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Two Studies of Connectedness to Parents and Suicidal Thoughts and Behavior in Children and Adolescents

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We tested hypotheses that greater connectedness to parent(s) is associated with lower risk for nonlethal suicidal thoughts and behavior (STB), termed direct protective effects, and that parent connectedness serves to moderate (lower) the risk for STB associated with psychopathology including major depressive episode (MDE), termed moderating protective effects. Independent samples of children and adolescents recruited for a multicenter study of familial alcoholism were studied. Generalized estimating equation models were used that adjusted for age, sex, and youth psychopathology variables. The sample for Study 1 was assessed at baseline and about 2- and 4-year follow-ups, with baseline characteristics of $n = 921$, M age $= 14.3 \pm 1.8$ years, and 51.8% female. The sample for Study 2 was assessed at baseline and about 5-year follow-up, with baseline characteristics of $n = 867$, M age $= 12.0 \pm 3.2$ years, and 51.0% female. In both studies, increased perceived connectedness to father but not mother was associated with lower risk for measures of STB, consistent with direct protective effects. In Study 1, measures of parent connectedness were associated with lower risk for STB but only for youth that did not experience MDE (or alcohol use disorder), inconsistent with moderating protective effects. Study 2 showed that connectedness to fathers was associated with lower risk for suicide plans or attempts (severe STB) but not frequent thoughts of death or dying (nonsevere STB). Improved connectedness to fathers may lower risk for STB in children and adolescents, consistent with direct protective effects. Hypotheses about moderating protective effects were not supported.

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Nonlethal suicidal thoughts and behavior (referred to heretofore as suicidal thoughts and behavior [STB]) has a wide range of expressions, from thoughts of death or dying to more serious manifestations such as developing a suicide plan or making a suicide attempt (Copeland, Wolke, Angold, & Costello, 2013; Foley, Goldston, Costello, & Angold, 2006). The prevalence of STB peaks during adolescence (Kessler, Borges, & Walters, 1999; Nock et al., 2008; Nock et al., 2013). Suicide attempts are particularly concerning, as they significantly increase the likelihood of eventually dying by suicide (Hawton & Harriss, 2007), with some experts describing an attempt as "*the single most potent risk factor for youth suicide*" (emphasis added; Bridge, Goldstein, & Brent, 2006, p. 375). Suicidal ideation or closely related thoughts such as preoccupation with death or dying may provide a critical target for risk recognition and intervention prior to the onset of attempts (Borges, Angst, Nock, Ruscio, & Kessler, 2008). Chronic and persistent suicidal thoughts, particularly more severe manifestations such as making a suicide plan, may also play a key role in overcoming the fear to attempt suicide (Van Orden et al., 2010). Suicidal thoughts, plans, and attempts during youth also share many common risk factors (Bridge et al., 2006; Gould & Kramer, 2001).

Etiologic models addressing how STB develops and progresses and corresponding prevention paradigms have been driven primarily by the identification and disruption of risk factors, such as mood and substance use disorders (Mann et al., 2005). Comparatively less is known about the factors and processes that lower the probability of STB. It has been theorized that variables that lower risk may do so by promoting a positive outcome directly, for example, *not* engaging in suicidal behavior, conceptualized as direct effects (Centers for Disease Control and Prevention [CDC], 2006) and referred to herein as *direct protective effects*. It has also been theorized that variables that lower risk may do so indirectly by lowering (i.e., moderating) the effect of established risk factors, for example, reducing the risk of suicidal behavior during the course of a major depressive episode, conceptualized as protective effects (CDC, 2006) and referred to herein as *moderating protective effects*.

Strengthening the hypothesized protective effects of "connectedness" at the individual, family, and community levels has been championed as a key strategy for suicide prevention by a range of experts (Brent et al., 2013; CDC, 2006; Daniel & Goldston, 2012; Office of the Surgeon General & National Action Alliance for Suicide Prevention, 2012; Whitlock, Wyman, & Moore, 2014). A focus on connectedness for prevention of STB among children and adolescents seems on target for several reasons. First, there is strong evidence that variables that may be conceptualized as the opposite of connectedness—including isolation and rejection from peers, low family cohesion, child neglect, and interpersonal conflict—confer risk for suicidal behavior in adolescents (King & Merchant, 2008; Wagner, Silverman, & Martin, 2003; Wilkinson, Kelvin, Roberts, Dubicka, & Goodyer, 2011). Second, evidence suggests that perceptions of being close, valued, and respected by peers (Hall-Lande, Eisenberg, Christenson, & Nuemark-Sztainer, 2007; Prinstein, Boergers, & Spirito, 2001), family including parents (Borowsky, Ireland, & Resnick, 2001; Connor & Rueter, 2006; McKeown et al., 1998; Resnick et al., 1997; Sharaf, Thompson, & Walsh, 2009), and school (Resnick et al., 1997) are inversely associated with suicidal behavior during adolescence, consistent with direct protective effects. Third, interventions that strengthen family ties (Diamond et al., 2010; Esposito-Smythers, Spirito, Kahler, Hunt, & Monti, 2011; Pineda & Dadds, 2013) and other interpersonal relationships (Wyman et al., 2010) may lower youth's risk for suicidal behavior.

