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SOCIAL SKILLS AND SOCIAL ACCEPTANCE IN CHILDHOOD ANXIETY DISORDERS

by

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M.S. University of Central Florida 2009

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A dissertation submitted in partial fulfillment of the requirements  
for the Doctor of Philosophy  
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## ABSTRACT

The present study examined the social skills and social acceptance of children with SAD (n=20), children with GAD (n=18), and typically developing (TD) children (n=20). A multimodal assessment paradigm was employed to address three study objectives: (a) to determine whether social skills deficits are unique to children with SAD or extend to children with GAD, (b) to assess whether skills vary as a function of social context (in vivo peer interaction Wii Task versus hypothetical Social Vignette Task) and (c) to examine the relationship between anxiety diagnosis and social acceptance. Parent questionnaire data indicated that both youth with SAD and GAD experienced difficulties with assertiveness, whereas children with SAD experienced a broader range of social skills difficulties. Blinded observers' ratings during the behavioral assessment social tasks indicated that compared to children with GAD and TD children, children with SAD have deficits in social behaviors and social knowledge across settings, including speech latency, a paucity of speech, few spontaneous comments, questions and exclamations, and ineffective social responses. In addition, vocal analysis revealed that children with SAD were characterized by anxious speech patterns. By comparison, children with GAD exhibited non-anxious speech patterns and did not differ significantly from TD youth on social behaviors, with the exception of fewer spontaneous comments and questions. Lastly, children with SAD were perceived as less likeable and less socially desirable by their peers than both children with GAD and TD children. Clinical implications of these findings are discussed.

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## **CHAPTER ONE: INTRODUCTION**

### **Social Skills**

Social anxiety disorder (SAD) is the most common of the pediatric anxiety disorders, with current prevalence ranging between 3-8% of children and adolescents (Costello, Egger, & Angold, 2005). The average age of onset for SAD is mid-to-late adolescence (Beesdo, Bittner, Pine, Stein, Hofler, Lieb, & Wittchen, 2007; Kessler, Berglund, Demier, Jin, Merikangas, & Walters, 2005; Wittchen & Fehm, 2003), although children as young as 8-years have been reliably diagnosed with this disorder (Beidel, Turner, & Morris, 1999; Grant et al., 2005). Youth with SAD experience a marked and persistent fear of social or performance situations in which embarrassment or criticism may occur. Although fear may be circumscribed, most youth endorse anxiety in at least three social situations (Bernstein, Bernat, Davis, & Layne, 2008). Feared social situations often include, but are not limited to, speaking, eating, writing, or reading in front of others, using school or public restrooms, speaking to unfamiliar children or adults, attending birthday parties or dances, participating in organized groups/clubs, and talking on the telephone (Beidel et al., 1999). Developmentally appropriate descriptors in the DSM-IV-TR indicate that children may fail to recognize their fears as being excessive and unreasonable (American Psychiatric Association [APA], 2000). In addition, youth with SAD may describe symptoms of anxiety, but fail to articulate the precise nature of their social interaction fears. Further, social interaction difficulties are consistently identified among youth with SAD (e.g., Beidel et al., 1999; Beidel, Turner, Young, Ammerman, Sallee, & Crosby, 2007; Spence, Donovan, & Brechman-Toussaint, 1999).

A growing empirical database documents the specific nature of the social impairment in youth with SAD (Alfano, Beidel, & Turner, 2006; Beidel et al., 1999; Beidel et al., 2007; Bernstein et al., 2008; Scharfstein, Alfano, Beidel, & Wong, 2011a; Scharfstein, Beidel, Sims, & Rendon Finnell, 2011b; Spence et al., 1999). Children with SAD are described as less socially competent and less socially skilled than non-anxious children according to self (Spence et al., 1999) and parental report (Scharfstein et al., 2011a; Spence et al., 1999). When presented with social vignettes, children with SAD are less likely to select assertive responses than typically developing (TD) peers (Spence et al., 1999), suggesting they behave less assertively during social interactions. Within the school environment, SAD is linked with higher teacher-rated deficits in social and leadership skills (Bernstein et al., 2008). Collectively, responses across multiple informants suggest that skills deficits and poor social competence are evident in socially anxious youth within home and school settings.

Observation strategies allow for the direct assessment of a variety of social behaviors as children with SAD interact with peers in controlled, analogue settings or within their natural environment (e.g., school). Typically, during an analogue task, children are instructed to imagine a series of brief, social scenarios described by an experimenter and respond to social prompts initiated by a same age peer as if these situations were really happening (e.g., giving and receiving a compliment, receiving help; Beidel et al., 1999; Ollendick, 1981). On a global rating of overall social effectiveness, children with SAD are rated by observers as less skilled interpersonally than children with no psychiatric diagnosis (Alfano et al., 2006; Beidel et al., 1999; Rao, Beidel, Turner, Ammerman, Crosby, & Sallee, 2007; Scharfstein et al., 2011b). When individual social behaviors comprising an overall impression of social effectiveness are

observed, children with SAD respond to social prompts with fewer words (Spence et al., 1999) and have significantly longer speech latencies than TD youth (Beidel et al., 1999; Scharfstein et al., 2011b). Furthermore, in the latter study, children with SAD also experience difficulty managing the topic of conversation, provide ineffective social responses to peers (pragmatic social behavior), and exhibit deficient speech production (speech and prosodic social behavior) compared to TD youth and youth with Asperger's Disorder.

Moreover, assessment of social skills need not be limited to subjective reports or observation. Digital analysis of vocal qualities reveals that children with SAD speak more softly than TD peers and have less variation in their voice volume, indicating that they consistently speak in a soft voice volume (Scharfstein et al., 2011b). Examinations of the emotional qualities carried in the voice indicate that youth with SAD have higher vocal pitch and more vocal pitch variability (jitteriness) than children with Asperger's Disorder (Scharfstein et al., 2011b). Thus, children with SAD have speech qualities consistent with their heightened anxiety (Fuller, Horii, & Conner, 1992) and evidence deficits in many of the basic social skills necessary for successful peer interactions.

Attention to social deficits during childhood is important due to the significant negative impact of impaired social skills on immediate and long-term functioning. Specifically, early social isolation, resulting from avoidance or peer rejection/neglect, impedes the acquisition of social skills (Rubin, LeMare, & Lollis, 1990), because most social behavior is learned through social engagement. Additionally, socially isolated children do not have the usual social learning experiences as their non-shy or non-socially phobic peers (Rubin et al., 1990), limiting opportunities for social contact and the development of age-appropriate relationships. Even

without a history of shyness or social isolation, a lack of friends or close relationships is associated with low self-esteem (Rubin, Dwyer, & Booth-LaForce, 2004) and depressed mood (Barnhill, 2001). Further, social impairment is associated with a high incidence of school maladjustment and dropout, delinquency, child psychopathology, and adult mental health difficulties (Elliott & Gresham, 1987). Moreover, social difficulties appear to remain stable over time, and may persist into adulthood in the absence of intervention efforts (e.g., Cowen, Pederson, & Babigian, 1973; Hymel, Rubin, Rowden, & LeMare, 1990; Moskowitz, Schwartzmann, & Ledingham, 1985).

Although relatively less well-studied, social skills have also been examined in children with other anxiety disorders (not just SAD). In a recent study, youth diagnosed with different types of anxiety disorders (either primary or secondary) were found to experience difficulties with their social skills even after controlling for social anxiety (Motoca, Williams, & Silverman, 2012). These findings were based on subjective report (parent and child) and analyzed for all anxious youth as a group. Further exploration using a comprehensive assessment approach, including direct observation and analysis by specific anxiety disorders, will help to elucidate the patterns of social strengths and weaknesses specific to individual anxiety diagnoses or common among all clinically anxious youth. In particular, due to considerable symptom overlap between childhood SAD and generalized anxiety disorder (GAD), including worry regarding social relationships and performance, GAD represents a natural comparison disorder.

GAD is characterized by an internal process of excessive, uncontrollable worry which often includes apprehension and/or rumination about interpersonal relationships, performance (e.g., at school), future events, past behavior, health, and world events (APA, 2000). With regard

to social and interpersonal functioning, children with GAD often worry about and set exceedingly high standards for both their competence in and the quality of their peer relationships (Albano, Chorpita, & Barlow, 2003). In addition, their eagerness to please others and their tendency to be perfectionistic, overly conscientious (Bernstein & Layne, 2006), and rule abiding in their relationships may serve to facilitate close friendships. Alternatively, however, some of the unique clinical features of GAD may place strain on peer relationships. For example, excessive reassurance-seeking and preoccupation with performance, both core features of GAD (Albano et al., 2003; Bernstein & Layne, 2006), might annoy and/or eventually alienate other children. The empirical data available on social variables in youth with GAD indicate that teacher-rated social skills increase as a function of clinician-rated GAD clinical severity (Bernstein et al., 2008). Moreover, despite having relatively fewer friends overall, children with GAD are similar to TD children in terms of parent-reported overall interpersonal functioning, social competence, presence of a best friend, and participation in groups/clubs (Scharfstein et al., 2011a). Thus, based on findings from the few available studies, children with GAD may possess adequate social skills in their behavioral repertoire. However, to date, no study has directly observed the social skills of youth with GAD in social settings, and thus conclusions regarding the presence/absence of these skills are provisional.

In addition to the heuristic value of determining the degree of presence/absence of social skills deficits in children with GAD, comparison of social abilities between diagnostic groups is important for understanding psychopathology and developing optimal remediation efforts. Specifically, youth with SAD and GAD often are researched collectively (i.e., as a unitary group), treated using identical treatment protocols, and outcome often is assessed unilaterally across the

sample. Yet if differences in clinical functioning exist, clinicians may be assuming an equivalent syndrome and/or treatment response, which may be inappropriate if these groups were examined separately. Thus, comparison of the social relations of youth with SAD and GAD under the same assessment conditions, using a multimodal assessment strategy that includes direct observation, will further our understanding of the social repertoire of childhood anxiety disorders (in this case SAD and GAD).

