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Exposure to Suicidal Behavior Predicts a Suicide Attempt, Depending on Past Psychiatric Diagnosis

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Abstract

Exposure to a suicide attempt and/or suicide death is associated with higher risk for an adolescent's own suicide attempt. Previous studies have examined whether exposure affects adolescents' own suicide attempts differently based on the presence of depressive symptoms or diagnoses, but these findings are inconsistent. We hypothesized that exposure to a suicide attempt would interact with history of a psychiatric diagnosis to predict a future suicide attempt among adolescents. Adolescents, aged 12-21, were recruited from seven high schools in the New York City metropolitan area. At baseline, they completed a two-stage suicide screen to assess for history of suicide attempt and suicide ideation, as well as the mood, anxiety, and substance use diagnostic modules (based on the previous 6 months) of the Computerized Diagnostic Interview Schedule for Children and were followed-up four to six years later to assess for lifetime exposure to a suicide attempt and suicide death (by someone they know) and any suicide attempts made since baseline. Race/ethnicity (Black vs. White), having at least one psychiatric diagnosis, suicidal ideation in the previous 3 months, and lifetime history of a suicide attempt were associated with a future suicide attempt, adjusting for gender. While exposure to a suicide attempt and/or suicide death did not predict a future suicide attempt, there was a significant interaction between having a psychiatric diagnosis at baseline and exposure to a suicide attempt and/or suicide death. Exposure to suicidal behavior may increase risk of future suicide attempts, but only among adolescents with at least one previous psychiatric diagnosis. Thus, compared to other adolescents, psychologically vulnerable adolescents may require more monitoring and support after exposure to suicidal behavior to reduce their heightened risk of attempting suicide.

Exposure to Suicidal Behavior Predicts a Suicide Attempt, Depending on Past Psychiatric Diagnosis

Adolescents and young adults are at a particularly high risk of thinking about and attempting suicide. Suicide was the second-leading cause of death among Americans aged 15-24 in 2017 (Drapeau & McIntosh, 2018). Compared to all Americans aged 18 and over, adults aged 18-25 had the greatest prevalence of suicide ideation in 2017 (4.3 vs. 10.5%) (SAMHSA, 2017), and the proportion of Americans aged 18-25 attempting suicide was more than three times greater than the general adult population (SAMHSA, 2017). The majority of adults with lifetime suicide ideation or attempts report that they first thought about or attempted in their late teens or early twenties (Kessler, Borges, & Walters, 1999; Nock et al., 2008). Given the elevated rate of adolescent and young adult suicide ideation and attempts in comparison to other age groups, research has focused on the role of exposure to suicidal behaviors in risk of suicide attempts among adolescents and emerging adults.

In 1787, Johann Wolfgang von Goethe published a novel that concluded with the main character, Werther, dying by suicide. Anecdotally, it was said that the novel influenced many young men in Europe to kill themselves using the same method after reading the book, although a formal analysis was never conducted. The pattern of copycat suicides was referred to as the "Werther effect" (Phillips, 1974). Centuries after the initial publication of Goethe's novel, the extent to which exposure to suicide affects suicide risk is still a lingering question, whether the exposure be through the media or through personal relationships. Recently, mental health professionals have expressed concern that the television series, *13 Reasons Why*, encourages young viewers to imitate the suicide of the main character (Ferguson, 2018). A study on

exposure to media reports of suicide found that the greatest increase in suicide deaths in the four months following the news reporting of a suicide occurred among people ages 15-25, suggesting that youth are at a heightened risk of engaging in suicidal behavior following media reports of suicide (Romer, Jamieson, & Jamieson, 2006). Additionally, a longitudinal study found an increased incidence of suicide deaths in secondary schools after a student's suicide death, suggesting that adolescents may imitate the suicidal behaviors of their classmates (Poijula, Wahlberg, & Dyrerov, 2001). Thus, evidence suggests that exposure to suicide attempts and suicide deaths through the media and by knowing someone personally may pose a particularly strong risk among high school-aged adolescents. Consequently, studies have focused on the effect of exposure to a suicide attempt or suicide death on risk of suicidal behavior among adolescents.

Although the effect of suicide exposure on adolescents has no universally accepted underlying mechanism, multiple theories have been proposed. Researchers have suggested that exposure to suicide encourages "imitation" of suicidal behavior through social learning, in that adolescents learn the methods to attempt suicide from family-members and friends (De Leo & Heller, 2008). In order to conclude that imitation is the mechanism responsible for an adolescent's suicide attempt following an exposure to a suicide attempt or death, exposure must have occurred prior to the attempt. Another theory is that adolescents who engage in or are vulnerable to suicidal behavior are more likely to form friendships with other suicidal adolescents (Joiner, 2003). Thus, adolescents are prone to making "assortative friendships" but do not necessarily transmit their suicidal behavior. These theories represent two possible pathways through which the suicidal behavior of one individual may influence subsequent suicidal behavior in others, although it is unclear which theory has more empirical support.

