Published in final edited form as:

J Autism Dev Disord. 2013 October ; 43(10): . doi:10.1007/s10803-013-1795-x.

The Phenomenology and Clinical Correlates of Suicidal Thoughts and Behaviors in Youth with Autism Spectrum Disorders

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Abstract

This study investigated the phenomenology and clinical correlates of suicidal thoughts and behaviors in youth with ASD ($N=102$; range=7–16 years). The presence of suicidal thoughts and behavior was assessed through the Anxiety Disorders Interview Schedule-Child and Parent Versions. Children and parents completed measures of anxiety severity, functional impairment, and behavioral and emotional problems. Approximately 11% of youth displayed suicidal thoughts and behaviors. Children with autism were more likely to have suicidal thoughts and behaviors whereas children with Asperger's disorder were less likely. Suicidal thoughts and behaviors were associated with the presence of depression and post-traumatic stress disorder. Overall, results suggest that suicidal thoughts and behaviors are common in youth with ASD, and may be related to depression and trauma.

Keywords

Suicide; Autism spectrum disorders; Pervasive developmental disorder; Asperger's disorder; Depression

For reasons yet to be fully elucidated, estimated prevalence rates for autism spectrum disorders (ASD) have been increasing over the past decade. New estimates suggest that as many as 1 out of 88 children may be affected by an ASD (CDC, 2012). These new prevalence estimates suggest a greater emphasis on understanding the full range of sequelae of ASD. In this regard, much of the extant research has focused on common co-occurring problems such as anxiety (de Bruin, Ferdinand, Meester, de Nijs, & Verheij, 2007) or disruptive behavior disorders (Gadow, Devincent, & Drabick, 2008; Mattila et al., 2010; Storch, Arnold et al., 2012). However, few data have been published on suicidal thoughts and behaviors (i.e., suicidal ideation, plan, or intent or a past suicide attempt) in youth with ASD. In addition to potentially resulting in the loss of life, improving our understanding about suicidal thoughts and behaviors in youth with ASD is critically important given the multitude of risk factors in this population associated with suicidality including social isolation (Bauminger & Kasari, 2000; Rotheram-Fuller, Kasari, Chamberlain, & Locke,

2010), frequent bullying (Cappadocia, Weiss, & Pepler, 2012; Sofronoff, Dark, & Stone, 2011; van Roekel, Scholte, & Didden, 2010), and increased incidence of anxiety (de Bruin et al., 2007; van Steensel, Bogels, & Perrin, 2011), impulsivity (Bradley & Isaacs, 2006; Mosconi et al., 2009), and depression (Simonoff et al., 2012; Strang et al., 2012). Accordingly, this study examines the phenomenology and clinical correlates of suicidal thoughts and behaviors, defined broadly as presence of suicidal ideation, plans, intent, and/or past attempts, in a sample of high-functioning youth with ASD and clinically significant anxiety.

To date, little is known regarding the incidence and predictors of suicidal thoughts and behavior among children and adolescents with ASD. Mikami et al. (2009) found that 12 of 94 adolescents (13%) who were hospitalized for a suicide attempt met criteria for an ASD diagnosis. Among these youth, 5 of the 12 adolescents (42%) with ASD had past histories of attempted suicide. Shtayermman (2007) reported that 5 of 10 (50%) adolescents and young adults with Asperger's disorder exhibited suicidal ideation (SI), which was moderately to strongly but inversely related to depressive ($r = -.40$) and ASD ($r = -.88$) symptoms. In a sample of adult psychiatric in-patients, Raja, Azzoni, and Frustaci (2011) found that 12 of 26 (46%) patients with ASD exhibited suicidal behavior, including four who had made suicide attempts (two of whom eventually committed suicide). However, full interpretation of this report is as complicated as the vast majority of patients exhibited comorbid psychosis. Although their sample included youth with multiple developmental disabilities including ASD, Hardan and Sahl (1999) reported that 47 of 233 children and adolescents exhibited suicidal ideation or attempts. Relative to youth who did not exhibit suicidal behavior, children and adolescents exhibiting suicidal behaviors had higher rates of comorbid depressive disorders, posttraumatic stress disorder (PTSD), and oppositional defiant disorder.

