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ORIGINAL ARTICLE

Effects of Anxiety Disorder Severity on Social Functioning in Children with Autism Spectrum Disorders

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Abstract Maladaptive social functioning is a core deficit in children with autism spectrum disorders (ASD). However, few studies have explicitly examined the linkage between anxiety and the degree of social functioning impairment in children with ASD. This study examines several types of anxiety and their covariation with social functioning deficits in children with ASD. Participants were 53 children with ASD who met criteria for at least one anxiety disorder. Within this sample of children, social anxiety disorder was the most common anxiety disorder. Results indicated that a greater severity of social anxiety disorder was associated with a higher level of social functioning deficits for elementary school aged children with ASD. Specifically, exploratory analyses revealed that higher levels of social anxiety disorder predicted lower assertive and responsible social skills. Social anxiety may increase the barriers to social engagement and thus serve as a risk factor for increased social deficits in youth with ASD.

Keywords Autism · Social anxiety disorder · Social functioning · Comorbidity

Common anxiety symptoms exhibited by children with high-functioning autism (HFA) have raised important questions about the impact of anxiety on children with autism spectrum disorder (ASD) (Wood and Gadow 2010). Recent studies have found a significant portion of children with ASD have at least one comorbid anxiety disorder, ranging from 29% to 84% of the ASD population (de Bruin et al. 2007; Gillott et al. 2001; Green et al. 2000; Kim et al. 2000; Leyfer et al. 2006; Muris et al. 1998; Simonoff et al. 2008). However, very few studies have examined the effects of anxiety on affected children, particularly the impact on social functioning (Bellini 2004); there are even fewer studies that examine the impact of specific anxiety disorders. Therefore, the current study investigates the effect of anxiety on social functioning in children on the ASD spectrum by examining (1) if greater severity of anxiety disorders predicts lower social functioning and (2) if social anxiety disorder (social phobia) symptoms have a specific effect on social functioning compared to other types of anxiety.

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Anxiety and Social Functioning

Typically developing children with anxiety disorders have deficits in social functioning. In one sample, Spence et al. (1999) found that children with high levels of social anxiety had poorer social skills when compared to non-anxious children. Their parents reported less assertive and responsible social skills, and researchers observed fewer initiations and social interactions. Teachers also reported fewer prosocial behaviors and more social withdrawal from children with higher levels of anxiety (Erath et al. 2007). In other studies, where children with an anxiety disorder were asked to perform certain tasks, they were also less socially skilled compared to non-anxious children. During role-play tasks, observers rated children with high anxiety to have lower quality social interactions and fewer interpersonal skills (Beidel et al. 1999; Rao et al. 2007). Children with anxiety disorders also had more difficulty in generating conversation topics during these role plays (Alfano et al. 2006). In read aloud tasks, children with anxiety appeared to be more anxious, less skilled, and had longer speech latencies (Alfano et al. 2006; Beidel et al. 1999; Rao et al. 2007). Complementarily, Wood (2006) found that changes in anxiety level over time are associated with corresponding changes in social functioning in children with anxiety disorders.

In addition to the negative impact on social skills, anxiety disorders in children are associated with poor peer acceptance and less friendship. Children with social anxiety disorder are less likely to be socially accepted by their peers and experience more peer victimization (Erath et al. 2007; Ginsburg et al. 1998). La Greca and Lopez (1998) also reported that adolescents with high levels of social anxiety reported less support from their classmates and have fewer friends. Of the children who reported about their friendships, they expressed poorer friendship qualities. They perceived their friendships to be less supportive, less intimate, and rated friendships lower in companionship. Children with an anxiety disorder also reported higher levels of loneliness and lower social competence and social global self-worth (Beidel et al. 1999; Ginsburg et al. 1998; Rao et al. 2007; Strauss et al. 1989).

Research suggests that these social difficulties can continue through adolescence and adulthood if the anxiety is left untreated. Davila and Beck (2002) found that individuals with social anxiety disorder tend to have interpersonal styles that impair their close relationships. They are less assertive and dependent in their relationships, by avoiding conflicts and suppressing emotions. Wenzel et al. (2005) also found social anxiety disorder to be impairing in romantic relationships. In a 10-min video-taped conversation between couples, individuals with social anxiety disorder exhibited poorer social interactions than other individuals. Individuals with high anxiety exhibited less eye contact, fewer smiles, fewer head nods, fewer gestures, and initiated fewer conversations. They also fidgeted more and spoke more softly than individuals with no social anxiety disorder. This study suggests that anxiety disorder continues to be a social hindrance in individuals even in adulthood. Compared to non-anxious individuals, individuals with anxiety disorder are exhibiting less positive behaviors that may potentially have a negative impact on their romantic relationships.