Within the broad domain of connectedness, indicators of connectedness to family show the strongest evidence for direct protective effects on STB. Adolescents in families with high levels of cohesion, behavior expectations, and academic standards are at lower risk for suicidal behavior than adolescents in families that provide less structure and support (Borowsky, Resnick, Ireland, & Blum, 1999; Hall-Lande et al., 2007; McKeown et al., 1998; Resnick et al., 1997). Strong parent–child relationships appear to be especially influential (Borowsky et al., 2001; Connor & Rueter, 2006). The fact that a large majority of children and adolescents live at home and are dependent on parent(s) reinforces the importance of the examination of parent connectedness during youth. Along these lines, data show that interventions designed to strengthen parent–child relationships can prevent suicidal behavior (Esposito-Smythers et al., 2011; Pineda & Dadds, 2013) and show an effect over and above rigorous individual-level intervention (Diamond et al., 2010). Parent and family connectedness have also been shown to be associated with decreased suicidal ideation in various adolescent samples (Logan, Crosby, & Hamburger, 2011; Matlin, Molock, & Tebes, 2011). Moderating protective effects have more rarely been demonstrated, an exception being a cross-sectional study demonstrating that family connectedness is associated with lowered risk in adolescents with poor social networks (Hall-Lande et al., 2007).

Although there are reports of associations between increased connectedness and lower risk for STB in several observational studies and in a small number of intervention studies, consistent with direct protective effects, some well-designed studies using repeated assessments have not identified statistically significant associations of family connectedness variables with lower youth

STB after adjustment for covariates including measures of "family support" (Lewinsohn, Rohde, Seeley, & Baldwin, 2001) and "parental acceptance" (Steinhausen, Bosiger, & Winkler Metzke, 2006). There are also meager data on parent and family connectedness as a moderating protective factor for STB in youth (Kidd et al., 2006). Moreover, the severity of STB ranges widely, yet studies of parent or family connectedness at differing levels of severity are rare (Hsu, Chen, & Lung, 2013).

Purpose

Overall, studies of associations of parent connectedness and youth STB using repeated measures designs are limited, results of such studies have been somewhat inconsistent, and this research has rarely uncovered moderating protective effects or disentangled STB at different levels of severity. We addressed these gaps in analyses of two large cohorts of youth recruited from families oversampled for parental alcohol dependence who are assumed to have a higher prevalence of family risk and psychopathology associated with STB. We focused on indicators of youth connectedness to their parents in light of the strength of empirical data that parental relationships may be especially influential and the fact that the large majority of children and adolescents live with and are dependent on parent(s). As maternal and paternal influences on offspring psychopathology often differ (Connell & Goodman, 2002), including in examinations of STB (Glowinski et al., 2004), we examined connectedness to mothers and fathers separately. We hypothesized that connectedness to mothers and fathers, respectively, lowers the risk for STB during youth (direct protective effect) and that such connectedness lowers the risk in individuals with psychopathology (moderating protective effect). In Study 1, we examined connectedness in relation to risk for STB globally and examined potential moderating protective effects of parent connectedness variables. In Study 2, we focused on direct protective effects of parent connectedness variables and examined connectedness in relation to severity of STB (frequent thoughts of death or dying vs. suicide plans and/or attempts).

METHODS COMMON TO STUDIES 1 AND 2

Data for the studies are based on independent samples with no overlap recruited for the Collaborative Study on the Genetics of Alcoholism (COGA), a multicenter family study in the United States for which multiple data sets have been created (National Institute of Alcohol Abuse and Alcoholism, 2014). COGA data are collected in the surrounding areas of six research institutions: University of California at San Diego, University of Connecticut, University of Iowa, Indiana University, Washington University in St. Louis, and The State University of New York at Brooklyn. COGA examines individuals with alcohol dependence recruited from treatment centers that serve as probands, first-degree relatives of these individuals, and nonalcohol-dependent comparison families recruited through various population sources (e.g., motor vehicle registration). As probands are recruited from treatment centers, generalizability to less severe nonclinical populations is unclear. The samples for Studies 1 and 2 comprised offspring of adult COGA participants. Participants received financial compensation for each assessment, and telephone was the primary method of retaining and scheduling participants. An exemption from the University of Rochester Institutional Review Board was granted to perform these secondary analyses of deidentified COGA data.

All data are based on versions of the Semi-Structured Assessment for the Genetics of Alcoholism, SSAGA (Bucholz, 1994). An adolescent version of the SSAGA (Kuperman et al., 2001) was administered when participants were ages 17 and younger. This youth version was primarily based on the adult SSAGA but used age-appropriate language. Diagnostic sections of the SSAGA examining alcohol use disorder (AUD) and other mental disorders have been intensively studied and show solid reliability (Bucholz, 1994; Bucholz, 1995; Kramer, 2009) and validity (Hesselbrock, 1999). The various diagnostic sections of the youth version have also been found to be reliable, with kappa coefficients averaging 0.72 (Kuperman et al., 2001). and validity (Hesselbrock, 1999).

