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Cognitive and Social Factors Associated with NSSI and Suicide Attempts in Psychiatrically Hospitalized Adolescents

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Abstract Although non-suicidal self-injury (NSSI) and suicide attempts (SA) frequently co-occur among youth, there is increasing evidence that both the risk factors and the phenomenology of the behaviors are distinct. This study examined how individuals who engage in NSSI only, individuals who attempt suicide only, and those who have histories of both NSSI and at least one suicide attempt may differ in terms of cognitions and perceived social support. Participants were 185 adolescents (78.1 % female) between the ages of 13 and 18 recruited from a psychiatric inpatient facility in the northeastern United States. One hundred forty-eight teens were identified with a history of self-injurious behavior and divided into three groups: NSSI only (n=45), SA only (n=24) or both NSSI and SA (NSSI+SA; n=79). Analyses showed that the NSSI+SA group exhibited more cognitive errors, negative self-statements, and negative views of self, world, and future, as well as less perceived familial support than either the NSSI or SA only groups. There were no differences between groups on perceived support from teachers or peers. No significant demographic or diagnostic differences were found between the NSSI and SA groups. Limitations and clinical implications of the current research are discussed.

Keywords Self-harm · Non-suicidal self-injury · Suicide attempt · Adolescents · Cognitive distortions · Social support

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Self-injurious behavior (SIB) has gained attention over the last several years in both the academic and clinical communities due to its escalating prevalence (Nock 2009) and the gravity of its associated risks. Two types of SIB are non-suicidal self-injury (NSSI), defined as deliberate harm to bodily tissue without intent to die (Andover et al. 2012), and suicide attempts (SA), defined as self-initiated, potentially injurious behavior with intent to die (Van Orden et al. 2010). Rates of NSSI in adolescent community samples range from 14 % to 46 % (e.g. Lloyd-Richardson et al. 2007; Ross and Heath 2002). Even higher rates are reported among incarcerated and inpatient psychiatric samples, with estimates ranging from 30 % to 61 % (Brown et al. 2008; DiClemente et al. 1991; Penn et al. 2003). The prevalence of attempted suicide in community samples of adolescents is even more concerning, with 12-month prevalence rates as high as 8.5 % (Grunbaum et al. 2004) and a lifetime prevalence rate of 9.7 % (Evans et al. 2005).

There is considerable overlap between NSSI and SAs. In clinical samples, up to 70 % of adolescents who engage in NSSI report a history of a suicide attempt (Nock et al. 2006). Within community samples, estimates of adolescents who engage in both behaviors range from 3.8–7.0 % (Brausch and Gutierrez 2010; Muehlenkamp and Gutierrez 2007). In fact, according to Cooper and colleagues (2005), those who attempt suicide or engage in NSSI are approximately 30 % more likely to die by suicide than the general population. However, research shows that not all adolescents who engage in NSSI attempt suicide, and not all individuals who attempt suicide engage in NSSI (Muehlenkamp and Gutierrez 2004; Nock et al. 2006). These findings may reflect that some of the risk factors and the phenomenology of the behaviors are distinct. For example, adolescents with a past SA report greater levels of anxious and depressed symptoms and are more likely to report a history of abuse

than those with a history of NSSI (Andover et al. 2012). Further research that identifies distinct clinical correlates of NSSI and SAs, as well as predictors of co-occurrence, is needed to better inform psychological theory, clinical assessment, and the prevention of SIB (Andover et al. 2012; Nock et al. 2006).

Relatively few studies have examined differences between adolescents with different forms and/or combinations of SIB. To date, most work in this area has focused on psychiatric constructs (diagnoses and symptoms; e.g. Dougherty et al. 2009; Guertin et al. 2001; Jacobson et al. 2008; Muehlenkamp and Gutierrez 2004, 2007), and yielded mixed findings. However, leading theories of NSSI and SA suggest that social-cognitive factors play an important role in the onset and maintenance of SIB. According to the functional model of NSSI as well as broader affect regulation models, adolescents may use NSSI to influence their social environment (e.g., increase attention, decrease conflict; Klonsky 2007; Nock and Prinstein 2004, 2005), and/or suppress negative affect which may arise in part from the experience of various types of cognitive distortion (Chapman et al. 2006; Nock and Prinstein 2004, 2005). These theories are also consistent with cognitive behavioral models, which suggest SIB emerges from reciprocal relations among learned maladaptive cognitive, affective, and behavioral responses to stressors among adolescents with predisposing vulnerabilities (Spirito et al. 2011). The purpose of the present study is to examine whether perceptions of social support and depressogenic cognitions, two potential social-cognitive risk factors for SIB, differ among youth with NSSI and/or SA.

