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The Functions of Nonsuicidal Self-Injury in an Adolescent Clinical Sample: Frequency, Structure, and Psychological Correlates

A Dissertation Presented

by

Catherine Rose Glenn

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Abstract of the Dissertation

The Functions of Nonsuicidal Self-Injury in an Adolescent Clinical Sample: Frequency, Structure, and Psychological Correlates

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Nonsuicidal self-injury (NSSI; e.g., cutting and burning) is most prevalent among adolescents, especially in clinical populations. Understanding the functions of NSSI can help clarify the behavior's etiology and treatment. Although research has begun to examine common functions of NSSI, there have been three major shortcomings to this literature: (a) inadequate assessment of the full range of NSSI functions, (b) use of non-validated assessment instruments, and (c) a limited examination of the psychological correlates of NSSI functions. The current study addressed these limitations through the use of a valid, comprehensive measure of NSSI functions and thorough measurement of diagnostic and clinical correlates of NSSI functions. In addition to supporting previous findings on the frequency and factor structure of NSSI functions, a central goal of the current project was to examine how NSSI functional endorsement varies for self-injurers with externalizing versus internalizing psychopathology, and for injurers with versus without borderline personality disorder (BPD). Consistent with previous research, the current study found that the most common NSSI functions were affect regulation and self-punishment.

In addition, results support a two-factor structure of NSSI functions: (a) intrapersonal – self-reinforcing (e.g., affect regulation) and (b) interpersonal – other-reinforcing (e.g., interpersonal influence). In regard to psychological correlates, greater endorsement of intrapersonal functions was associated with internalizing disorders (i.e., anxiety disorders, depressive disorders, and bulimia) and suicidal ideation, as well as with emotion and personality correlates (i.e., negative emotionality, impulsive urgency, loneliness, and self-derogation), even when controlling for NSSI severity (i.e., lifetime NSSI methods and frequency). Greater endorsement of interpersonal functions was associated with distress disorders (i.e., generalized anxiety disorder, depressive disorders, and posttraumatic stress disorder) and BPD, even when controlling for NSSI severity. Treatment implications of this research are discussed.

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List of Abbreviations

ADHD = Attention Deficit Hyperactivity Disorder

BPD = Borderline Personality Disorder

ISAS = Inventory of Statements About Self-Injury

NSSI = Nonsuicidal Self-Injury

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Introduction

Definition

Nonsuicidal self-injury (NSSI) refers to the deliberate, self-inflicted destruction of body tissue without suicidal intent, and for purposes not socially sanctioned (Favazza & Conterio, 1989; Herpertz, 1995; International Society for the Study of Self-Injury, n.d.; Nock & Prinstein, 2004; Whitlock, Eckenrode, & Silverman, 2006). This behavior has also been referred to by other names, including deliberate self-harm (Pattison & Kahan, 1983), self-mutilation (Favazza & Rosenthal, 1993), and parasuicide (Linehan, 1987). As many as 14 different types of NSSI have been identified, but the most common forms include skin-cutting, burning, and severe scratching (Heath, Toste, Nedecheva, & Charlebois, 2008; Nock & Prinstein, 2004; Ross & Heath, 2002; Whitlock et al., 2006). Other forms of NSSI include banging/hitting body parts, biting, carving, interfering with wound healing, pinching, pulling hair, rubbing skin against rough surfaces, sticking self with needles, and swallowing dangerous chemicals (Glenn & Klonsky, 2009; Whitlock et al., 2006). The majority of self-injurers use multiple NSSI methods over their lifetime (Glenn & Klonsky, 2009; Gratz, 2001; Whitlock et al., 2006).

Prevalence

Although the field lacks definitive epidemiological data, best estimates suggest that rates of NSSI are 4-6% in the general adult population (Briere & Gil, 1998; Klonsky, in press) and 20% in adult patient populations (Briere & Gil, 1998; Klonsky, Oltmanns, & Turkheimer, 2003). However, rates of NSSI appear to be disproportionately high in adolescents and young adults (Ross & Heath, 2002; Whitlock et al., 2006). Approximately 8% of children ages 12 to 14 (Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008), 14-15% of adolescents (Laye-Gindhu & Schonert-Reichl, 2005; Ross & Heath, 2002), and 17% or more of college students (Glenn & Klonsky,

2009; Gratz, 2001; Whitlock et al., 2006) report having self-injured. In adolescent inpatient samples, rates of NSSI are reported to be 40% or higher (DiClemente, Ponton, & Hartley, 1991; Kumar, Pepe, & Steer, 2004). It also appears that NSSI is increasing over time because *lifetime* rates are higher in younger compared to older populations (Briere & Gil, 1998; Klonsky, in press; Zlotnick, Mattia, & Zimmerman, 1999).