### **Social Acceptance**

Another important element of social and emotional functioning is peer relations (Hartup, 1996; Hartup & Stevens, 1999), including peer liking, friendships, and participation in social activities. In particular, youth with SAD, but not GAD, may have an increased risk for peer difficulties given their impairments in interpersonal skills for social discourse and friendship formation. Thus far, our knowledge regarding peer relations is largely based on early studies examining sociometric status. Results of sociometric ratings reveal that in general, children with anxiety disorders are neglected by their peers (diagnoses based on DSM-III or DSM-III-R; Strauss, Lahey, Frick, Frame, & Hynd, 1988; Strauss, Lease, Kazdin, Dulcan, & Last, 1989). They receive fewer peer nominations (positive or negative) than children with no psychiatric disorder as well as youth with externalizing or adjustment disorders (Strauss et al., 1988, 1989). Children's self-ratings are consistent with these sociometric data, wherein clinically anxious youth report having a best friend, but fewer friends overall relative to their peers (Chansky & Kendall, 1997). In addition, clinician rated anxiety symptoms among clinically anxious youth were positively related to parent and child reported negative peer interactions (Motoca et al., 2012). Further, social skills mediated the relations between youth anxiety symptoms and both

positive and negative peer interactions (Motoca et al, 2012). Although helpful in explaining the nature of the peer difficulties in anxious children, findings reported for anxious youth, as a group, may misrepresent the peer relations in each anxiety disorder group. A brief review of the extant literature on peer functioning in youth with SAD and GAD is described below.

A few studies have examined peer variables in youth with SAD. On the school playground, youth with SAD receive fewer positive responses and more negative and ignore responses than nonanxious peers (Spence et al., 1999), suggesting that socially anxious youth are overlooked and/or rejected by their peers. With respect to friendships, although children with SAD are just as likely as their peers to have a best friend (Bernstein et al., 2008; Scharfstein et al., 2011a) and be involved in extracurricular activities, they have fewer friends overall and have difficulty making new friends (Beidel et al., 1999; Bernstein et al., 2008; Scharfstein et al., 2011a; Spence et al., 1999). In addition, children with SAD prefer to spend time alone rather than with friends (Bernstein et al., 2008), likely reflecting their social anxiety and problematic peer relations rather than a lack of interest in social engagement.

Most studies of peer functioning have used self or parent reports, rather than direct report from same-age peers. Studies that do include peer reporters often rely primarily on sociometric data from an extant peer group, which may say less about the immediate impression of liking and more about anxious children's longstanding social reputations (Hymel et al., 1990). In the only study to evaluate an immediate impression of peer liking, Verduin and Kendall (2008) asked peers to rate likeability and anxiety based on the videotaped speeches of children with SAD, GAD, separation anxiety disorder, or no anxiety disorder (NAD). In general, likeability is inversely related to anxiety and peers tend to like children with an anxiety disorder significantly

less than the NAD group. Notably, when likeability ratings are examined by specific anxiety diagnosis, lower scores of peer liking are uniquely associated with the SAD group. Further, children with SAD were less liked regardless of how anxious they appeared, suggesting factors other than anxiety might also contribute to the relationship between SAD and low peer liking. Social skills deficits, commonly reported among youth with SAD, may represent the link for this relationship. Thus, further study of the social skills and peer acceptance in this population, as well as broadly among clinical samples of anxious youth, is warranted. An understanding of the secondary outcomes or correlates of social skills deficits, in turn may inform the use of social skills training programs to buffer against negative peer outcomes in the treatment for anxious youth.

### **The Current Study**

To summarize, impaired social skills have been identified consistently among children with SAD using various assessment strategies, including parent and child report, observer ratings of social behaviors, and digital analysis of verbal communication. To our knowledge, only one study has evaluated the social skills among youth with different types of anxiety disorders. Based on parent and child report, clinically anxious youth, and not just youth with SAD, were reported to have social difficulties. Although helpful in describing the existence of social deficits, it is unclear whether the social deficits present among all clinically anxious youth are similar or different to those documented for youth with SAD. Due to considerable symptom overlap with SAD, including concern about social impressions and performance, children with GAD represent a natural comparison group. Thus, a first aim of the study is to compare the social behavior of children with SAD and GAD under the same assessment conditions using a multimodal



assessment strategy, comprised of child and parent report, direct observation, and objective analyses. A second aim is to further evaluate the social repertoire of these groups by examining their social performance across different social settings (i.e., an in vivo peer interaction and hypothetical social vignettes). Additionally, peer ratings indicate that peers tend to like clinically anxious children less than non-anxious children. However, low likeability peer ratings are unique to children with SAD and they are less liked regardless of observed anxiety. Therefore, the third aim of the study is to examine the relationship between anxiety diagnosis and social acceptance.

Overall, the current study sought to address significant gaps in the literature by directly comparing the social abilities and peer ratings of liking of children with SAD to a control group of clinically anxious children (i.e., GAD) and children with no psychological disorder (i.e., TD). It was hypothesized that children with SAD would exhibit poorer social skills than children with GAD and TD children during a peer play interaction. It was further hypothesized that children with SAD would exhibit poorer social skills than children with GAD and TD children regardless of social context (i.e., in vivo peer interaction as well as hypothetical social vignettes task). Finally, it was hypothesized that peers would endorse lower ratings of likability and potential for friendship for children with SAD when compared to children with GAD and TD children.

## CHAPTER TWO: METHODOLOGY

### Participants

The sample consisted of 58 children: 20 children meeting DSM-IV-TR criteria for primary SAD (12 female, 8 male), 18 children meeting DSM-IV-TR criteria for primary GAD (12 female, 6 male), and 20 TD children (9 female, 11 male), not meeting criteria for any DSM-IV-TR diagnosis. The three groups were matched on age ( $F[2,55]=1.804$ ,  $ns$ ,  $\eta^2=0.062$ ), sex ( $\chi^2[2]=1.933$ ,  $ns$ ,  $\eta^2=0.183$ ), and race/ethnicity ( $\chi^2[4]=11.619$ ,  $ns$ ,  $\eta^2=0.325$ ). Children ranged in age from 6-13 years ( $M_{SAD}=8.70$ ,  $M_{GAD}=8.72$ , and  $M_{TD}=9.65$  years). Ten children in the SAD group were Caucasian (50%), 8 were Hispanic (40%), and 2 identified as Biracial (10%). Sixteen children with GAD were Caucasian (89%) and 2 were Hispanic (11%). The TD group consisted of 12 Caucasian (60%), 3 Hispanic (15%), and 5 Biracial children (25%). Four children with SAD (20.0%) and four children with GAD (22.2%) met criteria for a secondary disorder. Descriptive statistics for demographic and clinical characteristics are presented in Table 1.

Children with SAD and GAD were clinically referred and/or recruited to participate in the University of Central Florida Anxiety Disorders Clinic research protocol examining the social and peer functioning of children with and without anxiety disorders. The TD group consisted of children who were recruited through the protocol as healthy participants (i.e., no DSM-IV diagnoses). Exclusion criteria for the anxiety disorder groups included comorbid SAD or GAD (in children diagnosed with primary GAD or SAD, respectively), attention-deficit/hyperactivity disorder, autism spectrum disorders, bipolar diagnoses, psychosis, suicidal ideation, or mental retardation. All children and their parent(s) completed an in-person evaluation, during which all

measures for the present study were collected. All participants provided written informed consent/assent to the study procedures prior to enrollment (Appendix A).

### **Diagnostic Measures**

Children and their parents were interviewed independently using the *Anxiety Disorders Interview Schedule for DSM-IV: Children and Parent Versions* (ADIS-C/P, Silverman & Albano, 1996).

The ADIS-C/P is a semi-structured interview designed to assess DSM-IV anxiety disorders and other DSM-IV psychiatric disorders. As part of the ADIS-C/P diagnostic interview, a Clinician Severity Rating (CSR) was assigned to each diagnosis, using a 9-point scale ranging from scores of 0 to 8. A severity rating of 4 (moderate impairment) or higher was required for study inclusion.

An experienced doctoral student in clinical psychology conducted the diagnostic interview with both parent and child and diagnoses were established based on information from both sources.

The ADIS-C/P has high inter-rater reliability, particularly with regard to anxiety disorder categories (i.e., ranging from .85 to 1.0; Kendall, 1994; Kendall & Southam-Gerow, 1996) and is a widely used and accepted measure of psychopathology in children. Based on a random selection of 17% of the interviews conducted in this investigation, 90% inter-rater agreement on diagnosis and CSRs was obtained for the current sample. The definition of agreement used to determine inter-rater reliability for diagnosis and CSR was (1) agreement on presence or absence of diagnosis and (2) CSR ratings within one point.

Since limited cognitive and language abilities may influence social and peer functioning, the Block Design and Vocabulary subtests of the *Wechsler Intelligence Scale for Children-Fourth Edition* (WISC-IV; Wechsler) were administered to assure that children had an estimated IQ of

80 or above. On the Block Design subtest, a measure of nonverbal intelligence and reasoning, mean standard scores for all groups were average and did not differ significantly ( $M_{\text{SAD}}=10.30$ ,  $M_{\text{GAD}}=10.11$ ,  $M_{\text{TD}}=11.65$ ,  $F[2,53]=1.490$ , *ns*, partial  $\eta^2=0.053$ ). Mean Vocabulary standard scores indicated at least average verbal intelligence and reasoning for all groups, but scores were significantly lower in the SAD group than the GAD and TD groups ( $M_{\text{SAD}}=10.22$ ,  $M_{\text{GAD}}=12.67$ ,  $M_{\text{TD}}=13.75$ ,  $F[2,53]=8.453$ ,  $p=0.001$ , partial  $\eta^2=0.242$ ). Two children's Vocabulary scores in the SAD group were excluded from data analysis due to their refusal to speak during the subtest. All children were enrolled in regular education classrooms and their parents did not indicate any difficulty in cognitive functioning or any language delay.

## **Procedure**

### Child and Parent Report Measures

Parents completed the *Social Phobia and Anxiety Inventory for Children-Parent Version* (SPAIC-PV; Beidel, Turner, & Morris, 1995) to provide an assessment of their child's social fears. Twenty-six items were rated on a 3-point Likert scale and reflect cognitive, behavioral, and somatic symptoms of SAD in various feared social situations (e.g., group gatherings, performance situations). The SPAIC-PV has good to excellent parent-child agreement (Beidel, Turner, & Morris, 2000), internal consistency, and convergent and discriminant validity (Higa, Fernandez, Nakamura, Chorpita, & Daleiden, 2006).