Perceived Social Support

The role of social support becomes more critical during the adolescent years as interpersonal demands and stressors increase. Adolescents who perceive insufficient care and support from family, friends, or others may be less likely to use adaptive emotion regulation skills during times of stress and may be at risk for NSSI and SA (Prinstein 2008). Indeed, a fair amount of research suggests that variables typically associated with perceptions of low family support, including high family dysfunction (Adams et al. 1994; Garber et al. 1998; Martin et al. 1995; Prinstein et al. 2000; Swahn et al. 2012) and low family cohesion (Crowell et al. 2008; Martin et al. 1995) are associated with NSSI and SA. Peer support has also been shown to exert a strong influence on suicidal ideation, NSSI, and SA (Greydanus and Shek 2009; Groholt et al. 2000; Prinstein et al. 2000; Rigby and Slee 1999; Wichstrom 2009).

Few studies have examined whether perceptions of social support distinguish between types of SIB, and those that have been conducted yield mixed findings. In a study of psychiatrically hospitalized adolescents, those who engaged in both NSSI and SA reported greater loneliness than those who reported only a SA (Guertin et al. 2001). A more recent study, conducted with a community sample of adolescents, found that youth with a history of NSSI and SA reported lower parental support than those with NSSI only (Brausch and Gutierrez 2010). Interestingly, Brausch and Gutierrez (2010) also examined the role of peer and teacher support, but did not find differences between groups. The relationship between teacher support and different types of SIB is also unclear due to limited research in this area and conflicting study findings (Kidd et al. 2006; Landstedt and Gillander Gadin 2010; Rigby and Slee 1999). The current study attempted to delineate these factors and examine differences in perceived social support from family, friends, and teachers in those who engaged in NSSI, made at least one suicide attempt, or engaged in both behaviors.

Depressogenic Cognition

Research suggests that depressogenic cognitions (i.e., negative perceptual and attributional styles) are associated with SIB. For example, longitudinal research suggests a negative cognitive style (i.e., the inclination to designate the causes of negative events to stable and global factors) predicts NSSI in adolescents (Guerry and Prinstein 2010; Hankin and Abela 2011). Additionally, among depressed adolescents, those classified as suicidal exhibited greater cognitive errors (e.g., personalization, selective abstraction) than depressed non-suicidal adolescents (Brent et al. 1990).

To date, the handful of studies that compare depressogenic cognitions across types of self-injury generally suggest that adolescents with a history of both NSSI and SA report more cognitive distortion than those with a history of NSSI alone. In a sample of 373 adolescents, Brausch and Gutierrez (2010) found that those who engaged in both NSSI and SA reported more negative self-views than those who only engaged in NSSI. Similarly, Dougherty and colleagues (2009) found that hospitalized adolescents who engaged in both forms of SIB reported more negative views of the future, or hopelessness, than those who engaged only in NSSI. Relatedly, Muehlenkamp and Gutierrez (2004; 2007) found that community adolescents with a history of NSSI and SA reported fewer reasons for living and a higher degree of negative self-evaluation than those with NSSI alone.

Current Study

Preliminary evidence suggests that perceptions of low support and depressogenic cognitions are associated with

adolescent suicidal behavior. Fewer studies have examined whether these types of cognitive distortion are associated with NSSI. Moreover, despite the need to better understand factors that differentiate and/or predict the co-occurrence of NSSI and SA (Andover et al. 2012), even fewer studies have examined whether perceptions of social support and cognitive distortions vary across SIB type. In the present paper, we build upon the aforementioned literature by comparing perceived social support and cognitive distortions across three groups of adolescents (those with NSSI only, SA only, and NSSI+SA) to more clearly differentiate between different forms of SIB. Specifically, we examined perceived social support from family, friends, and teachers, as well as cognitive errors, negative self-statements, and the cognitive triad (i.e., negative view of self, world, and future), in order to compare the relative importance of various types of cognitive distortion across groups within the same sample.