STB are assessed with SSAGA in a dedicated section of the interview that uses standard items on frequent thoughts of death or dying (i.e., "Have you ever thought a lot about death or dying?"), suicide planning (i.e., "Have you ever made a plan about how you were going to kill yourself?"), and suicide attempt (i.e., "Have you ever tried to kill yourself?"). Participants endorsing depressed mood or lost interest or pleasure in the mood section of the SSAGA were asked additional screening questions on STB. These data were used to create categorical assessments of STB, which served as the outcome in the two studies. In SSAGA interviews, participants are asked "lifetime" questions (e.g., lifetime suicide attempts) as well as information on age of onset and recency, which allow for determining, at each follow-up, whether suicidal thoughts or behavior began or recurred since prior assessment(s) or the participant was merely referring to that reported in a previous interview. The same strategy is used to assess mental disorders across waves, for example, AUD. The versions of the SSAGA used in the two studies contained different items to assess perceived

connectedness to parent(s), and from these items we created novel, study specific assessments.

STUDY 1

Methods

Sample. We examined a cohort of 921 children and adolescents who were assessed at three waves, with mean (standard deviation) time from Wave 1 to Wave 2 follow-up of 2.10 ± 0.28 years, and time from Wave 2 to 3 follow-up of 2.11 ± 0.34 years. The cohort was created by selecting all participants from a larger cohort who were successfully interviewed at each wave. The current analyses focused on participants ages 17 and younger at each wave, ages when assessments of current perceived connectedness to mother and father, respectively, were obtained. The larger cohort from which the sample was selected had the following characteristics: $n = 1{,}649$; mean age at first assessment 14.3 ± 1.8 years; 49.5% male; 63.4% White non-Hispanic, 12.7% Hispanic, 27.5% Black; 85.6% retained for at least one follow-up; individuals retained were slightly older ($M = 0.2$ years) than those lost to follow-up ($p = .012$).

Measures. Participants ages 17 and younger were administered 12 SSAGA items that pertained to current connectedness to a ''mother figure'' (mother) and the items were repeated for a ''father figure'' (father). We rescaled the responses to make them suitable for summation, with higher scores indicating greater connectedness. We dropped two items that cohered poorly with the others and retained 10 items that summed to form a coherent overall scale for each parent (range = 10–24, $\alpha = 0.74$ mother, $\alpha = 0.77$ father). The items focused on helping, for example, ''Does your mother/father help you with things like school work or projects (1 = no/2 = yes)?''; communication, for example, ''Do you talk to your mother/father about problems or when you are worried about something (1 = no/2 = yes)?''; and closeness, for example, ''How close do you feel to your mother/father (1 = not at all close/2 = somewhat close/3 = very close)?''

A binary (present/absent) outcome variable was created based on endorsements of any STB including frequent thoughts of death or dying, suicide planning, or suicide attempt. Youth diagnoses of AUD including alcohol abuse or dependence, cannabis use disorder (CUD) including cannabis abuse or dependence, and major depressive episode (MDE) were based on *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) criteria. Other drug use disorders (e.g., cocaine) were comparatively infrequent, ruling out their examination. We included MDE and AUD because they confer risk for suicidal behavior in youth (Esposito-Smythers & Spirito, 2004; Goldston et al., 2009) and are rigorously assessed with SSAGA. We included CUD because it is a prevalent condition in youth although there are limited data on its association with STB.

Analyses. Associations of parent connectedness (primary predictors) with STB (outcome) were examined using generalized estimating equations (GEE). GEE uses the generalized linear model to estimate more efficient and unbiased regression parameters relative to ordinary least squares regression in part due to the specification of a working correlation matrix in GEE that accounts for the form of within-subject correlation of responses on dependent variables of many different distributions, including normal, binomial, and Poisson (Liang & Zeger, 1986). Analyses were performed using SAS 9.3 software. Results are presented as odds ratios (*OR*) and 95% confidence intervals (CIs). Statistically significant results are based on $p < .05$.

We examined associations between the connectedness variables and STB to test hypotheses of statistically significant, inverse associations (i.e., direct protective effects). Using GEE we conducted a series of unadjusted logistic models to examine the association of each connectedness variable with STB within each wave, and a series of models that adjusted for age, sex and adolescent disorders including AUD, CUD, and MDE. To examine hypotheses pertaining to moderating protective effects, we also tested two-way interactions between connectedness variables and adolescent disorders (e.g., MDE), yielding a total of six two-way interaction tests. Each moderation model included the main effects of the predictors (e.g., MDE, father connectedness), their two-way interaction, and age and sex. We plotted statistically significant interactions to confirm whether connectedness was associated with lower risk for STB among youth experiencing a risk factor (e.g., AUD), as hypothesized.

Results

Descriptive characteristics of the sample stratified by STB at each wave are presented in Table 1. Eighty-one (8.8%) participants reported lifetime STB at Wave 1, 26 (4.3%) were determined to have new or recurrent STB at Wave 2, and 18 (5.7%) were determined to have new or recurrent STB at Wave 3. Across waves, STB was about equally divided between frequent thoughts of death or dying only and more severe STB marked by suicidal planning and/or suicide attempt (data not shown).