While the evidence is mixed, the vast majority of findings suggest an association between exposure to suicide attempts and/or suicide deaths and adolescents' own suicide attempts. Previous studies on exposure to suicidal behavior have focused on whether knowing at least one person who attempted suicide, died by suicide, or both increased adolescents' risk of making a suicide attempt. A longitudinal study of a nationally representative sample of US adolescents (Feigelman & Gorman, 2008) and a Swedish case-control study of adolescents (Mittendorfer-Rutz, Rasmussen, & Wasserman, 2008) found that exposure to a suicide death predicted a future suicide attempt. A longitudinal study of Canadian adolescents found that exposure to a suicide death predicted both future suicide ideation and a suicide attempt (Swanson & Colman, 2013). Similarly, exposure to a suicide attempt has been found to predict future suicide attempts in nationally representative longitudinal studies of US adolescents and young adults (Mittendorfer-Rutz et al., 2008; Nanayakkara, Misch, Chang, & Henry, 2013; Randall, Nickel, & Colman, 2015).

Cross-sectional studies have reported similar findings. One cross-sectional study of a community sample in Hong Kong found that adolescents who knew someone who made a suicide attempt were more likely to report having made a suicide attempt, themselves (Wong, Stewart, Ho, Rao, & Lam, 2005). Still, a cross-sectional school study of American Indians and Alaska Natives that examined exposure to a suicide attempt or a suicide death (without examining them separately) found that any exposure was associated with a suicide attempt among adolescents and young adults (Borowsky, Resnick, Ireland, & Blum, 1999). Additionally, a cross-sectional family study in the United States and a cross-sectional study of New Zealand high school students have also found associations between any exposure and suicide attempt among adolescents (Burke et al., 2010; Chan, Denny, Fleming, Fortune, Peiris-

John, & Dyson, 2017). Thus, many studies have found an association between exposure to a suicide attempt and/or death and suicide attempts among adolescents.

Other longitudinal research has contradicted these findings. A 3-year longitudinal study of friends of adolescent suicide victims and unexposed community controls found no relationship between exposure to a suicide death and the incidence of suicide attempts during the follow-up period (Brent, Moritz, Bridge, Perper, & Canobbio, 1996). A population-based case-control study of patients in the emergency department following a suicide attempt and control individuals found that exposure to suicide attempts and/or deaths was cross-sectionally associated with decreased suicide attempts among adolescents and young adults (Mercy et al., 2001). While a few of these findings have not found an association between exposure to suicidal behavior and suicide attempts in adolescents, the overwhelming majority of these studies have found significant associations, indicating the importance of studying the negative effects of exposure to suicidal attempts and deaths.

In examining the potential impact of family suicidal behavior, some studies have found significant associations between family suicide deaths and/or suicide attempts and adolescent suicide attempts (Brent et al., 2015; Cerel & Roberts, 2005; Mittendorfer-Rutz et al., 2008), whereas others have found associations between friend/acquaintance suicides and/or suicide attempts with adolescent attempts (Cerel, Roberts, & Nilsen, 2005; Feigelman & Gorman, 2008; Randall, Nickel, & Colman, 2015; Swanson, & Colman, 2013). Other research has compared the impact of exposure to familial suicidal behavior, versus that of a friend or acquaintance, on adolescent suicide attempts. One nationally representative cross-sectional study found that exposure to familial suicide attempts, but not peer suicide attempts, was associated with suicide attempts among adolescents (Ali, Dwyer, & Rizzo, 2011). In contrast, a cross-sectional study of

Cambodian high school students found that exposure to suicide deaths of parents, siblings, friends, or partners, but not other relatives, was associated with suicide attempts among adolescents (Jegannathan & Kullgren, 2011). Chan et al.'s cross-sectional study of New Zealand high school students found that adolescent suicide attempts were associated with exposure to the suicide attempt or death of a family-member and also with exposure to the suicide attempt or death of a friend (Chan et al., 2017). While most studies have found a significant association between adolescent suicide attempts and exposure to both family and non-family suicidal behavior, some studies have found different effects between the two types of exposures.

