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How Do Cognitive Distortions and Substance Related Problems Affect the Relationship Between Child Maltreatment and Adolescent Suicidal Ideation?

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Abstract

Objective—The present study, informed by the cognitive-behavioral theory of suicide, is among the first studies to examine cognitive distortions and substance related problems as potential mediators and moderators of the relation between child maltreatment (CM) and suicidal ideation (SI) in adolescent psychiatric inpatients.

Method—The sample included 185 adolescents (71.4% female; 84% White) admitted to a psychiatric inpatient unit. Participants completed self-report measures assessing cognitive errors, negative cognitive triad, substance related problems, and SI. Participants and their parents completed a semi-structured diagnostic interview assessing CM history.

Results—In this clinical sample, we found that child maltreatment was associated with suicidal ideation only for youth with current substance abuse problems, indicating moderation. Contrary to predictions, substance related problems did not mediate the association between child maltreatment and adolescent SI. Further, cognitive errors and negative cognitive triad did not mediate or moderate the association between CM and SI. However, there were significant unique effects for both cognitive errors and negative cognitive triad on SI, suggesting that adolescents with more severe cognitive distortions report greater SI, regardless of CM history.

Conclusions—Clinically, results suggest that practitioners should carefully screen for and address any substance misuse among victims of maltreatment to prevent clinically significant SI. Study results also suggest that interventions that incorporate cognitive restructuring may help decrease risk for severe SI in adolescent clinical samples in general.

Keywords

Child abuse; Suicide; Cognitive Errors; Negative Cognitive Triad; Substance Use

Introduction

Approximately 13–20% of children will experience some form of child maltreatment (Brezo et al., 2008) including childhood sexual abuse, physical abuse, emotional abuse, and/or neglect. Youth seen in psychiatric settings report even higher rates of maltreatment relative to community based samples (Boxer & Terranova, 2008; Fehon, Grilo, & Lipschitz, 2001). Child maltreatment has been associated with numerous negative psychological sequelae, including adolescent suicidal ideation (SI) (King & Merchant, 2008; Toth, Cicchetti, & Kim, 2002).

In a recent literature review, it was concluded that child maltreatment, particularly physical and sexual abuse, is related to and/or predicts SI across adolescent community, clinical, and high-risk samples (Miller, Esposito, Weismore, & Renshaw, 2012). Given that SI is one of the strongest predictors of future suicidal behavior (King, Kerr, Passarelli, Foster, & Merchant, 2010), research that examines factors that help explain the association between child maltreatment and SI is of significant importance. The purpose of the present study is to examine potential mediators and moderators of this relationship in an adolescent psychiatric inpatient sample.

The cognitive-behavioral theory of adolescent suicide (Spirito, Esposito-Smythers, Weismore, & Miller, 2012) may offer insight into factors that help explain the association between child maltreatment and SI. According to this theory, adolescents who attempt suicide have predisposing vulnerabilities, such as a history of child maltreatment, that make it more likely that they will experience maladaptive cognitive, behavioral, and emotional responses to acute stressors. When these adolescents are exposed to an acute stressor (e.g., worsening of psychiatric symptoms resulting in psychiatric hospitalization; interpersonal stressor), they may process this stressor in a distorted manner, and have difficulty generating and/or implementing adaptive solutions to their problem, which ultimately increases distress. Under such conditions, they may engage in maladaptive behaviors, such as substance use, as a means to reduce distress. When the stressor persists or worsens as a result of their maladaptive behaviors, the adolescent may experience even greater cognitive distortion and affective arousal, which in turn increases risk for SI. If this cycle is not interrupted and other risk factors for suicide are in place (e.g., access to method, no supportive relationships), the adolescent may act on these suicidal thoughts as a means of escape from a perceived intolerable internal state and hopeless life situation.

According to this theory, victims of child maltreatment (i.e., a type of predisposing vulnerability) who report cognitive distortions and maladaptive behaviors, such as substance abuse, may be at heightened risk for SI. Specifically, it is possible that the experience of child maltreatment negatively influences general thought patterns and substance related coping behavior throughout adolescence, which in turn, increases risk for SI. Such a process is consistent with mediation and has not been examined to date. However, extant research has established bivariate links between child maltreatment and both cognitive distortions (Ponce, Williams, & Allen, 2004; Silverman, Reinherz, & Giaconia, 1996) and substance use (Ballon, Courbasson, & Smith, 2001; Nelson et al., 2006). Moreover, many studies have found an association between cognitive distortions and adolescent SI. For example, in a

sample of 42 suicidal and 14 nonsuicidal adolescent inpatients, suicidal adolescents reported greater cognitive errors (catastrophizing, selective abstraction, personalization, and overgeneralization) than their nonsuicidal peers (Brent, Kolko, Allan, & Brown, 1990). Stewart and colleagues (2005) assessed 2,044 Chinese and American adolescents and found that hopelessness (negative view of the future) was prospectively (6-months) associated with SI, even after controlling for depression. Other studies have also found a positive relation between hopelessness and adolescent SI (e.g., Dori & Overholser, 1999; Wagner, Rouleau, & Joiner, 2000).