Parents also completed the *Child Behavior Checklist-Parent Version* (CBCL; Achenbach & Edelbrock, 1991), a 117-item checklist that assesses children's behavioral and emotional functioning. The Social Competence and Social Problems sub-scales were used in this study

based on their specific relation to social functioning. Six items comprise the Social Competence Scale measuring the quality, quantity, and intensity of social activities, number of organizations involved in, activity level in organizations relative to peers (i.e., less active, average, or more active), number of close friends, frequency of contact with friends, how well the child gets along with others relative to peers (i.e., worse, average, or better), and how well the child works/plays alone relative to peers (i.e., worse, average, or better). The Social Problems Scale consists of eleven items rated on a 3-point Likert scale ranging from 0 (not true) to 2 (often/always true) with higher scores reflecting greater social problems: dependent, lonely, does not get along with other kids, jealous, feels others are out to get him/her, accident-prone, gets teased, not liked by other kids, clumsy, prefers being with younger kids, and speech problems. The CBCL is widely used and has documented validity, internal consistency, and test-retest reliability (Achenbach & Rescorla, 2001). The Social Competence and Social Problems scales have demonstrated test-retest reliability ( $r=0.93$  and  $0.90$ , respectively) and internal consistency ( $\alpha=0.68$  and  $0.82$ , respectively; Achenbach & Rescorla, 2001).

To assess parent perception of their child's social behaviors, parents completed the *Social Skills Rating System, Parent Version* (SSRS-P; Gresham & Elliott, 1990), a 55-item measure consisting of behavioral descriptions of social skills rated on a 3-point Likert scale describing the frequency of the behavior (0=never, 1=sometimes, 2=very often). A Social Skills Standard Score is calculated as a function of scores on four subscales: Cooperation (e.g., helping others, sharing materials, complying with rules/directions), Assertion (e.g., introducing oneself, asking others for information, responding to the actions of others), Self-Control (e.g., responding appropriately to teasing, taking turns, compromising), and Responsibility (e.g., ability to communicate with

adults, regard for property). The SSRS has good internal consistency ( $\alpha=0.90$ ) and test-retest reliability ( $r=0.87$ ; Gresham & Elliott, 1990).

Children and parents responded to six items of the *Interpersonal Relationships Module of the ADIS-C/P* (Silverman & Albano, 1996) to evaluate children's interpersonal functioning. These included "Would you say you have [your child has] more friends/fewer friends/same number as most kids?" (more friends, same number of friends, or fewer friends relative to same age peers); "Do you [does your child] have a best friend?" (yes or no); "Do you [does your child] have trouble making friends?" (yes or no); "Once you [your child has] have made friends, do you [your child] have trouble keeping them?" (yes or no); "Are you [Is your child] in any club or group or do you [does he/she] play on any sports team?" (yes or no); and, "Would you [your child] prefer to spend most of your [his/her] time alone or with other kids?" (alone or with other kids). A total score was calculated based on parent ( $\alpha=0.70$ ) and child report ( $\alpha=0.48$ ). The range of scores was 0-7, with higher scores indicating more positive peer experiences. The Interpersonal Relationships Module of the ADIS-C/P is sensitive to detecting the interpersonal functioning of children with SAD in comparison with TD children (Scharfstein et al., 2011a) and children with other anxiety disorders (Bernstein et al., 2008; Scharfstein et al., 2011a).

To assess range and severity of social fears, children completed the *Social Phobia and Anxiety Interview for Children* (SPAIC; Beidel et al., 1995). Twenty-six items were rated on a 3-point Likert scale and reflect cognitive, behavioral, and somatic symptoms of SAD in various feared social situations (e.g., group gatherings, performance situations) The SPAI-C has demonstrated internal consistency ( $\alpha=0.95$ ) and high test-retest reliability over a two week ( $r=0.86$ ) and ten month ( $r=0.63$ ) time period and convergent validity with a measure of trait

anxiety ( $r=0.50$ ; Beidel, Turner, & Fink, 1996; Beidel et al., 1995). Two SPAIC scores in the SAD group were excluded from data analyses due to inconsistent responding. In these cases, scores were zero, even though the diagnostic interview confirmed elevated social anxiety.

To evaluate friendship validation and intimacy, children completed a shortened (18-item) version of the *Friendship Quality Questionnaire-Revised* (Parker & Asher, 2003). Each item was rated on a 5-point Likert scale, with higher scores indicating higher levels of friendship quality (0=not at all true, 1=a little true, 2=somewhat true, 3=pretty true, 4=really true). The Validation and Intimacy subscales have demonstrated internal consistency ( $\alpha=0.82$  and  $0.72$ , respectively; Festa & Ginsburg, 2011) and these friendship qualities have been linked to social anxiety in youth (Hartup & Stevens, 1999; Rigby, 2000; Vernberg, Abwender, Ewell, & Beery, 1992).

### Behavioral Assessment

Social skills were assessed through observer ratings of each child's participation during two social interactions: (1) Wii Social Task, which involved playing the Wii with an unfamiliar child, and (2) the Social Vignettes Task, which involved providing written responses to audiotaped social vignettes depicting social engagement with a peer (i.e., Social Vignettes Task). Peer liking was assessed through peer and target child ratings during the Wii Social Task. Order of task administration was not randomized due to the possible priming effect of completing the vignette task prior to participation in the in vivo interaction.

Prior to beginning the behavioral assessment (i.e., baseline) and directly following each social task, children used a modified Self Assessment Manikin (SAM; Bradley & Lang, 1994,

Appendix J) to rate their level of anxiety. The modified SAM has five pictures illustrating various levels of distress that correspond with a 5-point Likert scale, ranging from 1 (little or no anxiety) to 5 (severe anxiety). The SAM is sensitive to detecting the anxiety of children with SAD in comparison with TD children (Beidel et al., 1999) and children with Asperger's Disorder (Scharfstein et al., 2011a).

#### *Wii Social Task.*

Playing a game on the Nintendo Wii was used to assess social interaction during a typical peer interaction. For task standardization, children played the Wii Mario Kart game. The investigator escorted the peer into the room where the child was waiting and told the children that they could play on the Nintendo Wii video game console. The peer was not provided any specific instructions other than to play the Wii and to have fun. The children were given 10 minutes to play freely. The task was videotaped and later coded by independent raters to assess for the presence of specific social behaviors (described below). At task completion (after 10 minutes), the peer left the room. The child used the Self Assessment Manikin (SAM; described above) to rate his/her anxiety during the Wii interaction. The child and control peer then independently rated (in separate rooms) their social impression of the other child using the Likeability Scale (described below).

*Child Report Measure Completed During the Wii Task.* To evaluate peers' immediate impression of children's social acceptance and likeability, directly following the Wii Social Task, the child and control peer independently rated their social impression of the other child using the *Peer Likeability Scale* (depicted in Appendix K). The Peer Likeability Scale was adapted from Asher and colleagues' research on peer acceptance and friendship selection (Chung & Asher



1996; Erdley & Asher, 1996) and research examining the peer liking of children with anxiety disorders (Verduin & Kendall, 2008). Items include: “How much did you like the child you played with?”; “How much fun did you have when you played with \_\_\_\_\_?”; “If you had a chance, would you like to play a game or talk to the child you played with again?”; “Do you think the child you played with would make a good friend?”; “If you had a chance, would you like to be friends with \_\_\_\_\_?” Higher scores indicate greater likeability of the rated child: 0 (not at all/definitely not), 1 (not very much/ probably not), 2 (a little bit/maybe), 3 (quite a bit/probably), and 4 (very much/definitely). For data analyses, ratings of 0, 1, and 2 were collapsed given the low frequency of 0 and 1 ratings within the sample. Internal consistency of the peer liking scale is very high ( $\alpha=0.90$ ; Verduin & Kendall, 2008), therefore a total Likeability score was used for data analyses.

*Behavioral Ratings.* Using the Noldus Behavioral Observation System, the following social behaviors were assessed: latency to speech (coded in seconds), instances of talk (speech separated by fewer than two seconds), and the frequency of different types of verbalizations, including spontaneous comments, questions, exclamations, and answers to questions.

*Speech Quality Analysis.* Digital vocal analysis was used to examine characteristics of speech not easily detected by observers, but that may affect social relationships (Laukka et al., 2008). *Pitch* is the average fundamental frequency of a voice sample (Kimble & Seidel, 1973), and carries the emotional aspects of the voice, including expression of anxiety. Elevated levels of anxiety are associated with higher vocal pitch, as the vocal cords and neck muscles tighten. Heightened anxiety also is associated with increased *vocal pitch variability* (i.e., standard deviation of vocal pitch), which is subjectively heard as pitch perturbations and jitteriness (Fuller

et al., 1992). A second vocal characteristic is *volume* (i.e., intensity), defined as mean peak amplitude of the voice and is subjectively heard as loudness (Kimble & Seidel, 1973). Variability in vocal volume (i.e., standard deviation of vocal volume) is subjectively heard as *voice volume variability*. Digital vocal analysis is sensitive to detecting specific speech patterns among children with SAD, Asperger's Disorder, and TD children (Scharfstein et al., 2011b). The PRAAT vocal analysis software program (Boersma & Weenink, 2005) was used to digitally analyze four measures of vocal *pitch* and vocal *volume* during the Wii task (described below): minimum, maximum, mean, and variability.

#### *Social Vignettes Task.*

In contrast with the in vivo nature and task demands for social interaction that occurs during the Wii Task, the Social Vignettes Task was designed to assess specific knowledge of social skills while minimizing the potential impact of anxiety on social performance. Specifically, children provided written responses to a previously recorded audiotape of five (5) brief vignettes depicting social interaction with a same-age peer (i.e., starting a conversation with an unfamiliar child, offering help, giving a compliment, receiving a compliment, and responding assertively to inappropriate behavior). The vignettes were adapted from an analogue role-play task commonly used to assess social behavior in youth (Beidel et al., 1999). Each vignette had two peer-initiated social prompts, affording ten response opportunities to evaluate children's social knowledge. Children were instructed to imagine each social situation and to write a response as if the situation were really happening (e.g., Scene 3: 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 'you did a great job.' You say...\_\_\_\_\_). The

boy [girl] next to you then says, you remembered every word and you looked so calm and cool. You say... \_\_\_\_\_). All five vignettes followed this format. A practice scene was presented first to allow for questions and clarification. At task completion, the child used the SAM to rate his/her anxiety during the Social Vignettes Task. The sex of the peer in the audiotaped vignettes matched the sex of the target child (all scenarios and confederate prompts are in Appendix L).