Among typically developing youth, there is more information about suicidal thoughts and behaviors. As many as 13.8% of adolescents have seriously considered suicide over a 12-month period, with 6.3% having made an attempt (CDC, 2010). A number of risk factors for suicidality have been implicated including psychosocial stressors (e.g., interpersonal conflict), a previous suicide attempt, and presence of certain psychiatric disorders (Bridge, Goldstein, & Brent, 2006). Because a full review of suicidal thoughts and behaviors in typically developing youth is outside the scope of this manuscript, we briefly discuss evidence of the relationship between anxiety and suicidal thoughts and behaviors among typically developing youth. Overall, a positive relationship between anxiety and suicidal thoughts and behaviors - but not completed attempts - has been established in youth without ASD. For example, a number of studies have found direct associations between anxiety symptoms or disorder caseness with increased suicidal thoughts and behaviors generally among adolescent samples (Hill, Castellanos, & Pettit, 2011). Estimates suggest that as many as 50% of children and adolescents with an anxiety disorder exhibit suicidal ideation (Carter, Silverman, Allen, & Ham, 2008). However, it is difficult to partial out other variables that may account for this relationship (e.g., depressive symptoms), and it remains unclear whether anxiety disorder caseness is predictive of later suicidal behaviors (Weissman et al., 1999).

In this study, we report initial data on the phenomenology and clinical correlates of suicidal thoughts and behaviors in a sample of high-functioning youth with ASD who were presenting for possible inclusion in an anxiety treatment study. We were interested in addressing the following research questions. First, what is the frequency of suicidal thoughts and behaviors in anxious youth with ASD? Second, do differences exist in the sociodemographic characteristics and comorbidity patterns of youth with ASD and anxiety disorders who exhibit suicidal thoughts and behaviors relative to those who do not? Third,

are there differences in clinical characteristics between anxious youth with ASD as a function of presence or absence of suicidal thoughts and behaviors? Although a paucity of extant literature prohibits the formulation of directional hypotheses, we anticipated that, similar to typically developing youth (Pelkonen & Marttunen, 2003), the presence of comorbid depressive symptoms/disorders would be associated with suicidal behaviors in youth with ASD, as would greater social dysfunction, impulsivity, and anxiety severity.

Method

Participants

Participants included 102 youth with ASD diagnoses and co-occurring anxiety problems (ages 7–16 years; $M = 10.55$, $SD = 2.31$; $n_{7-11 \text{ years}} = 68$; $n_{12-16 \text{ years}} = 34$). The majority of participants were male ($N = 79$, 77%). The most commonly listed race/ethnicity was Caucasian ($N = 89$, 87%), followed by Latino/Hispanic ($N = 7$, 7%), Asian ($N = 3$, 3%), Other/Mixed ($N = 2$, 2%), and Black/African American ($N = 1$, 1%). The most common ASD diagnosis was Asperger's disorder ($N = 39$, 38%), followed by pervasive developmental disorder not otherwise specified (PDD-NOS) ($N = 35$, 34%), and autistic disorder ($N = 28$, 27%). The majority of participants ($N = 62$, 61%) were reported by a caregiver to take psychiatric medication, which were stable at the time of evaluation. Participants were excluded from participation if they had an $IQ < 70$ on a standardized intelligence test (9 youth were excluded for this reason), a diagnosis of bipolar disorder, or active psychotic symptoms (no children were excluded for these reasons). A standardized IQ assessment was used unless there was documented evidence of any acceptable standardized IQ test occurring within the two years prior to screening.

Measures

Anxiety Disorder Interview Schedule—Child and Parent Versions (ADIS-IV-C/P; (Silverman & Albano, 1996))—The ADIS-IV-C/P are clinician-administered semi-structured diagnostic interviews that assess the presence and severity of anxiety, mood, and disruptive behavior disorder symptoms. Interviews with children and caregivers were conducted separately. Overall assessments were determined by clinicians as based on information provided by informants, their clinical judgment, and discussions during a consensus meeting with the investigation team. The ADIS-IV-C/P displays good test-retest reliability (Silverman, Saavedra, & Pina, 2001) and construct validity (Wood, Piacentini, Bergman, McCracken, & Barrios, 2002) in typically developing youth, and treatment sensitivity in children and adolescents with ASD (Storch et al., 2013; Wood et al., 2009).