It is unclear whether there are different mechanisms involved in exposure to a family-member's versus a non-family-member's suicide attempt or suicide death. Further research is necessary to determine whether exposure to any suicidal behavior – whether of a family-member or a non-family-member – may have similar impact on risk for adolescent suicide attempts. Some researchers have proposed that adolescents are more likely to be affected by the suicidal behaviors of their peers, rather than that of their family-members, because they identify more strongly with their peers (Abrutyn & Mueller, 2014). However, other studies have suggested that the shared genetic background and/or family environment between family-members could explain the risk for suicide attempt in adolescents exposed to family-member suicide attempts and/or deaths (Cerel & Roberts, 2005). Distinct mechanisms of these exposure types have not yet been confirmed, but continued research may elucidate this question.

Given mixed evidence on the relationship between exposure to suicidal behavior and risk of suicide attempts in adolescence, it may be that other variables moderate the relationship. For instance, having a history of psychiatric disorders predicts future suicide attempts (Harrington, Bredenkamp, Groothues, Rutter, Fudge, & Pickles, 1994; Kessler, Borges, Walters, 1999; Nock,

Hwang, Sampson, & Kessler, 2010), as such having a psychiatric disorder may put an adolescent at greater risk of engaging in suicidal behavior when exposed to a previous suicide attempt or death. Only a handful of studies have investigated whether exposures affect adolescents differently based on their history of psychiatric symptoms, and the results are mixed. A cross-sectional study of a community sample of adolescents in Hong Kong found that adolescents with depressive symptoms were at a significantly greater risk of attempting suicide when exposed to a suicide attempt, but not when exposed to a suicide death (Wong et al., 2005). In contrast, a nationally representative longitudinal study of American adolescents found that depression did not moderate the relationship between exposure to the suicide attempt or death of a family-member or peer and risk of a future attempt among adolescents, suggesting that exposure affects suicide attempt risk similarly, regardless of depressive symptoms (Nanayakkara et al., 2013). Few studies have studied the effect of depressive symptoms on exposure to suicidal behavior, and the effect is still unclear. Additionally, other psychiatric diagnoses have not been considered when studying the effects of exposure to suicide attempts and/or deaths in adolescents. Mood, anxiety, and substance use disorders have all been associated with increased suicide attempts in adolescents (Gould et al., 1998). Thus, the focus of the present study is on how exposure to suicide attempts and/or deaths may affect adolescents differently, depending on the absence or presence of at least one psychiatric diagnosis.

The Present Study

The small number of available studies with temporal data and their inconsistent findings suggest a need for further research examining the circumstances under which exposure to a suicide attempt or suicide death increases risk of adolescent suicide attempts. The current study thus sought to examine whether exposure to a suicide attempt (SA) and/or a suicide death (SD)

of a family-member, friend, or acquaintance would predict a future SA among adolescents and whether this association would differ based on the presence or absence of at least one mood, anxiety, or substance use disorder diagnosis. We hypothesized that exposure to SA and/or SD will be significantly related to SA, and that the relationship between exposure to a SA or SD would be more strongly associated with a suicide attempt among adolescents with a previous psychiatric diagnosis than among those without a psychiatric diagnosis, even after adjusting for other known predictors of suicide attempts.

Methods

Participants and Procedure

Participants were 518 adolescents (60% female) recruited from seven high schools (public, parochial, and vocational) in the New York City metropolitan area from 1991 to 1994 as part of a two-stage screening and who took part in a follow-up assessment 4-6 years later. At baseline, 1,729 adolescents completed the Columbia Suicide Screen (CSS; Shaffer et al., 2004), which assessed for recent suicidal ideation and lifetime/recent suicide attempt. Of these adolescents, 641 adolescents also completed the mood, anxiety, and substance use modules of the Computerized Diagnostic Interview Schedule for Children (C-DISC-2.3). Adolescents were selected to complete the C-DISC-2.3 based whether they screened "positive" for suicide risk on the CSS, such that two-thirds of the sample had endorsed either suicide ideation, and attempt, or emotion-related symptoms, while one-third of the sample (matched by grade, gender, and race/ethnicity) did not (Shaffer et al., 2004). Four to six years later, 518 adolescents (60.2% female) out of the 641 adolescents who completed both the CSS and C-DISC-2.3 at baseline were contacted by telephone to complete a follow-up assessment in which they answered questions about exposure to the suicidal behavior of someone they knew.

The racial/ethnic distribution of the final sample (N = 518) of individuals who completed both baseline and follow-up assessments was as follows: 45% White, 25% Black, 17% Latino/Hispanic, 7% Asian, and 6% "Other."