Demographic Correlates

The age of first onset of NSSI is relatively stable across studies (i.e., between 13 and 16 years of age; Muehlenkamp & Gutierrez, 2004; Rodham, Hawton, & Evans, 2004). However, research on how NSSI varies based on gender and ethnicity has been less consistent. Some studies indicate higher rates in females (Muehlenkamp & Gutierrez, 2004; Whitlock et al., 2006), while others find no gender differences (Briere & Gil, 1998; Klonsky et al., 2003). However, there appear to be gender differences in the forms of self-injury used by males and females rather than differences in overall prevalence rates. For example, males report more self-hitting and females more skin-cutting (Laye-Gindhu & Schonert-Reichl, 2005). A recent study examined differences between male and female self-injurers in a psychiatric sample (Claes, Vandereycken, & Vertommen, 2007). In this study, males were found to engage in more burning, to experience more pain, and to use self-injury to get attention from others (i.e., socially-oriented functions). Females, in comparison, engaged in more skin-cutting, reported more interpersonal complaints, and more histories of sexual abuse. In addition to gender differences, there also appears to be disagreement concerning the racial disparity in NSSI. Some studies have found higher rates of self-injury in Caucasian compared to non-Caucasian populations (Bhugra, Singh, Fellow-Smith, & Bayliss, 2002; Ross and Heath, 2002), whereas other studies have found similar rates of NSSI in Caucasian and minority samples (Lipschitz et al., 1999; Marshall & Yazdani, 1999).

Diagnostic Correlates

High, and potentially increasing, rates of NSSI are alarming because of NSSI's association with severe psychopathology. In the current edition of the Diagnostic and Statistical Manual of Mental Disorders (i.e., DSM-IV; American Psychiatric Association, 1994), NSSI is mentioned only once, as a symptom of borderline personality disorder (BPD). However, NSSI is associated with a range of Axis I and II diagnoses. For example, although self-injury exhibits a particularly large association with BPD (Andover, Pepper, Ryabchenko, Orrico & Gibb, 2005; Glenn & Klonsky, 2009; Klonsky et al., 2003; Stanley, Gameroff, Michalsen, & Mann, 2001), it is also related to other personality disorders, including histrionic, dependent, avoidant, paranoid, and schizotypal PDs (Klonsky et al., 2003; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Beyond Axis II PDs, self-injurers also exhibit higher rates of Axis I disorders, compared to noninjuring controls, including (a) internalizing disorders: anxiety and depression (Andover et al., 2005; Darche, 1990; Hawton, Rodham, Evans, & Weatherall, 2002; Klonsky et al., 2003), and eating disorders: anorexia and bulimia nervosa (Darche, 1990), as well as (b) externalizing disorders: conduct disorder and oppositional defiant disorder (Darche, 1990). In addition, high rates of substance use disorders are reported among NSSI samples (Favazza & Conterio, 1989; Nock et al., 2006), but have not been compared to rates in noninjuring controls.

Importantly, a recent study found that approximately 12% of adolescent inpatients who engaged in NSSI did not meet full diagnostic criteria for any existing DSM-IV Axis I disorder (Nock et al., 2006). These results may have significant treatment implications. It is possible that this group of self-injurers (i.e., without an Axis I diagnosis) may not receive adequate or appropriate treatment, or may be misdiagnosed for insurance purposes. Therefore, this finding may support the current decision of two Diagnostic and Statistical Manual of Mental Disorders

version 5 (DSM-V) Workgroups (i.e., Child and Adolescent Disorders and Mood Disorders Workgroups) to consider classifying NSSI as a distinct syndrome in DSM-V.