Prior studies, therefore, suggest that children with anxiety disorders, particularly social anxiety disorder, are at risk for having poorer social skills than children without

anxiety disorders. Research also suggests that children with anxiety disorders struggle with friendships and peer interactions, and these social problems can persist even into the adult years for individuals with anxiety disorders. When a comorbid ASD is present, social functioning becomes an even greater concern, as both disorders have been linked to long term, negative social outcomes.

Anxiety Disorders in Children with Autism Spectrum Disorder

While the issue of comorbid anxiety disorders in children with ASD is complex (Wood and Gadow 2010), research suggests that many youth with ASD experience high anxiety. For example, Cath et al. (2008) found that individuals with ASD showed similar levels of general anxiety symptoms, and had equal levels of social anxiety as individuals with SAD without ASD. Recent studies have shown that children with ASD do in fact exhibit high levels of anxiety, with impairment significant enough to be considered a disorder, at levels higher than neurotypical children in the general population (Bellini 2004; de Bruin et al. 2007; Farrugia and Hudson 2006; Kuusikko et al. 2008; Muris et al. 1998; Simonoff et al. 2008; Weisbrot et al. 2005). Further, the most common anxiety disorders found within the ASD population include specific phobia, social anxiety disorder, general anxiety disorder (GAD), and separation anxiety (de Bruin et al. 2007; Muris et al. 1998; Simonoff et al. 2008; Weisbrot et al. 2005).

Effect of Anxiety on Social Functioning in Children with HFA

Despite normal cognitive functioning, children with HFA still struggle with social interactions. Many children with HFA lack social and emotional reciprocity, have trouble maintaining eye contact, and have difficulty initiating and sustaining conversations. Often times, they misread social cues and misunderstand others' intentions (Meyer et al. 2006). They have difficulties with recognizing sarcasm and social faux pas (Baron-Cohen et al. 1999; Kaland et al. 2008). Thus, although many children with HFA may have average cognitive abilities, they are impaired in their ability to have successful social interactions and friendships (Bauminger and Kasari 2000; Bauminger et al. 2008).

When children with HFA also have an anxiety disorder, it may further impact their ability to interact with other children. Past studies have found positive correlations between social impairment and anxiety in children with ASD (Bellini 2004; Sukhodolsky et al. 2008), but these studies lacked diagnostic anxiety measures, instead relying on anxiety checklists completed by children or parents. This is a major limitation to previous research, as anxiety diagnostic measures are viewed as the gold standard measure of anxiety symptoms, allow for flexibility of questioning and clinical inference by diagnosticians, and take into account reports by both the child and the parent rather than just one informant (e.g., Wood et al. 2002). Therefore, the current study investigated the effect of anxiety as measured by diagnostic interview measures on the social functioning of children with ASD. It was hypothesized that children with higher anxiety levels would have lower social functioning, and that children

with high levels of social anxiety in particular would have lower social functioning compared to children with other types of anxiety.

Method

Participants

The sample included 53 children and their parents who expressed interest in a clinical trial for treatment of ASD and comorbid anxiety from larger study (Wood et al. 2009a, b) The children's age ranged from 7 to 11 years (M=9.55 years, SD=1.73 years). Children were recruited through multiple community sources, including school psychologists, teachers, and medical centers in the greater Los Angeles area.

All children met criteria for at least one anxiety disorder, including separation anxiety disorder (SAD, n=49), generalized anxiety disorder (GAD, n=55), social anxiety disorder (SoP, n=54), obsessive compulsive disorder (OCD, n=30) diagnosed by an independent evaluator using a semi-structured diagnostic interview. All children also met *DSM-IV* criteria for Autistic Disorder (HFA; n=28), Asperger's Syndrome (AS; n=4), or Pervasive Developmental Disorder Not-Otherwise-Specified (PDD-NOS; n=21).