Measures

Columbia Suicide Screen (CSS; Shaffer et al., 2004*)*

The CSS is a 32-question health self-report survey that identifies adolescents at risk of suicidal behavior. It included two questions that assessed each adolescent for lifetime SA and suicidal ideation in the previous 3 months. The questions were: "Have you ever tried to kill yourself?" and "During the past 3 months, have you thought about killing yourself?" These questions are embedded within a broader survey that also includes inquiries about emotion-related symptoms (e.g., irritability, anxiety, substance use) and other health-related questions not related to suicide. Test-retest reliability of these items has been found to be 0.58 (κ) for lifetime SA and 0.48 (κ) for suicidal ideation in the previous 3 months (Shaffer et al., 2004).

Computerized Diagnostic Interview Schedule for Children (*C-DISC), version 2.3* (Shaffer et al., 1996)

The C-DISC-2.3 assesses psychiatric diagnoses according to DSM-III-R criteria among children and adolescents between the ages of 6 to 17. At baseline, adolescents were assessed for mood, anxiety, and substance use disorder diagnoses in the previous 6 months. Mood disorders assessed were: major depressive disorder and dysthymic disorder; the anxiety disorders assessed were: panic disorder, agoraphobia, social phobia, generalized anxiety disorder, or overanxious disorder; and substance use disorders assessed included alcohol abuse/dependence, marijuana abuse/dependence, or other substance use/dependence. For the current study, a variable was

computed to reflect the presence or absence of at least one diagnosis in the 6 months preceding baseline assessment.

Test-retest reliabilities for the C-DISC-2.3 over 12-13 days have been found to be .40 for Major Depression Disorder/Dysthymia, .39 for Dysthymia, .53 for simple phobia, .44 for social phobia, -.05 for panic disorder, .35 for agoraphobia, .46 for separation anxiety, .35 for avoidant disorder, .44 for overanxious disorder, and .30 for generalized anxiety disorder (Shaffer et al., 1996). Reliabilities are not available for substance use disorders.

Adolescent Suicide Interview (Miranda et al., 2008)

At the 4-6 year follow-up assessment, adolescents completed an interview, by telephone, that inquired about whether adolescents had made a suicide attempt since baseline and included questions about number of lifetime suicide attempts and characteristics such as suicidal intent during each attempt, method used, and isolation during the attempt.

Additionally, the interview asked adolescents if they had ever known anyone who had attempted or completed suicide. Adolescents reported on how many people they knew that attempted and/or died by suicide, the person's gender, and their relationship to the person. Exposures were categorized as either a suicide attempts or a suicide death combined by family-members or non-family-members (friends and acquaintances). Family-members included parents, siblings, aunts, uncles, grandparents, cousins, and any other extended family-members. Non-family-members included anyone who was not a family-member, such as friends, acquaintances, friends of family members, classmates, and neighbors.

Data Analyses

Chi-squared tests assessed for differences at baseline in gender, race/ethnicity, at least one psychiatric diagnosis (in the previous 6 months), suicidal ideation (in the previous 3 months), lifetime SA, exposure to SA, exposure to SD, and any exposure (SA and/or SD) between those who attempted suicide between baseline and follow-up and those who did not. Chi-squared tests also assessed for differences in each type of exposure (family-member SA, family-member SD, non-family-member SA, and non-family-member SD) between those who made a SA since baseline and those who did not.

Odds ratios (ORs) and their 95% confidence intervals (CIs) for all variables were calculated using hierarchical logistic regression. Lifetime exposure to any SA/SD and having psychiatric diagnosis were entered into the first block of the regression, adjusting for gender, race/ethnicity, lifetime suicide attempt history, and recent suicide ideation. The interaction between exposure and psychiatric diagnosis was added into the second block of the regression. Simple effects were examined using logistic regression analyses stratified by psychiatric diagnosis (presence versus absence). Separate hierarchical logistic regressions were also conducted to examine the interaction between psychiatric diagnosis and each type of exposure as predictors of a SA, adjusting for other predictors. For race/ethnicity and gender, the reference groups were white adolescents and male adolescents, respectively.

Results

Baseline Characteristics and Suicide Attempts at Follow up

At baseline, 78 (15%) participants reported a lifetime SA, and 172 (33%) reported suicide ideation in the previous 3 months. One hundred thirty (25%) participants met criteria for a mood, anxiety, or substance-related diagnosis. At the follow-up assessment, 40 (8%) participants had made a SA since baseline. As shown in Table 1, there were significant proportional

differences in suicidal ideation at baseline (65% vs. 31%), lifetime SA at baseline (50% vs. 12%), and at least one psychiatric diagnosis (53% vs. 23%) between adolescents who reported a suicide attempt at follow up and those who did not, respectively. Additionally, there were significant differences in baseline mood (30% vs. 11%), anxiety (38% vs. 17%), and substance use (13% vs. 4%) disorders, respectively, between those who made a SA since baseline and those who did not.