*Behavioral Ratings.* Written responses during the Social Vignettes Task were coded for total number of words across responses, number of potential response opportunities left blank, and response appropriateness. Appropriateness of responses was rated using a 3-point Likert scale: 0 (not appropriate, operationalized as “no response”), 1 (somewhat appropriate, operationalized as “uses 1 word to accept/offer help/compliment or to respond to bully; if child writes ‘I don’t know’, does not accept/offer help or compliment, or was not assertive”) to 2 (appropriate, “accepts help/compliment, offers help/compliment, responds assertively to a bully”). All measures used during each social task are presented in Table 2.

## CHAPTER THREE: FINDINGS

### Parent Report of Social Competence, Social Problems, and Social Skills

A MANOVA was conducted to determine the effect of group membership on all dependent variables evaluating parent report of social functioning: Social Competence and Social Problems based on CBCL scores and Cooperation, Assertion, Responsibility, Self-Control, and Social Skills Standard based on SSRS scores. Statistics are based on all cases with valid data for all variables in the model. Since the assumption of homogeneity of variance was not met for these data, statistical significance was determined using Pillai's trace.

The MANOVA indicated a statistically significant group effect (Pillai's Trace=0.763,  $F[2,55]=4.403$ ,  $p<0.001$ , partial  $\eta^2=0.381$ ) and tests of between-subjects effects for each dependent variable were conducted as follow-up tests to the MANOVA. Significant F scores were followed by LSD tests to determine where differences occurred. Means and standard deviations for the three groups are reported in Table 3.

### CBCL

Tests of between-subjects effects for subscales of the CBCL revealed a significant main effect for group on Social Competence scores ( $F[2,55]=23.444$ ,  $p<0.001$ , partial  $\eta^2=0.460$ ) and Social Problems scores ( $F[2,55]=10.404$ ,  $p<0.001$ , partial  $\eta^2=0.274$ ). Post hoc LSD tests revealed that children with SAD and children with GAD were rated by parents as less socially competent ( $M_{SAD}=39.85$ ,  $M_{GAD}=39.61$ ,  $M_{TD}=54.90$ ,  $p_s<0.001$  and  $0.001$ , respectively) and experiencing more social problems than TD children ( $M_{SAD}=57.80$ ,  $M_{GAD}=62.22$ ,  $M_{TD}=52.05$ ,

$p=0.011$  and  $p<0.001$ , respectively). However, scores for all three groups fell within the non-clinical range for social competence and social problems, indicating that although statistically significant, deficits in the SAD and GAD groups were not clinically problematic. The SAD and GAD groups did not differ significantly on Social Competence and Social Problems scores ( $ps>0.05$ ).

### SSRS

On the SSRS, tests of between-subjects effects revealed that there was a significant main effect for group on Cooperation scores ( $F[2,55]=3.645$ ,  $p=0.033$ , partial  $\eta^2=0.117$ ), SSRS Assertion scores ( $F[2,55]=14.555$ ,  $p<0.001$ , partial  $\eta^2=0.346$ ), SSRS Responsibility scores ( $F[2,55]=8.501$ ,  $p=0.001$ , partial  $\eta^2=0.236$ ), and SSRS Social Skills Standard scores ( $F[2,55]=8.228$ ,  $p=0.001$ , partial  $\eta^2=0.230$ ). Post hoc LSD tests revealed that, based on skills that comprise the Social Skills Standard score, children with SAD and children with GAD exhibit fewer social behaviors necessary for successful social engagement than their TD counterparts ( $M_{SAD}=81.95$ ,  $M_{GAD}=86.61$ ,  $M_{TD}=107.05$ ,  $p<0.001$  and  $p=0.004$ , respectively). Specifically, parents rated the SAD and GAD groups as exhibiting fewer assertive ( $M_{SAD}=10.25$ ,  $M_{GAD}=11.78$ ,  $M_{TD}=16.50$ ,  $ps<0.001$  and  $0.001$ , respectively), cooperative ( $M_{SAD}=10.35$ ,  $M_{GAD}=10.00$ ,  $M_{TD}=13.00$ ,  $ps=0.031$  and  $0.018$ , respectively), and responsible behaviors than TD children ( $M_{SAD}=10.35$ ,  $M_{GAD}=12.25$ ,  $M_{TD}=14.55$ ,  $p<0.001$  and  $p=0.024$ , respectively). The SAD and GAD groups did not differ significantly on the Social Skills Standard, Cooperation, Assertion, and Responsibility scores ( $ps>0.05$ ). Finally, no significant group differences emerged on parent rated SSRS Self-Control scores ( $F[2,55]=2.203$ ,  $p=0.120$ , partial  $\eta^2=0.074$ ).

## Social Anxiety

Multivariate analysis of variance (MANOVA) was used to determine the effect of group membership on all social anxiety dependent variables: (a) SPAIC-PV, (b) SPAIC, (c) SAM Baseline, (d) SAM Wii Social Task, (e) SAM Social Vignettes Task. Statistics are based on all cases with valid data for all variables in the model. The MANOVA indicated a statistically significant group effect (Wilk's Lambda=0.346,  $F(2,53)=6.859$ ,  $p<0.001$ , partial  $\eta^2=0.412$ ) and tests of between-subjects effects for each dependent variable were conducted as follow-up tests to the MANOVA. Significant F scores were followed by LSD tests to determine where differences occurred. Means and standard deviations for the three groups are reported in Table 4.

The results indicated a significant main effect for group on SPAIC-PV ( $F[2,53]=47.148$ ,  $p<0.001$ , partial  $\eta^2=0.640$ ) and SPAIC ( $F[2,53]=6.236$ ,  $p=0.004$ , partial  $\eta^2=0.190$ ). LSD tests revealed that children with SAD and GAD were rated by parents as experiencing more social anxiety than TD children on the SPAIC-PV ( $M_{SAD}=33.81$ ,  $M_{GAD}=28.12$ ,  $M_{TD}=8.11$ ,  $ps<0.001$  and  $0.001$ , respectively). Similarly, on the SPAIC, children with SAD and children with GAD reported experiencing elevated social anxiety compared to their TD counterparts ( $M_{SAD}=19.42$ ,  $M_{GAD}=18.23$ ,  $M_{TD}=10.62$ ,  $ps=0.002$  and  $0.007$ , respectively). No significant differences emerged between the SAD and GAD groups on the SPAIC-PV and SPAIC ( $ps>0.05$ ).

For all three groups, there were no significant differences on SAM ratings during the Baseline ( $F[2,53]=0.403$ , *ns*, partial  $\eta^2=0.015$ ), Wii Social Task ( $F[2,53]=0.366$ , *ns*, partial  $\eta^2=0.014$ ), and Social Vignettes Task ( $F[2,53]=0.019$ , *ns*, partial  $\eta^2=0.001$ ).

### **Social Effectiveness and Social Knowledge during the Social Vignettes Task**

A MANOVA was conducted to determine the effect of group membership on the social skill variables recorded during the Social Vignettes Task which were: a) number of response opportunities left blank, b) average number of words per response, c) total number of words across responses, and d) appropriateness of responses. Statistics are based on all cases with valid data for all variables in the model. Since the assumption of homogeneity of variance was not met for these data, statistical significance was determined using Pillai's trace.

The MANOVA revealed a significant main effect for group (Pillai's trace=0.268,  $F[2,55]=2.787$ ,  $p=0.015$ , partial  $\eta^2=0.134$ ). Tests of between-subjects effects for each dependent variable were conducted as follow-up tests to the MANOVA. Significant F scores were followed by LSD tests to determine where differences occurred. Means and standard deviations for the three groups are reported in Table 5.

Tests of between-subjects effects revealed a significant main effect for group on the number of response opportunities left blank ( $F[2,55]=6.034$ ,  $p=0.004$ , partial  $\eta^2=0.180$ ), total number of words across social responses ( $F[2,55]=5.800$ ,  $p=0.005$ , partial  $\eta^2=0.174$ ), and appropriateness of responses ( $F[2,55]=7.145$ ,  $p=0.002$ , partial  $\eta^2=0.206$ ). Post hoc LSD tests revealed that when providing written responses to audiotaped social vignettes, children with SAD left more of the 10 response opportunities blank ( $M_{SAD}=2.45$ ,  $M_{GAD}=0.28$ ,  $M_{TD}=0.70$ ,  $ps=0.002$  and  $0.010$ , respectively) and responded to social prompts with fewer words overall compared to children with GAD and TD children ( $M_{SAD}=24.65$ ,  $M_{GAD}=45.39$ ,  $M_{TD}=47.15$ ,  $ps=0.008$  and  $0.003$ , respectively). Furthermore, when the quality of responses was evaluated, children with SAD provided less effective social responses to peer-initiated social prompts than

children with GAD and TD children ( $M_{SAD}=13.4$ ,  $M_{GAD}=16.22$ ,  $M_{TD}=16.80$ ,  $p_s=0.006$  and  $0.001$ , respectively). No significant differences emerged between the TD and GAD groups on any social skills variable recorded during the Social Vignettes Task ( $p_s>0.05$ ).

### **Social Skills during the Wii Social Task**

A MANOVA was conducted to determine the effect of group membership on all social skill variables recorded during the Wii social play task: a) latency to first utterance, b) instances of talk, and the frequency of c) answers to peer questions, d) spontaneous comments, e) exclamations, and f) questions. Statistics are based on all cases with valid data for all variables in the model. Since the assumption of homogeneity of variance was not met for the data, statistical significance was determined using Pillai's trace.

The MANOVA was significant (Pillai's trace=0.705,  $F[2,55]=4.625$ ,  $p<0.001$ , partial  $\eta^2=0.352$ ). Tests of between-subjects effects for each dependent variable were conducted as follow-up tests to the MANOVA. Significant F scores were followed by LSD tests to determine where differences occurred. Means and standard deviations for the three groups are reported in Table 6.