Diagnostic Measures

The *Autism Diagnostic Interview-Revised (ADI-R)* was used to assess whether the child met criteria for autism spectrum disorder (HFA, AS, or PDD-NOS). The ADI-R is a 93-item standardized interview that provides a comprehensive autism spectrum diagnostic assessment. Domains assessed by the ADI-R include social, communication, and repetitive behaviors (Lord et al. 1994). The ADI-R was administered by doctoral students and doctoral-level psychologists who received standardized training and assessment certification.

The *Autism Diagnostic Observation Schedule (ADOS)* is a standardized, semi-structured protocol for observation of social and communicative behavior associated with autism (Lord et al. 2001). Module 3 of the ADOS was used to measure the range of developmental and communicative abilities in the social, communication, social-communication, and restricted and repetitive behaviors domains. The ADOS was also administered by doctoral students and doctoral-level psychologists who received standardized training and assessment certification. The validity and reliability of the cut-off scores have been determined to be robust (Lord et al. 2000).

The *Anxiety Disorders Interview Scale for DSM-IV: Parent and Child Versions* (ADIS-C/P; Albano and Silverman 1996) was used to assess presence of anxiety disorders. The ADIS –C/P is a semi-structured interview that provides reliable and valid anxiety disorder diagnoses (Silverman et al. 2001; Wood et al. 2002). The severity of children's anxiety was assessed using the Clinical Rating Scale on the *ADIS-C/P* (Albano and Silverman 1996; 0=*not at all*, 4=*some*, 8=*very*, *very much*). For the purpose of this study, only the severity ratings for social anxiety phobia (SoP), separations anxiety disorder (SAD), generalized anxiety disorder (GAD), and obsessive-compulsive disorder (OCD) were used for analysis. The ratings were made

by trained independent evaluators (graduate students). Training for the diagnostic interview involved attending a presentation of interview administration, coding and rating videos of past interviews, co-rating multiple interviews alongside a trained diagnostician, and completing an interview under supervision of a trained diagnostician. Diagnosticians had adequate interrater reliability in terms of severity rating and diagnoses (Wood et al. 2009a).

Social Functioning Measure

The Social Skills Rating System (SSRS; Gresham and Elliott 1990) includes parent- and teacher-rated scales. For this study, only the parent-rated scale was used. The SSRS consists of 55 items measuring prosocial skills and problem behaviors that can interfere with the development of positive social skills. For the purpose of this study, only the prosocial skills subscales, including cooperation, assertion, responsibility, and self-control, were analyzed. The SSRS uses a 3-point Likert response scale. It has demonstrated robust validity and reliability (DiPerna and Volpe 2005).

Procedure

An initial phone screen approved by the UCLA Institutional Review Board (IRB) was conducted with parents by research study personnel. The screening was 5 min in length and was used to determine whether an additional evaluation was warranted.

Families and their children were then invited to participate in a research diagnostic evaluation to determine anxiety disorder diagnoses as well as the presence of additional psychopathology, such as depression. The research diagnostic evaluations were conducted by doctoral students using the ADIS-C/P under the supervision of the Principal Investigator (Wood). Measures of demographic information and parent reported social skills were collected from paper and pencil self-reported scales. These assessments were conducted at the intake evaluations.

If an anxiety diagnosis was confirmed, the family was invited back for an autism diagnostic evaluation administered by a trained independent evaluator. If the child was diagnosed with an autism spectrum disorder using the ADOS and the ADI-R within the past 2 years, the child was exempt from the diagnostic evaluation.

Parents of children who were determined to be ineligible to participate in this study following the diagnostic evaluation were contacted by study staff. If warranted, resources and/or referrals were provided to parents. Parents were compensated $20 for participating in the assessments.

Results

Table 1 presents descriptive statistics for the variables in this study. All children met criteria for at least one anxiety disorder (see Table 1 for proportions of children meeting criteria for each disorder, and the mean, *SD*, and range of severity scores associated with these disorders). Social phobia was the most common disorder diagnosed (n=49).