Exposure and Risk of a Suicide Attempt at Follow up

Fifty-eight percent of participants knew someone who had attempted suicide or died by suicide in their lifetime when assessed at follow-up; 42% reported being exposed to a SA and 30% reported being exposed to a SD. Participants reported four different types of exposure: SA of a family-member (7%), SD of a family-member (5%), SA of a non-family-member (37%), and SD of a non-family-member (27%).

In the chi-square analyses, there was no significant difference in exposure to any SA and/or SD (70% vs. 57%) between adolescents who attempted suicide since baseline and those that did not (Table 1). However, there was a significant difference in exposure to family-member SA (6% vs. 1.5%) between those who made a SA since baseline and those who did not (Table 1).

Exposure to a SA and/or SD did not significantly predict a future SA. Results from logistic regression analyses indicated that race/ethnicity (Black vs. White) (OR = 2.79, 95% CI = 1.12 – 6.94), having at least one psychiatric diagnosis (OR = 2.17, 95% CI = 1.03-4.56), reporting suicidal ideation in the previous three months (OR = 2.37, 95% CI = 1.08-5.23), and having a lifetime history of SA (OR = 2.83, 95% CI = 2.24-10.41) at baseline were associated with reporting a future SA, adjusting for gender.

There was a significant interaction between having at least one psychiatric diagnosis at baseline and exposure to a SA and/or SD (Table 2). When examining adolescents who did/did not have at least one psychiatric diagnosis at baseline separately, exposure to a SA and/or SD was associated with a future SA among adolescents with at least one psychiatric diagnosis at baseline (OR = 4.45, 95% CI = 1.05-18.91) but not among those without a psychiatric diagnosis (OR = 0.82, 95% CI = 0.31-2.19) (Table 3). Separate analyses of each exposure type (family SD, family SA, non-family-member SD, non-family-member SA) indicated that only non-family-member SD had a significant interaction with psychiatric diagnosis in predicting a SA (OR = 8.71, 95% CI = 1.36-55.91).

Among adolescents who did not have at least one psychiatric diagnosis at baseline, having a racial/ethnic identity of Black (OR = 11.01, 95% CI = 2.14 – 56.74), Hispanic (OR = 8.69, 95% CI = 1.65 – 45.73), or Other (OR = 9.31, 95% CI = 1.42 – 15.91) significantly predicted SA between baseline and follow-up, compared to white adolescents without at least one psychiatric diagnosis. Race/ethnicity was not a predictor of SA at follow-up among adolescents with at least one psychiatric diagnosis at baseline. History of SA prior to baseline was a significant predictor of future SA among adolescents with a psychiatric diagnosis (OR = 8.85, 95% CI = 2.57 – 30.42) and those without (OR = 4.75, 95% CI = 1.42 – 15.91).

Discussion

The current study found that more than half of adolescents from a two-stage high school screening who were follow-up over 4-6 years had known at least one person who engaged in suicidal behavior (suicide attempt, suicide death, or both), with more adolescents being exposed to suicide attempts than deaths and the majority of adolescents being exposed to the suicide attempts or deaths of non-family-members. The most common type of exposure was to the

suicide attempt of a non-family-member. These findings support an association between exposure and risk of a suicide attempt, but only among adolescents with a psychiatric diagnosis at baseline, and not among adolescents without a baseline diagnosis. These results are somewhat congruent with a previous finding that adolescents with depressive symptoms had an increased risk of attempting suicide when exposed to a suicide attempt, compared to adolescents without symptoms, although that study did not find depressive symptoms to interact with exposure to a suicide death (Wong et al., 2005). However, the present results are inconsistent with a previous finding that exposure to a suicide attempt and death affected the incidence of adolescent suicide attempts similarly, regardless of depression (Nanayakkara et al., 2013).