Suicidality

In addition to being associated with a number of DSM-IV disorders, NSSI is also related to suicidality, although the link is complicated and not well understood. For instance, although NSSI differs from suicidal behavior in terms of motivation (i.e., individuals who engage in NSSI want to continue life, whereas those who engage in suicide attempts want to end life) and medical severity (i.e., NSSI requires medical attention less often and is more superficial in its tissue damage than attempted suicide) (Brown, Comtois, & Linehan, 2002; Favazza & Conterio, 1989; Muehlenkamp & Gutierrez, 2004), NSSI remains a documented risk factor for suicidal behavior. Elevated rates of suicidal ideation and behaviors are consistently reported among self-injuring populations (Glenn & Klonsky, 2009; Nock et al., 2006; Whitlock et al., 2006). In addition, certain features of NSSI are predictive of suicidality, including a longer history of NSSI and more NSSI methods (Nock et al., 2006), greater endorsement of NSSI intrapersonal functions (e.g., affect regulation; Klonsky & Glenn, 2009; Nock & Prinstein, 2005), absence of pain during NSSI (Nock et al., 2006), and engaging in NSSI while alone (Glenn & Klonsky, 2009). Moreover, from the perspective of Joiner's theory of suicide (2002), NSSI is a risk marker for increased suicide capability because self-injurers habituate to the fear and pain of self-inflicted violence.

NSSI Functions

Understanding the functions of NSSI can help clarify the behavior's etiology and treatment. Research has begun to illuminate factors that cause NSSI and maintain the behavior over time. In a review of the literature, Klonsky (2007) found that although NSSI can serve

various purposes, from punishing oneself to eliciting attention from others (Briere & Gil, 1998; Brown et al., 2002; Favazza, DeRosear, & Conterio, 1989; Nock & Prinstein, 2004; Rodham et al., 2004), studies have consistently found that the behavior's most common motivation is affect regulation (i.e., to stop bad feelings or to calm down; Klonsky, 2007; Klonsky & Glenn, 2009; Nock & Prinstein, 2004). In fact, this finding has been stable across all types of samples. Favazza and Conterio (1989) found that affect regulation was the most highly endorsed function in a nonclinical sample of adult females. In addition, many studies (Briere & Gil, 1998; Brown et al., 2002; Herpertz, 1995) have replicated this finding in adult clinical samples, both inpatient and outpatient. The pervasiveness of an affect regulation function has also been observed in adolescents, including both nonclinical (Laye-Gindhu & Schonert-Reichl, 2005) and clinical samples (Nock & Prinstein, 2004).

Further supporting the emotion regulation function of NSSI, converging evidence from self-report and laboratory studies suggests that: (a) NSSI is preceded by intense negative affect and followed by decreased negative affect and increased relief (Briere & Gil, 1998; Kemperman, Russ, & Shearin, 1997; Laye-Gindhu & Schonert-Reichl, 2005), (b) laboratory proxies for NSSI cause decreases in negative affect and arousal (Brain, Haines, & Williams, 1998; Haines, Williams, Brain, & Wilson, 1995; Russ et al., 1992), and (c) reductions in negative affect following NSSI predict lifetime frequency of the behavior, and might therefore provide the reinforcement that perpetuates the behavior over time (Klonsky, 2009).

Beyond affect regulation, the second most commonly endorsed function of NSSI is self-punishment (i.e., to derogate or express anger, disgust, or contempt towards oneself). Studies have found evidence for this function in adult nonclinical (Favazza & Conterio, 1989) and clinical samples (Briere & Gil, 1998; Brown et al., 2002), as well as in adolescent nonclinical

(Laye-Gindhu, & Schonert-Reichl, 2005) and clinical samples (Nixon, Cloutier, & Aggarwal, 2002; Nock & Prinstein, 2004). Other NSSI functions that have received modest support include, anti-dissociation (i.e., to stop the experience of disconnection or depersonalization; Brown et al., 2002; Favazza & Conterio, 1989), interpersonal influence (i.e., to obtain help from others/manipulate others; Brown et al., 2002; Herpertz, 1995; Laye-Gindhu, & Schonert-Reichl, 2005), sensation seeking (i.e., to create feelings of excitement; Laye-Gindhu, & Schonert-Reichl, 2005; Nixon et al., 2002), and anti-suicide (i.e., to avoid the urge to attempt suicide; Laye-Gindhu, & Schonert-Reichl, 2005; Nixon et al., 2002).

