

The Role of Cognitive Distortion in the Relationship Between Abuse, Assault, and Non-Suicidal Self-Injury

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Abstract The purpose of this study was to examine the relationship between childhood abuse, assault, cognitive distortion, and non-suicidal self-injury (NSSI) in a clinical adolescent sample. The sample included one hundred eighty-five psychiatrically hospitalized adolescents and their parents. Adolescent participants were predominantly female (71.4%), Caucasian (84%), and of non-Hispanic ethnicity (9.2%). Participants completed a diagnostic interview and self-report measures to assess youth history of abuse and assault, cognitive errors, negative self-views, and recent NSSI. No relationship was found between childhood abuse and NSSI. However, a history of assault was associated with NSSI among youth who reported higher cognitive errors and more negative self-views, even after controlling for gender and internalizing disorders. These results suggest that existing affect regulation models of NSSI may be enhanced by incorporating the role of cognitive distortion. Clinically, results also suggest that assessing adolescent victims of assault for cognitive errors and negative self-views, and helping them restructure these cognitive distortions when present, may reduce the likelihood of NSSI.

Keywords Non-suicidal self-injury · Abuse · Assault · Cognitive distortion

Introduction

Non-suicidal self-injury (NSSI) refers to the act of deliberately and directly damaging one's own body tissue without conscious suicidal intent. While a fair amount of research has been published to examine NSSI among adults, relatively less research has been conducted to examine NSSI among adolescents. Yet, NSSI is highly prevalent in this age group. Rates of NSSI in adolescent community samples have been found to range from 14 to 46% (e.g., Ross and Heath 2002; Lloyd-Richardson et al. 2007). Rates in incarcerated and inpatient psychiatric adolescent samples have been found to be even higher, ranging from 30 to 61% (Penn et al. 2003; Brown et al. 2008; DiClemente et al. 1991). Moreover, the average age of onset of NSSI has been found to be as early as age 10 (Hilt et al. 2008). Given the high prevalence rate of NSSI among youth and the early age of onset of this behavior, it is of particular importance to study NSSI.

Several theoretical models have been put forth in attempt to explain why adolescents might engage in NSSI, all of which postulate that NSSI is used for affect regulation purposes. In a review conducted by Messer and Fremouw (2008), they suggest that NSSI may serve an affect regulation function, based on research indicating that NSSI is preceded by feelings of tension, anxiety, anger, and depersonalization. Chapman et al. (2006) also offer an affect regulation model of NSSI, which is referred to as the experiential avoidance model (EAM). According to the EAM model, an individual experiences a negative event, such as an interpersonal trauma, that evokes strong, aversive emotions. In response, an individual experiences an urge to escape from the distressful emotional state and may engage in NSSI as a means to reduce or eliminate the emotional arousal. Nock and Prinstein (2004) have

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proposed a more comprehensive functional model suggesting that NSSI is initiated and maintained via automatic and/or social reinforcement. Reinforcement received from engaging in NSSI may be negative (i.e., the reduction of negative mood states or the escape from interpersonal demands) and/or positive (i.e., the induction of a positive mood state or the attainment of interpersonal attention). Thus, according to this model, a primary purpose of engaging in NSSI in response to stressful circumstances may be to reduce negative affect, increase positive affect, and/or influence social interactions.

While a number of theoretical models have been offered to explain NSSI, few studies have been conducted to examine various aspects of these models in adolescent populations. Much of the clinical research in this area has examined the association between various psychiatric disorders and NSSI. Given that many psychiatric disorders are associated with negative affect, youth with DSM-IV diagnoses may be at heightened risk for engagement in NSSI as a means to increase positive or decrease negative affect (Nock and Prinstein 2004). Indeed, research suggests that adolescents who engage in NSSI have high rates of psychiatric disorders. For example, in one study that included 89 adolescent psychiatric inpatients who engaged in NSSI within the past year, 87% met criteria for an Axis I diagnosis, including an internalizing disorder (52%), externalizing disorder (63%), and/or a substance use disorder (59%) (Nock et al. 2006).

Relative to psychiatric disorders, less is known about the relationship between interpersonal stressors and NSSI. This is an important area of study as interpersonal stressors, as suggested in the EAM model of NSSI (Chapman et al. 2006), may also increase negative affect and thus subsequent risk for NSSI. Childhood sexual abuse has been found to predict NSSI among females in cross-sectional studies with community samples of children and adolescents (Noll et al. 2003; Zoroglu et al. 2003) as well as adults (Gratz et al. 2002). Childhood physical abuse has also been found to be predict NSSI in a cross-sectional, community study of adolescents (Zoroglu et al. 2003). However, results of a recent meta-analysis (Klonsky and Moyer 2008) suggest that the relationship between childhood sexual abuse and NSSI is relatively small, may be inflated due to publication bias, and explains little unique variance when other psychiatric factors are controlled. Thus, further examination of the relationship between childhood abuse and NSSI is indicated.