Pediatric Anxiety Rating Scale (PARS; (RUPP, 2002))—The PARS is a clinician-rated, semi-structured interview that assesses the presence and severity of anxiety symptoms. A 50-item checklist assesses the presence of anxiety symptoms, while an additional five items assess anxiety severity on a 6-point scale. The PARS severity items assess anxiety symptom frequency, related distress, severity of avoidance, home interference, and other interference (e.g., peer relationships, school functioning). The psychometrics of the PARS are well established in populations of youth with anxiety without (RUPP, 2002) and with ASD (Storch, Wood et al., 2012).

Child Behavior Checklist for Ages 6–18 (CBCL; (Achenbach, 2001))—The CBCL is a 113-item parent-report measure that assesses a wide range of behavioral and emotional problems in youth. Items are rated on a 3-point scale ranging from 0, “not true” to 3, “very or often true.” A variety of CBCL Syndrome Scales have been established to assess internalizing (e.g., Anxiety, Depression, Social Problems) and externalizing (e.g., Attention Problems, Aggressive Behavior, Delinquency) forms of psychopathology (Achenbach,

Dumenci, & Rescorla, 2003). For the purposes of this study, we choose scales that we believed were theoretically relevant to predicting suicidal thoughts and behaviors (i.e., Anxiety, Depression, Social Problems, Aggressive Behavior, Attention Problems, and Delinquency). Psychometric support for the CBCL has been established in clinical and non-clinical populations (Achenbach, 2001; Achenbach et al., 2003).

Multidimensional Anxiety Scale for Children-Parent Version (MASC-P; (March, 1998))—The MASC-P is a 39-item parent-report measure of childhood anxiety. Items are rated on a 4-point scale ranging from 0, “never” to 3, “often.” Higher scores on the MASC-P correspond with higher degrees of experienced distress. Psychometrics of the MASC-P have been established in a variety of clinical and non-clinical samples (Kingery, Ginsburg, & Burstein, 2009; March, 1998).

Columbia Impairment Scale-Parent Version (CIS-PV; (Bird et al., 1996))—The CIS-PV is a 13-item parent-report measure of functional impairment in social, academic, and family settings. Items are rated on a 5-point scale ranging from 0 “no problem” to 4 “very bad problem.” The psychometrics for the CIS-PV are well established in populations of youth displaying clinically significant psychopathology (Bird et al., 1996).

Procedures

A university institutional review board approved all study procedures. Caregivers provided written consent and children provided written assent prior to study participation. All measures were completed during a preliminary assessment for potential inclusion into a study investigating the effects of treating anxiety in youth with ASD diagnoses. Regardless of treatment inclusion, all participants in this investigation had primary ASD diagnoses as determined by the *Autism Diagnostic Observation Scale* (ADOS; (Lord, Rutter, DiLavore, & Risi, 1999) and *Autism Diagnostic Interview-Revised* (ADI-R; (Rutter, LeCouteur, & Lord, 2003) assessments. A certified examiner assessed all participants with these measures and a licensed psychologist confirmed ASD diagnoses according to *Diagnostic and Statistical Manual, Fourth Edition, Text Revision* (DSM-IV-TR; (APA, 2000) criteria.

As part of the screening process across studies, participants and caregivers were assessed with the ADIS-IV-C/P and PARS by an independent evaluator to determine the presence and severity of DSM-IV-TR diagnoses. Independent evaluators were trained through participating in didactics, supervised ADIS-IV-C/P administrations, and receiving feedback on live or videotaped assessments. Caregivers completed the MASC-P, CBCL, and CIS-P. These measures were used in the present report as they were consistently administered across screening assessments and assessed unique domains of interest. The presence of suicidal behavior was determined by responses from children and caregivers on critical items on the ADIS-IV-C/P. Specifically, items 12a–12d and 11a–11d in the ADIS-IV-C/P Major Depressive Disorder modules, respectively, assessed thoughts of death (12a/11a), suicidal ideation (12b/11b), suicidal plan (12c/11c), and past suicide attempts (12d/11d). Children with positive endorsements for ADIS-IV-C/P 12b–d or 11b–11d items were classified as displaying suicidal thoughts and behaviors because of the presence of thoughts about killing themselves or having a history of suicide attempts versus just having thoughts about death or dying (12a/11a). All children ($n = 20$) who reported (or were reported to have by their parent) any suicidal thoughts or behaviors were immediately evaluated by a licensed psychologist or board certified psychiatrist and triaged appropriately to ensure the welfare of these youth.