Preliminary research suggests that adolescents with NSSI+SA report greater cognitive distortion, including perceptions of lower parental support as well as negative self-views and hopelessness, than those with NSSI only. We hypothesized these results would be replicated in the current investigation. Moreover, it is likely that when present, cognitive distortion is less severe among youth with NSSI only versus SA. Therefore, we hypothesized that adolescents with a history of SA (with and without NSSI) would report lower social support and greater depressogenic cognition relative to those with only a history of NSSI. These hypotheses were tested in a large clinical sample of hospitalized adolescents.

Method

The methods used in this study have been described in a prior publication (Weismoore and Esposito-Smythers 2010). Participants were 185 adolescents (ages 13 to 18) recruited from a psychiatric inpatient facility in the northeastern United States. All adolescents admitted to the unit were eligible for study participation, provided that they spoke English, were in their parents' custody, and had sufficient cognitive functioning to complete the study (i.e., no active psychosis and a Verbal IQ estimate≥70 as per the Kaufman Brief Intelligence Test).

From the original sample of 185 adolescents, 148 teens (80 %) were identified with a history of SIB and divided into three groups: NSSI only, SA only, or both NSSI and SA. The mean age was 15.07 (SD=1.32) and 78.1 % were female. Approximately 85 % of adolescents identified themselves as Caucasian, 2.6 % African American, 2.0 % Asian, 2.6 % Native American, and 7.9 % other racial background. Approximately 12 % 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. Consistent with institutional review board approved procedures, adolescents and their parents were invited to participate in this study shortly after admission to the unit. They were administered a comprehensive assessment battery after providing written consent and assent. A bachelor's level research assistant administered the battery, with the exception of the diagnostic interview that was conducted by trained master's and doctoral level clinicians. 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.

Measures

Suicide attempts and nonsuicidal self-injury Lifetime history of NSSI and SA was assessed using the Schedule for Affective Disorders and Schizophrenia for School-Age Children (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 nonsuicidal self-injurious behaviors. In the present study, items pertaining to SA and NSSI included in the depression module were examined. The parent and child consensus rating was used in study analyses.

NSSI 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. Some examples of prompts used to assess NSSI include, "Did you ever try to hurt yourself even though you did not have any suicidal thoughts? Have you ever burned yourself with matches/candles? Or scratched yourself with needles, scissors, a knife, your nails? Anything else? How many times have you done this?"

SA as defined in the K-SADS-PL refers to physical acts done *with* the intent of killing oneself. Participants were asked to indicate whether they ever tried to kill themselves and the number of times this occurred. For each physical act endorsed, follow-up questions were asked including the method of attempt, whether anyone was present (room, apartment, or house), whether they told anyone in advance, whether they asked for help after the attempt, and what

happened after the attempt (e.g., unconscious, got sick, went to doctor for medical treatment or an evaluation). Behaviors performed with suicidal intent that occurred one or more times were coded as a SA. Some examples of prompts used to assess SA include, "Have you actually tried to kill yourself? When? What did you do? Did you really want to die? Was anybody in the room/apartment/house? Did you tell anyone in advance? Did you ask for any help after you did it? How close were you to dying? What happened after you tried to kill yourself?"Interviews were conducted by one of six trained masters or post-doctoral level clinical psychology trainees. 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. During the study, all interviews were audiotaped and 10 % were randomly selected and rated for reliability. Based on independent ratings of 37 randomly selected audiotapes, inter-rater reliability reflected fair to strong agreement across all diagnoses (kappas=.65–1.0). In addition to conducting regular reliability ratings, all cases were staffed during weekly clinical consensus team meetings. A best-estimate clinical consensus procedure was used to resolve discrepancies between adolescent and parent report and confirm psychiatric diagnoses as well as suicidal and non-suicidal self-injurious behavior. A best-estimate clinical consensus procedure is commonly used to reconcile discrepancies (Cantwell et al. 1997; Klein et al. 1994, 2001) and yields good to excellent reliability (Klein et al. 1994; 2001).

Social support The Survey of Children's Social Support (SOCSS; Dubow and Ullman 1989) is a 9-item self-report measure of peer, family, and teacher support. The measure assesses the adolescent's perception of how he or she is valued and esteemed by others. Each item is rated on a 5-point scale (1=*always*, 5=*never*). Internal consistency scores for the peer (α=.77), teacher (α=.82), and family (α=.88) subscales were acceptable in the present sample.