The results examining the unadjusted associations of father connectedness and mother connectedness

variables with STB indicate that both measures are associated with lower odds of STB; father connectedness, $OR = 0.863$, 95% CI [0.813, 0.916], $p < .001$; mother connectedness, $OR = 0.879$, 95% CI [0.833, 0.927], $p < .001$. The results of examining the connectedness variables and STB after adjustment for age, sex, AUD, CUD, and MDE indicate that father connectedness is associated with lower odds of STB, $OR = 0.920$, 95% CI [0.863, 0.982], $p = .012$. These results indicate that a 1-unit increase on the 10-item Father Connectedness scale (range = 10–24) is associated with an 8.0% (1.8–13.7%) decreased risk of youth STB, consistent with a direct protective effect. In the adjusted model, mother connectedness is not associated with lower odds of STB at a statistically significant level, $OR = 0.947$, 95% CI [0.882, 1.017], $p = .136$.

Tests of moderation yielded three statistically significant two-way interactions between an adolescent disorder and mother or father total connectedness in the prediction of STB: MDE × Connectedness to Mother ($Z = 4.35$, $p < .001$), MDE × Connectedness to Father ($Z = 1.93$, $p = .038$), and AUD × Connectedness to Father ($Z = 2.70$, $p = .007$). The MDE × Connectedness Connectedness to Mother interaction is plotted in Figure 1 and shows the odds of STB (vertical axis) as a function of connectedness score (horizontal axis) in offspring with and without MDE. Results indicate that that risk for STB is decreased with increased connectedness to mother in offspring without MDE but not those with MDE. The MDE × Total Connectedness to father interaction is also plotted in Figure 1. It shows a similar pattern to Figure 1. Finally, the AUD × Connectedness to Father interaction is plotted in Figure 2. Results indicate that that risk for STB is decreased with increased connectedness to father for offspring without AUD but not those with AUD. Despite the significant two-way interactions, these plots (Figures 1 and 2) are not consistent with moderating protective effects as hypothesized because youth with MDE (and AUD) did not show lowered risk for STB as a function of increased parent connectedness. Finally, analyses of the simple slopes of risk for STB as a function of increased parent connectedness do not show that risk is changed with increased connectedness to mothers among youth with MDE ($p = .386$) or with increased connectedness to fathers among youth with MDE ($p = .273$) or AUD ($p = .291$).

STUDY 2

Methods

Sample. We examined a cohort of 867 children and adolescents (51.5% female) who were assessed at Time 1 at average age 12.0 ± 3.2 years (range = 7–17) and who were reassessed approximately 5 years later at average age 17.5 ± 3.6 years (range = 10–28). The larger cohort from which the sample was selected had the following characteristics: $n = 1{,}340$; mean age at first assessment 12.3 ± 3.2 years; 51.0% female; 78.3% retained for 5-year follow-up; individuals retained were slightly younger (by

TABLE 1
Descriptive Data

	Wave 1		*Wave 2*		*Wave 3*	
Predictor	*Nonsuicidal*[a]	*Suicidal*[b]	*NonSuicidal*[c]	*Suicidal*[d]	*Nonsuicidal*[e]	*Suicidal*[f]
Father Connectedness	19.56 (2.93)	17.87 (3.62)	19.54 (3.11)	17.32 (3.37)	19.54 (3.18)	18.21 (3.79)
Mother Connectedness	21.00 (2.47)	19.78 (3.02)	20.89 (2.62)	19.38 (3.87)	20.99 (2.92)	20.50 (2.73)
Child Disorder						
AUD	9 (1.07%)	4 (4.94%)	6 (1.04%)	3 (11.54%)0	8 (2.68%)	2 (11.11%)
CUD	10 (1.19%)	3 (3.70%)	12 (2.09%)	1 (3.85%)	13 (4.36%)	4 (22.22%)
Dep	46 (5.48%)	41 (50.62%)	26 (4.52%)	18 (69.23%)	25 (8.39%)	9 (50.00%)
Age *M* (*SD*)	14.32 (1.77)	14.83 (1.70)	15.30 (1.26)	15.50 (1.30)	16.36 (0.62)	16.17 (0.79)
Gender						
Female	418 (49.8%)	59 (72.8%)	300 (52.1%)	18 (69.2%)	155 (51.8%)5	12 (66.7%)
Male	422 (50.2%)	22 (27.2%)	276 (47.9%)	8 (30.8%)	144 (48.2%)	6 (33.3%)

Note: Descriptive data on variables among children with no suicidal ideation, planning, and/or attempt (nonsuicidal) and those with frequent thoughts of death/dying, suicide planning, and/or suicide attempt (suicidal) up to Wave 1 (Wave 1), from Wave 1 to Wave 2 (Wave 2), and from Wave 2 to Wave 3 (Wave 3). Father Connectedness and Mother Connectedness scale results are shown as *M* (*SD*), and child disorder results are shown as *N* (%). AUD = alcohol use disorder; CUD = cannabis use disorder; Dep = major depressive episode.

[a] $N = 840$.
[b] $N = 81$.
[c] $N = 576$.
[d] $N = 26$.
[e] $N = 299$.
[f] $N = 18$.

average 0.5 years) than those lost to follow-up ($p = .007$).