Tests of between-subjects effects revealed that there was a significant main effect for group on latency to first vocalization ( $F[2,55]=8.708$ ,  $p=0.001$ , partial  $\eta^2=0.240$ ), instances of talk ( $F[2,55]=16.769$ ,  $p<0.001$ , partial  $\eta^2=0.379$ ), and the frequency of spontaneous comments ( $F[2,55]=18.894$ ,  $p<0.001$ , partial  $\eta^2=0.407$ ), exclamations ( $F[2,55]=4.272$ ,  $p=0.019$ , partial  $\eta^2=0.134$ ), and questions ( $F[2,55]=14.828$ ,  $p<0.001$ , partial  $\eta^2=0.350$ ). Each of these is described below.



Post hoc LSD tests revealed that when playing the Wii with another child, children with SAD took longer to make their first prompted or unprompted vocalization (in seconds:  $M_{SAD}=225.30$ ,  $M_{GAD}=18.78$ ,  $M_{TD}=34.66$ ,  $ps=0.001$  and  $0.001$ , respectively) and spoke on fewer occasions compared to children with GAD and TD children ( $M_{SAD}=16.60$ ,  $M_{GAD}=40.50$ ,  $M_{TD}=44.80$ ,  $ps<0.001$  and  $0.001$ , respectively), whereas the GAD and TD groups did not differ significantly on these variables ( $ps>0.05$ ). Examinations of the quality of conversational speech revealed that children with SAD made fewer spontaneous comments than children with GAD and TD children ( $M_{SAD}=11.65$ ,  $M_{GAD}=35.61$ ,  $M_{TD}=53.40$ ,  $ps=0.006$  and  $0.001$ , respectively). Additionally, the GAD group made fewer spontaneous comments than children in the TD group ( $p=0.014$ ). Children with SAD made fewer exclamations than TD children ( $M_{SAD}=2.15$ ,  $M_{GAD}=10.00$ ,  $M_{TD}=14.00$ ,  $p=0.006$ ), whereas the GAD group fell between the other groups but was not significantly different ( $ps>0.05$ ). Both children with SAD and children with GAD asked fewer questions than TD children ( $M_{SAD}=2.10$ ,  $M_{GAD}=4.72$ ,  $M_{TD}=9.35$ ,  $ps=0.006$  and  $0.001$ , respectively), but were not significantly different from each other ( $ps>0.05$ ). No significant group differences emerged for the number of answers to questions ( $F[2,55]=2.489$ , *ns*, partial  $\eta^2=0.083$ ).

### Vocal Characteristics

A MANOVA was conducted to determine the effect of group membership on vocal characteristics during the Wii Social Task: (a) minimum vocal pitch, (b) maximum vocal pitch, (c) mean vocal pitch, and (d) vocal pitch variability, (e) minimum volume, (f) maximum volume, (g) mean volume, and (h) volume variability. Statistics are based on all cases with valid data for

all variables in the model. Since the assumption of homogeneity of variance was not met for the data, statistical significance was determined using Pillai's trace.

The MANOVA revealed a main effect for group (Pillai's Trace=0.643,  $F[2,51]=2.666$ ,  $p=0.002$ , partial  $\eta^2=0.322$ ). Tests of between-subjects effects for each dependent variable were conducted as follow-up tests to the MANOVA. Significant F scores were followed by LSD tests to determine where differences occurred. Means and standard deviations for the three groups are reported in Table 7 (See Figure 1 for visual representation of vocal characteristics).

Tests of between-subjects effects revealed that there was a significant main effect for group on minimum pitch ( $F[2,51]=5.798$ ,  $p=0.005$ , partial  $\eta^2=0.185$ ), maximum pitch ( $F[2,51]=5.430$ ,  $p=0.007$ , partial  $\eta^2=0.176$ ), pitch variability ( $F[2,51]=3.558$ ,  $p=0.036$ , partial  $\eta^2=0.122$ ), maximum volume ( $F[2,51]=5.171$ ,  $p=0.009$ , partial  $\eta^2=0.169$ ), mean volume ( $F[2,51]=4.864$ ,  $p=0.012$ , partial  $\eta^2=0.160$ ), and volume variability ( $F[2,51]=8.087$ ,  $p=0.001$ , partial  $\eta^2=0.241$ ).

Children with SAD exhibited higher minimum vocal pitch ( $M_{SAD}=196.59$ ,  $M_{GAD}=185.50$ ,  $M_{TD}=183.26$ ,  $ps=0.011$  and  $0.002$ , respectively) and lower maximum vocal pitch than GAD and TD children ( $M_{SAD}=444.59$ ,  $M_{GAD}=497.64$ ,  $M_{TD}=505.17$ ,  $ps=0.011$  and  $0.003$ , respectively), whereas the latter groups were not significantly different ( $ps>0.05$ ). Children with SAD also had significantly less variability in their pitch than TD children ( $M_{SAD}=46.66$ ,  $M_{GAD}=56.10$ ,  $M_{TD}=59.25$ ,  $p=0.012$ ). In contrast, the GAD group fell between the SAD and TD groups, but was not significantly different from either group ( $ps>0.05$ ). Pitch findings for the SAD group indicated that these youth had a small range of pitch and spoke with little vocal inflection. For vocal volume, children with SAD spoke in a lower mean volume than TD children ( $M_{SAD}=65.17$ ,

$M_{GAD}=69.39$ ,  $M_{TD}=71.84$ ,  $p=0.003$ ), and again, the mean volume for children with GAD was not significantly different from either group ( $p>0.05$ ). Children with SAD had lower maximum volume ( $M_{SAD}=82.14$ ,  $M_{GAD}=88.30$ ,  $M_{TD}=88.73$ ,  $ps=0.010$  and  $0.005$ , respectively) and less variability in their volume than children with GAD and TD children ( $M_{SAD}=4.99$ ,  $M_{GAD}=6.68$ ,  $M_{TD}=5.95$ ,  $p<0.001$  and  $p=0.023$ , respectively), whereas the latter two groups were not significantly different on these variables ( $p>0.05$ ). Finally, no significant group differences were found on Wii mean pitch ( $F[2,51]=0.177$ , *ns*, partial  $\eta^2=0.007$ ) or minimum vocal volume ( $F[2,51]=0.028$ ,  $p=0.973$ , partial  $\eta^2=0.001$ ).

## **Interpersonal Functioning**

### **Interpersonal Relationships**

ANOVAs assessed for group differences on (a) parent report on the Interpersonal Relationships Module of the ADIS-P and (b) child report on the Interpersonal Relationships Module of the ADIS-C. A significant F value was followed by LSD tests to determine where differences occurred. Given the number of analyses conducted, a Bonferroni correction was applied to avoid inflation of the Type I error rate, setting the significance level for all statistical tests at  $p=0.025$ . The means and standard deviations for the three groups are reported in Table 8.

There was a significant main effect for group on parent report on the Interpersonal Relationships Module of the ADIS-P ( $F[2,55]=13.641$ ,  $p<0.001$ , partial  $\eta^2=0.332$ ) and child report on the Interpersonal Relationships Module of the ADIS-C ( $F[2,55]=10.466$ ,  $p<0.001$ , partial  $\eta^2=0.276$ ). Post hoc LSD tests revealed that from the parent's perspective, TD youth have better interpersonal relationships than children with SAD and GAD ( $M_{SAD}=3.55$ ,  $M_{GAD}=3.39$ ,

$M_{TD}=5.70$ ,  $ps<0.001$  and  $0.001$ , respectively). Similarly, TD youth reported having better interpersonal relationships than children with SAD and GAD ( $M_{SAD}=3.95$ ,  $M_{GAD}=4.00$ ,  $M_{TD}=5.75$ ,  $ps<0.001$  and  $0.001$ , respectively). No significant differences were found between the SAD and GAD groups on parent or child report of interpersonal relationships ( $ps>0.025$ ).

### Friendship Validation and Intimacy

A series of ANOVAs examined group differences on child ratings of friendship Validation and Intimacy based on Friendship Quality Questionnaire-Revised scores. A significant F value was followed by LSD tests to determine where differences occurred. Given the number of analyses conducted, a Bonferroni correction was applied to avoid inflation of the Type I error rate, setting the significance level for all statistical tests at  $p=0.025$ . The means and standard deviations for the three groups are reported in Table 8.

There was a significant main effect for group on friendship Validation scores ( $F[2, 55]=4.363$ ,  $p=0.017$ , partial  $\eta^2=0.137$ ). Post hoc LSD tests revealed that children with SAD were less likely to report having friends that made them feel good about their ideas, told them they were good at things, and made them feel important and special compared to TD children ( $M_{SAD}=2.37$ ,  $M_{GAD}=3.06$ ,  $M_{TD}=3.22$ ,  $p=0.007$ ). The GAD group was not significantly different from either group on friendship Validation ( $ps>0.025$ ). For all three groups, no significant differences emerged for friendship Intimacy ( $F[2,55]=1.686$ ,  $ns$ , partial  $\eta^2=0.058$ ).

### Peer Acceptance

ANOVAs examined group differences on (a) peer ratings of target child likeability and (b) target child ratings of peer likability. A significant F value was followed by LSD tests to

determine where differences occurred. Given the number of analyses conducted, a Bonferroni correction was applied to avoid inflation of the Type I error rate, setting the significance level for all statistical tests at  $p=0.025$ . The means and standard deviations for the three groups are reported in Table 9.

There was a significant main effect for group on peer ratings of target child likeability ( $F[2,55]=5.352, p=0.008, \text{partial } \eta^2=0.171$ ). Post hoc LSD tests revealed that when playing the Wii with a peer, children with GAD and TD children were rated by peers as more likeable, fun, a good friend, and they were more interested in being friends with them or playing with them again than children with SAD ( $M_{\text{SAD}}=14.84, M_{\text{GAD}}=18.06, M_{\text{TD}}=17.21, p=0.007$ ). No significant differences were found between peer ratings of likeability for the GAD and TD groups ( $p>0.025$ ). For all three groups, no significant differences emerged for target child ratings of the peer's likeability ( $F[2,55]=0.106, ns, \text{partial } \eta^2=0.004$ ).