Negative self talk The frequency of anxious and depressive self-statements experienced in the past week were assessed with the Negative Affect Self-Statement Questionnaire (NASSQ ; Ronan et al. 1994). The NASSQ is a self-report questionnaire and each item is rated on a 5-point Likert scale (0=*not at all*, 5=*all the time*). Higher scores reflect more frequent negative self-talk. Adequate internal consistency, test-retest reliability, and convergent/divergent/ construct validity have been demonstrated in child and adolescent populations (Lerner et al. 1999; Ronan et al. 1994). Internal consistency in the present sample was high at .96.

Cognitive errors The Children's Negative Cognitive Errors Questionnaire (CNCEQ; Leitenberg et al. 1986) 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*." Higher scores represent a greater likelihood to catastrophize, overgeneralize, personalize, and use selective abstraction. Good internal consistency (α=.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 in the present study was high (α=.95).

Cognitions The Cognitive Triad Inventory for Children (CTI-C; Kaslow et al. 1992*)* is a 36-item self-report measure that assesses depressogenic thinking 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 scale that includes *yes*, *maybe*, or *no*. Higher scores reflect more positive views in each domain. Strong reliability, concurrent and discriminant validity have been demonstrated for the CTI-C (Kaslow et al. 1992). Each subscale yielded a high internal consistency in the present sample (Self α=.91; World α=.80; Future α=.94, and Total α=.96).

Data Analysis

Demographic information was examined for participants in the three SIB groups. Means and standard deviations for each measure were calculated across these groups, and a series of one-way ANOVAs with a Bonferroni correction of p=0.002 were computed to determine differences in these variables across groups. A one-way multivariate analysis of covariance (MANCOVA) was completed to examine group differences for main outcomes. Gender was examined as a covariate due to its significant correlation with some of the dependent variables (CNCEQ and NASSQ; see below). A series of independent group mean analyses were computed to further evaluate group differences. Homogeneity of variance was first examined using Levene's Test. If Levene's test was non-significant, one-way ANOVAs were computed to examine univariate main effects of each dependent variable, and post-hoc comparisons were examined using Tukey's LSD. If Levene's test was significant, a non-parametric Kruskal-Wallis Test was utilized to examine univariate main effects of each dependent variable, followed by pairwise comparisons. Violations of homogeneity of variance were noted for CTI-C Self, CTI-C Future, and CNECQ. Effect sizes for omnibus univariate analyses are reported in terms of η^2. Effect sizes are noted in terms of Cohen's d for post-

hoc comparisons. A Bonferroni correction of p=0.006 was used to determine significance.

Results

Seventy percent of adolescents in the sample reported a history of NSSI. Forty-two percent engaged in self-injurious acts greater than 12 times per year, approximately 17 % committed acts of NSSI between 4–11 times a year, and about 10 % engaged in NSSI between one and three times a year. Approximately 64 % of adolescents in the sample made a suicide attempt. The number of actual attempts for adolescents in the sample ranged from zero to twelve (M=2.14, SD=2.19, total attempts=223) with the largest proportion of adolescents endorsing one (42.3 %) or two (25 %) attempts. Adolescents were collapsed into one of three groups: NSSI only (NSSI; 24.3 %; n=45), SA only (SA; 13 %; n=24) or both NSSI and SA (NSSI+SA; 42.7 %; n=79) for study analyses.

Demographic and diagnostic factors (see Table 1) were analyzed to identify differences across SIB groups. Results of a series of one-way ANOVAs with a Bonferroni correction of p=0.002 showed no significant group differences on demographic or diagnostic measures examined other than gender (F (2, 148)=9.247, p<001). Gender was examined as a covariate in all MANCOVA analyses. A one-way MANCOVA showed a significant multivariate main effect for NSSI/SA group [Wilks' λ=.710, F (16,274)=3.206, p<001, η^2=.158] suggesting differences between the three groups, however, there was no main effect for gender [Wilks' λ=.908, F (8, 137)=1.736, p=.095, η^2=.092].