Measures. The child/adolescent version of the SSAGA used for the current study contains eight items about connectedness to a self-identified "mother" and "father." These items were adapted from the Diagnostic Interview for Children and Adolescents (Reich, 1982). The items were identical and repeated: (a) "Does your (mother/father) show that he/she cares about others in the family by giving them hugs or kisses?"; (b) "Does your (mother/father) go out of his/her way to say you did a good job when you do something well? For example, if you received a good grade in school, are you told something nice about it?"; (c) "When you are in an activity at school, does (mother/father) usually try to attend?"; and (d) "Do you feel very close to your (mother/father)?"

Interviewers coded responses to each family connectedness item as "yes," "no," "unknown" (rarely endorsed), or "missing" (used for participants who did not report a father figure or mother figure, as applicable). We used contrast coding (Hardy & Baird, 2004) to rescore each item as −1 (no), +1 (yes), and 0 (missing/unknown). Contrast coding allowed for analysis of all responses regardless of missingness and was based on the idea that a strained relationship (e.g., does not feel close to father) may be more toxic than not having a given relationship (e.g., no self-identified father figure).

We summed the items and conducted an exploratory factor analysis (Fabrigar & Wegener, 2012). We looked at the eigenvalues and scree plot to determine the number of factors. We checked all the factor loadings to identify each factor item. This analysis indicated that Item 1 on mothers and Item 1 on fathers form a two-item factor that we labeled "parent physical closeness" (range = −2 to +2, $M = 1.3 \pm 1.1$, $\alpha = 0.53$). Items 2, 3, and 4 in mothers formed a three-item factor "connectedness to mother" (range = −3 to +3, $M = 2.3 \pm 1.4$, $\alpha = 0.55$) and the corresponding items in fathers formed a three-item factor "connectedness to father" (range = −3 to +3, mean = 1.4 ± 1.9, $\alpha = 0.64$). We used the Time 1 assessment of connectedness in all analyses because many participants were not readministered the connectedness assessment at Time 2 due to aging out of the child/adolescent version of SSAGA when reaching age 18.

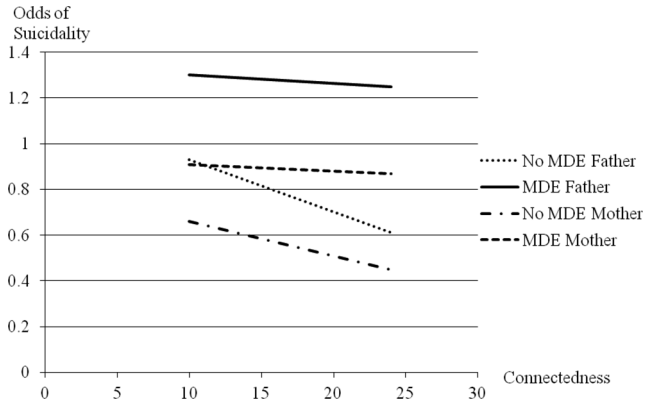

FIGURE 1 (Study 1) Association between connectedness to both father and mother and odds of suicidality in youth with and without a major depressive episode (MDE).

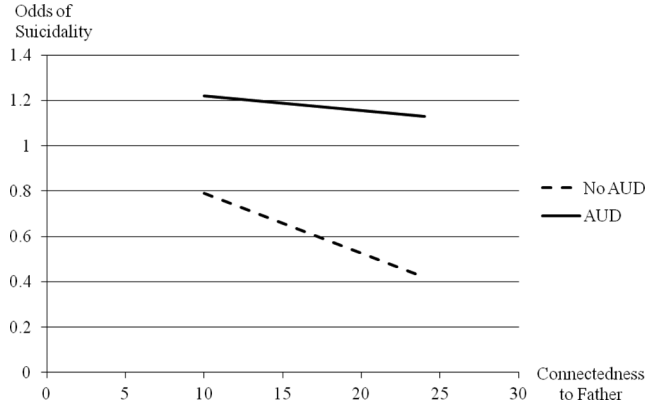

FIGURE 2 (Study 1) Association between connectedness to father and odds of suicidality in youth with and without an alcohol use disorder (AUD).

As previously described, SSAGA assesses frequent thoughts of death/dying, suicide planning, and suicide attempt using standard items, from which we created a three-level categorical outcome measure: 0 = nonsuicidal, 1 = frequent thoughts of death/dying, 2 = suicidal plans and/or attempts. Symptoms of AUD, MDE, drug use disorder (nonalcohol) including drug abuse or dependence (DUD), and conduct disorder (CD) are based on *DSM–III–R* criteria (American Psychiatric Association 1994). For each disorder, we created three ordered categories—0 symptoms, 1 symptom, and 2-plus symptoms.