When examining type of exposure (i.e., family-member suicide attempt, family-member suicide death, non-family-member suicide attempt, and non-family-member suicide death), only exposure to the suicide attempt of a family-member distinguished adolescents who attempted suicide at follow up from those who did not, in that a higher proportion of attempters had been exposed to a family-member's suicide attempt than had non-attempters. However, when adjusting for other variables, the interaction between exposure to a SA/SD and psychiatric diagnosis was accounted for by non-family-member SD. Thus, exposure to non-family-member SD predicted a SA among adolescents with a psychiatric diagnosis. This suggests that the other exposure types may equally affect adolescents, regardless of the presence or absence of at least one psychiatric diagnosis. Previous studies on exposure to familial suicidal behavior suggest that vulnerability to suicidal behavior is a combination of genetic vulnerability and social environmental influences (Brent & Melhem, 2008; Brodsky et al., 2008; Mittendorfer-Rutz et al., 2008). Additional research comparing family-member and non-family-member exposure is needed to answer this question. Future research should focus on gathering details about the

effect of each type of exposure, such as to whether the exposed adolescent was close to the family-member and how much time had passed since the exposure. However, our current data suggest that non-family-member SD exposure may carry more weight in predicting adolescent SA than non-family-member SA, family SD and family SA exposures. At the same time, this may also be due to the fact that exposure to SA/SDs of non-family-members were more common than to those of family-members. Obtaining more data on adolescents exposed to the SA/SDs of family members might provide a more complete understanding of the impact of different exposure types.

Consistent with other studies, we found that lifetime history of a suicide attempt predicted a future suicide attempt (Iorfino et al., 2018; Joiner et al., 2005; Nanayakkara et al., 2013; O'Connor, Smyth, Ferguson, Ryan, & Williams, 2013), as did recent suicidal ideation and having at least one mood, anxiety, or substance use disorder. Unlike prior studies, we assessed for suicidal ideation within the previous three months and for psychiatric diagnosis within the previous six months, rather than the lifetime history (Beghi, Rosenbaum, Cerri, & Cornaggia, 2013; Harrington et al., 1994; Kessler et al., 1999; Nock et al., 2010; Wichstrøm, 2000). Recent suicidal ideation may be a better predictor of a suicide attempt in the short term than lifetime history, since the first year of ideation onset is the period of highest risk for attempting suicide (Nanayakkara, et al., 2013) (though it should be noted that we did not assess when an adolescent's first onset of ideation occurred). While recent suicidal ideation, recent psychiatric diagnosis, and lifetime suicide attempt were all associated with a future suicide attempt in the current study, only lifetime suicide attempt remained significantly associated with a future suicide attempt when adjusting for the interaction between psychiatric diagnosis and exposure, suggesting that suicide attempt history is a better independent predictor of a future attempt than

recent suicidal ideation or psychiatric diagnosis when also accounting for the interaction between exposure and psychiatric diagnosis.

Race/ethnicity (Black vs. White) also significantly predicted a future suicide attempt, both before and after adjusting for the interaction between exposure and diagnosis, and having an identity of "Other" was also significantly associated after adjusting for the interaction. However, when looking at adolescents with and without at least one psychiatric diagnosis separately, having racial/ethnic identities of Black, Hispanic, and Other significantly predicted a future suicide attempt among adolescents without a diagnosis, while race/ethnicity did not predict an attempt among adolescents with a diagnosis. These results suggest that in the absence of psychiatric diagnosis, there are racial disparities in risk of suicide attempts, and these disparities may be related to experiences, such as perceived racial discrimination, that make adolescents with Black, Hispanic, and Other racial/ethnic identities more likely to attempt suicide than White adolescents. Similarly, it was found in 2017 that among high school students, significantly more black students (9.8%) attempted suicide in the past 12 months than white students (6.1%). However, there was no significant difference between the amount of Hispanic students and white students who attempted suicide (Kahn et al., 2018). Drawing conclusions from data on racial and ethnic differences in suicide attempts may be difficult, as the current study did not adjust for socioeconomic status, experiences of racial discrimination, or other related variables that may explain racial and ethnic differences in risk for suicide attempts. Future research should assess for racial discrimination, along with other traumatic life events associated with risk of suicidal behavior among adolescents (Ásgeirsdóttir et al., 2018; Polanco, 2018; Walker, Francis, Brody, Simons, Cutrona, & Gibbons, 2017; Wang, Lin, & Wong, 2018). Black and Hispanic youth are at greater risk of experiencing certain types of traumatic events, such as childhood maltreatment,

and this may also help to explain racial/ethnic differences in suicide attempts (Roberts, Gilman, Breslau, Breslau, & Koenen, 2011; Wildeman, Emanuel, Leventhal, Putnam-Hornstein, Waldfogel, & Lee, 2014).

