Form: Molecular Conversational Behaviors

Patient Initials: _____ Patient ID#: _____
Assessment: _____ Tape #: _____
Rater Name: _____ Rater#: 1 or 2
Date: _____

Latency to First Utterance: Record the number of seconds between when the child actor finishes each line and when the target child begins to speak **(.1-10 secs).**

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Response time from Line 1:	_____	_____	_____	_____	_____
Response time from Line 2:	_____	_____	_____	_____	_____

Average of All Scenes: _____

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Number of Words Spoken (Do NOT include utterances, e.g., eh, uh, um, like)	_____	_____	_____	_____	_____

Average of All Scenes: _____

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Facial Orientation While Speaking	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1= No eye contact or staring
2= Minimal eye contact; Less than 50% of interaction
3= Moderately appropriate eye contact; Greater than approximately 50% of interaction
4= Appropriate eye contact; Approximately 70% of the interaction

Average of All Scenes: _____

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Facial Orientation While Peer is Speaking	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1= No eye contact or staring
2= Minimal eye contact; Less than 50% of interaction
3= Moderate eye contact; Greater than 50% of interaction
4= Appropriate eye contact; Approximately 70% of the interaction

Average of All Scenes: _____

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Motor Movement	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Frequency of movement, not intensity. e.g., wringing hands; scratching self; playing with chair or other objects in sight)

Average of All Scenes: _____

1= Consistent throughout the entire interaction (this includes fine motor movements)
2= During most of the interaction; greater than 50% of interaction
3= During some of the interaction; less than 50% of interaction
4=Less than 50% of the interaction

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Posture-Stiffness	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Stiff movements and whether lack of movement is stiff; not an all or nothing; e.g., arms crossed, seated at edge of chair)
1= Significantly stiff; seated at edge of chair (e.g., completely stiff, no movement)
2= Moderately stiff (completely stiff, but slight fluid movement)
3= Somewhat stiff (somewhat stiff, but some fluid movement)
4= Not stiff at all (all movement is fluid or posture is relaxed)

Average of All Scenes: _____

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Posture-Awkwardness	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Seated away from other child; legs hanging over arm of chair; hand over face)
1= Significantly awkward; legs hanging over arm of chair
2= Moderately awkward (significantly awkward for 1 response; moderately awkward for both responses)
3= Somewhat awkward (e.g., leaning off to the side of the chair; facing somewhat away from peer)
4= No awkwardness (e.g., posture oriented towards peer)

Average of All Scenes: _____

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Voice Volume	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Loudness or softness)
1= Inappropriate voice volume; too loud or inaudible
2= Voice volume somewhat too loud or barely audible Average of All Scenes: _____
3= Slightly too loud or moderately audible
4= Appropriate volume

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Vocal Fluidity	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1= Trembling
2= Moderately trembling Average of All Scenes: _____
3= Somewhat trembling
4= No trembling

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Vocal Inflection	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Vocal quality that indicates some emotion or feeling in voice)
1= Monotone; no inflection
2= Minimally appropriate inflection Average of All Scenes: _____
3= Moderately appropriate inflection; inflection for only 1 response
4= Appropriate inflection for both responses

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Affect	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Degree to which the emotion displayed is appropriate to the social scenario; facial expressions; overt behavior)
1= Inappropriate affect (angry when complimenting)
2= Minimally appropriate affect Average of All Scenes: _____
3= Moderately appropriate affect
4= Appropriate affect (smiles when displaying positive assertion, firm expression when assertive and offering help)

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Appropriateness of Response	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(Degree to which the content of the response is effective; code response as a transcript)
1= No response to either prompt; response is not at all appropriate
2= Minimally appropriate response
3= Moderately appropriate; Average of All Scenes: _____
4= Appropriate response; both responses are appropriate (e.g., says "thank you" when complimented; asserts oneself with a bully)

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
Effort to Maintain Conversation	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1= Did not speak at all; no response Average of All Scenes:_____
2= Minimal response; responded to 1 prompt with minimum response (e.g., "ok")
3= Responded to both prompts with a minimal response (e.g., "ok," "ok"); elaborated on 1 response but did not respond to second prompt (e.g., "ok, that would be great," "--")
4= Effort to maintain conversation; elaborated on both responses**;** elaborated on 1 response and at least minimum response to other prompt (e.g., "ok, that would be great," "thanks")