Similar to cognitive distortion, a positive association between substance related behavior and adolescent SI has also been found (see Esposito-Smythers & Spirito, 2004; Goldston, 2004 for reviews). Using data collected from 13,917 high school students who completed the Youth Risk Behavior Survey, Swahn and Bossarte (2007) found that pre-teen substance use was associated with a history of SI (adjusted for grade, gender, race/ethnicity, fighting, weapon carrying, dating violence, sexual assault, and sadness). Similarly, in a sample of 1,458 children and adolescents (ages 9–17), Wu et al. (2004) found that the odds of SI increased as a function of greater substance use, but not after controlling for depression. In a nationally representative sample of 2,090 Canadian adolescents (ages 12 & 13), Afifi, Cox, and Katz (2007) found that substance use (alcohol and other substances) was associated with SI for males and females. However, after adjusting for each substance and delinquent behaviors, only cigarette use remained significant in the model, and this was only among males. Therefore, though research suggests that substance use behavior is associated with adolescent SI, there is some evidence that other factors (i.e., gender, depression) may help explain this relationship.

Though it is possible that cognitive distortions and substance related problems mediate the association between child maltreatment and adolescent SI, it is equally plausible that they serve as moderators of this relationship. The direct influence of earlier child maltreatment on general thought patterns and coping behaviors may decrease throughout adolescence, particularly when more recent significant stressors and/or mental health problems (e.g., depression) are experienced which exert a more proximal and/or stronger influence on adolescents' thoughts and behavior. Under such conditions, though current cognitive distortions and maladaptive coping behaviors may not result solely or directly from distal child maltreatment per se, it is likely that the association between child maltreatment and SI would be stronger among youth who report greater (versus lower) levels of cognitive distortion and maladaptive behavior. Such a relationship would be consistent with moderation and may be more likely in adolescent samples with clinically significant mental health problems. To our knowledge, only one study has examined whether any cognitive or behavioral factors heighten risk for SI among maltreated youth. In a sample of adolescents detained at a juvenile correction facility, Esposito and Clum (2002) found that greater severity of childhood physical abuse was associated with greater SI, but only among adolescents who expressed low versus high confidence in their problem-solving abilities. In this same study, greater severity of childhood sexual abuse was associated with more severe SI among adolescents who reported lower versus higher *perceived* satisfaction with their social support network.

Drawing from prior research and theory, the purpose of the present study was to examine whether cognitive distortions, including cognitive errors and the negative cognitive triad (i.e., negative views of self, world, and future), and substance related problems serve as mediators or moderators of the association between child maltreatment and SI. Participants included psychiatrically hospitalized adolescents, a sample in clinically significant distress known to have high rates of both child maltreatment and SI.

Hypothesis 1: Consistent with mediation, we hypothesized that a history of child maltreatment would be significantly related to higher levels of current cognitive distortion, which in turn, would be associated with higher levels of SI.

Hypothesis 2: Consistent with mediation, we hypothesized that a history of child maltreatment would be significantly related to greater severity of current substance related problems, which in turn, would be associated with higher levels of SI.

Hypothesis 3: Consistent with moderation, we hypothesized that the association between child maltreatment and adolescent SI would be stronger among youth who reported higher (versus lower) levels of current cognitive distortion.

Hypothesis 4: Consistent with moderation, we hypothesized that the association between child maltreatment and adolescent SI would be stronger among those who reported greater (versus fewer) current substance related problems. These cross-sectional associations were hypothesized to remain significant after accounting for potential confounding variables, including mood disorder, gender, race, and other traumas, all of which have been associated with adolescent SI (Goldston et al., 2009; Valois, Zullig, Huebner, & Drane, 2004)

Method

Participants

Two hundred sixty-three adolescents (range = 13–18 years, mean age = 15.04, SD = 1.32), who were consecutively hospitalized on an acute adolescent psychiatric inpatient unit, and their parents, were approached for study recruitment on a voluntary basis. Recruitment occurred over the course of three years and was conducted as part of a larger study that examined the relation between psychopathology, cognition, and adolescent suicidality. Of the 263 families approached, 201 families (76%) agreed to participate and provided both adolescent assent and parental consent. Sixteen adolescents failed to complete the full assessment battery, and thus, the final sample consisted of 185 participants. Adolescents were recruited from a child psychiatric hospital that accepted youth who were uninsured, privately insured, or on Medicaid. Inclusion criteria for the current sample included: 1) fluency in English; 2) parental consent and adolescent assent; and 3) a Verbal IQ estimate at or above 70 via the Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1990). Exclusion criteria included youth: 1) in full DCYF legal guardianship as documented in the hospital admission records; and 2) actively psychotic.