Measurement of NSSI Functions

As discussed above, previous studies have examined some functions of NSSI. However, there are a number of limitations to this previous research, including the use of measurement instruments with unknown psychometric properties and incomplete assessment of the full range of NSSI functions (Klonsky, 2007). Most of the studies referenced above used different measures to assess NSSI functions. In fact, due to the nonexistence of a standardized measure of NSSI functions, many researchers designed their own instrument for their individual study (Briere & Gil, 1998; Favazza & Conterio, 1989). In addition, most previous NSSI functions studies utilized questionnaires that underrepresent the number and variety of motivations endorsed by self-injurers (Klonsky, 2007).

Perhaps the measure of NSSI functions with the most well-established psychometric properties is the Functional Assessment of Self-Mutilation (FASM; Lloyd, Keeley, & Hope, 1997). The FASM has been utilized in some seminal NSSI studies (Nock & Prinstein 2004; 2005), and has demonstrated fair psychometric properties, including adequate internal consistency and criterion validity in relation to other clinical variables (Esposito, Spirito,

Boergers, & Donaldson, 2003; Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001; Lloyd et al., 1997; Penn, Esposito, Schaeffer, Fritz, & Spirito, 2003). However, this measure has some important limitations. Psychometrically, the FASM includes only two items on the automatic-negative subscale (i.e., intrapersonal-negative reinforcement – affect regulation), even though this scale assesses the NSSI functions consistently found to be most prevalent. Two items are not sufficient for a psychometrically sound scale. Moreover, one of the two items from this scale was moved from the automatic-negative to the automatic-positive subscale (i.e., intrapersonal-positive reinforcement – feeling generation) in a later study (see Nock, Holmberg, Photos, & Michel, 2007). In addition, the FASM is not comprehensive, in that it does not assess a number of functions acknowledged in the clinical literature, including resisting suicidal urges and sensation seeking (Klonsky, 2007).

To fill this gap in the field, a new and more comprehensive measure of NSSI functions was created: the Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009). The ISAS was constructed based on a complete review of the current NSSI literature (Klonsky, 2007), correspondence with NSSI researchers and clinical professionals, and review of online NSSI websites. The ISAS is the most comprehensive measure of NSSI functions to date. In total, the ISAS assesses 13 NSSI functions (i.e., affect regulation, anti-dissociation, anti-suicide, autonomy, interpersonal boundaries, interpersonal influence, marking distress, peer bonding, revenge, self-care, self-punishment, sensation seeking, and toughness), each of which has its own subscale (Klonsky & Glenn, 2009). The ISAS has demonstrated good psychometric properties in a large sample of young adult self-injurers (Klonsky & Glenn, 2009; further details about the ISAS are provided below in the Structure of NSSI section).

Structure of NSSI Functions

Although research to date has identified many functions of NSSI (Briere & Gil, 1998; Laye-Gindhu & Schonert-Reichl, 2005; Nixon et al., 2002), the conceptual and empirical overlap among these functions remains unclear. Nock and Prinstein (2004) were the first to propose that the various functions of NSSI could be organized into superordinate factors. In a sample of 108 adolescent inpatients, the authors utilized the FASM to measure NSSI functions (Lloyd et al., 1997). A confirmatory factor analysis suggested that the functions of NSSI could be organized into four groups along two dimensions. The first dimension divided the functions of NSSI into two types: automatic functions (i.e., intrapersonally reinforcing functions – affect regulation, self-punishment) and social functions (i.e., interpersonally reinforcing functions – attention-seeking, peer bonding). The second dimension further divided the automatic and social functions into those that are positively reinforcing and those that are negatively reinforcing (i.e., automatic-negative, automatic-positive, social-negative, and social-positive). From this perspective, self-injuring to regulate overwhelming emotions is conceptualized as negatively reinforcing, whereas self-injuring to feel something (even if it is pain) is conceptualized as positively reinforcing, even though both would be regarded as automatic functions.