Data Analysis

SPSS version 20.0 was used to conduct all descriptive and inferential analyses. A total of 10% of cases were missing data. Multiple imputation was conducted with SOLAS 4.0 to replace missing values with a set of plausible values that account for variability across imputations (Schlomer, Bauman, & Card, 2010). Independent-sample *t*-tests and chi-square tests of independence were used to test for differences in demographic variables (e.g., age, sex, race/ethnicity, and medication status [i.e., taking psychiatric medication/no medication]) in youth displaying or not displaying suicidal thoughts and behaviors. Chi-square tests of independence were used to assess the influence of psychiatric disorder comorbidity on suicidality. Cramér's *V* was calculated to test strengths of association between categorical variables, and Cohen's *d* was calculated to test strengths of association between continuous and ordinal variables. The Kruskal-Wallis test was used to assess for omnibus differences in types of youth with ASD (e.g., autism, Asperger's disorder, PDD-NOS) and suicidal thoughts and behaviors. Because Kruskal-Wallis tests do not determine where significant differences exist between variables or allow for easily interpretable effect size estimates, Mann-Whitney tests were conducted to assess for specific differences in suicidal thoughts and behaviors between specific groups of youth with ASD (e.g., autistic disorder, Asperger's disorder, and PDD-NOS). Lastly, independent logistic regression models were conducted to examine predictors of suicidal thoughts and behaviors.

Results

Table 1 lists numbers of children and parents who endorsed each item on the ADIS-IV-C/P that assess death ideation, suicidal thoughts and behaviors (i.e., 12a–12d and 11a–11d) as well as agreement between children and parents. In total, 20 of 102 youth (20%) endorsed either thinking a lot about death or dying, having suicidal thoughts, or having a history of a suicide attempt as evidenced by either self-, parent-, or combined reports (i.e., endorsed any ADIS-IV-C/P item assessing suicidal thoughts and behaviors). Suicidal thoughts and behaviors were observed in 11 of 102 youth (11%) based on their responses to ADIS-IV-C/P items that suggest suicidal thoughts, planning, or previous attempts (i.e., 12b–d 11b–11d). Parent-child agreement was poor across items.

Table 2 presents differences in demographic variables, comorbidities, and medication use between youth with ASD displaying or not displaying suicidal thoughts and behaviors. Differences in age, sex, race/ethnicity, type of ASD, and medication status did not predict suicidal thoughts and behaviors ($p > .05$). Children with autism ($Mdn\ rank = 37.68$) were more likely to have suicidal thoughts and behaviors than were children with Asperger's disorder ($Mdn\ rank = 31.36$), $z = 2.47$, $p < .05$. No differences were found between youth with PDD-NOS ($Mdn\ rank = 30.60$) or youth with autism ($Mdn\ rank = 33.75$), $z = 1.07$, $p = .28$, or between youth with PDD-NOS ($Mdn\ rank = 39.23$) and youth with Asperger's disorder ($Mdn\ rank = 35.95$), $z = 1.51$, $p = .13$, in having suicidal thoughts and behaviors. Comorbid diagnoses of major depressive disorder/dysthymia and post-traumatic stress disorder significantly predicted suicidal thoughts and behaviors. Other comorbid diagnoses of social phobia, separation anxiety disorder, specific phobia, generalized anxiety disorder, obsessive-compulsive disorder, and disruptive behavior disorders (e.g., conduct disorder, oppositional defiant disorder) were not associated with suicidal thoughts and behaviors.

Independent logistic regression models containing CBCL subscales (i.e., Aggressive Behavior, Attention Problems, Anxiety, Depression, Delinquency, and Social Problems), MASC-P Total Scores, PARS Total Severity Scores, and CIS-P Total Scores were specified to examine their associations with suicidal thoughts and behaviors. However, only the CBCL Depression subscale independently predicted suicidal thoughts and behaviors. Table

2 presents beta values, standard errors, odds ratios, confidence intervals, and significance values for inferential variables.