Participants were 71.4% female, and identified themselves as white (84%), black (2.7%), Asian (2.2%), Native American (3.2%), or from other (7.6%) racial backgrounds. Approximately 9.2% of the sample identified themselves as Hispanic/Latino. The sample

demographics matched those of the hospital population from which they were recruited. Family income varied from <\$10,000 to >\$100,000 per year with a mean income range of \$50–60,000.

Procedure

A trained research assistant approached eligible adolescents and their parents/guardians for recruitment during family visits on the adolescent inpatient unit or during family meetings. After obtaining parent/guardian consent and adolescent assent, parents/guardians and their adolescent were separately administered the assessment battery by a bachelor level research assistant and the diagnostic clinical interview by master/doctoral level clinicians. The parent and adolescent assessments/interviews were completed in one (parents) or two (adolescents) 1–2 hour sessions. Parents were given \$50 and adolescents were given four movie tickets for participation.

With parental permission, a feedback form summarizing responses on study clinical assessments (excluding substance related information which is accurate and reliable if disclosed under conditions of confidentiality; Needle, McCubbin, Lorence, & Hochhauser, 1983) was placed in the adolescent's inpatient file to aid in treatment and discharge planning. Affiliated University and Hospital Institutional Review Boards approved this study.

Measures

Mood Disorders, Child Maltreatment, Other Traumas

Mood disorders, child maltreatment, and other types of trauma were assessed using the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1997). The K-SADS-PL is a widely used semi-structured diagnostic interview that provides a reliable and valid measurement of DSM-IV diagnoses in children and adolescents. The mood disorders section and items from the trauma screen in the Post-Traumatic Stress Disorder (PTSD) module were examined in this study.

As part of the PTSD screen, each participant was asked screener questions regarding whether or not s/he had ever been the victim of sexual or physical abuse. Physical abuse was defined as sustaining bruises on more than one occasion or one or more serious injuries perpetrated by a caretaker. Given the conservative criteria for physical abuse employed in this study (i.e., must report bruises or serious injury) relative to other studies (e.g., Kinard, 2004), this may be considered severe physical abuse. The adolescent was asked "When your parents (other caretaker) got mad at you, did they ever hit you? Have you ever been hit so hard that you had bruises or marks on your body, or were hurt in some way?" Sexual abuse was defined as isolated or repeated incidents of genital fondling, oral sex, or vaginal or anal penetration, perpetrated by a caretaker. The adolescent was asked "Did anyone ever touch you in a way that made you feel bad? Has anyone who shouldn't have ever made you undress or make you touch him/her in a way that made you feel uncomfortable?" If either sexual or physical abuse were endorsed, follow up questions probed for details of the abuse experience (e.g., duration, identity of perpetrator). Parents were asked the same questions

with regard to knowledge about their child's experiences. Other traumas (neglect, witness to domestic violence, serious illness/death of loved one, serious accidents) were assessed in a similar manner. Responses were coded as present (1) or absent (0).

All interviewers underwent extensive training in the K-SADS-PL including didactic training, rating audiotapes, administering in-person interviews while being observed, and audiotaping full interviews for reliability reviews. All interviews were audiotaped, and 10% were randomly selected and rated for reliability. Kappa coefficients reflected strong agreement for major depressive and depressive disorder NOS ($\kappa = .89-.1.0$) and fair agreement for dysthymia and bipolar disorder ($\kappa = .48-.65$). All cases were also reviewed during weekly clinical consensus team meetings that included doctoral level child psychologists. During these meetings, all symptoms and assessment data were reviewed. When discrepancies arose between adolescent and parent report, the clinical team reviewed all available study data (including data obtained from the inpatient chart) and came to a consensus. This best estimate clinical consensus procedure is commonly used and yields good to excellent reliability (Cantwell, Lewinsohn, Rohde, & Seeley, 1997; Klein, Ouimette, Kelly, & Ferro, 1994).

Adolescent Drinking Index (ADI)—The ADI (Harrell & Wirtz, 1989) is a 24-item self-report questionnaire that assesses frequency of alcohol use and problem drinking behaviors (e.g., “how many days did you drink before school?” “how often did you get into trouble with the law?”) in the last year. Higher scores indicate greater severity of problem drinking. The ADI yields strong psychometric properties with adolescents (Harrell & Wirtz, 1989). The ADI total score yielded high internal consistency in the present study ($\alpha = .95$).