	SCENE 1	SCENE 2	SCENE 3	SCENE 4	SCENE 5
No Response to Entire Scene	0 1	0 1	0 1	0 1	0 1

0= responded to at least one prompt to a scene
1= no response to either prompt

Total (sum) number of scenes with no response_____

APPENDIX F: INSTITUTIONAL REVIEW BOARD APPROVAL

Appendix F: Institutional Review Board Approval

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Exempt Review Status

From: **UCF Institutional Review Board**
FWA00000351, Exp. 10/8/11, IRB00001138

To: **Lindsay Scharfstein**

Date: **November 10, 2008**

IRB Number: **SBE-08-05901**

Study Title: **Elucidating the specific social skill deficits in children with Asperger's Disorder: A comparative study**

Dear Researcher:

Your research protocol was reviewed by the IRB Vice-chair on 11/9/2008. Per federal regulations, 45 CFR 46.101, your study has been determined to be **minimal risk for human subjects and exempt** from 45 CFR 46 federal regulations and further IRB review or renewal unless you later wish to add the use of identifiers or change the protocol procedures in a way that might increase risk to participants. Before making any changes to your study, call the IRB office to discuss the changes. **A change which incorporates the use of identifiers may mean the study is no longer exempt, thus requiring the submission of a new application to change the classification to expedited if the risk is still minimal.** Please submit the Termination/Final Report form when the study has been completed. All forms may be completed and submitted online at https://iris.research.ucf.edu.

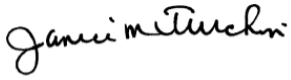
The category for which exempt status has been determined for this protocol is as follows:

4. Research involving the collection or study of existing data, documents, records, pathological specimens or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. ("***Existing***" means already collected and/or stored before your study starts, not that collection will occur as part of routine care.)

All data, which may include signed consent form documents, must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Janice Turchin on 11/10/2008 03:54:39 PM EST



IRB Coordinator

APPENDIX G: TABLES

Table 1 Demographic Characteristics

	Typically Developing $N = 30$	Social Phobia $N = 30$	Asperger's Disorder $N = 30$	
Mean Age	10.60(2.0)	10.00(1.8)	10.57(1.6)	$p = .354$
Gender				$\chi^2 = .420$
Males	22(73.3%)	23(76.7%)	26(86.7%)	
Females	8(26.7%)	7(23.3%)	4(13.3%)	
Race/Ethnicity				$\chi^2 < .001$
Caucasian	11(36.7%)	18(60.0%)	27(90.0%)	
Latino/a	6(20.0%)	1(3.3%)	1(3.3%)	
African American	9(30.0%)	7(23.3%)	0(0%)	
Asian/Pacific Islander	0(0%)	3(10%)	0(0%)	
Other	4(13.3%)	1(3.3)%	0(0%)	
No Endorsement	0(0%)	0(0%)	2(6.7%)	

Table 2 Correlational Matrix of Conversational Behaviors

	Effort	Approp	Affect	Latency	Words	Vol	Inflec	Fac Or Speak	Fac Or Peer Speak	Move	Stiff	Awk
Effort	1											
Approp	.933	1										
Affect	.719	.724	1									
Latency	-.862	-.859	-.766	1								
Words	.662	.577	.517	-.487	1							
Volu	.403	.305	.541	-.455	.413	1						
Inflec	.563	.534	.795	-.626	.452	.592	1					
Fac Or Speak	.338	.312	.450	-.324	.268	.198	.374	1				
Fac Or Peer Speak	.217	.238	.389	-.273	.256	.042	.229	.661	1			
Mov	.177	.117	.089	-.166	.104	.018	.018	-.192	-.220	1		
Stiff	.145	.205	.366	-.152	.153	.236	.241	.179	.225	-.091	1	
Awk	.082	.135	.254	-.116	.139	.167	.191	.215	.295	-.019	.395	1