In contrast to previous studies that found higher female suicide attempt rates among adolescents and young adults (Lewinsohn, Rohde, Seeley, & Baldwin, 2001; Zhang, Mckeown, Hussey, Thompson, & Woods, 2005), gender did not significantly predict future suicide attempts in the current study. One possible reason might be that the present sample included more high-risk adolescents than the general population, as about two-thirds of adolescents selected for follow-up had screened positive for suicide risk at baseline. A sample that is more representative of the general adolescent population might show gender differences similar to prior studies.

The data support a theoretical framework in which adolescents with a preexisting psychiatric vulnerability will be more affected by exposure to a suicide attempt or death than those without psychiatric diagnoses, in terms of risk for engaging in suicidal behavior. One possibility is that adolescents with a psychiatric diagnosis may already be more vulnerable to thinking about suicide or may already have previously thought about suicide, and exposure may increase their acquired capability to transition from suicidal ideation to an attempt (Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner, 2010). The Interpersonal Theory of Suicide suggests that people acquire the capability to attempt suicide as they become less fearful of death and increase their tolerance of physical pain, and that habituation to suicide results in a lessened fear of death (Van Order et al., 2010). Being exposed to the suicidal behavior of others may habituate adolescents to suicide, increasing their risk of making an attempt. Exposed adolescents may view a suicide attempt to be a more socially acceptable option of coping with stress. Another possibility is that knowing someone who has attempted or died by suicide provides

exposure to a potential method of attempt. The current study did not examine methods used among people known by the adolescents, but similarity in methods of adolescents' own attempts should be taken into consideration in future research. A third possibility is that exposed adolescents develop an attentional bias toward suicide-related stimuli following exposure, in which they have a heightened awareness and are more likely to be focused on information relating to suicide when they are distressed. This attentional bias could put them at risk for future suicide attempt, as has been demonstrated among suicidal individuals (Cha, Najmi, Park, Finn, & Nock, 2010). Future studies might incorporate behavioral paradigms in addition to self-report measures to assess differences in attentional bias before and after exposure to a suicide attempt or death. Differences should also be examined among adolescents who were thinking about suicide before an exposure, versus those who had no previous suicidal ideation before exposure to suicidal behavior. A fourth explanation is that suicidal adolescents form "assortative friendships." Adolescents and young adults with similar suicidal behaviors may flock together, bonding over their shared life stressors and maladaptive behaviors (Joiner, 2003). Thus, one adolescent does not learn the suicidal behavior from the other, but rather they form a friendship based on their existing vulnerability to suicidal behavior. Future research should include information on dates of exposure to determine whether adolescents are influenced by the suicidal behavior of their peers.

Limitations

Limitations of this study include not knowing when each exposure to a SA/SD occurred in relation to when adolescents made a suicide attempt at follow up. Since we assessed for lifetime exposure to suicide attempt and death only during the follow-up assessment, it is possible that the exposure occurred after the attempt that was made during the follow-up period,

since exposure was only assessed at follow-up. Given that the majority of adolescents did not report the date when the exposure occurred, it is also possible that suicide attempts or deaths occurred before the adolescents were born, making it unclear whether those exposures would affect adolescents in the same way as exposures that occurred more recently.

It should be noted that the confidence intervals for adolescent suicide attempt prediction were large, due to the small number of people in the sample who attempted suicide between baseline and follow-up. A larger sample size would provide more robust estimates of these effects. Finally, future research should use prospective designs to minimize recall bias.

We did not obtain data on exposure to other stressful or traumatic life events, such as non-suicide-related deaths of a close relative or friend, nor did we assess for posttraumatic stress symptoms, which have been shown to be associated with suicide attempts and deaths (Gradus, Qin, Lincoln, Miller, Lawler, Sørensen, & Lash, 2010; Wilcox, Storr, & Breslau, 2009), although this could be attributed to the high comorbidity between posttraumatic stress symptoms and depression (Oquendo et al., 2005). Nevertheless, these should be considered in future research.

Conclusion

Our findings suggest that adolescents are at greater risk of attempting suicide when they know someone who has attempted or died by suicide, but only if they have a history of a psychiatric diagnosis. Adolescents with psychiatric diagnoses should thus be assessed for whether they know someone who has died by suicide to inform their own risk of making a suicide attempt. Future research would benefit from the use of prospective study designs and from including information about timing of exposure, relative to the timing of the adolescent's suicide attempt, to shed light on the underlying mechanisms of the relationship between exposure and risk, and to inform interventions with vulnerable adolescents.