Substance Abuse Subtle Screening Inventory Adolescent Version 2 (SASSI A-2)—The face valid other drug use scale (FVOD) from the SASSI A-2 (Miller & Lazowski, 2001) was used to assess frequency of drug use and related problems (i.e., “gotten into trouble in school, at home, on the job, or with the police”). Higher scores indicate greater severity of drug related problems in the last 6-months. The SASSI A-2 yields strong psychometric properties with adolescents (Miller & Lazowski, 2001). Internal consistency for the FVOD scale was high ($\alpha = .95$).

Cognitive Triad Inventory for Children (CTI-C)—The CTI-C (Kaslow, Stark, Printz, Livingston, & Ling Tsai, 1992) is a 36-item self-report measure that assesses current perceptions of oneself (i.e., “I am a failure.”), the world (i.e., “People like me.”), and the future (i.e., “My future is too bad to think about.”) among children and adolescents. It yields strong reliability and concurrent and discriminant validity (Kaslow et al, 1992). Higher scores reflect more positive views. Internal consistency in the present study was excellent ($\alpha = .96$).

Children's Negative Cognitive Errors Questionnaire (CNCEQ)—The CNCEQ (Leitenberg, Yost, & Carroll-Wilson, 1986) is a 24-item self-report measure that assesses four types of current cognitive distortion: overgeneralization, selective abstraction, personalizing, and catastrophizing. Participants read a hypothetical situation (e.g., your team loses a spelling contest) followed by a negative interpretation (e.g., “If I were smarter we

would not have lost”), and are asked to indicate the degree to which the interpretation mirrors their thinking. Higher scores reflect greater cognitive errors. Good internal consistency has been reported for adolescents (Weems, Berman, Silverman, & Saavedra, 2001). In the present study, internal consistency was high ($\alpha = .95$).

Suicide Ideation Questionnaire (SIQ)—The SIQ (Reynolds, 1988), senior version, is a 30 item self-report measure that assesses the degree to which high school aged adolescents report thoughts about suicide (e.g., “I thought about killing myself”, “I wished I were dead”) within the last month. Higher scores represent more severe SI. Internal consistency in a sample of 2,400 adolescents ($\alpha = .97$; Reynolds, 1988) and the current sample ($\alpha = .98$) was excellent.

Data analytic strategy

Due to the relatively small cell sizes for physical and sexual abuse, these variables were combined into a composite measure of child maltreatment in an effort to increase power for analyses. This decision was deemed acceptable as sexual violence rarely occurs in the absence of physical victimization (Tjaden & Thoennes, 2000). Physical abuse and sexual abuse are also commonly collapsed in the child maltreatment literature (e.g., DuMont, Widom, & Czaja, 2007).

All analyses used the SPSS statistical package. Preliminary bivariate analyses were conducted with study variables to examine distributional assumptions. All variables were normally distributed with skewness and kurtosis values equal to or less than 1.5. Mediation analyses employed macros recommended by Hayes and Preacher (2012) and bootstrapping of indirect effects with 1,000 resamples consistent with recommendations by MacKinnon (2008). This approach examines mediation by evaluating the significance of both direct and indirect effects through multiple regression analyses. Direct effects represent the association of the predictor variable with the outcome variable while accounting for the proposed mediating variable (c' path; Baron & Kenny, 1986). Indirect effects include the association of the predictor variable with the outcome variable *via* the proposed mediator ($a*b$ path; Baron & Kenny, 1986). The Hayes and Preacher (2012) approach provides a biased corrected significance test of the indirect ($a*b$) path through bootstrapping. A 95% confidence interval is provided for each indirect effect, which allows examination of whether the confidence interval contains 0. If the interval does not contain 0, the indirect effect is significant at the .05 level. Even in cases of non-significant paths ($a \rightarrow b$; $b \rightarrow c$) overall mediation can still be present (MacKinnon, 2008).

To test moderation, we conducted a series of hierarchical multiple regression analyses to test study hypotheses. In each regression, covariates were entered on the first step, childhood abuse and a moderator on the second step, and the interaction between childhood abuse and a moderator on the final step. Following recommendations by Cohen, Cohen, West, and Aiken (2003) predictors were centered around their means prior to forming the interaction term. As a sample size of >300 is generally recommended for detecting significant interactions with small effect sizes (Aiken, West, & Reno, 1991), we ran regressions

separately for each potential moderator to preserve power and probed significant interactions with simple slope analyses.