Likewise, the role of other interpersonal traumas, such as physical and sexual assault, should also be considered in relationship to NSSI. Whereas childhood abuse is perpetrated by an older individual in a caretaker role, whom the youth typically knows and trusts (e.g., guardian, relative), assault is typically perpetrated by an individual who is not

in a caretaker role, with whom the youth may or may not have an existing relationship (e.g., stranger, dating partner). Differences in the nature of the relationship between the youth and the perpetrator, among other factors, may have a differential impact on psychological outcomes. In support, recent research suggests that different types of interpersonal trauma may be associated with different psychological outcomes (Krupnick et al. 2004; Whisman 2006). Though not yet studied in relationship to NSSI, physical and sexual assault has been associated with psychological symptoms and impairment among adolescents and adults, such as post-traumatic stress disorder and suicidal behavior (Krupnick et al. 2004; Lawyer et al. 2006; Waldrop et al. 2007).

As is evident, prior research provides some evidence to suggest that various types of interpersonal traumas are associated poor psychological outcomes, such as NSSI. However, the relationship between interpersonal trauma and NSSI is likely not direct (Klonsky and Moyer 2008). Not all adolescents who experience childhood abuse or assault engage in NSSI. One factor that may influence this relationship is the presence of distorted thought patterns, referred to as cognitive distortions. Cognitive distortions, as well as other cognitive vulnerability factors, have been shown to precede and maintain different forms of psychopathology (Beck 1967; Beck et al. 1985). Cognitive errors (e.g., overgeneralization, catastrophizing, selective abstraction) and the cognitive triad (i.e., negative views of self, world, and future) are two types of cognitive distortions that have been associated with depression in youth (Jacobs et al. 2008; Timbremont and Braet 2006). There is also evidence to suggest that cognitive errors are associated with anxiety among adolescents (Weems et al. 2001). As adolescents who engage in NSSI have high rates of psychiatric disorders and/or are at increased risk for their onset, cognitive distortion may be particularly prevalent within this population.

Similar to psychiatric disorders, cognitive distortions may play a prominent role in the development and maintenance of NSSI. Cognitive distortions tend to occur with high frequency and can be difficult to control. With repeated negative behavioral events, distorted thought processes can become more stable and pervasive (Kendall and Dobson 1993). Under such circumstances, youth may be more likely to engage in maladaptive coping behaviors, such as NSSI, as a means to regulate associated negative affect. Indeed, escape from aversive thoughts and feelings has been identified as a primary reason for engaging in NSSI, and the tendency to suppress unwanted thoughts has been associated with the presence and frequency of NSSI among adolescents (Nock and Prinstein 2004, 2005; Najmi et al. 2007). Cognitive rumination among depressed youth has also been found to predict NSSI (Hilt et al. 2008).

The Current Study

The purpose of the present study was to build upon existing literature by examining the relationship between different types of interpersonal traumas, including childhood abuse and assault, cognitive distortion, and NSSI, in an adolescent psychiatric inpatient sample. With regard to cognitive distortion, this study explored more general cognitive errors and more specific negative self-views. Negative self-views may be particularly salient for youth who have experienced an interpersonal trauma as adolescence is the development period during which a sense of identity is developed through person-context interactions (Adams and Marshall 1996). Adolescent self-views may be shaped, in part, through negative interpersonal experiences, which in turn may influence future cognitive processing. In support, there is evidence to suggest that self-criticism, a construct conceptually related to negative self-views, has been found to partially mediate the relationship between abuse and NSSI among adolescents (Glassman et al. 2007).

Based on prior research and theory, it was hypothesized that youth with a history of childhood abuse or assault, and greater cognitive distortion, in the form of both general cognitive errors and negative self-views, would be more likely to engage in NSSI than those with a history of abuse or assault and less cognitive distortion. Further, to ensure that these models were not confounded by the presence of psychiatric disorders, the presence of mood, anxiety, disruptive behavior, alcohol, and substance use disorders, were examined in preliminary analyses and those associated with NSSI were controlled for in multivariate analyses.

Method

Participants

Two-hundred sixty-three adolescents ages 13–18 (mean age = 15.04, SD = 1.32) who were hospitalized on an acute adolescent inpatient unit, and their parents, were approached for recruitment over the course of a 3 year period. Of those approached, 201 families voluntarily provided adolescent assent and parental consent to participate in the study. As 16 adolescents did not complete the full assessment battery after enrollment, the final sample consisted of 185 participants. Inclusion criteria for this sample included: (1) fluency in spoken English, (2) adolescent assent and parental consent, and (3) an adolescent Verbal IQ estimate ≥ 70 as assessed via the Kaufman Brief Intelligence Test (Kaufman and Kaufman 1990). Exclusion criteria included current psychosis or placement in DCYF custody as documented in the hospital inpatient admission materials.