Analyses. Using GEE, we examined associations of parent connectedness measures (primary predictors) with STB (outcome) within each wave to test direct protective effects of parent connectedness variables. We conducted a series of unadjusted GEE models and models that adjusted for age, sex and symptoms of MDE, AUD, DUD, and CD. Multinomial models (Riefer & Batchelder, 1988) were used to compare the three outcome groups. For these models we compared the thoughts of death/dying and plan/attempt groups to the nonsuicidal group (reference) and reran the models to directly compare the suicide plan/attempt group to the thoughts of death/dying group (reference). In secondary analyses, we used crossed lagged analyses within GEE (Cui, Lyness, Tu, King, & Caine, 2007) to confirm

that STB outcomes at Time 2 were predicted by connectedness variables assessed at Time 1. Specifically, we reexamined statistically significant inverse associations between connectedness measures and STB outcomes obtained in the primary analyses in a series of cross-lagged models that adjusted for age, sex, and symptoms of MDE, AUD, DUD, and CD. Analyses were performed using SAS 9.3 software. Results are presented as *OR*s and 95% CIs. Statistically significant results are based on $p < .05$.

Results

Descriptive data on STB and psychopathology are provided in Table 2. At Time 1, 682 (78.6%) youth determined to have no lifetime STB, history of frequent thoughts of death/dying was identified in 129 (14.9%), and history of suicide planning/attempt in 56 (6.5%). During the period from Time 1 to Time 2 follow-up, 677 (78.1%) youth were determined to have no STB, new or recurrent frequent thoughts of death/dying were identified in 111 (12.8%), and suicide plan/attempt in 79 (9.1%). MDE symptoms had similar prevalence at both time points, whereas the other psychopathology symptoms were more common at Time 2.

Unadjusted comparisons of each connectedness variable and the outcomes are presented in Table 3. Comparisons of the suicide plan/attempt group and nonsuicidal group (reference group, ref) are shown in column 2. These analyses show that higher scores on each connectedness measure are associated with being less likely to be in the suicide plan/attempt group than in the nonsuicidal group. Comparisons of the thoughts of death/dying group and nonsuicidal group (ref) are shown in column 3. Results indicated that these groups did not differ at a statistically significant level on any of the connectedness variables. Comparisons of the suicidal plan/attempt group and thoughts of death/dying group (ref) are shown in the last column. These results show that higher scores on parent physical connectedness and connectedness to father are associated with being less likely to be in the suicide plan/attempt group than in the thoughts of death/dying group.

Comparisons adjusted for age, sex, and symptoms of AUD, DUD, CD, and MDE are shown in Table 4. Comparisons of the suicide plan/attempt group and non-suicidal group (ref) are shown in column 2. These analyses reveal that father connectedness is uniquely associated with lower likelihood of being in the plan/attempt compared to the nonsuicidal group: $OR = 0.86$, 95% CI [0.77, 0.96], $p = .006$. The result suggests that a 1-unit increase on the three-item Father Connectedness scale (range = −3 to +3) is associated with a 14% (4–23%) decreased risk of planning/attempt versus nonsuicidal. Comparisons of the thoughts of death/dying and nonsuicidal group (ref) are shown in column 3, with none of the groups differing in connectedness at a statistically significant level. Comparisons of the suicidal plan/attempt group and thoughts of death/dying group (ref) are shown in the last column of Table 4. Again, father connectedness is uniquely associated with lower likelihood of being in the plan/attempt compared to the thoughts of death/dying group: $OR = 0.81$, 95% CI [0.72, 0.91], $p < .001$. The result indicates that a 1-unit increase on the Father Connectedness scale is associated with a 19% (9–28%) decreased risk of planning/attempt versus thoughts of death/dying.

Secondary analyses using adjusted, cross-lagged models were consistent with the primary, multivariate findings pertaining to statistically significant, inverse associations between connectedness measures and STB outcomes. Specifically, father connectedness at Time 1 is uniquely associated with lower likelihood of being in the plan/attempt compared to the nonsuicidal group assessed at Time 2: $OR = 0.89$, 95% CI [0.81, 0.97], $p = .013$. Similarly, father connectedness at Time 1 is uniquely

TABLE 2
Descriptive Data on Suicidality and Psychopathology

	Time 1				*Time 2*			
Variable	*0* *N (%)*	*1* *N (%)*	*2* *N (%)*	*Miss* *N*	*0* *N (%)*	*1* *N (%)*	*2* *N (%)*	*Miss* *N*
SUI	682 (78.7)	129 (14.9)	56 (6.5)	0	677 (78.1)	111 (12.8)	79 (9.1)	0
AUD	826 (95.6)	11 (1.3)	27 (3.1)	3	733 (85.5)	21 (2.5)	103 (12.0)	10
DUD	835 (96.3)	25 (2.9)	7 (0.8)	0	706 (81.5)	127 (14.7)	33 (3.8)	1
MDE	644 (74.4)	158 (18.2)	64 (7.4)	1	649 (74.9)	131 (15.1)	87 (10.0)	0
CD	444 (51.2)	303 (35.0)	120 (13.8)	0	257 (29.6)	402 (46.4)	208 (24.0)	0

Note: $N = 867$. SUI = suicidality (0 = none, 1 = frequent thoughts of death or dying, 2 = suicide plan and/or attempt). For all psychopathology variables (e.g., AUD), 0 = zero symptoms of a disorder (e.g., 0 symptoms of AUD); 1 = one symptom of a disorder (e.g., one AUD symptom); 2 = two or more symptoms of a disorder (e.g., 2-plus AUD symptoms). Miss = *N* with missing data on a given variable; AUD = alcohol use disorder; DUD = drug use disorder; MDE = major depressive episode; CD = conduct disorder.