Results

Descriptive Statistics

Means and standard deviations of study variables were within the expected ranges for a clinical population (Table 1). Approximately 57% of adolescents reported clinically significant SI (SIQ score > 41). Approximately 40 (19.9%) adolescents reported a history of physical abuse, 36 (17.9%) sexual abuse, 62 (35.7%) physical *or* sexual abuse, and 123 (66.5%) reported neither form of abuse. Fourteen adolescents reported *both* physical and sexual abuse. For age of onset and duration for physical and sexual abuse see Table 1. All perpetrators of the abuse were in a caretaker position at the time of the abuse. Perpetrators of physical abuse included fathers ($n = 22$), mothers ($n = 5$), uncles ($n = 1$), brothers ($n = 1$), grandfathers ($n = 1$), and step-relatives ($n = 3$). Perpetrators of sexual abuse included fathers ($n = 7$), mothers ($n = 1$), uncles ($n = 6$), older brothers ($n = 3$), grandfathers ($n = 1$), cousins ($n = 3$), and step-relatives ($n = 2$).

Preliminary Bivariate Analyses

Pearson's bivariate correlation coefficients (r) were computed to examine the bivariate relationship between SI, demographic variables, mood disorders, other traumas, child maltreatment, and potential moderators/mediators (see Table 2). Adolescents who were female (versus male), depressed (versus non-depressed), and non-white (versus white) reported significantly more SI. Other traumas were not correlated with SI and thus were not controlled for in multivariate analyses to preserve degrees of freedom. Child maltreatment was not significantly correlated with SI. Greater alcohol and drug related problems as well as cognitive distortion (cognitive errors and negative views of self, world and future) were associated with greater SI.

Regression Analyses Testing Potential Mediators

Cognitive errors (Hypothesis 1)—In the model examining cognitive distortions as a potential mediator, there was a significant, positive relationship between cognitive errors and SI ($b = 1.16, p < .001$). There was no direct relationship between child maltreatment and SI ($b = 5.74, p = .38$) or cognitive errors ($b = -1.85, p = .58$). Bootstrapping results indicated no significant indirect effect of child maltreatment on SI (via cognitive errors), $a*b = -2.14$, 95% CI $[-9.68, 5.73]$.

Negative cognitive triad (Hypothesis 1)—In the model examining negative cognitive triad as a potential mediator, there was a significant, negative relationship between negative cognitive triad and SI ($b = -1.95, p < .001$). There was no direct relationship between child maltreatment and SI ($b = 3.66, p = .53$) or negative cognitive triad ($b = -.07, p = .98$). Bootstrapping results indicated no significant indirect effect of child maltreatment on SI (via cognitive triad), $a*b = .14$, 95% CI $[-9.86, 10.04]$.

Alcohol related problems (Hypothesis 2)—In the model examining alcohol related problems as a mediator, there was a significant, positive relationship between alcohol related problems and SI ($b = .76, p < .01$). There was no significant relationship between child maltreatment directly to SI ($b = 2.32, p = .76$) or alcohol related problems ($b = 1.92, p = .34$). Bootstrapping results indicated no significant indirect effect of child maltreatment on SI (via alcohol related problems), $a*b = 1.45$, 95% CI $[-1.30, 5.8]$.

Drug related problems (Hypothesis 2)—In the model examining drug related problems as a mediator, there was a significant, positive relationship between drug related problems and SI ($b = 1.10, p < .001$). There was no significant relationship between child maltreatment directly to SI ($b = 4.34, p = .56$) or drug related problems ($b = -.67, p = .70$). Bootstrapping results indicated no significant indirect effect of child maltreatment on SI (via other drug problems), $a*b = -.74$, 95% CI $[-4.22, 4.41]$.

Linear Regression Analyses Testing Potential Moderators

Cognitive errors (Hypothesis 3)—The first linear regression analysis examined the relationship between cognitive errors, child maltreatment, and SI (see Table 3). There was a unique effect of cognitive errors on SI. Specifically, more cognitive errors were associated with significantly higher levels of SI. There was no unique effect of child maltreatment on SI or interaction between child maltreatment and cognitive errors.

Cognitive triad (Hypothesis 3)—The second linear regression analysis examined the relationship between the cognitive triad, child maltreatment, and SI (see Table 3). There was a unique effect of the cognitive triad on SI. Specifically, more negative views of oneself, the world, and the future were associated with significantly higher levels of SI. There was no unique effect of child maltreatment on SI or an interaction between child maltreatment and the cognitive triad.

Alcohol related problems (Hypothesis 4)—The third linear regression analysis examined the relationship between alcohol related problems, child maltreatment, and SI (see Table 3). There was a unique effect of alcohol related problems on SI. Specifically, greater alcohol related problems were associated with more severe SI. There was no unique effect of child maltreatment on SI. There was a significant interaction between child maltreatment and alcohol related problems on SI. A simple slopes analysis of the interaction revealed that there was a trend for a history of child maltreatment to be associated with greater SI among youth who reported higher but not lower levels of alcohol related problems. Specifically, under higher levels of alcohol related problems, the association between child maltreatment and SI was positively related and trended towards significance (slope = 17.3, $t = 1.7, p = .09$). Conversely under low levels of alcohol related problems, the association between child maltreatment and SI was not significant (slope = -13.41, $t = -1.3, p = .20$). Adolescents without a history of child maltreatment did not report significantly different levels of SI based on their alcohol related problem status.