Consistent with the hospital population from which the sample was drawn, the majority of the participants were female (71.4%). Approximately 84% of adolescents identified themselves as Caucasian, 2.7% African American, 2.2% Asian, 3.2% Native American, and 7.6% other racial background. Approximately 9.2% of the sample identified themselves as Hispanic/Latino. Family income varied widely from less than \$10,000 to greater than \$100,000 per year with a mean income range of \$50,000 to \$60,000.

Procedure

Eligible adolescents and their parents/guardians were approached for recruitment by a research assistant after family meetings or during family visits on the adolescent inpatient unit. After parent/guardian consent and adolescent assent was obtained, adolescents and their parent/guardian were separately administered the assessments while the adolescent was hospitalized on the inpatient unit. With the exception of the diagnostic interview that was conducted by trained masters and doctoral level clinicians, a bachelor's level research assistant administered the battery. The parent version of the diagnostic interview and assessment measures were administered in a 120 min session. The adolescent diagnostic interview and assessment measures were given in two separate 60–120 min sessions. As compensation for participation, parents were given \$50 and adolescents were given four movie tickets.

Upon completion of the full assessment battery, with parental permission, a feedback form summarizing responses to clinical measures, with the exception of alcohol/substance related information, was placed in each adolescent's inpatient file so that it could be utilized by the adolescent's healthcare team for treatment and discharge planning. Affiliated University and Hospital Institutional Review Boards approved this study.

Measures

Psychiatric Disorders, NSSI, Abuse, and Assault

Psychiatric disorders, NSSI, abuse, and assault 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 semi-structured diagnostic interview that provides a reliable and valid measurement of DSM-IV diagnoses in children and adolescents as well as suicidal and non-suicidal self-injurious behaviors. The mood, anxiety, disruptive behavior, alcohol, and substance use disorder modules from the K-SADS-PL were administered. In the present study, items pertaining to NSSI included in the depression module

and items from the trauma screen included in the Post-Traumatic Stress Disorder module were also examined.

Non-suicidal self-injury as defined in the K-SADS-PL refers to self-mutilation or other physical acts done *without* the intent of killing oneself. Participants were asked to indicate whether they ever tried to hurt themselves, such as burned self with matches or candles, scratched self with needles or knife or nails, put hot pennies on the skin, or another method of self-injury. They were then asked when and how often they engaged in this type of behavior. Behaviors performed in the absence of suicidal intent that occurred one or more times were coded as NSSI.

With regard to the Post-Traumatic Stress Disorder screen, participants were coded for whether they were ever a victim of physical abuse, sexual abuse, physical assault, or sexual assaults, as defined in the K-SADS-PL. Adolescents were asked to indicate if they had been physically abused, defined as bruises sustained on more than one occasion or one or more serious injuries perpetrated by a caretaker, or sexually abused, defined as isolated or repeated incidents of genital fondling, oral sex, or vaginal or anal penetration, perpetrated by a caretaker. With regard to physical and sexual assault, adolescents were asked to indicate if they had ever been mugged or attacked by an individual who was not a caretaker. Adolescents were then asked to describe what happened. Incidents that were physical in nature were coded as physical assault and those that were sexual in nature were coded as sexual assault. Adolescent participants and their parent/guardian were asked to recount if, at what age, and by whom, the adolescent had experienced any of these traumatic events.

All interviewers were extensively trained in the K-SADS-PL through didactic training, rating audiotapes and in-person K-SADS-PL interviews, administering in-person interviews while being observed, and audiotaping full interviews for reliability reviews. Upon completion of training, all interviews were audiotaped and 10% were randomly selected and rated for reliability. Kappa coefficients reflected strong agreement for most mood disorders (Kappa = .89–1.0 for major depressive and depressive disorder NOS), anxiety disorders (Kappa = .92–1.0 for generalized anxiety, social phobia, post-traumatic stress, and anxiety disorder NOS), disruptive behavior disorders (Kappa = 1.0 for attention deficit/hyperactivity, oppositional defiant, and conduct disorders), and alcohol/substance use disorders (Kappa = .79–1.0 for alcohol abuse/dependence and substance abuse/dependence). Kappa coefficients reflected fair agreement for other disorders (Kappa = .48–.65 for dysthymia and bipolar disorder, respectively).

In addition to conducting regular reliability ratings, all cases were staffed during weekly clinical consensus team meetings. This clinical consensus team comprised doctoral level child psychologists in addition to the interviewers. During this meeting, all K-SADS symptoms and assessment

data were reviewed, including responses provided to the NSSI questions and traumas included in the PTSD screen. A best-estimate clinical consensus procedure was used to resolve discrepancies between adolescent and parent report as well as confirm diagnoses, traumas, and suicidal/non-suicidal self-injurious behavior. A best-estimate clinical consensus procedure is commonly used to reconcile discrepancies and yields good to excellent reliability (Cantwell et al. 1997; Klein et al. 1994, 2001).