Discussion

This study investigated the phenomenology and clinical correlates of suicidal thoughts and behaviors in treatment-seeking youth with ASD and co-occurring anxiety. Overall, 11% of children displayed suicidal thoughts and behaviors, suggesting that suicidality is present in relative high frequency among anxious youth with ASD and occurs at similar rates as neurotypical youth without anxiety (Wunderlich, Bronisch, Wittchen, & Carter, 2001) but perhaps lower rates than anxious youth (Carter et al., 2008). We also found several direct relationships between traits and comorbid diagnoses and suicidal thoughts and behaviors. Consistent with findings in typically developing youth (Lee, Wong, Chow, & McBride-Chang, 2006) and youth in psychiatric settings (Brown, Beck, Steer, & Grisham, 2000; Fenton, 2000), youth with ASD and clinically significant depressive symptoms displayed an increased risk for suicidal thoughts and behaviors. Similarly, presence of comorbid PTSD was associated with increased risk for suicidal thoughts and behaviors in youth with ASD, which is consistent with findings in youth without ASD (Mazza, 2000) and youth in psychiatric settings (Marshall et al., 2001; Reinherz et al., 1995). Collectively, these results may illustrate a particular vulnerability in youth with ASD who have the additional burdens of depression and/or trauma history. For these children, suicide may seem like a viable option to relieve distress. We also speculate about a potential link between ruminative thoughts associated with depression and PTSD that may increase suicide risk (Ben-Sasson et al., 2009; Sareen, Houlahan, Cox, & Asmundson, 2005; Smith, Alloy, & Abramson, 2006). Autism spectrum caseness has been associated with rigidity (Ben-Sasson et al., 2008; Lecavalier, Gadow, DeVincent, Houts, & Edwards, 2009), limited cognitive flexibility (Foley Nicpon, Doobay, & Assouline, 2010), and deficits in understanding the temporal sequencing and durability of events (Brereton, Tonge, & Einfeld, 2006; Gillott, Furniss, & Walter, 2001). These characteristics may increase risk for becoming stuck in distressing and potentially overwhelming depressogenic thought patterns without having the perspective to understand that these states are temporary or time-limited.

Despite the frequency of suicidal thoughts and behaviors in this sample, these rates may be lower than typically developing youth with anxiety (Carter et al., 2008), and actual suicide attempts were relatively infrequent as two children (~2%) had a history of having made a suicide attempt. However, rates of suicidal thoughts, behaviors, and attempts remains very concerning; accordingly, it is important for clinicians to assess for the presence and functions that underlie suicidality in youth with ASD. In addition to an expression of extreme duress, suicidal threats may be one way for youth with ASD, who may have limited coping skills, to escape from an aversive experience or obtain a desired outcome (e.g., attention, removal of a distressing stimulus, tangible reinforcers). More specifically, youth with ASD may make suicidal statements when they are emotionally overwhelmed and incapable of applying more effective functional communication, emotional regulation, and general coping skills to manage their distress (Brereton et al., 2006; Gillott et al., 2001; Wood & Gadow, 2010). It is also possible that a small minority of youth with ASD act out aggressively towards others in the face of extreme duress, which should be further studied.

With regards to differences in suicidal thoughts and behaviors as a function of ASD diagnosis, youth with autism were the most likely to have suicidal thoughts or display suicidal behavior, whereas youth with Asperger's disorder were significantly less likely to have these problems. This finding is somewhat surprising given that youth with Asperger's disorder have been shown to report high levels of internalizing symptoms (White, Oswald, Ollendick, & Scahill, 2009) and thus, findings should be replicated in a larger sample.

However, we speculate that these findings may reflect an interaction between psychosocial functioning and communication abilities. In general, youth with autism experience greater impairment in social functioning and more profound deficits in their functional communication skills relative to children with Asperger's disorder (Eisenmajer et al., 1996). Thus, children with Asperger's disorder, who may have more advanced functional communication skills, may be able to cope with distress more effectively and less likely to display suicidal thoughts and behaviors when they are frustrated or overwhelmed relative to children with autism. On balance, the severity of suicidal thoughts and behaviors that are linked to sustained internalizing distress seen in some youth (versus more transient frustration or duress) may represent a more serious form of psychopathology that increases risk for self-harm.