Drug related problems (Hypothesis 4)—The fourth linear regression analysis examined the relationship between drug use, child maltreatment, and SI (see Table 3). There

was an effect of drug related problems on SI. Specifically, greater drug related problems were significantly associated with greater SI. There was no unique effect of child maltreatment on SI. There was a significant interaction between child maltreatment and drug related problems on SI. A simple slopes analysis of the interaction revealed a history of child maltreatment was associated with greater severity of SI among youth who reported higher but not lower levels of drug related problems. Specifically, under high levels of drug related problems, the association between child maltreatment and SI was significantly positive (slope = 23.06, $t = 2.2$, $p < .05$). Conversely, under lower levels of drug related problems, the association between child maltreatment and SI was not significant (slope = -12.63, $t = -1.26$, $p = .21$). Youth without a history of child maltreatment did not report significantly different levels of SI based on drug related problem status (see Figure 1).

Discussion

Drawing from the cognitive-behavioral theory of adolescent suicidal behavior (Spirito et al., 2012), the present study explored cognitive distortions and substance related problems as both mediators and moderators of the association between a history of child maltreatment and adolescent SI. No evidence was found for mediation. However, substance related problems were found to moderate this relationship. More generally, study results suggest that proximal factors, including current cognitive distortions and substance related problems, are more closely tied to current suicidal ideation than distal factors, such as child maltreatment.

Moderational models

Consistent with study hypotheses (*Hypothesis 4*), adolescents with a history of child maltreatment who reported greater (versus lower) levels of substance related problems, particularly illicit drug use, endorsed higher SI. Moreover, this relationship was found after controlling for potential confounding variables, including gender, race, and mood disorders. This finding is noteworthy given that most studies in this area do not control for extraneous variables (King & Merchant, 2008), and because it adds uniquely to prior work (Esposito & Clum, 2002) that has examined moderators of the relation between child maltreatment and adolescent SI. Thus, study results suggest that current substance related problems play an important role in suicide risk among adolescent victims of child maltreatment, regardless of the origin of these problems. Substance use may generate further stress as regular developmental tasks and pathways are disrupted (e.g., school dropouts, suspensions), which in turn, may increase risk of SI (Conner & Goldston, 2007). According to the cognitive behavioral theory of suicide and prior research, this may be most likely to occur when adolescents cannot think of adaptive ways to manage substance related stressors or solve associated problems, and thus view suicide as a viable option for escape (Speckens & Hawton, 2005; Spirito et al., 2012).

In contrast to study hypotheses (*Hypothesis 3*), level of cognitive distortion, including cognitive errors and negative views of self, world, and future (cognitive triad) was not found to moderate the association between child maltreatment and SI. Notably, in the present study, only the severity of general cognitive distortion was assessed. As the degree of

cognition distortion related to the abuse experience itself (e.g., “it was my fault”, “those who love me will hurt me”) has been shown to predict negative outcomes (Cohen et al., 2003; Ponce et al., 2004), it possible that abuse specific distortions may yield stronger associations with SI than more general cognitive distortion among victims of maltreatment.

Alternatively, this finding may reflect that the study may have been underpowered to detect interactions with small effect sizes. Thus, this is an important area for future research.

Though cognitive distortions did not serve as moderators in the models examined, higher levels of cognitive errors and the cognitive triad were associated with greater severity of SI in this psychiatrically hospitalized adolescent sample as a whole, even after controlling for demographic differences and mood disorders. These findings add uniquely to prior research that found a positive association between cognitive distortions and adolescent SI.

Specifically, prior studies in this area have employed an adolescent community sample (Stewart et al., 2005) or a psychiatric inpatient sample, but examined a composite measure of suicidal behavior (Brent et al., 1990) or one facet of the cognitive triad (hopelessness; Dori & Overholser, 1999; Stewart et al., 2005; Wagner et al., 2000). As type of distortion, suicide outcome, and study sample can affect findings, study results are novel, important, and reinforce the need to target different types of cognitive distortions in suicide prevention efforts. Study results also bolster evidence for theories that suggest that cognitive distortions play a central role in SI, such as the cognitive behavioral theory of suicide (Spirito et al., 2012) and the cognitive-vulnerability hypothesis (Alloy et al., 2000). This latter theory suggests that a depressive attributional style (stable and global attributions to negative events) predisposes individuals to depression (Alloy et al., 2000) and potentially SI (Abramson et al., 1998).