Table 3 Mean Scores for the Three Groups on Social Skill Ratings (Asperger's Disorder, Social Phobia, Typically Developing)

	Typically Developing M (s.d.)	Social Phobia M (s.d.)	Asperger's Disorder M (s.d.)	F value
Measure				
Total Scores				
Overall Social Effectiveness Total***	14.06(2.5) [a]	10.70(3.7) [b]	13.33(2.7) [a]	10.177
Pragmatic Behaviors Total***	53.75(8.9) [a]	42.77(11.6) [b]	50.59(9.0) [a]	9.764
Speech/Prosodic Behavior Total***	34.73(5.5) [a]	22.77(12.8) [b]	31.47(9.0) [a]	12.569
Paralinguistic Behaviors Total	64.00(9.0)	57.47(11.3)	61.43(12.5)	2.647
Additional Analyses				χ^2 =
Number of Scenes with No Response to Either Prompt	2(1.33%)	34(22.67%)	10(6.66%)	7.438

$p < .05$*; $p < .01$**; $p < .001$***
Means not sharing superscripts are significantly different.

Table 4 Mean Scores for the Three Groups by social scenario (Asperger's Disorder, Social Phobia, Typically Developing)

	Typically Developing M (s.d.)	Social Phobia M (s.d.)	Asperger's Disorder M (s.d.)	F value
Measure				
Offering Help				
Overall social effectiveness**	2.73(0.7) [a]	2.03(0.8) [b]	2.57(0.7) [a]	5.438
Pragmatic Behaviors score**	10.37(2.5) [a]	8.36(2.8) [b]	10.17(2.5) [a]	5.783
Speech and Prosodic Behaviors***	7.00(1.6) [a]	4.33(2.6) [b]	6.20(2.1) [a]	12.297
Paralinguistic Behaviors score	12.90(2.1)	11.67(2.6)	12.53(2.8)	1.887
Receiving Help				
Overall social effectiveness*	2.83(0.6) [a]	2.33(0.8) [b]	2.73(0.6) [ab]	4.489
Pragmatic Behaviors score**	11.13(2.3) [a]	9.14(2.0) [b]	9.92(1.7) [ab]	7.391
Speech and Prosodic Behaviors**	6.83(1.2) [a]	5.03(2.6) [b]	6.63(1.7) [a]	7.650
Paralinguistic Behaviors score	12.9(2.2)	11.67(2.5)	12.30(2.5)	1.895
Giving Compliments				
Overall social effectiveness**	2.70(0.7) [a]	2.13(0.9) [b]	2.77(0.7) [a]	5.949
Pragmatic Behaviors score**	10.23(2.3) [a]	8.07(3.0) [b]	10.30(2.1) [a]	7.801
Speech and Prosodic Behaviors***	6.63(1.6) [a]	4.30(3.0) [b]	6.30(2.1) [a]	8.852
Paralinguistic Behaviors score*	12.97(2.0) [a]	11.40(2.2) [b]	12.07(3.0) [ab]	3.139
Receiving Compliments				
Overall social effectiveness**	2.77(0.7) [a]	3.27(0.5) [b]	2.77(0.7) [a]	5.635
Pragmatic Behaviors score***	11.12(2.0) [a]	8.76(2.4) [b]	9.91(2.0) [ab]	9.746
Speech and Prosodic Behaviors***	7.23(0.9) [a]	4.33(3.0) [b]	6.10(2.5) [a]	12.314
Paralinguistic Behaviors score	12.76(2.0)	11.40(2.4)	12.33(2.5)	2.690
Assertiveness				
Overall social effectiveness***	2.93(0.6) [a]	2.10(0.9) [b]	2.63(0.8) [a]	8.529
Pragmatic Behaviors score**	10.37(2.5) [a]	8.36(2.8) [b]	10.17(2.5) [a]	5.438
Speech and Prosodic Behaviors***	7.23(0.9) [a]	4.33(3.0) [b]	6.10(2.5) [a]	12.314
Paralinguistic Behaviors score	12.48(2.2)	11.33(2.4)	12.20(2.7)	1.771

$p < .05$*; $p < .01$**; $p < .001$***

Table 5 Mean scores for Children with Asperger's Disorder who Report Low or High Anxiety on the SPAI-C (*p* value Bonferroni Corrected, .05/25 = .002)