However, there are both conceptual and empirical problems with the positive/negative distinction for the automatic and social function scales. An examination of FASM items suggests that many items assigned to the automatic-negative and automatic-positive scales could be conceptualized as either negatively or positively reinforcing. For example, 'to feel relaxed' could be conceptualized as positively reinforcing (i.e., generating a state of calm) or negative reinforcing (e.g., alleviating stress). Therefore, it is not surprising that FASM items do not reliably stay on the positive or negative scales. For instance, individuals who self-injure to

relieve feeling numb or empty (i.e., anti-dissociation function) are trying to alleviate a negative state (i.e., numbness). Therefore, the anti-dissociation function may be best conceptualized as automatic-negative reinforcement. However (as mentioned above), this item of the FASM initially was placed on the automatic-negative function scale in the original CFA (Nock & Prinstein, 2004), but then loaded onto the automatic-positive function scale in a later study (Nock et al., 2007), leaving only one item on the automatic-negative scale. Notably, functions that are more consistent with automatic-positive motivations, such as generating excitement, are not included on the FASM.

There also appears to be substantial conceptual and empirical overlap for the social-negative and social-positive functions. Similar to the automatic functions, many social functions can also be regarded as both positively and negatively reinforcing. For example, 'to gain control of a situation' is classified as a social-positive function. However, feeling out of control is an unpleasant state and therefore gaining control might be better conceptualized as a social-negative function. In fact, the empirical overlap between the social-negative and social-positive function scales is quite substantial (r[108] = .78; Nock & Prinstein, 2004).

Moreover, there are psychometric problems with the positive/negative distinction. First, Nock and Prinstein's original study (2004) reported that the two-, three-, and four- factor models all demonstrated a better fit to the data than a one-factor model. However, because the more parsimonious models (i.e., the two- and three-factor models) did not provide a significantly better model fit, the four-factor model was retained. Importantly, the four-factor model did not provide a better fit to the data than the other two models. Given the similar fit of the models, some may argue that the two-factor rather than four-factor model should have been retained using the standard of parsimony (Fabrigar, Wegener, MacCallum, & Strahan, 1999). In addition,

as mentioned above, the total scales for the automatic-negative and automatic-positive factors are composed of only two (or one item in Nock et al., 2007) and three items, respectively, which is not an adequate number of items for a factor scale.

Lastly, one core feature of a useful clinical scale is its meaningful relationship with diagnostic and/or personality variables. Although automatic and social functions have distinct clinical correlates (Nock & Prinstein, 2005), the correlates of automatic-negative versus automatic-positive functions are either nonspecific or atheoretical. For example, there is no previous research to predict that major depression would be more related to automatic-positive than to automatic-negative functions of NSSI. In fact, conceptually, we might expect major depression to be higher in those who want relief from unpleasant emotions and therefore endorse more automatic-negative functions. In conclusion, there is both conceptual and empirical consensus on the automatic/social (or intra/interpersonal) dimension of NSSI functions (Klonsky & Glenn, 2009; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007; Nock et al. 2007). However, at this time, there is not adequate support for the positive/negative distinction as an empirically valid or clinically important dimension of NSSI functions.

Consistent with Nock and Prinstein's (2004) automatic/social NSSI function dimension, a recent exploratory factor analysis (Klonsky & Glenn, 2009) revealed that the 13 NSSI functions assessed by the ISAS load onto two superordinate function factors: (a) intrapersonal functions (i.e., self-reinforcing; corresponding to the dimension labeled by Nock & Prinstein [2004] as 'automatic') and (b) interpersonal functions (i.e., reinforced by others; corresponding to the dimension labeled by Nock & Prinstein [2004] as 'social'). The intrapersonal functions factor is comprised of five functions for NSSI that are self-reinforcing (i.e., affect regulation, anti-dissociation, anti-suicide, marking distress, and self-punishment). In contrast, the interpersonal

functions factor includes eight NSSI motivations that are reinforced by others (i.e., autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, self-care, sensation-seeking, and toughness). In short, this study supported the original distinction between intrapersonal and interpersonal functions of NSSI using a more comprehensive assessment tool.