Table 1 Descriptive statistics for anxiety disorders (N=53)

Anxiety disorder	%	*M*	*SD*	Range
Social phobia	92.5%	4.17	1.44	0–6
Generalized anxiety disorder	90.6%	3.62	1.72	0–6
Separation anxiety disorder	83.0%	3.32	1.98	0–6
Obsessive compulsive disorder	50.9%	2.00	2.17	0–6

To examine if the severity of anxiety disorders, including social phobia (SoP), separation anxiety disorder (SAD), generalized anxiety disorder (GAD), and obsessive-compulsive disorder (OCD), predicts variability of social functioning in children with ASD, simple correlations between ADIS severity scores and social skills (*SSRS-P*) total scores were examined. Only the correlation between SoP severity and SSRS-P scores was significant (r=−.368, p<.01). Next, a direct entry multiple linear regression analysis was conducted using all four ADIS severity scores simultaneously to predict parent-reported social skills (*SSRS-P)* total scores (see Table 2). At an alpha level of .05, only SoP severity predicted lower social functioning (B=−.39, p<.01).

An independent-samples t-test was also conducted to compare social functioning in children with social phobia and without social phobia (but with other anxiety disorders). There was a significant difference in social functioning between the two groups. On average, parents of children with social anxiety disorder reported lower social functioning (M=29.49, SD=8.97) in their children than parents of children without social anxiety disorder (M=41.75, SD=9.71), t(51)=2.62, p<.05.

Exploratory Analyses with SSRS Subscales

A series of four simple regressions was then conducted, examining relations among the severity of social phobia and the four subscales of the SSRS. Coefficients for the assertion and responsibility subscales were significant, suggesting that increased social phobia severity is associated with lower functioning in these areas of social skills (see Table 3).

Simple correlation analyses were conducted to further examine which items on the SSRS-P correlated with social phobia severity scores. Out of the 38 SSRS-P items measuring social skills, 10 items correlated significantly with social phobia severity (see Table 4), including a broad range of social skills challenges that were associated with social anxiety.

Table 2 Multiple linear regression analysis for anxiety disorders severity predicting social skills

Variables	B	β
Social phobia	−2.542	−.385**
Generalized anxiety disorder	−.492	−.089
Separation anxiety disorder	.090	.019
Obsessive compulsive disorder	−.166	−.038

R^2=.145. *p<.05, **p<.01

Table 3 Simple regression analyses for social phobia in predicting SSRS subscales

Variables	R^2	B	β
Cooperation subscale	.050	−.097	−.224
Assertion subscale	.121	−.183	−.348*
Responsibility subscale	.119	−.162	−.345*
Self-control subscale	.064	−.093	−.252

*$p<.05$

Discussion

In this sample of children who were diagnosed with both HFA and an anxiety disorder, the severity of social anxiety disorder (social phobia) predicted lower social functioning as rated by parents. This finding was similar to that of past research examining typically-developing children who were diagnosed with social anxiety disorder. Compared to children with lower social anxiety, children with higher social anxiety had more impaired social functioning in typical samples. This finding also paralleled that of previous research in children with ASD in which self-reports of anxiety were employed (Bellini 2004; Sukhodolsky et al. 2008).

Past research has indicated that children with social anxiety disorder tend to be less assertive and less responsible in their social skills and also more withdrawn compared to non-anxious children (Alfano et al. 2006; Beidel et al. 1999; Erath et al. 2007; Rao et al. 2007; Spence et al. 1999). The current study had similar findings in the exploratory analyses with the social skills measure. In the current sample, higher levels of social anxiety disorder predicted lower assertive and responsible social skills.

Assertive social skills are illustrated by behaviors such as initiating conversations or joining in groups, while responsible social skills are demonstrated by behaviors like asking permission to use family member's property or reporting accidents to appropriate people. Perhaps the finding that children with HFA and higher levels of social anxiety were more likely to have poorer social skills in these two areas indicates that these children are more fearful of being judged by others or humiliated

Table 4 Correlations between social phobia severity and individual social skills items

Individual SSRS Items	*r*
Child uses free time at home in an acceptable way.	−.289*
Child speaks in an appropriate tone of voice at home.	−.365**
Child joins group activities without being told to.	−.418**
Child congratulates family members on accomplishments.	−.313*
Child volunteers to help family members with tasks.	−.301*
Child appropriately questions household rules that may be unfair.	−.268*
Child is liked by others.	−.368**
Child starts conversation rather than waiting for others to talk first.	−.369**
Child ends disagreements with you calmly.	−.294*
Child gives compliments to friends or other children in the family.	−.304*

*$p<.05$, **$p<.01$

by their own actions, particularly actions which must be initiated by the child. This intense fear of humiliation and embarrassment may possibly prevent them from approaching others, whether it is for social engagement (i.e., conversations or play) or for moral reasons (i.e., reporting an accident).