TABLE 3
Unadjusted Associations Between Connectedness Measures and Suicidality Outcomes

	Plan/Attempt (2) vs. Nonsuicidal (0, ref)	*Death/Dying (1) vs. Nonsuicidal (0, ref)*	*Plan/Attempt (2) vs. Death/Dying (1, ref)*
Connectedness Measure	*OR [95% CI], p*	*OR [95% CI], p*	*OR [95% CI], p*
Parent Physical	0.82 [0.69, 0.95], .010	1.01 [0.89, 1.15], .837	0.78 [0.65, 0.94], .008
To Mother	0.81 [0.72, 0.92], .001	0.93 [0.84, 1.03], .175	0.89 [0.76, 1.02], .079
To Father	0.80 [0.72,0.88], <.001	1.02 [0.94, 1.10], .630	0.78 [0.70, 0.87], <.001

TABLE 4
Adjusted Associations Between Connectedness Measures and Suicidality Outcomes

	Plan/Attempt (2) vs. Nonsuicidal (0, ref)	*Death/Dying (1) vs. Nonsuicidal (0, ref)*	*Plan/Attempt (2) vs. Death/Dying (1, ref)*
Connectedness Measure	*OR [95% CI], p*	*OR [95% CI], p*	*OR [95% CI], p*
Parent Physical	0.92 [0.75, 1.11], .358	1.07 [0.93, 1.22], .339	0.83 [0.67, 1.02], .071
To Mother	0.93 [0.81, 1.08], .345	1.01 [0.90, 1.12], .919	0.96 [0.82, 1.13], .648
To Father	0.86 [0.77, 0.96], .006	1.07 [0.99, 1.16], .087	0.81 [0.72, 0.91], <.001

Note: Each connectedness variable was examined in a separate model that adjusted for age (continuous), sex, and four psychopathology variables including measures of AUD, DUD, MDE, and CD symptoms.

associated with lower likelihood of being in the plan/attempt compared to the thoughts of death/dying group at Time 2: $OR = 0.85$, 95% CI [0.75, 0.96], $p < .001$.

GENERAL DISCUSSION

We conducted analyses of two large cohorts of youth to examine associations of connectedness to parents with STB including a study of a younger sample ($\leq$17 years) assessed at baseline and about 2- and 4-year follow-ups (Study 1) and a somewhat older sample assessed at baseline and about 5-year follow-up (Study 2). The main findings were (a) in both studies measures of connectedness to mothers and fathers were associated with lower risk for STB in unadjusted analyses; (b) in both studies measures of father (but not mother) connectedness were associated with lower risk for STB after adjustment for age, sex, and several adolescent disorders that confer risk for STB; (c) in Study 1 connectedness to mother and father showed moderating protective effects on STB broadly measured in youth who did not experience MDE but not in those with MDE, and connectedness to father showed a moderating protective effect on STB broadly measured in youth who did not have AUD but not in those with AUD; (d) in Study 2 measures of connectedness to fathers was associated with lower risk for severe STB (i.e., suicidal plan/attempt) in particular.

The statistically significant associations between parent connectedness measures and STB in unadjusted analyses are consistent with our hypothesis of a direct protective effect and suggest that efforts to strengthen connectedness to parent(s) may lower risk for STB during childhood and adolescence. Public health models describe a continuum of strategies including universal programs delivered to whole communities or populations, selective programs delivered to individuals or groups with indications of increased risk (e.g., AUD), and indicated programs for those displaying precursors to or manifestations of a targeted outcome (e.g., suicidal behavior; Caine, 2013). Conceptually, efforts to increase parent connectedness could be delivered across the continuum and through interventions designed to reduce or prevent a variety of disorders. For example, a number of universal school-based programs that strengthen youth–parent communication and parent monitoring of their children's behavior have been shown to reduce substance use behaviors and other problem behaviors (Brody et al., 2004; Spoth, Redmond, & Shin, 2001). Determining whether those and other parent-focused preventive interventions extend their beneficial effects to reducing STB would enhance knowledge of effective suicide prevention strategies.

The fact that father connectedness, but not mother connectedness, was associated with STB after adjustment for age, sex, and several adolescent disorders suggests that paternal relationships in particular may be an important source of distress among youth vulnerable to STB. Consistent with these findings, previous research has shown that father–child connectedness is uniquely associated with both unhealthy weight control and substance use in adolescents enrolled in public schools

(Ackard, Neumark-Sztainer, Story, & Perry, 2006). Also, a prior study (Day & Padilla-Walker, 2009) found that involvement and connectedness with the father (but not mother) were negatively related to internalizing and externalizing behaviors in youths randomly selected from the general population. Moreover, De Luca, Wyman, and Warren (2012) found that Latina adolescents who perceived their fathers (but not mothers) as more supportive and their parents as caring for them were less likely to have suicidal thoughts. Taken together, previous findings and the current results suggest that preventive interventions designed to improve paternal relationships in particular may lower risk for youth STB.