The ISAS has demonstrated good psychometric properties in a large sample of young adult self-injurers (Klonsky & Glenn, 2009). First, the two superordinate function factors exhibited excellent internal consistency (intrapersonal α = .80 and interpersonal α = .88) and accounted for 61% of variance in NSSI functions. In addition, a recent study found that the ISAS function scales demonstrated good one-year test-retest reliability (Glenn & Klonsky, in press). Consistent with previous research (Brown et al., 2002; Nock & Prinstein, 2004), the intrapersonal functions received greater endorsement than interpersonal functions. In regard to gender differences, women were more likely to endorse intrapersonal functions than were men, but there were no gender differences in the overall endorsement of interpersonal functions. As for the individual function subscales, there was only one gender difference: men were more likely than women to endorse the sensation seeking function. Lastly, the ISAS demonstrated good construct validity in its relationship to both clinical variables and contextual features of NSSI. In line with previous studies (Lloyd-Richardson et al., 2007; Nock & Prinstein, 2005), both intrapersonal and interpersonal functions were related to depression, anxiety, borderline personality disorder (BPD) features, and suicidality (i.e., suicidal ideation, plans, and attempts). However, consistent with Nock and Prinstein (2005), intrapersonal functions were related to significantly greater depression, BPD features, and suicidal ideation, compared to interpersonal functions. In addition, only intrapersonal functions were significantly related to self-injuring while alone. Because reinforcement associated with intrapersonal functions is self-focused (e.g.,

relieving one's negative emotions, or directing anger at oneself), it stands to reason that individuals endorsing intrapersonal functions would most often self-injure alone.

Clinical Correlates of NSSI Functions

Beyond a functional assessment of the behavior itself, it is also important to understand the implications of different functions for diagnosis and treatment. Identifying psychological correlates of functions could help clarify the clinical presentation of self-injurers who engage in NSSI for different reasons. For example, self-injurers who primarily endorse the affect regulation function of NSSI may present with disorders of emotion, such as anxiety or depression, whereas self-injurers who primarily endorse the sensation seeking function of NSSI may present with more externalizing psychopathology.

Only a few studies to date have examined the relationship of NSSI functions to clinical and personality variables. In a sample of adolescent inpatients, Nock and Prinstein (2005) found that intrapersonal functions (i.e., referred to as 'automatic' functions) were related to hopelessness, major depressive disorder symptoms, posttraumatic stress disorder symptoms, and suicide attempts. Interpersonal functions (i.e., referred to as 'social' functions) were also related to major depressive disorder, but were more strongly related to social-perfectionism (i.e., believing that others hold exceptionally high standards for oneself). In addition, a recent latent class analysis, which examined subgroups of self-injurers (Klonsky & Olino, 2008), found that greater endorsement of intrapersonal functions was associated with more suicidal ideation, suicide attempts in general, and medically severe attempts specifically. Taken together, these studies suggest that intrapersonal functions are associated with more severe psychopathology. However, further replication, with the inclusion of more varied diagnostic (e.g., externalizing psychopathology) and personality correlates, is needed. In addition, it is important to examine

these clinical correlates using a valid and comprehensive measure of NSSI functions in order to obtain a more complete understanding of this relationship.

The Current Study

Although research has begun to examine common functions of NSSI, the breadth of functions explored and the assessment of psychopathology related to those functions has been incomplete. There are three major shortcomings to previous research on the functions of NSSI: (a) inadequate assessment of the full range of NSSI functions, (b) use of non-validated assessment instruments, and (c) a limited examination of the psychological correlates of NSSI functions. The primary aims of this project were to address these limitations through the use of a valid, comprehensive measure of NSSI functions and thorough measurement of diagnostic and clinical correlates of NSSI functions in an adolescent clinical sample. As indicated above, this group of self-injurers is of particular interest because NSSI usually begins in adolescence (i.e., between 13 and 16 years of age) and adolescents exhibit the highest rates of NSSI (i.e., approximately 14-15% in nonclinical samples and 40% or more in clinical samples). The study aims and corresponding hypotheses are further explicated below.

The first major aim of the current study was to utilize a comprehensive and validated measure of NSSI functions (i.e., the Inventory of Statements about Self-Injury: ISAS) to examine endorsement and structure of NSSI functions in an adolescent clinical sample. Therefore, this project builds upon previous studies in clinical samples that utilized non-validated instruments that only assessed a subset of NSSI functions. The relative endorsement of NSSI functions was examined in relation to demographic variables, including age, gender, and ethnicity. Based on recent evidence suggesting that younger adolescents may be more likely to self-injure for interpersonal reasons (Lloyd-Richardson et al., 2007), it was predicted that younger adolescent

self-injurers would endorse more interpersonal functions of NSSI than older adolescent self-injurers. In addition, we examined potential gender differences in the overall endorsement of intrapersonal and interpersonal functions of NSSI, as well as gender differences in the 13 ISAS functions. We predicted that adolescent self-injurers would exhibit the same patterns as young adult self-injurers (Klonsky & Glenn, 2009). That is, female participants would endorse more intrapersonal functions overall and male participants would endorse the sensation seeking function more often. Lastly, in line with previous studies (Klonsky & Glenn, 2009; Lloyd-Richardson et al., 2007; Nock & Prinstein, 2005), we did not expect to find differences in NSSI functions based on ethnicity.