Depressogenic Cognition

A series of one-way ANOVAs are presented in Table 2 and indicated significant group differences on negative views of the world (CTI-C World) and negative self-statements (NASSQ). Non-parametric Kruskal-Wallis tests indicated significant group differences on negative views of self (CTI-C Self), negative views of the future (CTI-C Future), and negative cognitive errors (CNCEQ). Post-hoc tests revealed significant differences between NSSI+SA and NSSI groups on negative views of self (p<.001, d=.653), negative views of the world (p<.001, d=.889), negative views of the future (p<.001, d=.752), negative cognitive errors (p=.001, d=.774), and negative self-statements (p<.001, d=.777). Scores on negative views of the self, world, and future were significantly lower for the NSSI+SA group compared to the

Table 1 Demographics and diagnoses across groups

Characteristic	NSSI (N=45) *M (SD) or %*	SA (N=24) *M (SD) or %*	NSSI+SA (N=79) *M (SD) or %*	p-value
Age	14.81 (1.21)	15.46 (1.47)	15.11 (1.32)	.136
Gender				<.001*
Female	74.5 %	50.0 %	88.8 %	
Race				.141
Caucasian	93.6 %	79.2 %	81.3 %	
Other	6.4 %	20.8 %	18.7 %	
Ethnicity				.147
Hispanic	4.3 %	16.7 %	15.0 %	
Non-Hispanic	95.7 %	83.3 %	85.0 %	
K-SADS Diagnosis				
MDD	63.8 %	62.5 %	71.3 %	.589
Dysthymia	4.3 %	0.0 %	5.0 %	.548
Bipolar	2.1 %	12.5 %	5.0 %	.182
GAD	19.1 %	12.5 %	35.0 %	.035
Social Phobia	34.0 %	16.7 %	45.0 %	.036
PTSD	29.8 %	4.2 %	36.3 %	.009
ADHD	31.9 %	20.8 %	37.5 %	.312
Conduct	21.3 %	12.5 %	31.3 %	.138
ODD	14.9 %	8.3 %	18.8 %	.466
Alcohol Abuse	12.8 %	20.8 %	13.8 %	.635
Alcohol Dependence	4.3 %	4.2 %	11.3 %	.285
Substance Abuse	6.4 %	12.5 %	16.3 %	.274
Substance Dependence	14.9 %	20.8 %	18.8 %	.794

* statistically significant difference; p-values were obtained from a series of one-way ANOVAs with a Bonferroni correction of p=0.002

K-SADS Schedule for affective disorders and schizophrenia for school age children; *MDD* major depressive disorder; *GAD* generalized anxiety disorder; *PTSD* post traumatic stress disorder; *ADHD* attention deficit hyperactivity disorder; *ODD* oppositional defiant disorder

Table 2 Associations between types of self-injurious behavior and social-cognitive factors

Dependent Measure	NSSI (*N*=45) *M* (*SD*)	SA (*N*=24) *M* (*SD*)	NSSI+SA (*N*=79) *M* (*SD*)	*F*/*H*	*p*	η^2/*d*
CTI-C Self	17.02 (6.70)^{A}	19.46 (3.98)^{A}	12.75 (6.38)^{B}	27.247	<0.001*	n/a
CTI-C World	17.13 (4.51)^{A}	16.46 (3.92)^{A}	13.13 (4.50)^{B}	13.273	<0.001*	0.156
CTI-C Future	19.24 (5.69)^{A}	20.58 (3.54)^{A}	14.30 (7.34)^{B}	25.744	<0.001*	n/a
CNCEQ	46.29 (16.17)^{A}	46.04 (21.44)^{A}	61.49 (22.59)^{B}	19.029	<0.001*	n/a
NASSQ	83.36 (35.39)^{A}	74.83 (31.66)^{A}	111.65 (37.38)^{B}	11.714	<0.001*	0.140
SOCSS Family	4.05 (0.87)^{A}	3.93 (0.92)^{A}	3.40 (1.07)^{B}	8.935	<0.001*	0.110
SOCSS Teacher	3.43 (0.95)	3.31 (0.94)	3.22 (0.97)	.630	0.534	0.009
SOCSS Friend	3.99 (0.90)	4.24 (0.78)	3.96 (0.80)	1.132	0.325	0.015

Within each row, means with the same letter superscript do not differ significantly from one another according to a series of one-way ANOVAs and non-parametric Kruskal-Wallis tests with a Bonferroni correction of p=0.006. Effect sizes were not produced in the Kruskal-Wallis tests. *CTI-C* cognitive triad inventory-children; *CNCEQ* children's negative cognitive error questionnaire; *NASSQ* negative affect self-statement questionnaire; *SOCSS* survey of children's social support; *NSSI+SA* history of non-suicidal self-injury and suicide attempt; *NSSI* history of non-suicidal self-injury without a history of suicide attempt; *SA* history of suicide attempt without a history of non-suicidal self-injury; * statistically significant difference (p<0.006)