Cognitive Errors

General cognitive errors were assessed using the Children's Negative Cognitive Errors Questionnaire (CNCEQ; Leitenberg et al. 1986). The CNCEQ is a 24-item self-report measure that assesses four major cognitive distortions: catastrophizing, overgeneralization, personalizing, and selective abstraction. Each item includes a hypothetical situation followed by a possible negative interpretation. Participants are asked to respond using a five-point Likert scale ranging from "almost exactly like I would think" to "not at all like I would think." Total CNCEQ scores range from 24 to 120, with higher scores representing greater likelihood to catastrophize, overgeneralize, personalize, and use selective abstraction. Good internal consistency ($\alpha = .77-.84$ for subscales) has been demonstrated for the CNCEQ in a sample of adolescents (Weems et al. 2001). Internal consistency for the CNCEQ total score used in the present study was high ($\alpha = .95$).

Negative Self-Views

Adolescent self-views were measured using the Cognitive Triad Inventory for Children (CTI-C; Kaslow et al. 1992). The CTI-C is a 36-item self-report measure that assesses self-perceived competencies and global self-worth in children and adolescents. It is comprised of three 12-item subscales, including View of Self, View of World, and View of Future. Responses are given on a three-point Likert scale that includes yes, maybe, or no. The View of Self subscale was examined in present study. The View of Self subscale scores range from 0 to 24, with higher scores reflecting more positive self-views. Strong reliability, concurrent and discriminant validity have been demonstrated for the CTI-C (Kaslow et al. 1992). Internal consistency for the CTI-C View of Self subscale in the present study was high ($\alpha = .89$).

Results

Prevalence of NSSI, Abuse, and Assault

One hundred and sixteen adolescents (62.7%) reported engaging in NSSI in the past year. Forty (21.6%) adolescents

reported a history of physical abuse and 35 (18.9%) adolescents reported a history of sexual abuse. All perpetrators were in a caretaker position at the time of the abuse, the majority of whom were family members. This includes fathers, mothers, uncles, brothers, grandfathers, cousins, and step-relatives.

Nineteen (10.3%) adolescents reported a history of physical assault and 32 (17.3%) adolescents reported a history of sexual assault. All adolescents who experienced a physical or sexual assault reported that the perpetrator was a non-relative in a non-caretaking role, with one exception. One adolescent indicated that a brother, also in a non-caretaker role, perpetrated an assault. Other perpetrators identified included peers, boyfriends, friends, neighbors, and strangers. See Table 1 for additional details regarding abuse and assault histories.

Preliminary Bivariate Analyses

Correlation coefficients were computed to examine the bivariate relationships between NSSI, demographic variables, interpersonal traumas, and potential cognitive moderators (see Table 2). Of the demographic variables examined, only female gender was significantly correlated with NSSI, and thus it was controlled for in multivariate regression analyses. Of the sexual and physical traumas examined, only sexual assault was significantly correlated with NSSI. Both cognitive distortions were significantly correlated with NSSI. Greater cognitive errors and more negative self-views were positively associated with NSSI.

Due to the relatively small cell sizes for each individual trauma, the interpersonal traumas of physical abuse and sexual abuse were combined into a composite measure of childhood abuse, and physical assault and sexual assault were combined into a composite measure of assault, in an effort to increase power for multiple regression analyses. This conceptual split was made for a number of reasons. First, there was a significant degree of overlap between youth who were physically abused and those who were sexually abused in the present sample, $r(183) = .22, p < .05$. As

sexual violence rarely occurs in the absence of physical victimization (Tjaden and Thoennes 2000), physical and sexual abuse are commonly collapsed in the child maltreatment literature (e.g., DuMont et al. 2007). Second, the average age of onset of physical ($M = 7.45$ years, $SD = 4.85$) and sexual ($M = 6.70$ years, $SD = 4.05$) abuse was similar as was the mean age of onset of physical ($M = 13.61$, $SD = 1.75$) and sexual assault ($M = 12.84$, $SD = 2.70$). The decision to differentiate often repeated childhood abuse from often single assaults is also supported by research indicating that adolescents who experience ongoing abuse have more psychological difficulties than those who experience a single assault (Krupnick et al. 2004).