Within this first aim, the structure of NSSI functions (i.e., superordinate NSSI function factors) was examined using an exploratory factor analysis. It was hypothesized that the overall structure of NSSI functions would be similar to previous research (Klonsky & Glenn, 2009; Nock & Prinstein, 2004). That is, the 13 NSSI functions would load onto two superordinate factors: intrapersonal functions (i.e., self-reinforcing) and interpersonal functions (i.e., other-reinforcing).

The second major aim of the current study was to examine how NSSI functional endorsement varies for self-injurers with externalizing versus internalizing psychopathology, and for injurers with versus without BPD. In addition, other theoretically related clinical correlates of NSSI functions were examined, including negative emotionality, impulsivity, loneliness, and self-derogation. This aim builds upon previous research that has been limited in the number of psychological and diagnostic correlates of NSSI functions examined. Beyond a functional assessment of the behavior itself, it is also important to understand the implications of different functions for diagnosis and treatment.

In regard to this second aim, the current study first examined how the functions of NSSI related to a number of diagnostic variables, including Axis I internalizing disorders, Axis I externalizing disorders, and Axis II borderline personality disorder (BPD). As indicated above, there has been little research on the diagnostic correlates of NSSI functions. In fact, only one study has examined the relationship between NSSI functions and diagnostic variables using a structured interview for diagnostic/clinical variables (Nock & Prinstein, 2005) and that study only assessed major depressive disorder, posttraumatic stress disorder, and recent (past month) suicide attempts. The current study extended this line of research by examining a full range of Axis I disorders observed in children and adolescents, including internalizing disorders (anxiety disorders, depressive disorders, and eating disorders) and externalizing disorders (attention-deficit and disruptive behavior disorders and substance-related disorders). In particular, we were interested in examining the functions endorsed by self-injurers with disorders that have been underrepresented in the NSSI literature (i.e., externalizing disorders). For example, no studies to date have examined NSSI functions endorsed by self-injurers with disruptive behavior disorders, such as conduct disorder, which is highly prevalent in clinical samples (Fehon et al., 1997). It was predicted that self-injurers with externalizing disorders would endorse more interpersonal functions of NSSI, such as sensation seeking and revenge, compared to self-injurers with internalizing disorders. If adolescents diagnosed with more externalizing psychopathology endorse different (i.e., more interpersonal) NSSI functions, these findings could have important treatment implications.

In addition, the present study also examined the relationship between NSSI functions and BPD. Although there once was some debate about whether Axis II personality disorders could be diagnosed before adulthood, consistent research has now shown that personality disorders can

be reliably and validly identified in adolescence (Becker, Grilo, Edel, & McGlashan, 2000; Ludolph et al., 1990; Westen, Shedler, Durrett, Glass, & Martens, 2003). BPD is of interest in the present study because, although NSSI is symptom of BPD, not all self-injurers receive a BPD diagnosis (Klonsky et al., 2003; Nock et al., 2006). Therefore it is important to examine if NSSI serves different functions for self-injurers with or without BPD. Because BPD is characterized by both affective and interpersonal instability, it was predicted that self-injurers with BPD would endorse more overall functions of NSSI (i.e., both more intrapersonal functions and more interpersonal functions) compared to self-injurers without BPD.

Next, the second objective of the second aim was to examine the relationship between NSSI functions and suicidality (ideation and attempts). Two previous studies (Klonsky & Glenn, 2009; Nock & Prinstein, 2005) have examined the relationship between NSSI functions and suicide. Klonsky and Glenn (2009) found that lifetime suicidal ideation and lifetime suicide attempts were related to both intrapersonal and interpersonal NSSI functions; however, suicidal ideation exhibited a stronger relationship with intrapersonal functions. In addition, Nock and Prinstein (2005) found that recent (past month) suicide attempts were related to only intrapersonal functions (i.e., automatic-negative – affect regulation). This study examined both recent (past month) suicidal ideation and suicide attempts. Based on previous research, it was hypothesized that intrapersonal functions would be more related to suicidality than interpersonal functions.