Mediation models

Study results did not yield support for cognitive distortions or substance related problems as mediators of the relation between child maltreatment and adolescent SI (*Hypotheses 1 & 2*). Though it is possible that child maltreatment experiences exert a direct influence on maladaptive thought patterns and substance related coping behavior around the time of the trauma, study results suggest that this association may not persist years later. This attenuation may be most likely to occur among clinical samples of youth who tend to experience multiple recent significant stressors and/or mental health problems (e.g., depression), which exert a more proximal and/or stronger influence on adolescents' thoughts and behavior. Indeed, the average age of onset of childhood physical and sexual abuse was 6 to 7 years of age with an average duration of 1.8 to 3 years in the present sample, suggesting that for many youth a number of years had lapsed since the last instance of abuse. Further, we did not collect data on whether youth received therapy for the abuse in particular, or the success of such treatment, which could also play a role in the association between childhood maltreatment and outcomes in adolescence.

Child Maltreatment and Suicidal Ideation Across Contexts

Interestingly, the present study failed to find a direct association between child maltreatment and SI. These results are inconsistent with previous studies (see King & Merchant, 2008, for a review). It is possible that the degree of mental illness present in the study sample

obscured the relationship between child maltreatment and SI. Indeed, 91% of the study sample met criteria for a mood, anxiety, disruptive behavior, alcohol, and/or substance use disorder, which is much higher than rates in community samples. In comparison, Newman et al. (1996) followed a community based birth cohort of 1,037 children into young adulthood and found that the prevalence of DSM mental disorders ranged from 22% in early adolescence (13 years old) to 41% in late adolescence (18 years old). Additionally, in the present sample, 94% of adolescents reported some SI, with approximately 57% reporting clinically significant SI (SIQ > 41; Reynolds, 1988). Comparatively, another study using the SIQ (Mazza & Reynolds, 1998) to assess 374 high school students found that between 4.8–9.4% reported clinically significant SI. Studies using other measures of SI find that between 12.9–13.8% of adolescents from community samples report any SI (YRBS; CDC, 2010; Lewinsohn, Rohde, & Seeley, 1996). Therefore, it is possible that the effect of child maltreatment may not be as evident in a sample of adolescents with such remarkably high rates of SI as has been found in comparatively healthier community samples. In addition, as suggested above, it is also possible a history of treatment for the maltreatment experience in particular, which was not measured in the present study, played a role in study findings. Collectively, study findings highlight the importance of considering context when conducting and interpreting results of clinical research studies.

Limitations

While the current study offers new and important information for understanding how child maltreatment, cognitive distortions, and substance problems relate to SI, a number of limitations should be considered. Though common in the maltreatment literature, physical and sexual abuse were included in a composite variable as opposed to examined independently. Second, history of abuse may have been under-reported by parents and adolescents for fear of involvement from authorities. Third, cognitive and behavioral moderators/mediators were examined in separate analyses due to sample size considerations thus their relative importance could not be compared. Fourth, this study used a cross-sectional design; thus, causality of effect cannot be determined. Fifth, the sample was predominantly White and non-Hispanic; thus, results may not generalize to more racially and ethnically diverse samples. Last, the study sample comprised of psychiatrically hospitalized adolescents in the custody of a parent or legal guardian, and thus results may not readily generalize to hospitalized youth in state custody, non-hospitalized clinical samples, or community-based samples. Though clearly unique, this severe psychiatric sample is perhaps at greatest risk for completed suicide, thus research conducted to better understand SI in this population is of significant importance.

Implications

Clinical—Study results hold several important clinical implications for work with clinical adolescent samples. Specifically, adolescents with a maltreatment history who report greater substance related problems may be at higher risk for SI than those with less or no problems in this area. These findings reinforce the importance of assessing for current substance related problems and the purpose of use, especially among youth with an abuse history. Depending on level of current substance involvement, substance abuse prevention or treatment may help to prevent or reduce SI. Results from the current study also suggest that

cognitive distortions are important to address among clinically referred youth. Interventions that incorporate cognitive restructuring, such as cognitive-behavioral therapy, may be particularly beneficial.

Research—It will be important for future research to examine the unique effect of various types of abuse, as well as the cumulative effect of multiple traumas, in relation to SI, cognitive distortion, and substance use in large adolescent samples. Indeed, research conducted with adults with child maltreatment histories suggests that suicide risk increases with greater numbers/types of maltreatment experiences (e.g., Bruffaerts et al., 2010; Dube et al., 2001; Stein et al., 2010).