As prior research suggests that psychiatric disorders are associated with NSSI, a series of Chi-square analyses were used to independently assess the relationships between psychiatric disorders and NSSI. Approximately 91% of the sample was diagnosed with a mood, anxiety, disruptive behavior, alcohol, and/or substance use disorder. Youth with versus without a history of NSSI were diagnosed with higher rates of major depressive disorder (70.7 vs. 55.1%), $\chi^2(1, N = 185) = 4.58, p > .03$, generalized anxiety disorder (31.0 vs. 11.6%), $\chi^2(1, N = 185) = 9.02, p > .01$, and posttraumatic stress disorder (35.3 vs. 11.6%), $\chi^2(1, N = 185) = 12.53, p > .00$. There were no statistically significant differences across groups in rates of dysthymia (5.2 vs. 1.4%), $\chi^2(1, N = 185) = 1.67, p > .05$, bipolar disorder (5.2 vs. 8.7%), $\chi^2(1, N = 185) = .89, p > .05$, depressive disorder NOS (6.0 vs. 8.7%), $\chi^2(1, N = 185) = .47, p > .05$, panic disorder (9.5 vs. 4.3%), $\chi^2(1, N = 185) = 1.63, p > .05$, social phobia (30.4 vs. 39.7%), $\chi^2(1, N = 185) = 1.59, p > .05$, anxiety disorder NOS (6.9 vs. 2.9%), $\chi^2(1, N = 185) = 1.35, p > .05$, attention-deficit/hyperactivity disorder (36.2 vs. 31.9%), $\chi^2(1, N = 185) = .36, p > .05$, conduct disorder (28.4 vs. 26.1%), $\chi^2(1, N = 185) = .12, p > .05$, oppositional defiant disorder (15.1 vs. 23.2%), $\chi^2(1, N = 185) = 1.70, p > .05$, alcohol use disorder (22.4 vs. 23.2%), $\chi^2(1, N = 185) = .02, p > .05$, or substance use disorder (29.3 vs. 24.6%), $\chi^2(1, N = 185) = .47, p > .05$. To obtain a

Table 1 Summary of descriptive information regarding interpersonal traumas

| | Physical abuse | | Sexual abuse | | Physical assault | | Sexual assault | |
|-----------------------------|----------------|----------|--------------|----------|------------------|----------|----------------|----------|
| | % | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % | <i>n</i> |
| History of trauma | 21.6 | 40 | 18.9 | 35 | 10.3 | 19 | 17.3 | 32 |
| Perpetrators | | | | | | | | |
| Relatives only | 85.0 | 34 | 71.4 | 25 | 05.3 | 1 | 00.0 | 0 |
| Non-relatives only | 10.0 | 4 | 22.9 | 8 | 94.7 | 18 | 96.9 | 31 |
| Both | 02.5 | 1 | 05.7 | 2 | 00.0 | 0 | 00.0 | 0 |
| No information ^a | 02.5 | 1 | 00.0 | 0 | 00.0 | 0 | 03.1 | 1 |
| Age of trauma onset | | | | | | | | |
| <i>M</i> (<i>SD</i>) | 7.45 | 4.85 | 6.70 | 4.05 | 13.61 | 1.75 | 12.84 | 2.70 |
| Range (low–high) | <1 | 15 | <1 | 15 | 10 | 17 | 5 | 16 |

^a Participants only indicated whether or not the perpetrator was a caretaker, but not did disclose if the caretaker was a relative or non-relative

Table 2 Intercorrelations between variables of interest ($N = 183$)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------------|---|------|-------|------|------|-------|------|-------|--------|--------|
| 1. NSSI | – | –.06 | .35** | .07 | .11 | .06 | –.03 | .15* | –.42** | .27** |
| 2. Age | | – | –.06 | .00 | –.07 | –.03 | .11 | .05 | –.06 | .13 |
| 3. Gender | | | – | –.08 | –.02 | .22** | –.06 | .26** | –.18* | .20** |
| 4. Race | | | | – | –.03 | –.10 | .05 | –.08 | –.11 | .02 |
| 5. Physical abuse | | | | | – | .22** | –.05 | .07 | .02 | .03 |
| 6. Sexual abuse | | | | | | – | .06 | –.04 | .03 | –.04 |
| 7. Physical assault | | | | | | | – | .13 | –.07 | .05 |
| 8. Sexual assault | | | | | | | | – | –.23** | .12 |
| 9. View of Self | | | | | | | | | – | –.58** |
| 10. Cognitive errors | | | | | | | | | | – |

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

conservative test of the proposed model and partial out the influence of psychiatric diagnoses, major depressive disorder, generalized anxiety disorder, and post-traumatic stress disorder were collapsed into a composite internalizing disorder variable and controlled for in multivariate logistic regression analyses. These diagnoses were collapsed to reduce multicollinearity given their significant overlap in the present sample ($r = .17$ – $.18$, $p > .05$).

Logistic Regression Analyses

A series of logistic regression analyses were used to independently assess the relationships between NSSI, interpersonal traumas (i.e., abuse and assault), and potential cognitive moderators (i.e., the CTICSS View of Self subscale and CNCEQ total score), after controlling for gender and relevant internalizing disorders (i.e., major depressive, generalized anxiety, and post-traumatic stress disorders). The dependent variable was the presence of NSSI in the past year. Gender was entered in the first step, internalizing disorders in the second step, one interpersonal trauma and one cognitive moderator in the third step, and the interaction between the interpersonal trauma and the cognitive moderator in the fourth step of each analysis. The CTICSS View of Self subscale ($M = 15.94$, $SD = 6.60$) and CNCEQ total score ($M = 52.61$, $SD = 21.50$) were normally distributed. They were mean centered prior to computing interaction terms.