NSSI group indicating more cognitive distortion in the NSSI+SA group. Scores on negative cognitive errors and negative self-statements were significantly higher in the NSSI+SA group compared to the NSSI group, also indicating more cognitive distortion in the NSSI+SA group. Similarly, significant differences were found between NSSI+SA and SA on negative views of self (p<.001, d=1.260), negative views of the world (p=.001, d=.789), negative views of the future (p<.001, d=1.090), negative cognitive errors (p=.003, d=.702), and negative self-statements (p<.001, d=1.063). Scores on negative views of the self, world, and future were significantly lower for the NSSI+SA group compared to the SA group indicating greater cognitive distortion in the NSSI+SA group. Scores on negative cognitive errors and negative self-statements were significantly higher in the NSSI+SA group compared to the SA group, also indicating greater cognitive distortion in the NSSI+SA group. There were no significant differences between NSSI only and SA only groups on measures of cognitive factors.

Perceptions of Social Support

Omnibus one-way ANOVAs indicated significant group differences on perceived family support (SOCSS Family subscale). There were no significant group differences on perceived teacher support (SOCSS teacher subscale) or on perceived social support from friends (SOCSS friends subscale). Post-hoc tests revealed significant differences between the NSSI+SA and NSSI groups on perceived family support (p<.001, d=.673). There was also a significant difference between NSSI+SA and SA groups on perceived family support (p=.005, d=.535). Scores on perceived family support were significantly lower in the NSSI+SA group compared to the NSSI group and the SA group, indicating lower levels of perceived social support from family in the NSSI+SA group compared to either the NSSI group or the SA group. There were no significant differences between NSSI and SA groups on measures of social factors.

Discussion

The current study sought to examine differences in the clinical correlates of distinct presentations of SIB. To date, surprisingly little is known about how to differentiate these groups and identify those at greatest risk for serious NSSI and suicidal behavior. Previous research has focused primarily on identifying aspects of psychopathology that may discriminate between adolescents who engage in NSSI and those who attempt suicide. This investigation explores other potential variables that may differentiate these groups by evaluating similarities and differences in perceived social support and depressogenic cognition among psychiatrically hospitalized youth with a history of NSSI, SA, or NSSI+SA.

Results showed nearly 77 % of those who had a history of a SA also reported NSSI. These findings are consistent with prior research that found high rates of NSSI among youth who attempted suicide (Muehlenkamp and Gutierrez 2004; Nock et al. 2006). However, it is also important to note that nearly a quarter of participants who attempted suicide did not report prior NSSI, thus highlighting the heterogeneity among suicidal youth. These results emphasize the importance of taking all acts of self-injury seriously, and the imperative need to investigate factors that may differentiate those at highest risk for specific types of SIB.

In partial support of study hypotheses, youth with a history of NSSI+SA, relative to those with only one of these forms of SIB, reported greater cognitive errors, negative views of the self, world and future, and negative self-statements. Findings associated with negative views of oneself and future are consistent with prior research (Brausch and Gutierrez 2010; Muehlenkamp and Gutierrez 2007) whereas this is the first study to explore cognitive errors and negative self-statements in this regard. The association between perceptions of support and SIB groups was found to vary by type of support examined. Perceptions of family support were only found to differ between youth with a history of both NSSI+SA, relative to those with either behavior alone. This finding supports previous research that found less parental support among adolescents with a history of NSSI+SA relative to those with NSSI only (Brausch and Gutierrez 2010). In contrast, no differences were found across SIB groups on perceptions of peer or teacher support.

Our preliminary study findings reflect that perceived lack of family support has a greater association with the co-occurrence of NSSI+SA than other sources of support. While peer and teacher support are critical factors in adolescent development, it appears that family support may play a formative role in the expression of NSSI and SA. It is possible that those who have better communication with parents and perceive their parents as more dependable have a greater or more stable foundation for coping skills than those who rely on the support of peers or teachers. Alternatively, it is possible that peer support may be just as important as family support, but the effects of peer support may vary to a greater degree across youth. Indeed, prior research suggests that peer support may serve to reinforce maladaptive and risk taking behavior among psychologically impaired adolescents (Deliberto and Nock 2008; Kerr et al. 2006). Thus, for some youth, peer social support might reduce the likelihood of NSSI and SA, whereas for others, peer social support might increase the propensity toward NSSI and SA. It is possible that such variability may have attenuated the significance of peer support in this severely impaired sample.