Given that a specific linkage between the severity of social anxiety disorder and social impairment may exist in children with comorbid HFA and social anxiety, it is important to understand the nature of this relationship. For example, anxiety could have been caused by self-awareness of social impairments for these children (Bauminger and Kasari 2000). Capps et al. (1995) found that children with ASD can recognize and label emotions, and this was especially true for children with ASD who had higher IQs. Recognition of emotions compounded with increased loneliness (Bauminger and Kasari 2000) suggests that these children may be aware of their social skills differences from typically-developing children, which may in turn make them more anxious in approaching others. As they are already aware of limitations in social functioning, fear of judgment or embarrassment due to high levels of social anxiety may further limit the likelihood that they will initiate interactions with peers. This in turn may limit the number of social interactions, thereby depriving these children of opportunities for social interaction from which to learn and refine social skills and potentially initiating a vicious cycle of avoidance, increase in anxiety levels, and awareness of limited social functioning.

Further, social anxiety in children with autism may originate from their preexisting negative experiences with their peers (i.e., any attempts at interaction are punished socially by peers). Children and adolescents with autism are often times bullied and victimized by their peers, both emotionally and physically (Little 2002; van Roekel et al. 2010). Studies have found that children with autism experience high prevalence of victimization and bullying, ranging from 6 to 46% (van Roekel et al. 2010). These stressful experiences of rejection or victimization around such social skill differences may also be a precursor of heightened social anxiety, leading to future social avoidance and, again, limited opportunities to practice and refine skills (Wood and Gadow 2010).

The findings from the current study suggest that social anxiety in particular may be more impairing to social functioning in children with ASD than other anxiety disorders. There are both clinical and educational implications to these findings. Children with ASD and high anxiety may need clinical intervention to address their social anxiety issues since this may further impact their existing social difficulties. Therefore, these children would likely benefit from interventions and treatments, such as cognitive behavioral therapy designed to address anxiety in children with autism (Wood et al. 2009a). Children with autism and comorbid intellectual disability may benefit more from direct instruction (e.g., applied behavior analysis) to overcome anxiety through automatic learning processes, such as extinction (cf. Lang et al. 2010). Teachers may benefit from recognizing that social anxiety can be an impairing issue that affects social (including class) participation for children on the spectrum, and utilize appropriate teaching supports for the child with ASD to address these emotional barriers (Frankel and Wood 2012).

A few limitations should be acknowledged for this study. First, due to the moderate sample size, results from the study should not be viewed as conclusive evidence for all children with ASD. Second, the current study only used the parent

version of the SSRS to measure social functioning in these children instead of using multiple reporters, such as the children themselves or their teachers. On the other hand, the study lends some support to the hypothesis that having high social anxiety would further impair the social functioning of children with ASD. In the neurotypical literature, it has been well documented that having social anxiety disorder in the absence of ASD has relatively pronounced negative effects on social adjustment (Alfano et al. 2006; Beidel et al. 1999). These children tend to have lower expectations of their own abilities and fear being evaluated by others. They are more likely to have increased attention to threat cues (e.g., perceived signs of disapproval by others) and reduced attention to interaction processes and cues (see Puliafico and Kendall 2006 for a review). This may either decrease their focus from the interpersonal interaction or it may cause misattributions of others' social behaviors (e.g., rejection).

Future research should include a larger sample to address the heterogeneity within the ASD population. In addition, measures of social functioning should include both rating scales and observational measures collected from multiple reporters to provide convergent evidence of social functioning. Further, a non-anxious comparison group should also be used to provide insight into the relative impact of anxiety disorders in children with ASD. Lastly, future research should also examine the role of self-awareness and cognitive functioning (i.e., IQ) in social functioning and social anxiety for children with ASD. Ultimately, programs that target both social skills and anxiety management skills simultaneously may be best suited to promoting social engagement and peer acceptance among many school-aged children with ASD.

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