Abuse as a Predictor

The first logistic regression model examined the association between abuse history, self-views, and NSSI. Results are presented in Table 3. After controlling for gender and internalizing disorders, there was a significant main effect for the CTICSS View of Self subscale ($OR = .83$, $p < .00$)

on NSSI, suggesting that more negative self-views are associated with the presence of NSSI. There was no main effect for abuse ($OR = 2.04$, $p > .05$) or the interaction of abuse \times View of Self and NSSI ($OR = .83$, $p > .05$).

The second logistic regression model examined the association between abuse history, cognitive errors, and NSSI. Results are presented in Table 3. After controlling for gender and internalizing disorders, there was a significant main effect for cognitive errors as measured by the CNCEQ total score ($OR = 1.02$, $p < .05$) on NSSI, suggesting that greater cognitive errors are associated with the presence of NSSI. There was no main effect for abuse ($OR = 1.69$, $p > .05$) or the interaction of abuse \times cognitive errors and NSSI ($OR = .99$, $p > .05$).

Assault as a Predictor

The third logistic regression model examined the association between assault history, self-views, and NSSI. Results are presented in Table 4. After controlling for gender and internalizing disorders, there was no main effect of assault on NSSI ($OR = .91$, $p > .05$). However, there was a main effect of the CTICSS View of the Self subscale on NSSI ($OR = .83$, $p < .00$). Further, the interaction of assault \times View of Self was a significant predictor of NSSI ($OR = .69$, $p < .05$).

The fourth logistic regression model tested the association between assault history, cognitive errors, and NSSI. Results are presented in Table 4. After controlling for gender and internalizing disorders, there was no main effect of assault on NSSI ($OR = 1.24$, $p > .05$). However, there was a main effect of cognitive errors as measured by the CNCEQ total score on NSSI ($OR = 1.02$, $p < .05$). Further, the interaction of assault \times cognitive errors was a significant predictor of NSSI ($OR = 1.09$, $p < .05$).

Table 3 Summary of the logistic regression analyses examining negative self-views and cognitive errors as moderators of the relationship between abuse history and NSSI

| Predictor variables | B | SE | OR | 95% CI | Wald | p value |
|---------------------------------|-------|-----|------|-----------|-------|---------|
| <i>View of self</i> | | | | | | |
| Step 1 Gender | 1.60 | .35 | 4.96 | 2.51–9.81 | 21.20 | .00** |
| Step 2 Internalizing | 0.78 | .36 | 2.18 | 1.07–4.42 | 02.18 | .03* |
| Step 3 | | | | | | |
| Abuse | 0.71 | .39 | 2.04 | 0.95–4.37 | 03.36 | .07 |
| View of self | –0.19 | .04 | 0.83 | 0.77–0.90 | 21.25 | .00** |
| Step 4 Abuse × View of self | –0.18 | .13 | 0.83 | 0.65–1.07 | 02.05 | .15 |
| <i>Cognitive errors</i> | | | | | | |
| Step 1 Gender | 1.57 | .35 | 4.81 | 2.43–9.54 | 20.27 | .00** |
| Step 2 Internalizing | 0.80 | .36 | 2.22 | 1.09–4.49 | 04.88 | .03* |
| Step 3 | | | | | | |
| Abuse | 0.53 | .37 | 1.69 | 0.83–3.48 | 02.06 | .15 |
| Cognitive errors | 0.02 | .01 | 1.02 | 1.00–1.04 | 05.45 | .02* |
| Step 4 Abuse × Cognitive errors | –0.01 | .02 | 0.99 | 0.95–1.03 | 00.45 | .50 |

B unstandardized beta, SE standard error at entry, OR odds ratio, *internalizing* internalizing disorders
* $p < .05$, ** $p < .01$

Table 4 Summary of the logistic regression analyses examining negative self-views and cognitive errors as moderators of the relationship between assault history and NSSI

| Predictor variables | B | SE | OR | 95% CI | Wald | p value |
|-----------------------------------|-------|-----|------|-----------|-------|---------|
| <i>View of self</i> | | | | | | |
| Step 1 Gender | 1.60 | .35 | 4.96 | 2.51–9.81 | 21.20 | .00** |
| Step 2 Internalizing | 0.78 | .36 | 2.18 | 1.07–4.42 | 04.68 | .03* |
| Step 3 | | | | | | |
| Assault | –0.09 | .45 | 0.91 | 0.38–2.21 | 00.04 | .84 |
| View of self | –0.18 | .04 | 0.84 | 0.78–0.91 | 20.18 | .00** |
| Step 4 Assault × View of self | –0.37 | .19 | 0.69 | 0.48–0.99 | 04.02 | .05* |
| <i>Cognitive errors</i> | | | | | | |
| Step 1 Gender | 1.57 | .35 | 4.81 | 2.43–9.54 | 20.27 | .00** |
| Step 2 Internalizing | 0.80 | .36 | 2.22 | 1.09–4.49 | 04.88 | .03* |
| Step 3 | | | | | | |
| Assault | 0.21 | .42 | 1.24 | 0.54–2.82 | 00.26 | .61 |
| Cognitive errors | 0.02 | .01 | 1.02 | 1.00–1.04 | 05.14 | .02* |
| Step 4 Assault × Cognitive errors | 0.08 | .04 | 1.09 | 1.01–1.17 | 05.05 | .03* |