Parents and children exhibited poor agreement on the presence of suicidal thoughts and behaviors, which has been observed when assessing other symptom typologies (Storch, Ehrenreich May et al., 2012; White, Schry, & Maddox, 2012). The relative lack of insight observed in many anxious youth with and without ASD (Johnson, Filliter, & Murphy, 2009; Lewin et al., 2010; Magnuson & Constantino, 2011) and/or difficulties with self-reflection among youth with ASD (Jackson, Skirrow, & Hare, 2012) may contribute to discrepant parent-child reports. For example, a child's inability to access desired items or activities may lead to suicidal statements (e.g., "I wish I were dead") and/or self-injurious behaviors, which may be endorsed by the parent as suicidal thoughts and/or behaviors, while not perceived as such by the child. Alternatively, in some instances children may be better reporters than parents of internalizing symptoms as these symptoms are not necessarily overtly displayed (Engel, Rodrigue, & Geffken, 1994).

Youth with and without suicidal thoughts and behavior did not differ in terms of sociodemographic characteristics, comorbidity status (beyond depression and PTSD), certain clinical characteristics (e.g., externalizing behaviors, anxiety severity), and psychiatric medication status. These findings diverge from findings in neurotypical youth in which several demographic variables have been associated with suicidality (e.g., gender, age, medication status). Overall, one way of considering these non-significant relationships are that these variables are simply not associated with suicidal thoughts and behaviors in anxious youth with ASD. With regards to gender, among non-ASD samples, females attempt suicide more often than males yet males are more likely to die by suicide (Hallfors et al., 2004). Although the unbalanced gender distribution in our sample prevented a full assessment of gender differences, there was no evidence of different patterns of suicidal thoughts and behavior between boys and girls. With regards to age, suicidal thoughts seem to peak in frequency during adolescence and then modestly decrease into young adulthood (Shah, 2007). Although participants' age range was relatively truncated, no significant association was found. The lack of association with attentional problems was surprising, as this conflicts with findings in typically developing youth (Javdani, Sadeh, & Verona, 2011). It may be that high levels of inattention, hyperactivity, and impulsivity across our sample resulted in attenuated associations or that these problems are less associated with risk-taking behaviors in those with ASD. Lastly, there was no association between psychiatric medication status and suicidal thoughts and behaviors. This may be reflective of high rates of medication use among youth with ASD irrespective of presence of suicidal thoughts and behaviors.

Study results should be interpreted in light of several limitations. First, the use of a single measure for suicidal thought and behavior presence can be improved in future studies through using a multi-method/multi-trait approach that assesses for presence, frequency and severity. Conducting such detailed assessments would further assist in identifying children who are at different levels of suicide risk (e.g., acute, chronic high risk) (Bryan & Rudd,

2006). Specific measures of suicidality should be – pending investigation of their psychometric properties in youth with ASD - incorporated into future studies, such as the Suicidal Ideation Questionnaire-Junior (Reynolds, 1987) and Columbia Classification Algorithm of Suicide Assessment (Posner, Oquendo, Gould, Stanley, & Davies, 2007). Second, the current sample was actively seeking anxiety treatment, which may correspond to higher rates of suicidality and psychopathology compared to youth with ASD without other psychiatric comorbidities. However, because at least 50% of youth with ASD experience clinically significant anxiety (de Bruin et al., 2007; Leyfer et al., 2006; Muris, Steerneman, Merckelbach, Holdrinet, & Meesters, 1998), these results hold relevance to a large portion of affected youth. Third, the study sample of 102 youth is modest and results may not generalize to ethnically or culturally diverse populations because the sampled population largely was Caucasian. On balance, studies of suicidal thoughts and behaviors in youth with ASD are few, so these data are valuable in expanding consideration of suicidality in youth with ASD. Fourth, we found significant associations between suicidal thoughts and behaviors and depression and PTSD comorbidity. However, it remains unclear if there are inherent differences in youth with ASD who exhibit depression and PTSD relative to other conditions or risk factors in terms of their linkage to suicidal thoughts and behaviors. For example, the function of suicidal behaviors in a youngster who is depressed may be different relative to a non-depressed, but impulsive child. We highlight this as an area for future study. Fifth, we did not include a comparison sample of typically developing youth, which makes it difficult to determine whether rates of suicidal thoughts and behaviors are increased relative to youth with other psychiatric conditions when using this methodology. Indeed, some data suggest that rates of suicidal thoughts and behaviors found in this study may be lower than in typically developing youth with anxiety (Carter et al., 2008); incidence of suicidality among youth and adults with ASD warrants additional study. Regardless, the present findings indicate that suicidal thoughts and behaviors are common in high-functioning youth with ASD and are associated with several clinical features. Finally, the cross-sectional nature of this study prevents a pathogenic analysis of suicidal thoughts and behaviors as well as putative protective factors in youth.