Contrary to study hypotheses, no differences in depressogenic cognitions or perceptions of any forms of support (family, peer, teacher) were found between youth with a history of NSSI only or SA only. However, those with NSSI and SA reported greater distortion than either alone. Though there was no control group, the means of the variables under investigation were elevated relative to that found in community based samples across all groups. As interpersonal stressors are common precipitants to both NSSI and SA (Johnson et al. 2002; Prinstein et al. 2009), these results suggest that youth with NSSI or SA alike may process such events in a similarly distorted manner. Indeed, Guerry and Prinstein (2010) found that the interaction between interpersonal stressors and negative attributional style predicted increases in NSSI over the course of 18 months, even after controlling for depressive symptoms.

The greater severity of distortion among youth with both NSSI+SA may reflect an additive effect of distortion associated with each behavior. It is also possible that repeatedly engaging in either form of SIB perpetuates and strengthens cognitive distortion (e.g., negative self-view, hopelessness), particularly when it is not met with a desired response from family members. One hypothesized function of NSSI is to manage the social environment (Nock and Prinstein 2004, 2005). Under such conditions, the likelihood of the onset of other forms of SIB, or the risk for co-occurrence of a SA and NSSI, may increase.

The current study yields valuable information about the nature of SIB among adolescent inpatients. Despite the gravity of SA and NSSI, and the substantial subgroup of youth that exhibit both behaviors, relatively little is known about associated risk, protective, and maintenance factors (Andover et al. 2012). While the temporal relationship between NSSI, SA, depressogenic cognition, and perceived support cannot be determined in these analyses, these findings may provide a starting point for intervention. Clinicians should not only consider the severity of psychopathology symptoms, but also closely monitor depressogenic cognition and perceived social support in determining the risk for potential SA and NSSI. Greater severity, or increases in severity, of distortion in these areas may reflect a need for early intervention and prevention of further suicidal and non-suicidal self-injury. Skills based intervention approaches, particularly those that incorporate cognitive restructuring and family work, may prove particularly useful in this regard. As suggested by Brausch and Gutierrez (2010), family support is an important treatment target for youth with NSSI and/or SA, whether perceived lack of support precedes or results from SIB. The use of family therapy models, or incorporating family members into treatment of youth with SIB, may help prevent the onset of both behaviors and/or reduce their re-occurrence. In particular, family communication may be an important treatment focus due to the influence of perceived family support and research suggesting the use of SIB as a way to communicate and express emotion dysregulation.

Several limitations of this research should be noted. First, due to the cross-sectional nature of the data, causal relationships could not be determined among the variables examined. Second, this sample consisted of adolescent psychiatric inpatients that were primarily Caucasian. Thus, findings may not generalize to other populations, including community-based samples of adolescents, minority groups, or adolescents who choose not to participate in research studies. Still, these findings may provide important information for those who work with adolescents in inpatient

settings. Third, while the overall sample size in this study appeared adequate, the sample size of each SIB group varied and may have impeded the ability to identify group differences, particularly among the SA alone group. Larger, balanced sample sizes among these groups in future research would be useful. Fourth, it should be noted that there is some debate about the use of dichotomous ratings of NSSI and SA behaviors, especially when teens indicate uncertainty about their suicidal intent. However, as noted by Prinstein (2008), this debate may not be resolved without further research and it remains common practice to categorize these behaviors based on the presence or absence of the intent to die. Finally, future studies may be enhanced through a more detailed assessment of self-directed injury that may allow for a dimensional analysis of behaviors. The current study relied on a limited section of the KSADS interview that does not prompt for a comprehensive description of self-injurious acts. Future studies should include alternative measures of SIB that yield more detailed descriptions of the type, frequency, severity, and perceived purpose or function of NSSI and SA. Use of these measures may also allow for continuous ratings of SIB that are not limited by traditional dichotomous ratings based on the presence or absence of the intent to die.

Despite these limitations, the findings presented in this study add uniquely to the growing body of literature on adolescent NSSI and SAs. In addition to replicating previous findings, this study extends prior research by examining a greater array of cognitive variables across three distinct groups of adolescents with SIB. Identification of potential predictors of NSSI and/or SA, such as depressogenic cognitions and perceived social support, contribute to the advancement of clinical theory, assessment, and the prevention of SIB. Future prospective research that builds upon the present study results is needed to further advance knowledge in this area and improve treatment and prevention of SIB in adolescents.

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