B unstandardized beta, SE standard error at entry, OR odds ratio, *Internalizing* internalizing disorders
* $p < .05$, ** $p < .01$

Analysis of Interactions

To understand the nature of each interaction, the guidelines offered by Agresti (2002) for probing interactions in logistic regression models were followed. The cognitive moderators were divided into low and high groups using a median split. Then Chi-square analyses were conducted to examine the prevalence of NSSI among those with a history of assault at low and high values of the cognitive moderator. As can be seen in Fig. 1, youth with a history of assault and more negative self-views (low CTICSS score) reported a higher prevalence of NSSI than those with a history of assault and more positive self-views (high CTICSS score) (85.3 vs. 27.3%), $\chi^2(1, 45)=13.62, p < .00$. As can be seen in Fig. 2, youth with a history of assault and greater cognitive errors (high CNCEQ score) reported a

greater prevalence of NSSI than those with a history of assault and fewer cognitive errors (low CNCEQ score) (90.0 vs. 35.7%), $\chi^2(1, 44) = 14.18, p < .00$.

Discussion

This study evaluated the relation between NSSI, childhood abuse, assault, and cognitive distortion in a sample of psychiatrically hospitalized adolescents. In contrast to prior research, childhood sexual and/or physical abuse was not found to be associated with the presence of NSSI either directly (Gratz et al. 2002; Noll et al. 2003; Zoroglu et al. 2003) or in the presence of cognitive distortion. However, these results are consistent with the results of a recent meta-analysis (Klonsky and Moyer 2008) suggesting that

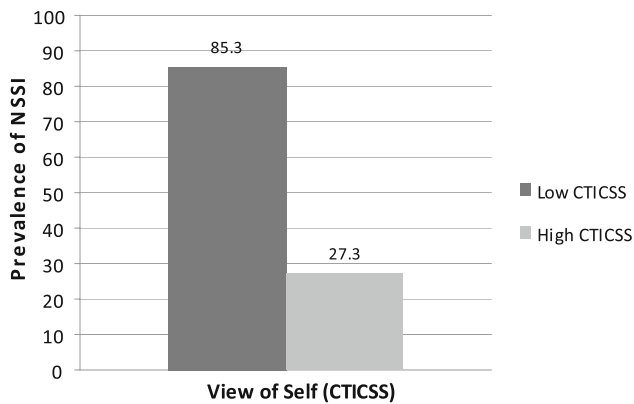


Fig. 1 Illustrative graph of the prevalence of NSSI among youth with a history of assault at high and low values of CTICSS scores or views of self

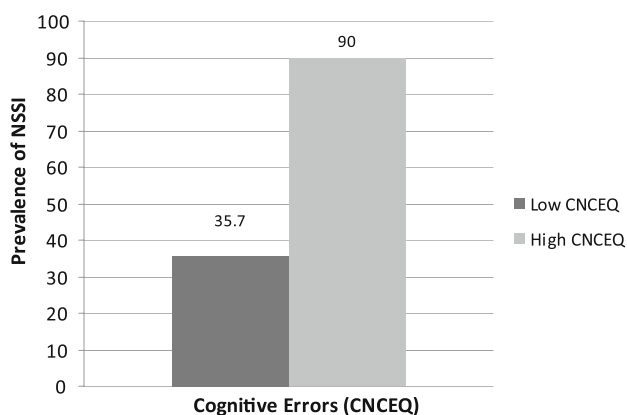


Fig. 2 Illustrative graph of the prevalence of NSSI among youth with a history of assault at high and low values of CNCEQ scores or cognitive errors

the association between sexual abuse and NSSI is small, if present at all, after controlling for other psychiatric risk factors. This study was conducted with adolescents hospitalized on a psychiatric inpatient unit, 91% of whom met criteria for a mood, anxiety, disruptive behavior, alcohol, and/or substance use disorder.