## **CHAPTER FOUR: CONCLUSIONS**

The current study examined the social and peer functioning of children with SAD, children with GAD, and children with no psychiatric diagnosis. There were three study objectives: (a) to determine whether social skills deficits are unique to children with SAD, (b) to assess whether social skills vary as a function of context (i.e., an in vivo peer interaction compared to hypothetical social vignettes), and (c) to examine the relationship between anxiety diagnosis and social acceptance. Findings from this study inform our current understanding of the social repertoire and peer acceptance of youth with SAD and GAD and highlight a need to more closely examine the social functioning and peer relations of clinically anxious youth based on specific diagnoses rather than broad categories of psychopathology.

### **Social Skills among Children with SAD and GAD**

Parents' perception of their child's social problems, social competence, and social skills suggested both similarities and differences in the social functioning of children with SAD or GAD. Consistent with previous research (Scharfstein et al., 2011a), parent reports on the CBCL indicated that all groups of children exhibited nonclinical levels of social problems such as being dependent, jealous, lonely, clumsy, and exhibiting speech problems. CBCL social competence scores for the SAD and GAD groups were lower than the TD group, which indicated that both anxious groups were somewhat less socially competent in terms of their friendship quality, friendship quantity, and participation in social activities when compared to TD youth.

Parent ratings of complex social behaviors on the SSRS indicated that all youth displayed appropriate cooperation and self-control skills. In contrast, specific skills deficits assessed by this measure (that is, the types of social behaviors needed for initiating and maintaining friendships) were noted for youth with SAD and GAD. Consistent with the SAD literature (Alfano et al., 2006; Beidel et al., 1999; Beidel et al., 2007; Spence et al., 1999), youth with SAD in this study were reported to exhibit fewer social skills and assertive behaviors than same-age peers. Parent reports indicated also that youth with SAD exhibited less frequent responsible behaviors relative to peers. Examinations of the specific behaviors comprising the responsibility scale of the SSRS indicated that low responsibility scores for SAD youth might reflect their social fears (items such as introduces self to new people, ask sales clerks for information) rather than a (dis)regard for authority (items such as requests permission before leaving the house, appropriately questions household rules). By comparison, parents reported that youth with GAD exhibited average responsibility and appropriate social skills, but displayed less frequent assertive behaviors than same-age peers. This is consistent with the clinical understanding of children with GAD, who are described as rule-abiding, concerned with safety, and eager to please others (Bernstein et al., 2008; Scharfstein et al., 2011a); therefore, some of the specific assertive behaviors measured (e.g., reports accidents, accepts friends' ideas for play) may occur with greater frequency than others (e.g., joins group activities without being told to). Overall, parent questionnaire data indicated that both youth with SAD and GAD experience difficulties with assertiveness, but children with SAD have additional social skills difficulties.

To better understand the unique social functioning of children with SAD and GAD, social performance during an in vivo peer interaction was examined. Overall findings from direct

observations of children during the Wii Social Task indicated a distinct pattern of social behavior deficits for children with SAD. While playing the Wii with an unfamiliar peer, youth with SAD took longer to make their first vocalization than the GAD and TD groups, a latency of greater than three minutes in the SAD group compared to fewer than 35 seconds in the other groups. Delayed speech during social engagement is characteristic of behaviorally inhibited toddlers and young children (Kagan, Reznick, & Snidman, 1987) and is one of the earliest predictors for whom social phobia will develop during adolescence (Hayward, Killen, Kraemer, & Taylor, 1998; Schwartz, Snidman, & Kagan, 1999). In addition to a substantial latency to speak during the current study's Wii Task, children with SAD spoke on nearly 60% fewer occasions than the GAD and TD groups, indicating a relative paucity of speech. Examinations of the different types of vocalizations while playing the Wii revealed that children with SAD made fewer exclamatory statements (e.g., "I win!") than TD peers, and fewer spontaneous comments (e.g., I've played this game before) than both children with GAD and TD children. In addition, they asked fewer questions than TD children. By comparison, youth with GAD also asked fewer questions than TD children, but they did not differ from the TD group in terms of the latency to the first vocalization, instances of talk, or the number of exclamations made. Overall, these data suggest a social awkwardness among children with SAD, suggesting spontaneous interactions with others are more difficult. Given that first impressions are formed quickly, this deficient ability to quickly/spontaneously interact with an unknown peer may be an important factor in the ability of these children to establish friendships.

Implications of these findings are notable and suggest important differences in the social skills of youth with SAD and GAD. Attention to the shared and distinctive aspects of their social



repertoire may inform differential diagnosis and treatment planning for these groups. Specifically, youth with GAD were less assertive and asked fewer questions than their peers, but otherwise possessed adequate conversational skills to interact effectively during peer interactions. Therefore, youth with GAD may benefit from assertiveness training and guidance in the use of questions to facilitate social conversation. Among youth with SAD, the current study supported and extended previous research documenting their social impairments (Alfano et al., 2006; Beidel et al. 1999, 2007; Scharfstein et al., 2011b; Spence et al. 1999). Children with SAD in the current study had deficits in overall social skill and difficulties with assertiveness and responsibility. In addition, these youth took longer to speak, talked less often, engaged in infrequent spontaneous conversation, asked fewer questions, and used fewer exclamatory statements during an unstructured peer interaction compared to TD youth. Such findings for children with SAD suggest that these significant conversational difficulties might occur during other commonly encountered unstructured interactions (e.g., recess, play date waiting for the school bus, at a birthday party). Therefore, social skills training programs for SAD youth should be comprehensive and incorporate skills for unstructured and extended interactions with peers (e.g., use of spontaneous speech, exclamations, latency to speech).

With regard to anxious arousal, parent and child reports on the SPAIC indicated that both the SAD and GAD groups experience elevated anxiety in social situations. However, all groups of children reported experiencing minimal anxiety when playing the Wii with a peer. These findings are discrepant with Beidel and colleagues (1999) wherein children with SAD reported moderate anxiety during role plays interactions with a peer. This discrepancy may reflect fundamental differences in study methodology (i.e., expectation to speak, eye contact maintained

by peer, noise level, when/how anxiety was assessed). For example, during the Wii task, the child and peer were instructed to play the Wii with another child and to have fun; no expectations to speak or to make eye contact were made. In contrast, during the role play task (Beidel et al., 1999), children were instructed to respond to the peer's social prompts and peers were instructed to maintain eye contact and to prompt the child after 10 seconds of silence. Though both tasks required social engagement with an unfamiliar child, the social/conversational demand characteristics of the interactions were very different. Thus, task parameters provide one important explanation for the differences in reported anxious distress.

In addition to observer ratings of social behavior during the peer interaction, vocal characteristics (pitch, volume) were digitally analyzed to provide objective measures of social responsiveness. When playing the Wii with a peer, children with SAD spoke with a lower average and maximum voice volume and exhibited a restricted range of pitch compared to TD children. These speech qualities can be subjectively heard as soft speech with a lack of vocal inflection. In a previous study investigating social interactions, children with SAD responded to social prompts with low volume and high pitch, but with high variability in their vocal pitch (i.e., jitteriness; Scharfstein et al., 2011b). When data from both types of interactions are considered together, children with SAD consistently evidence anxious speech patterns comprised of low volume and high pitch, and either a lack of variation in their pitch (poor inflection) or elevated variation in their pitch (jitteriness) depending on the conversational demands of the interaction. Regarding the GAD group, their vocal characteristics did not differ significantly from the TD group, indicating a nonanxious speech pattern. Thus, despite low self-reported anxiety while

playing Wii with a peer, children with SAD behaved very differently from the other groups and expressed anxiety through their voice.

### **Do Social Skills Vary by Social Context?**

To assess whether social performance varies as a function of social context, and specifically during a task designed to reduce the impact of social anxiety on social skills, children's written responses to hypothetical social vignettes during the Social Vignettes Task were examined. Numerous deficits in social skills were apparent in the SAD group. Specifically, children with SAD responded to social prompts with a paucity of content, using nearly 50% fewer words across responses than their GAD and TD counterparts. There were no significant differences between the GAD and TD groups on number of words, indicating that children with GAD respond to social prompts with an adequate length.

Examinations of the quality of responses to peer initiated social prompts revealed that children with SAD were less likely than children with GAD or TD children to offer help, accept help, give a compliment, accept a compliment, and respond assertively to a bully. One consideration when interpreting this pattern of results is that several of the social vignettes implied a likelihood that continued social interaction would occur (e.g., "would you like some help with your [basketball] free throws"). That is, socially anxious children often responded to social overtures in a way that reduced the likelihood of engaging in sustained social interactions (e.g., "no," "no, I just need practice"). Thus, from an avoidance or negative reinforcement perspective, refusing a request for help or not offering help to others may reflect attempts to manage anxious arousal. By doing so, individuals may limit or end future opportunities to

interact that may elicit social anxiety. Clinically, parents of children with SAD often report that these youth do not seek help at school even when needed because they are too nervous to interact with the teacher or their classmates. Findings from the current study suggest that socially anxious youth may also refuse offers of help by their teacher or peers because it implies continued interaction. Therefore in the context of treatment, social skill interventions and exposure sessions for children with SAD that target assertiveness and giving and receiving compliments may be enhanced with exercises designed to address this subtle form of avoidance to include accepting help from others and accepting social invitations. Although this preliminary research awaits replication, the results are notable, and indicate that children with GAD may not suffer from the same social behavior deficits or deficits in social knowledge as children with SAD.

### **Social Acceptance**

Social acceptance was assessed using different methods, including parent and child report of interpersonal relationships, child report of the validation and intimacy within their closest friendship, and peer ratings of their social impressions. Parent and child ratings indicated that youth with SAD and GAD experienced greater difficulties in interpersonal relationships than TD youth. Child reports indicated also that all groups experienced similar levels of intimacy within their friendships. Low reported friendship intimacy for all groups might be representative of the age range examined. That is, during adolescence, but not childhood, friendships are described as intimate, and friends commonly partake in shared activities, personal disclosure, and sticking up for one another (Berndt, 2002; Hartup & Stevens, 1999). With respect to friendship validation, children with SAD perceived less validation in their relationship with their best friend than their GAD and TD counterparts. Consistent with Festa and Ginsburg (2011), children with SAD were

less likely to report that their best friend made them feel good about their ideas, told them they were good at things, and made them feel important and special. Therefore, children with SAD and GAD have greater difficulties in their interpersonal relationships overall compared to TD youth, but only children with SAD feel invalidated within their closest friendship.