	Low Anxiety (n = 16) M (s.d.)	High Anxiety (n = 14) M (s.d.)	t value
Total Scores			
Overall Social Effectiveness Total	12.88(3.4)	13.86(1.6)	-.977
Pragmatic Behaviors Total	48.73(10.9)	52.72(5.9)	-1.220
Speech/Prosodic Behavior Total	29.38(11.6)	33.86(3.6)	-1.383
Paralinguistic Behaviors Total	59.81(12.7)	63.29(12.6)	-.751
Offering Help			
Overall social effectiveness	2.38(0.9)	2.79(0.4)	-1.581
Pragmatic Behaviors score	9.24(2.9)	11.23(1.3)	-2.348
Speech and Prosodic Behaviors	5.63(2.7)	6.86(0.9)	-1.617
Paralinguistic Behaviors score	12.31(2.8)	12.79(2.9)	-.455
Receiving Help			
Overall social effectiveness	2.63(0.7)	2.86(0.4)	-1.091
Pragmatic Behaviors score	9.34(1.68)	10.59(1.6)	-2.082
Speech and Prosodic Behaviors	6.25(2.1)	7.07(1.0)	-1.328
Paralinguistic Behaviors score	12.06(2.4)	12.57(2.7)	-.551
Giving Compliments			
Overall social effectiveness	2.69(0.8)	2.86(0.5)	-.676
Pragmatic Behaviors score	10.19(2.5)	10.43(1.7)	-.313
Speech and Prosodic Behaviors	5.75(2.7)	6.93(1.0)	-1.543
Paralinguistic Behaviors score	11.44(2.9)	12.79(3.1)	-1.242
Receiving Compliments			
Overall social effectiveness	2.56(0.8)	2.71(0.6)	-.571
Pragmatic Behaviors score	9.93(2.1)	9.88(2.0)	.072
Speech and Prosodic Behaviors	5.94(2.4)	6.57(2.0)	-.779
Paralinguistic Behaviors score	12.13(2.6)	12.57(2.6)	-.474
Assertiveness			
Overall social effectiveness	2.63(0.9)	2.64(0.7)	-.059
Pragmatic Behaviors score	10.03(3.0)	10.59(2.4)	-.555
Speech and Prosodic Behaviors	5.81(2.8)	6.43(2.1)	-.676
Paralinguistic Behaviors score	11.88(3.1)	12.57(2.3)	-.693

$p < .002$*

Table 6 Pearson Correlations between Observer Ratings of Social Effectiveness and Observer Ratings of Conversational Behaviors Total Scores (all participants, then by group) (*p* value Bonferroni Corrected, .05/12 = .0041)

	Observer Ratings of Social Effectiveness
	r
All Participants	
Pragmatic Behavior***	.865
Speech and Prosodic Behaviors***	.865
Paralinguistic Behaviors***	.390

$p < .001$***

Table 7 Mean Scores for the Three Groups on Social Anxiety Ratings (Asperger's Disorder, Social Phobia, Typically Developing)

	Typically Developing M (s.d.)	Social Phobia M (s.d.)	Asperger's Disorder M (s.d.)	F value
Measure				
Self- Ratings of Social Anxiety				
SAM rating***	1.60(0.9) [a]	3.00(2.1) [b]	1.67(0.8) [a]	9.472
SPAI-C rating***	9.29(7.4) [a]	24.04 (8.5) [b]	12.84(9.7) [a]	23.547
Observer Ratings of Anxiety***	13.33(2.7) [a]	16.23(2.3) [b]	14.40(2.7) [a]	9.641

$p < .05$*; $p < .01$**; $p < .001$***
Means not sharing superscripts are significantly different.