Despite these limitations, this study has important implications for clinical practice and future research. With regards to assessment, it is important for mental health practitioners to assess for suicidality in youth (and adults) with ASD especially in the presence of significant depression and/or trauma. Clinicians should carefully consider the functions of suicidal statements and behaviors. If it seems clear that suicidal statements are being made to obtain reinforcers or escape demands/aversive situations following a comprehensive functional assessment, replacement behaviors (e.g., asking for help, signaling when overwhelmed) should be systematically trained and shaped to provide adaptive coping strategies for the child. With regards to treatment, psychosocial interventions for youth with ASD and anxiety (Reaven, Blakeley-Smith, Culhane-Shelburne, & Hepburn, 2012; Wood et al., 2009) have shown excellent promise, especially when individualized approaches to therapy are used. These data suggest that additional modules focused on suicidal thoughts and behaviors (perhaps in the context of addressing depressive symptoms) may be warranted. Alternatively, these data are suggestive of the need to develop psychosocial interventions to address depressive symptoms inclusive of suicidality for use in youth with high functioning ASD. Pharmacological interventions in typically developing depressed youth have demonstrated efficacy for reducing depressive symptoms (March et al., 2004); examining their efficacy in youth with ASD is an important next step. Across treatment modalities, creative and comprehensive strategies are needed to help address the needs of anxious youth with ASD and suicidal thoughts and behaviors in a manner that youth and their parents find acceptable.

Beyond the immediate clinical implications of this study, there are a number of areas we highlight for future study. First, in addition to replication of these findings, additional correlates of suicidal thoughts and behaviors should be examined, including variables that could predict or buffer against negative outcomes such as family dynamics (e.g., expressed emotion, warmth, conflict, etc.), peer variables (e.g., peer support, peer victimization), and child characteristics (e.g., coping strategies). Because few measures have been psychometrically evaluated in youth with high-functioning ASD, it will be necessary to establish reliability and validity properties of these measures, and to adapt as appropriate. Second, studies examining if and how suicidal thoughts and behaviors in youth with ASD differ from those who are typically developing are needed to inform intervention development. Research is needed to understand the function of suicidal statements, antecedent triggers, and associated risk factors. Third, extending investigations of suicidality into late adolescents and adults with ASD is critical given that age has been directly associated with suicidality in typically developing individuals (Shah, 2007), and due to functional impairment seen in this cohort (Cottenceau et al., 2012; Shattuck et al., 2012). Finally, as noted above, studies examining treatment modalities for suicidality in youth with ASD are needed. Although clear treatment guidelines have been established for typically developing youth who exhibit suicidal thoughts and behaviors (Shaffer & Pfeffer, 2001), it is unclear of the extent to which these approaches hold relevance for youngsters (or adults) with ASD and how they might be adapted. For example, given the cognitive features of youth with ASD, cognitive-behavioral therapeutic approaches that incorporate caregivers into treatment would likely have to be adapted as they have been in working with anxious youth with ASD (Storch et al., 2013; Wood et al., 2009). Taken together, this study provides information about the incidence and correlates of suicidal thoughts and behaviors among children and adolescents with ASD and co-occurring anxiety. Although several methodological limitations were present, these data have important clinical implications and provide directions for future research in this area.

Acknowledgments

The contributions of Lindsay Brauer, Robert Selles, Dr. Jeffrey Wood, and Danielle Ung are acknowledged. This paper was supported by grants to the first author from the National Institute of Child Health and Human Development (5R34HD065274-02), All Children's Hospital Research Foundation and the University of South Florida Office of Research and Innovation Established Researcher Grant Program.