In Study 1 that modeled youth STB broadly defined, there were significant two-way interactions identified between mother and father connectedness variables and MDE in children and adolescents as well as a significant interaction between father connectedness and an AUD. Examination of the nature of these interactions suggested that it was youth without psychopathology risk factors who gained the most from parent connectedness insofar as increased connectedness to mother and father (Figure 1) was associated with lowered risk for STB in nondepressed adolescents, and increased connectedness to father (Figure 2) was associated with lowered risk for STB in adolescents without an AUD. In contrast, increased scores on mother and father connectedness were not associated with changes in risk for STB in adolescents experiencing a MDE (Figure 1) and increased father connectedness was not associated with change in risk for STB among youth with AUD (Figure 2). Although we used two-way interactions to identify moderating protective effects and obtained statistically significant results, the results were not supportive of our hypothesis that connectedness would show a moderating protective effect on youth with psychopathology. Rather, connectedness lowered risk only in youth without psychopathology. Overall, our results suggest that connectedness to a parent in its own right may not be enough to exert a moderating protective effect in youth experiencing MDE or AUD. Based on the interaction results, it may be that indicators of parent connectedness exert a positive, overall influence on well-being among the larger segment of the youth population who do not develop MDE or AUD, rather than by attenuating the association between these risk factors and STB. Along these lines, a study of high-risk youth showed that improved family connectedness was related to less severe suicidal ideation during the year after hospitalization for nonmultiple suicide attempters but not those with multiple attempts (Czyz, Liu, & King, 2012), another instance where youth who may be presumed to be at lower risk for STB may have benefitted the most from family connectedness.

In Study 2, STB of lower severity (i.e., frequent thoughts of death/dying) and greater severity (i.e., suicide plans/attempts) was disentangled, advantageous because some research suggests that the former may not be associated with increased risk for suicidal behavior during adolescence (Vander Stoep, McCauley, Flynn, & Stone, 2009). None of the connectedness variables is associated with lower risk for frequent thoughts of death or dying. In contrast, the assessment of connectedness to fathers is associated with lower risk for suicide plans/attempts, a result that appears robust insofar as it is observed whether the reference group for comparison is youth with no STB or those reporting frequent thoughts of death/dying only. These results suggest that efforts to improve connectedness to parents, particularly fathers, may have the greatest impact on suicidal plan/attempts or other severe manifestations of youth STB. Few prior studies of youth in the United States have directly compared measures of connectedness to STB of differing levels of severity. An exception is a study by King and colleagues (2001) that determined that in a community sample of youth ages 9 to 17, a combined group of youth with histories of suicidal ideation and/or attempt had poorer family environments and lower parental monitoring than nonsuicidal youth, but the suicidal ideation and attempt groups did not differ from one another on these family variables.

There were limitations of the investigations. The study population is composed predominantly of youth from families with one or more parent with AUD, many of whom recruited from substance use disorder treatment centers, with unclear generalization to other youth. The parent connectedness items are novel and based on youths' subjective reports, and the connectedness measures used in Study 2 are limited by their brevity and low internal consistency. The SSAGA item concerning frequent thoughts of death or dying does not measure suicidal ideas per se. In Study 1 there was not sufficient data to differentiate the item from more severe indicators of STB. Accordingly, relevance of the results of Study 1 to suicidal thoughts and behavior versus frequent thoughts of death and dying is unclear. The study of the influence of paternal versus maternal connectedness on STB in youth is at a nascent stage. Moreover, in the analytic models there was rigorous covariate adjustment for youth psychopathology but not parent psychopathology, because the latter data were unavailable at one or more waves, a limitation in light of the oversampling of parents with AUD. Accordingly, the results pertaining to parental differences in direct protective associations with offspring STB are considered preliminary. The data were gathered using a face-to-face interview between and adult interviewer and a child or adolescent which may serve to inhibit disclosure of STB, a different scenario than anonymous, self-report

surveys that provide most of the epidemiological surveillance data on youth, for example the Youth Risk Behavior Survey (Eaton et al., 2008). As a result, it seems unsurprising that the prevalence rates for STB obtained are lower than is observed in such surveys. It is also important to note that self-report surveys are open to criticism for overestimating STB in youth. Our primary analytic approach is appropriate for repeated measures data and serves to maximize power, but it does not test prospective associations between connectedness variables assessed at earlier assessments and STB outcomes measured later. In Study 1 we were underpowered to test prospective relationships, for example, based on Monte Carlo simulations applying cross-lagged approaches we estimated power to be 37% to 42% (Zhang, Lu, et al., 2011; Zhang, Xia, et al., 2011). However, in Study 2 we were able to assess prospective associations in secondary analyses, and the results confirmed the primary analyses and further suggest that connectedness to fathers is indeed predictive of future youth STB, consistent with direct protective effects.

In conclusion, analyses of two large samples of youth exposed to parental alcoholism and at heightened risk for psychopathology provide convergent evidence that increased connectedness to fathers is associated with lower risk for STB, suggesting a direct protective effect. Confidence in this central finding is increased by the use of repeated measures data, validated semistructured interviews, rigorous covariate adjustment, and confirmation of the results using prospective modeling of the data in Study 2. We also obtained results to suggest that one or more measures of parent connectedness are protective from youth without psychopathology risk factors for STB (Study 1) and that such connectedness is associated with lowered risk for severe STB in particular (Study 2), findings that require further study.

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