To evaluate peers' immediate impression of children's social acceptance and likeability, directly following the Wii Social Task, the child and control peer independently rated their social impression of the other child using the *Peer Likeability Scale*. Children with SAD were rated by peers as less likeable, less fun, less likely to be a good friend, and they were less interested in being friends with them or playing with them again than children with GAD or TD children. Thus, children with SAD, characterized by fear of being negatively evaluated by others, are *actually* perceived as less likeable and less socially desirable playmates by their peers.

Interestingly, children with GAD reported impaired interpersonal relationships and elevated social anxiety, yet they were positively rated by their peers on likability and potential for friendship. The possible influence of the unique clinical features associated with this disorder may help to explain the incongruence between self report and peer perception of social acceptance among these youth. Clinically, youth with GAD often worry in the absence of objective for concern (Albano et al., 2003). In addition, the worry persists despite reassurance from others (Albano et al., 2003). Therefore, youth with GAD may experience worry about or perceive social failure due to their tendency to overestimate the likelihood of negative outcomes and/or because they have not met their own self-imposed standards of performance. Although these possibilities remain speculative at present, findings indicating that children with GAD are

well liked by their peers suggest important differences in peer functioning compared to youth with SAD.

### **Summary**

To summarize, during an unstructured play interaction with a peer, the social behaviors of children with SAD and children with GAD are very different. Children with SAD exhibit a marked latency to vocalization, speak on fewer occasions, and make fewer spontaneous comments and exclamatory statements than TD peers, whereas children with GAD do not. Similarly, during hypothetical social vignettes, children with SAD, but not GAD, demonstrated deficits in social knowledge. Children with SAD responded to hypothetical social prompts with nearly 50% fewer words and they were less likely to offer help, accept help, give a compliment, accept a compliment, and respond assertively to a bully than children with GAD or TD. Regarding their immediate social impressions directly following playing the Wii with a peer, children with SAD, but not GAD, were rated by peers as less likeable, fun, less likely to be perceived as a good friend, and they were less interested in being friends with them or playing with them again when compared to TD peers. Therefore, this study demonstrates important distinctions between the SAD and GAD groups. More research is necessary to determine the relations between observer ratings of social skills deficits and impaired social knowledge in the SAD group, and peer ratings of poor likeability. Future studies should also investigate what factors contributed to the peers' low ratings of likeability for children with SAD and adequate ratings of likeability in the GAD and TD groups (e.g., amount of speech, social skills, anxiety, etc.).

## **Limitations**

Some limitations of this study should be noted. First, the sample was relatively small, but the study was sufficiently powered to detect significant differences among the groups. Second, the children in the SAD and GAD groups did not have both disorders (i.e., they were not comorbid for SAD and GAD, a comorbidity that is often reported in the literature). It is possible that they represent “pure” samples which might not be representative of the primary groups of interest. However, the use of semi-structured interview schedules often leads to the reporting of multiple diagnoses without sufficient reflection as to whether one disorder may be uniquely accounting for the positive symptoms endorsed in a different diagnostic category. In DSM-IV-TR, concerns about social interactions are found in both disorders, contributing to the high rates of comorbidity. Third, direct observation of children’s behavior in social settings such as school and group activities were not used but may ultimately provide a more accurate reflection of true social functioning. Fourth, since the social and peer variables included in the current study do not represent all possible aspects of social and peer relations during childhood, additional empirical studies are needed to further examine the interpersonal functioning and social behaviors of youth with different anxiety disorders compared to TD youth. Thus, non-significant differences in observer and peer ratings between the GAD and TD groups should not be interpreted to suggest overall equivalence in the social functioning of these two groups.

**APPENDIX A: IRB APPROVAL LETTER**





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

### Approval of Human Research

From: **UCF Institutional Review Board #1  
FWA00000351, IRB00001138**

To: **Lindsay Scharfstein, Franklin Mesa, Melissa Nieves**

Date: **August 28, 2011**

Dear Researcher:

On August 28, 2011, the IRB approved the following human participant research until 08/09/2012 inclusive:

Type of Review: UCF Initial Review Submission Form  
 Full Board Review  
 Project Title: Social Skills Study  
 Investigator: Lindsay Scharfstein  
 IRB Number: SBE-11-07711  
 Funding Agency: None

The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 08/09/2012, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a signed and dated copy of the consent form(s).

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., CF IRB Chair, this letter is signed by:

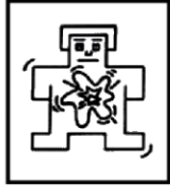
Signature applied by Janice Turchin on 08/28/2011 10:42:48 PM EDT

IRB Coordinator

**APPENDIX B: SELF ASSESSMENT MANIKAN (SAM)**



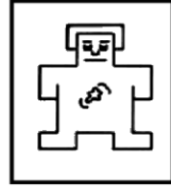
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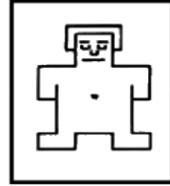
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!!!!2! !



! 1! !

**APPENDIX C: SOCIAL VIGNETTES TASK SCENARIOS AND CONFEDERATE PROMPTS**

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

(a) Actor: How's the popcorn? (b) Actor: I think I'm going to get some!

Scene 1: You are riding your bike in front of your house with another boy/girl. The boy/girl stops after he/she almost crashes. It looks as though he/she has a flat tire. You approach him/her. He/she looks at you, and with a sad voice, he/she says:

(a) Actor: How am I going to get my bike home? (b) Actor: I guess I ought to call my parent.

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:

(a) Actor: Would you like for me to help you with your free throws? (b) 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:

(a) Actor: I finally got an A! (b) Actor: I've been studying so hard.

Scene 4: You've been working hard to memorize a poem to recite in English class. You finish reciting the poem in front of the class and return to your seat. The boy/girl sitting next to you says:

(a) Actor: You did a great job. (b) Actor: You remembered every word and you looked so calm and cool.

Scene 5: You are playing with a ball during recess. All of a sudden another kid takes the ball from you and says: (a) Actor: This is my ball now! (b) Actor: Go find another one.

## **APPENDIX D: TABLES AND FIGURE**

**Table 1: Demographic and Clinical Characteristics (N=58)**

	Generalized Anxiety Disorder n=18	Social Anxiety Disorder n=20	Typically Developing n=20	<i>F/χ<sup>2</sup>/t</i> value	Partial $\eta^2/\eta^2$
<i>Age (M/SD)</i>	8.72(1.6)	8.70(2.0)	9.65(1.8)	1.804	0.062
<i>Sex (n/%)</i>				1.933	0.183
Females	12(66.7)	12(60.0)	9(45.0)		
Males	6(33.3)	8(40.0)	11(55.0)		
<i>WISC Standard Scores (M/SD)</i>					
Block Design	10.11(3.0)	10.30(2.8)	11.65(2.9)	1.643	0.056
<sup>+</sup> Vocabulary*	12.67(1.5) <sup>ab</sup>	10.22(2.8) <sup>a</sup>	13.75(3.3) <sup>b</sup>	8.453	0.242
<i>Race/Ethnicity (n/%)</i>				11.619	0.325
Caucasian	16(88.9)	10(50.0)	12(60.0)		
Hispanic	2(11.1)	8(40.0)	3(15.0)		
Biracial	0(0.0)	2(10.0)	5(25.0)		
<i>CSR (M/SD)</i>	5.56(1.0)	5.25(0.8)		1.027	
<i>Secondary Disorder (n/%)</i>				6.045	0.054
No diagnosis	14(77.8)	16(80.0)			
OCD	1(5.6)	0(0.0)			
Specific Phobia	1(5.6)	1(5.0)			
Major	1(5.0)	0(0.0)			
Depression					
Selective	0(0.0)	3(15.0)			
Mutism					
PTSD	1(5.6)	0(0.0)			

**Table 2: Measures during Behavioral Assessment**

	Observer Ratings of Social Behavior	Vocal Analysis	Social Acceptance	Anxiety
Baseline	-	-	-	-SAM
Unstructured Wii Play	-Latency to first utterance -Instances of talk -Number of spontaneous comments, answers to questions, exclamations, questions asked	Pitch and volume: -Minimum -Maximum -Mean -Variability	- Peer Likeability Scale completed by peer and target child	-SAM
Hypothetical Social Vignettes	-Appropriateness of response -Total number of words -Number of response opportunities left blank	-	-	-SAM



**Table 3: Parent Ratings of Social Competence and Social Problems (N=58)**

	Generalized Anxiety Disorder n=18 M(s.d)	Social Anxiety Disorder n=20 M(s.d)	Typically Developing n=20 M(s.d)	<i>F</i> value	Par $\eta$
<i>CBCL Sub-Scale</i>					
Social Competence***	39.61(7.9) <sup>a</sup>	39.85(8.3) <sup>a</sup>	54.90(7.8) <sup>b</sup>	23.444	.40
Social Problems***	62.22(8.3) <sup>a</sup>	57.80(7.4) <sup>a</sup>	52.05(4.6) <sup>b</sup>	10.404	.27
<i>SSRS Sub-Scale</i>					
Cooperation***	10.00(3.4) <sup>a</sup>	10.35(3.5) <sup>a</sup>	13.00(4.4) <sup>b</sup>	3.645	.11
Assertion***	11.78(3.2) <sup>a</sup>	10.25(2.9) <sup>a</sup>	16.50(5.0) <sup>b</sup>	14.555	.34
Responsibility**	12.11(3.3) <sup>a</sup>	10.35(1.5) <sup>a</sup>	14.55(4.3) <sup>b</sup>	8.501	.27
Self-Control	12.17(4.1)	11.55(3.1)	14.05(4.5)	2.203	.07
SSRS Total Score**	86.61(15.9) <sup>a</sup>	81.95(10.5) <sup>a</sup>	107.05(30.1) <sup>b</sup>	8.228	.27

<sup>ab</sup> Means sharing superscripts are not significantly different.