Table 8 Pearson Correlations between Measures of Social Anxiety (i.e., observer ratings of social anxiety, SPAI-C ratings, SAM ratings; all participants, then by group; p value Bonferroni Corrected (.05/12 = .0041))

All Participants	Observer Ratings of Social Anxiety R	SPAI-C r
SPAI-C	.250	
SAM	.346*	.452*

p < .0041*

Asperger's Disorder	Observer Ratings of Social Anxiety r	SPAI-C r
SPAI-C	-.265	
SAM	.179	.190

p < .0041*

Social Phobia	Observer Ratings of Social Anxiety r	SPAI-C r
SPAI-C	.031	
SAM	.203	.343

p < .0041*

Typically Developing	Observer Ratings of Social Anxiety r	SPAI-C R
SPAI-C	.289	
SAM	.386	.294

p < .0041*

Table 9 Pearson Correlations between Observer Ratings of Social Anxiety and Observer Ratings of Social Skills Total Scores (all participants, then by group)

	Observer Ratings of Social Anxiety
	r
All Participants	
Overall Social Effectiveness***	-.587
Pragmatic Behavior***	-.550
Speech and Prosodic Behaviors***	-.626
Paralinguistic Behaviors***	-.375

$p < .05$*; $p < .01$**; $p < .001$***

Table 10 Pearson Correlations between SAM ratings and Observer Ratings of Social Skills

All Participants	SAM ratings r	P value
Overall Social Effectiveness**	-.296	.005
Pragmatic Behavior*	-.255	.015
Speech and Prosodic Behaviors**	-.293	.005
Paralinguistic Behaviors	-.094	.380

$p < .05$*; $p < .01$**; $p < .001$***

Table 11 Pearson Correlations between SPAI-C ratings and Observer Ratings of Social Skills

All Participants	SPAI-C R	P value
Overall Social Effectiveness**	-.286	.007
Pragmatic Behavior*	-.227	.033
Speech and Prosodic Behaviors*	-.230	.031
Paralinguistic Behaviors	-.111	.301

$p < .05$*; $p < .01$**; $p < .001$***

REFERENCES

Achenbach, T. M. (1991). Manual for the Child Behavioral Checklists/4 – 18 and 1991 profile. Burlington: University of Vermont.

American Psychiatric Association. (2000). *Diagnostic and statistical manual for mental disorders (*4th ed., rev.). Washington, DC: Author.

Barnhill, G. P. (2001). Social attributions and depression in adolescents with Asperger Syndrome. *Focus on Autism and Other Developmental Disabilities, 16(1),* 46-53.

Bauminger, N. (2002). The facilitation of social-emotional understanding and social interaction in high-functioning children with autism: Intervention outcomes. *Journal of Autism and Developmental Disorders, 32(4),* 283-298.

Bauminger, N., Rogers, S. J., Aviezer, A., & Solomon, M. (2005). The Friendship Observation Schedule (FOS). Unpublished manual, Bar Ilan University, Israel and University of California, Davis, CA.

Bauminger, N., Shulman, C., & Agam, G. (2003). Peer interaction and loneliness in high-functioning children with autism. *Journal of Autism and Developmental Disorders, 33(5),* 489-507.

Bauminger, N., Solomon, M., Aviezer, A., Heung, K., Gazit, L., Brown, J. et al. (2008). Children with autism and their friends: A multidimensional study of friendship in high-functioning autism spectrum disorder. *Journal of Abnormal Child Psychology, 36,* 135-150.

Beidel, D. C., Rao, P. A., Scharfstein, L. A., Wong, N., Alfano, C. (in preparation). Adult social phobia.

Beidel, D. C., & Morris, T. L. (1995). Social Phobia. In J.S. March (Ed.). Anxiety disorders in children and adolescents (pp. 181-211). New York: Guilford Press.

Beidel, D. C., Rao, P A., Alfano, C. A., Scharfstein, L. A., Wong, N. (in preparation). Social skills and social phobia: An investigation of DSM-IV subtypes.

Beidel, D. C., Turner, S. M., & Morris, T. L. (1995). A new inventory to assess childhood social anxiety and phobia: The Social Phobia and Anxiety Inventory for Children. *Psychological Assessment, (7)1,* 73-79.

Beidel, D. C., Turner, S. M., & Morris, T. L. (1999). Psychopathology of childhood social phobia. *Journal of the American Academy of Child and Adolescent Psychiatry, 38(6),* 643-650.