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Table 1. Sample Characteristics

	Total sample *N* = 518	**No SA at follow-up *N* = 478**	**SA at follow-up *N* = 40**	**SA vs. No SA at follow-up**	
	***N* (%)**	***N* (%)**	***N* (%)**	***X²***	***p***
Race/Ethnicity					
White	231 (44.6)	219 (45.8)	12 (30)	4.31	0.37
Black	130 (25.1)	118 (24.7)	12 (30)		
Hispanic	89 (17.2)	79 (16.5)	10 (25)		
Asian	39 (7.5)	36 (7.5)	3 (7.5)		
Other	29 (5.6)	26 (5.4)	3 (7.5)		
Sex					
Female	312 (60.2)	283 (59.2)	29 (72.5)	2.72	.10
Male	206 (39.8)	195 (40.8)	11 (27.5)		
At least one psychiatric diagnosis at baseline	130 (25.1)	109 (22.8)	21 (52.5)	**17.32**	**<.01**
Mood	66 (12.7)	54 (11.3)	12 (30.0)	**11.61**	**<.01**
Anxiety	95 (18.3)	80 (16.7)	15 (37.5)	**10.63**	**<.01**
Substance Use	26 (5.0)	21 (4.4)	5 (12.5)	**5.09**	**.02**
SI at baseline (past 3 months)	172 (33.2)	146 (30.5)	26 (65.0)	**19.76**	**<.01**
SA at baseline (lifetime)	78 (15.1)	58 (12.1)	20 (50.0)	**41.38**	**<.01**
Exposure to SA	219 (42.3)	199 (41.6)	20 (50.0)	1.06	.30
Exposure to SD	155 (29.9)	141 (29.5)	14 (35.0)	0.53	.47
Exposure to any SA and/or SD	299 (57.7)	271 (56.7)	28 (70.0)	2.68	.10
Type of exposure					
Family SA	35 (6.8)	29 (6.1)	6 (15.0)	**4.68**	**.03**
Family SD	25 (4.8)	21 (4.4)	4 (10.0)	2.53	.11
Non-family SA	193 (37.3)	177 (37.0)	16 (40.0)	0.14	.71
Non-family SD	142 (27.4)	131 (27.4)	11 (27.5)	0.00	.99

Table 2. Logistic Regression Predicting Suicide Attempt at Follow-up

	Suicide Attempt at Follow-up			
	Before Adjusting for Interaction		After Adjusting for Interaction	
	OR	**95% CI**	**OR**	**95% CI**
Exposure to SA/SD	1.51	0.71 – 3.22	0.77	0.29 – 2.03
Race/Ethnicity				
Black	**2.79**	**1.12 - 6.94**	**2.98**	**1.18 – 7.55**
Hispanic	2.15	0.83 – 5.60	2.15	0.81 – 5.69
Asian	1.13	0.28 – 4.68	1.19	0.28 – 5.00
Other	3.96	0.95 – 16.40	**4.18**	**1.00 – 17.40**
Sex	1.05	0.48 – 2.32	1.04	0.47 – 2.31
At least one psychiatric diagnosis at baseline	**2.17**	**1.03 – 4.56**	0.63	0.14 – 2.73
SI at baseline	**2.37**	**1.08 – 5.23**	2.18	0.97 – 4.90
SA at baseline	**2.83**	**2.24 – 10.41**	**5.79**	**2.59 – 12.92**
Interaction Exposure by psychiatric diagnosis	--	--	**5.83**	**1.05 – 32.20**

Table 3. Logistic Regressions Predicting Suicide Attempt at Follow-up Separately by Presence/Absence of at Least One Psychiatric Diagnosis at Baseline

	OR	95% CI
No Psychiatric Diagnosis		
Exposure to SA/SD	0.82	0.31 – 2.19
Race/Ethnicity		
Black	**11.01**	**2.14 – 56.74**
Hispanic	**8.69**	**1.65 – 45.73**
Asian	3.36	0.28 – 39.78
Other	**9.31**	**1.18 – 73.15**
Sex (Male)	0.99	0.37 – 2.64
SI at baseline	1.92	0.63 – 5.84
SA at baseline	**4.75**	**1.42 – 15.91**
At Least One Psychiatric Diagnosis		
Exposure to SA/SD	**4.45**	**1.05 – 18.91**
Race/Ethnicity		
Black	0.94	0.22 – 4.11
Hispanic	0.58	0.12 – 2.70
Asian	0.52	0.07 – 3.64
Other	5.63	0.36 – 87.46
Sex (Male)	1.41	0.31 – 6.44
SI at baseline	3.05	0.74 – 12.56
SA at baseline	**8.85**	**2.57 – 30.42**