\* *p* value < 0.05, \*\* *p* value < 0.01, \*\*\* *p* value < 0.001

**Table 4: Child and Parent Report on Measures of Social Anxiety (N=56)**

	Generalized Anxiety Disorder n=18 M(s.d.)	Social Anxiety Disorder n=18 M(s.d.)	Typically Developing n=20 M(s.d.)	<i>F</i> value	Parti al $\eta^2$
<i>Parent Report</i>					
SPAIC-PV**	28.12(10.4) <sup>a</sup>	33.81(6.2) <sup>a</sup>	8.11(8.7) <sup>b</sup>	47.148	.640
<i>Self-Report</i>					
SPAIC*	18.23(9.0) <sup>a</sup>	19.42(9.2) <sup>a</sup>	10.62(6.9) <sup>b</sup>	6.236	.190
<i>Behavioral Assessment</i>					
Baseline SAM	1.39(0.7)	1.39(0.5)	1.25(0.4)	0.403	0.01 5
Wii SAM	1.78(1.1)	1.50(0.8)	1.70(1.1)	0.366	0.01 4
Social Vignette SAM	1.33(0.7)	1.33(0.6)	1.30(0.6)	0.019	0.00 1

<sup>ab</sup> Means sharing superscripts are not significantly different.

\**p* value < 0.01, \*\**p* value < 0.001

**Table 5: Observer Ratings of Social Knowledge during Social Vignettes Task (N=58)**

	Generalized Anxiety Disorder n=18 M(s.d)	Social Anxiety Disorder n=20 M(s.d)	Typically Developing n=20 M(s.d)	<i>F</i> value	Partial $\eta^2$
# of Words*	45.39(23.2) <sup>a</sup>	24.65(22.4) <sup>b</sup>	47.15(23.6) <sup>a</sup>	5.800	0.174
# of Blank Responses*	0.28(0.8) <sup>a</sup>	2.45(3.3) <sup>b</sup>	0.70(0.9) <sup>a</sup>	6.034	0.180
Appropriateness*	16.22(2.7) <sup>a</sup>	13.40(3.7) <sup>b</sup>	16.80(2.5) <sup>a</sup>	7.145	0.206

<sup>ab</sup> Means sharing superscripts are not significantly different.

\* *p* value < 0.01

**Table 6: Social Conversation and Types of Vocalization during the Will Play (N=58)**

	Generalized Anxiety Disorder n=18 M(s.d)	Social Anxiety Disorder n=20 M(s.d)	Typically Developing n=20 M(s.d)	<i>F</i> Value	Partial $\eta^2$
+Latency to Speech**	18.78(25.68) <sup>a</sup>	225.30 (274.7) <sup>b</sup>	34.66(99.3) <sup>a</sup>	8.708	0.240
Instances of Talk***	40.50(17.1) <sup>a</sup>	16.6(17.5) <sup>b</sup>	44.80(14.9) <sup>a</sup>	16.769	0.379
Comments***	35.61(22.4) <sup>a</sup>	11.65(14.0) <sup>b</sup>	53.4(26.5) <sup>c</sup>	18.894	0.407
Exclamations*	10.00(10.6) <sup>ab</sup>	2.15(3.4) <sup>a</sup>	14.00(19.5) <sup>b</sup>	4.272	0.134
Questions***	4.72(3.0) <sup>a</sup>	2.1(3.9) <sup>a</sup>	9.35(5.4) <sup>b</sup>	14.828	0.350
Answers	5.28(3.5)	3.65(4.3)	6.50(4.2)	2.489	0.083

<sup>abc</sup> Means sharing superscripts are not significantly different.

\* *p* value < 0.05, \*\* *p* value < 0.01, \*\*\* *p* value < 0.001

<sup>+</sup> in seconds

**Table 7: Vocal Pitch and Vocal Volume when Speaking to a Peer during Wii Play (N=56)**

	Generalized Anxiety Disorder n=18 M(s.d)	Social Anxiety Disorder n=16 M(s.d)	Typically Developing n=20 M(s.d)	<i>F</i> value	Partial $\eta^2$
<i>Vocal Pitch</i>					
Minimum**	185.50(9.3) <sup>a</sup>	196.59(17.9) <sup>b</sup>	183.26(8.5) <sup>a</sup>	5.798	0.185
Maximum**	497.64(48.2) <sup>a</sup>	444.59(87.1) <sup>b</sup>	505.17(33.4) <sup>a</sup>	5.430	0.176
Mean	274.65(20.5)	271.01(24.2)	275.01(20.5)	.177	0.007
Variability*	56.10(13.8) <sup>ab</sup>	46.66(18.0) <sup>a</sup>	59.25(11.5) <sup>b</sup>	3.558	0.122
<i>Vocal Volume</i>					
Minimum	55.71(4.0)	55.97(2.3)	55.89(3.5)	.028	0.001
Maximum**	88.30(6.0) <sup>a</sup>	82.14(8.0) <sup>b</sup>	88.73(6.0) <sup>a</sup>	5.171	0.169
Mean*	69.39(6.3) <sup>ab</sup>	65.17(3.1) <sup>a</sup>	71.84(8.2) <sup>b</sup>	4.864	0.160
Variability**	6.68(1.4) <sup>a</sup>	4.99(1.4) <sup>b</sup>	5.95(0.8) <sup>a</sup>	8.087	0.241

<sup>ab</sup> Means sharing superscripts are not significantly different.

\* *p* value < 0.05, \*\* *p* value < 0.01

**Table 8: Parent and Self Report of Interpersonal Functioning (N=58)**

	Generalized Anxiety Disorder (GAD) n=18 M(s.d)	Social Anxiety Disorder (SAD) n=20 M(s.d)	Typically Developing (TD) n=20 M(s.d)	<i>F</i> value	$\eta^2$
<i>ADIS Interpersonal Relationships Module</i>					
Parent*	3.39(3.9) <sup>a</sup>	3.55(1.7) <sup>a</sup>	5.70(1.3) <sup>b</sup>	13.641	0.332
Child*	4.00(1.1) <sup>a</sup>	3.95(1.5) <sup>a</sup>	5.75(1.6) <sup>b</sup>	10.466	0.276
<i>Friendship Survey Sub-scale</i>					
Intimacy	1.93(1.4)	1.53(1.3)	2.28(1.2)	1.686	.058
Validation*	3.06(1.0) <sup>ab</sup>	2.37(1.1) <sup>a</sup>	3.2(0.8) <sup>b</sup>	4.363	.137

<sup>ab</sup> Means sharing superscripts are not significantly different.

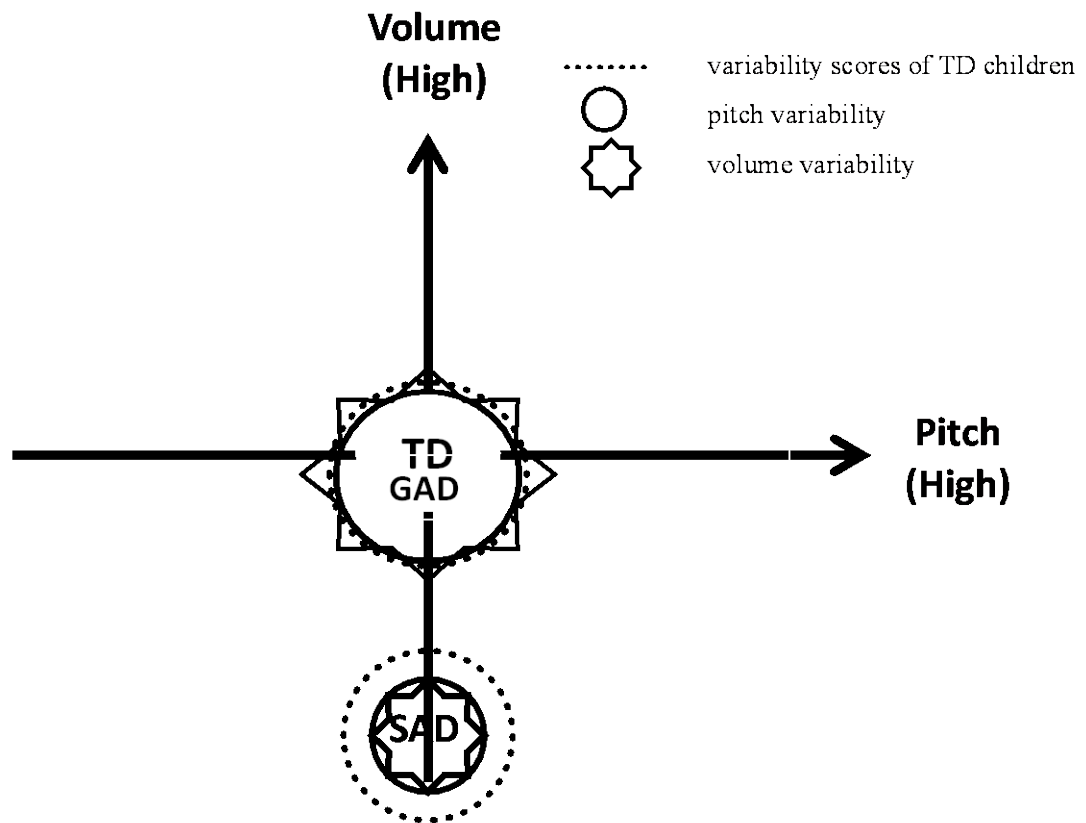
\* *p* value < 0.025

**Table 9: Social Impressions of Likeability during a Social Play Interaction (N=58)**

	Generalized Anxiety Disorder (GAD) n=18 M(s.d)	Social Anxiety Disorder (SAD) n=20 M(s.d)	Typically Developing (TD) n=20 M(s.d)	<i>F</i> value	$\eta^2$
<i>Peer Likeability Scale</i>					
Likeability of Target Child*	18.06(2.5) <sup>a</sup> [n=17]	14.84(3.4) <sup>b</sup> [n=19]	17.21(3.3) <sup>a</sup> [n=19]	5.352	0.171
Likeability of Peer	16.33(2.93)	15.95(2.8)	16.30(2.9)	0.106	0.004

<sup>ab</sup> Means sharing superscripts are not significantly different.

\* *p* value < 0.025



**Figure 1: Visual Representation of Vocal Characteristics**

*Note:* TD = typically developing children; SAD = children with social anxiety disorder; GAD = children with generalized anxiety disorder. SAD characterized by anxious speech, i.e., low volume, low volume variability, low pitch variability (lack inflection); GAD characterized by nonanxious speech, i.e., nonsignificant differences between GAD and TD on all vocal characteristics.



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