Beidel, D. C., Turner, S. M., & Young, B. J. (2006). Social Effectiveness Therapy for Children: Five years later. *Behavior Therapy, 37,* 416-425.

Beidel, D. C., & Turner, S. M. (2007). *Shy children, phobic adults: The nature and treatment of social anxiety disorder (2nd ed.).* Washington, DC: American Psychological Association Books.

Beidel, D. C., Turner, S. M., Young, B. J., Ammerman, R. T., Sallee, F. R., & Crosby, L. (2007). Psychopathology of adolescent social phobia. *Journal of Psychopathology and Behavioral Assessment, 29,* 47-54.

Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: The Self-Assessment Manikin and the semantic differential. *Journal of Behavior Therapy and Experimental Psychiatry, 25(1),* 49-59.

Charlesworth, R., & Hartup, W. W. (1967). Positive social reinforcement in the nursery school peer group. *Child Development, 38,* 993-1002.

Eisenmajer, R., Prior, M., Leekam, S., Wing, L., Gould, J., Welhan, M., et al. (1996). Comparison of clinical symptoms in autism and Asperger's Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 1523-1531.

Elliott, S. N., & Gresham, F. M. (1987). Children's social skills: Assessment and classification practices. *Journal of Counseling and Development, 66(2),* 96–99.

Francis, G., Last, C.G., & Strauss, C. C. (1992). Avoidant disorder and social phobia in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 31(6),* 1086-1089.

Gottman, J., Gonso, J., & Rasmussen, B. (1975). Social interaction, social competence, and friendship in children. *Child Development,* 46, 709-718.

Grant, B. F., Hasin, D. S., Blanco, C., Stinson, F. S., Chou, S. P., Goldstein, R. B., et al. (2005). The epidemiology of social anxiety disorder in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry, 66(11),* 1351-1361.

Gresham, F. M. (1986). Conceptual and definitional issues in the assessment of children's social skills: Implications for classification and training. *Journal of Clinical Child Psychology, 15(1),* 3–15.

Gresham, F. M., & Elliot, S. N. (1990). *Social skills rating system*. Circle Pines, MN: American Guidance Service.

Hartup, W. W., & Coates, B. (1967). Imitation of a peer as a function of reinforcement from the peer group and rewardingness of the model. *Child Development,* 55, 1003-1016.

Hartup, W. W., Glazer, J. A., & Charlesworth, R. (1967). Peer reinforcement and sociometric status. *Child Development,* 1017-1024.

Kazdin, A. E., Esveldt-Dawson, K., & Matson, J. L. (1982). Changes in children's social skills perfprmance as a function of preassessment experiences. *Journal of Clinical Child Psychology, 11(3),* 243-248.

Kazdin, A., Esveldt-Dawson, K., & Matson, J. L. (1983). The effects of instructional set on social skills performance among psychiatric inpatient children. *Behavior Therapy, 14,* 413-423.

Kazdin, A. E., Matson, J. L., & Esveldt-Dawson, K. (1984). The relationship of role-play assessment of children's social skills to multiple measures of social competence. *Behavior Research and Therapy, 22(2),* 129-139.

Keller, M. F., & Carlson, P. M. (1974). The use of symbolic modeling to promote social skills in preschool children with low levels of social responsiveness. *Child Development, 45,* 912-919.

Kendall, P. C. (1994). Treating anxiety disorders in children: Results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology, 62,* 100-110.

Kendall, P. C., & Southam-Gerow, M. A. (1996). Long-term follow-up of a cognitive-behavioral therapy for anxiety-disordered youth. *Journal of Consulting and Clinical Psychology, 64,* 724-730.

Koning, C., & Magill-Evans, J. (2001). Social and language skills in adolescent boys with Asperger Syndrome. *Autism,5(1),* 23-36.

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(5),* 659-85.

Lopata, C., Thomeer, M. L., Volker, M. A., & Nida, R. E. (2006). Effectiveness of a cognitive-behavioral treatment on the social behaviors of children with Asperger Disorder. *Focus on Autism and Other Developmental Disabilities, 21(4),* 237-244.