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Table 1

Endorsed ADIS-IV-C/P suicidal thoughts and behavior items as well as child-parent agreement

Item	<u>Children</u>	<u>Parents</u>	<i>k</i>
	<i>N (%)</i>	<i>N (%)</i>	
11/12a. Thought a lot about death or dying	8 (8%)	8 (8%)	.18
11/12b. Thought about killing yourself (himself or herself)	5 (5%)	4 (4%)	.05
11/12c. Thought of a way to kill yourself (himself or herself)	9 (9%)	5 (5%)	.10
11/12d. Tried to kill yourself (himself or herself)	1 (1%)	1 (1%)	.01

Note: *k* = kappa

Table 2

Differences in demographic and clinical variables between youth with and without suicidal behavior

	Youth with ASD and suicidal thoughts/behavior (<i>N</i> = 11)	Youth with ASD without suicidal thoughts/behavior (<i>N</i> = 91)	Test statistic value (<i>df</i>)	<i>p</i>	<i>ES</i>
Age (in years)					
<i>M</i> (<i>SD</i>)	11.45 (2.88)	10.44 (2.22)	<i>t</i> (100) = 1.39	.10	.40
Sex					
Male	7	72			
Female	4	19	$\chi^2(1) = 1.34$	.25	.16
Race/Ethnicity					
Minority					
Status	1	12			
White/Caucasian	10	79	$\chi^2(1) = .15$	.70	.04
Type of ASD diagnosis					
Autism	6	22			
Asperger's			$\chi^2(1) = 5.99$	.05*	
Disorder	1	38			
PDD-NOS	4	31			
Comorbidities					
Social					
Phobia	11	77	$\chi^2(1) = 1.92$	.16	.13
GAD	10	66	$\chi^2(1) = 1.75$	.20	.13
Specific					
Phobia	8	56	$\chi^2(1) = .53$	.47	.04
Separation					
Anxiety					
Disorder	3	39	$\chi^2(1) = .98$	.32	.10
OCD	6	30	$\chi^2(1) = 2.00$	.16	.14
PTSD	3	3	$\chi^2(1) = 10.12$	.00**	.32
MDD/Dysthymia	4	10	$\chi^2(1) = 5.34$	.02*	.23

Youth with ASD and suicidal thoughts/behavior (N = 11)	Youth with ASD without suicidal thoughts/behavior (N = 91)	Test statistic value (df)	p	ES
DBD	7	51	.19	.05
Medication Type				
Antidepressant	3	28	.81	.02
Atypical Antipsychotic	2	12	.65	.05
Mood Stabilizer	1	3	.35	.09

Note: ASD = Autism spectrum disorder; PDD-NOS = Pervasive developmental disorder—Not otherwise specified; GAD = Generalized anxiety disorder; OCD = Obsessive-compulsive disorder; PTSD = Post-traumatic stress disorder; MDD = Major depressive disorder; DBD = Disruptive behavior disorder;

the 2 value of a Kruskal-Wallis test;

*
p < .05;

**
p < .01.

Table 3

Beta values, standard errors, odds ratios, confidence intervals, and significance values for inferential variables

Variables	(SE)	Odds Ratio	95% CI	<i>p</i>
CBCL Aggressive Behavior	.11 (.09)	.90	.75 – 1.06	.20
CBCL Attention Problems	.08 (.11)	1.08	.87 – 1.34	.47
CBCL Anxiety	.14 (.13)	.89	.67 – 1.13	.28
CBCL Depression	.53 (.21)	1.69	1.12 – 2.54	.01 *
CBCL Social Problems	.03 (.13)	1.03	.80 – 1.32	.84
CBCL Delinquency	.37 (.27)	.69	.41 – 1.18	.17
MASC Total Score	.03 (.03)	.97	.91 – 1.03	.35
PARS Total Severity Score	.22 (.20)	1.25	.84 – 1.87	.27
CIS-P Total Score	.03 (.07)	1.03	.90 – 1.17	.71

Note: = Standardized regression coefficient vales; *SE* = Standard error; CI = Confidence interval; CBCL = Child Behavior Checklist, MASC = Multidimensional Anxiety Scale for Children, PARS = Pediatric Anxiety Rating Scale; CIS-P = Columbia Impairment Scale, Parent Report;

*
p < .05