It would also be of interest to examine the relative importance of various cognitive and substance related variables in explaining the association between child maltreatment and SI across the span of adolescence. Moreover, the use of a longitudinal design with community and clinically based samples would help disentangle the temporal relationships between child maltreatment, cognitive distortions, substance use, and SI, across various settings and contexts. Indeed, the present study highlights the importance of considering context (i.e., nature of sample) when conducting and interpreting clinical research in this area.

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Figure 1.

Note: $N = 185$, Drug related problems were assessed with the Substance Use Subtle Screening Inventory – Drug Use Scale (SASSI).

Table 1

Descriptive Statics of Study Variables

Variable	M (SD)		Range
Main Study Variables			
Suicidal Ideation	62.86	(50.69)	0–174
Cognitive Errors	52.55	(21.40)	24–114
Cognitive Triad	48.52	(16.51)	4–72
Alcohol Related Problems	9.73	(12.92)	0–49
Drug Related Problems	7.48	(11.06)	0–47
Physical Abuse			
Age of Onset	7.44	(4.90)	<1–15
Duration in Years	3.00	(3.60)	.5–15
Sexual Abuse			
Age of Onset	6.74	(4.0)	<1–15
Duration in Years	1.82	(1.72)	.5–7

Note. $N = 185$ for Main Study Variables, $N = 37$ for Physical Abuse, $N = 36$ for Sexual Abuse

Table 2

Summary of Intercorrelations Among Study Variables.

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	-													
2. Race	-.08	-												
3. Mood	.11	-.04	-											
4. Maltreatment	.14	-.05	-.07	-										
5. Neglect	.05	-.17*	.03	.19**	-									
6. Domestic Violence	.06	-.04	.06	.34**	.30**	-								
7. Illness Loved One	.01	-.12	-.06	.06	.03	.01	-							
8. Death Loved One	.14	-.05	.10	.01	-.08	.03	.01	-						
9. Serious Accident	-.04	.02	.06	.08	.11	.17*	-.10	.10	-					
10. Suicidal Ideation	.21**	-.14*	.29**	.05	-.04	.11	.02	.10	-.01	-				
11. Cognitive Errors	.20**	.03	.18*	-.03	-.06	.07	.05	.15*	-.10	.54**	-			
12. Cognitive Triad	-.12	-.07	-.31**	.01	-.03	-.10	.01	-.11	-.10	-.65**	-.56**	-		
13. Alcohol Problems	-.01	.08	-.04	.07	-.05	.10	.10	.02	.03	.17*	.12	-.18*	-	
14. Drug Problems	-.06	.13	-.02	-.04	-.03	.05	.04	.07	.03	.21**	.13	-.22*	.78**	-

Note. $N = 185$;

*

 $p < .05$,

**

 $p < .001$

Table 3
Hierarchical Multiple Regression Analyses Predicting Suicidal Ideation From Child Maltreatment and Cognitive Errors, Negative Cognitive Triad, Alcohol Related Problems, and Drug Related Problems.

Predictor	B	Beta	SE Beta	Adj. R ²	R ²
1. Cognitive Errors					
Step 1 Gender	19.59	.17*	.07	.12	.14**
Race	-17.78	-.13	.07		
Mood	31.29	.27**	.07		
Step 2 Maltreatment	5.74	.05	.06	.34	.22**
Cognitive Errors	24.80	.49**	.06		
Step 3 Maltreatment × Cognitive Errors	-55	-.01	.07	.34	.01
2. Negative Cognitive Triad					
Step 1 Gender	20.41	.18*	.07	.12	.14**
Race	-17.99	-.13	.07		
Mood	30.89	.26**	.07		
Step 2 Maltreatment	3.66	.03	.05	.48	.36**
Cognitive Triad	-32.12	-.63**	.06		
Step 3 Maltreatment × Cognitive Triad	6.17	.07	.07	.48	.00
3. Alcohol Related Problems					
Step 1 Gender	19.65	.17*	.07	.12	.14**
Race	-17.72	-.13	.07		
Mood	31.35	.27**	.07		
Step 2 Maltreatment	2.32	.02	.07	.15	.04*
Alcohol Related Problems	9.76	.19*	.09		
Step 3 Maltreatment × Alcohol Related Problems	15.90	.19*	.09	.16	.02*
4. Drug Related Problems					
Step 1 Gender	19.59	.17*	.07	.12	.14**
Race	-17.78	-.13	.07		
Mood	31.29	.27**	.07		

Predictor	B	Beta	SE Beta	Adj. R ²	R ²
Step 2	4.34	.04	.07	.17	.06*
Maltreatment					
Drug Related Problems	12.11	.24*	.07		
Step 3	17.73	.21*	.08	.19	.03*
Maltreatment × Drug Related Problems					

Note. N = 185,

* p < .05,

** p < .001