Luteijn, E., Luteijn, F., Jackson, S., Volkmar, F., & Minderaa, R. (2000). The Children's Social Behavior Questionnaire for milder variants of PDD problems: Evaluation of the psychometric properties. *Journal of Autism and Developmental Disorders, 30(4),* 317-330.

Macintosh, K., & Dissanayake, C. (2006). Social skills and problem behaviours in school aged children with high-functioning autism and Asperger's Disorder. *Journal of Autism and Developmental Disorders, 36,* 1065-1076.

Magill-Evans, J., Koning, C., Cameron-Sadava, A., & Manyk, K. (1995). The child and adolescent social perception measure. *Journal of Nonverbal Behavior, 19(3),* 151-169.

Michelson, L., & Wood, R. (1982). Development and psychometric properties of the Children's Assertive Behavior Scale. *Journal of Behavioral Assessment, 4,* 3-13.

Mueser, K. T., Bellack, A. S., Douglas, M. S., & Morrison, R. L. (1991). Prevalence and stability of social skill deficits in schizophrenia. *Schizophrenia Research, 5(2),* 167-176.

Nijmeijer, J. S., Minderaa, R. B., Buitelaar, J. K., Mulligan, A., Hartman, C. A., & Hoekstra, P. J. (2008). Attention-deficit/hyperactivity disorder and social dysfunctioning. *Clinical Psychology Review, 28,* 692-708.

Ollendick, T. H. (1981). Assessment of social interaction skills in school children. *Behavioral Counseling Quarterly, 1,* 227-243.

Reynolds, C. R., & Kamphaus, R. W. (1992). *Behavior Assessment System for Children manual.* Circle Pines, MN: American Guidance Service.

Rubin, K. H., Daniels-Beirness, T., & Bream, L. (1984). Social isolation and social problem solving: A longitudinal study. *Journal of Consulting and Clinical Psychology, 52(1),* 17-25.

Rubin, K., Dwyer, K., Booth-LaForce, C., Kim, A. H., Burgess, K. B., & Rose-Krasnor, L. (2004). Attachment, friendship, and psychosocial functioning in early adolescence. *Journal of Early Adolescence, 24(4),* 326–356.

Rutter, M., & Le Courteur, A. (1995). *Autistic Diagnostic Interview-Revised*. University of Chicago.

Silverman, W. (1994). The Anxiety Disorders Interview Schedule for Children (DSM-IV). Albany, NY: Greywind Publications.

Silverman, W. K., & Albano, A. M. (1996). *The anxiety disorders interview schedule for DSM-IV-Child and parent versions.* San Antonio, TX: Psychological Corporation.

Spence, S. H. (1995). *Social skills training: Enhancing social competence with children and adolescents.* Windsor, U.K.: NFER-Nelson.

Spence, S. H., Donovan, C., & Brechman-Toussaint, M. (1999). Social skills, social outcomes, and cognitive features of childhood social phobia. *Journal of Abnormal Psychology, 108(2),* 211-221.

Spence, S. H., Donovan, C., & Brechman-Toussaint, M. (2000). The treatment of childhood social phobia: The effectiveness of a social skills training-based, cognitive-behavioural intervention, with and without parental involvement. *Journal of Child Psychology & Psychiatry, 41(6),* 713-726.

Tager-Flushberg, H., Paul, R., & Lord., C. (2005). Language and communication in autism. In F. Volkmar, R. Paul, A., Klin, & D. Cohen (Eds.), *Handbook of autism and pervasive developmental disorders* (3rd Eds., Vol. 1, pp. 335-364). New York: Wiley.

Vasey, M. W. (1995). Social anxiety disorders. In A. R. Eisen, C. A. Kearney, & C. E. Schaefer (Eds.), *Clinical handbook of anxiety disorders in children and adolescents* (pp. 131-168). Northvale, NJ: Jason Aronson Inc.

Vernberg, E. M., Abwender, D. A., Ewell, K. K., & Beery, S. H. (1992). Social anxiety and peer relationships in early adolescence: A prospective analysis. *Journal of Clinical Child Psychology, 21,* 189-196.

Weiss, M. J., & Harris, S. L. (2001). Teaching social skills to people with autism. *Behavior Modification, 25(5),* 785-802.