In contrast, while a history of assault was not associated with NSSI in the study sample as a whole after controlling for gender and internalizing disorders, it was associated with NSSI among youth with the highest level of cognitive errors. Cognitive errors, including personalizing, catastrophizing, overgeneralization, and selective abstraction, appeared to act as a vulnerability factor for NSSI among youth with a history of assault. It is possible that adolescent victims of assault who are prone to cognitive errors of overgeneralization and selective abstraction may be more likely to view social situations with peers, acquaintances, and/or strangers as potentially dangerous, ignoring evidence to the contrary. They may also be more prone to perceive personal insult in negative interpersonal interactions (i.e., personalization) and

anticipate future interpersonal difficulties (i.e., catastrophizing). Such adolescents may engage in NSSI as a way to cope with overwhelming emotions resulting from the perception of the world as an unbearable, threatening place. Indeed, there is a burgeoning body of research suggesting that cognitive errors serve as vulnerability factors for and mechanisms resulting in others forms of self-destructive behaviors such as suicidality (Prezant and Neimeyer 1988).

Similar to cognitive errors, more negative self-views were also associated with higher rates of NSSI among adolescent victims of assault. It is possible that negative self-views may increase the likelihood that an adolescent will perceive that he/she is to blame for an assault or that he/she is vulnerable to another assault, thus increasing the experience of aversive emotions and the perceived need to engage in NSSI. Therefore, work dedicated toward enhancing self-views may serve as an effective psychological coping resource following the experience of assault. Prior research suggests that positive self-views, as assessed through a measure of self-esteem, acts as a buffer against the development of other types of psychological impairment among adolescents such as depression (Costello et al. 2008).

Interestingly, while results of the present study suggest that cognitive distortions moderate the association between assault history and NSSI, a similar association was not found between a history of abuse and NSSI. On average, in the present sample, childhood physical and sexual abuse was experienced during early childhood whereas physical and sexual assault primarily occurred during the adolescent years. Given that the cognitive assessments measured current cognitive processes, one might expect a stronger association between a more proximal assault experience than a more distal abuse experience and current cognitive processes.

The results of the present study must be considered with the limitations inherent in the method. First, due to a relatively small sample size, it was necessary to collapse physical and sexual abuse into one composite abuse variable and physical and sexual assault into one composite assault variable to obtain adequate power to conduct analyses. Future research with a larger sample should examine the unique contributions of each these interpersonal traumas in relation to NSSI and cognitive distortion. Second, this study employed a cross-sectional design. Therefore, the direction of the observed relationships cannot be determined. Future prospective research, beginning in early childhood, should be conducted to examine the temporal relationships between interpersonal trauma, cognitive distortion, and NSSI. Third, this study was conducted with a sample of adolescent psychiatric inpatients and thus results may not readily generalize to other clinical and community populations of adolescents. Fourth, the sample was predominantly Caucasian and of non-Hispanic ethnicity, thus results may not generalize to more racially and ethnically

diverse samples. Finally, this study examined factors associated with the presence or absence of NSSI. Future research should utilize measures of NSSI that capture aspects of frequency, severity, and purpose of NSSI, to better build upon existing theoretical models.

With consideration of these limitations, the findings presented in this study add uniquely to the growing body of literature on adolescent NSSI. This study extends previous research by increasing understanding of the role that various cognitive distortions play in the relationship between abuse, assault, and NSSI among adolescents. To our knowledge, cognitive errors and self-views have not been examined in relationship to NSSI in prior research. This study also provides an initial exploration of the association between physical and sexual assault and NSSI among adolescents which has not been previously examined. Results of the present study also build upon affect regulation models of NSSI (e.g., Chapman et al. 2006) to suggest that it may not merely be the experience of an interpersonal stressor, such as an assault, that renders an adolescent vulnerable to affect dysregulation and thus subsequent NSSI, but the availability of cognitive resources needed to adaptively process such traumatic experiences. Youth who lack adequate cognitive coping resources, such as those who tend to process recent behavioral events in a distorted manner, may be most likely to experience strong aversive emotions subsequent to an assault, and under such circumstances, may resort to NSSI as a maladaptive coping strategy. Also of interest is that cognitive distortions appeared to moderate the association between assault and NSSI, even after controlling for the presence of mood and anxiety disorders. These results highlight the potential importance of cognitive factors in the onset and maintenance of NSSI.

The results of the present study hold important developmental and clinical implications. Adolescent victims of assault who reported more negative self-views and greater cognitive errors (i.e., tendency to catastrophize, overgeneralize, personalize, and selectively abstract negative information from behavioral events and interpersonal interactions) reported higher rates of NSSI than adolescent victims with a more healthy cognitive profile. Given the importance of cognition to youth outcome, attending to and promoting healthy cognitive development may represent one venue to help prevent adolescents from developing maladaptive coping behaviors in response to interpersonal stress and trauma. Providing youth with praise and opportunities for experiences of success to facilitate the development of positive self-views as well as helping them accurately process interpersonal conflicts and stressors may be particularly helpful. When working with adolescent clinical samples, it will be important to assess for the presence of negative self-views and cognitive errors,

particularly among youth with an assault history. Incorporating cognitive restructuring methods to address these cognitive distortions in the context of therapy with adolescent assault victims may reduce the likelihood of NSSI.

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