Finally, there is little research on relevant emotion and personality correlates of NSSI functions. Thus, the third, and last, objective of the second aim was to examine the association between NSSI functions and theoretically related emotion and personality variables, including negative emotionality/ emotion dysregulation, loneliness, and self-derogation, and impulsivity.

Based on research suggesting that the endorsement of intrapersonal functions is related to greater psychopathology (Klonsky & Glenn, 2009; Klonsky & Olino, 2008; Nock & Prinstein, 2005), we predicted that intrapersonal functions would be related to greater negative emotionality/ emotion dysregulation. Further, given the relationship between intrapersonal functions and self-injuring while alone (Klonsky & Olino, 2008), we predicted that intrapersonal functions would exhibit a stronger relationship to loneliness. In addition, it was hypothesized that self-derogation would be more related to the intrapersonal functions factor, which includes the self-punishment motivation for NSSI. Lastly, we predicted that the urgency facet of impulsivity (i.e., committing rash decisions when faced with negative affect) would be more associated with intrapersonal functions, whereas the sensation seeking facet of impulsivity (i.e., seeking excitement and adventure) would demonstrate a stronger relationship with the interpersonal functions factor.

Method

Participants and Procedure

Participants for the current study were recruited from a large sample of patients admitted to the adolescent inpatient and partial hospitalization units at South Oaks Hospital-The Long Island Home in Amityville, NY from June 2008-October 2010. South Oaks Hospital offers short-term treatment for adolescents suffering with a range of severe psychopathology, including anxiety disorders, mood disorders, substance-related disorders, and suicidality. On the adolescent inpatient unit, a patient's stay ranges from 72 hours to a few weeks, but most adolescents are admitted to the inpatient unit for one week or less. On the partial hospitalization unit, patients attend groups from 9:30am-3:30pm and then return home in the evenings. Many patients are transferred from the inpatient to the partial hospitalization unit before they are finally discharged from the hospital. However, some patients are admitted to the partial hospitalization program only (i.e., patients who are never admitted to the inpatient unit). On average, patients attend partial hospitalization treatment for 1-2 weeks. Patients on both the adolescent inpatient and partial hospitalization units can range in age from 12 to 18 years old.

Adolescent patients were eligible for this study if their parent/legal guardian provided consent during the adolescent's admission to the hospital, if the adolescent provided child assent, and if the adolescent did not meet one of the following exclusion criteria: (a) current psychotic symptoms, (b) physically aggressive behavior, (c) cognitive deficits, (participants were only excluded for reasons a-c if it interfered with their ability to complete the study measures), and (d) suicidality that the staff deemed too extreme to participate in the study. In addition, because the current study was interested in NSSI, the population was oversampled for patients who engaged in NSSI. Therefore, the data from the current study cannot be used to estimate NSSI prevalence.

Approximately 1,772 patients were admitted to the adolescent inpatient and partial hospitalization units during the data collection period. However, not all parents and adolescents were given information about the research project. This decision was under the discretion of the hospital admissions staff. We know that 524 parents and adolescents were informed about the research project during admission to the hospital. Of the 524 potential participants, 102 parents refused participation during the admissions process (reason for refusal was not provided).[1] Of the 422 parents who consented for their adolescent to participate: (a) 19 adolescents refused participation – six reported being too upset/depressed about hospital admission, and 13 reported not being interested in study but did not provide a reason, (b) 13 adolescents were not appropriate for the study based on the exclusion criteria mentioned above – five exhibited current severe psychosis, aggression, or suicidality, and eight had severe cognitive impairments. In addition, 186 parents consented for their adolescents to participate, but the adolescent was not admitted to the hospital long enough for data to be collected. Finally, four participants were excluded from data analysis because they did not complete the key NSSI measure (i.e., the ISAS). The final sample consisted of 200 adolescents and their custodial parent/legal guardian.

The project was approved by both Stony Brook University's and South Oaks Hospital's Institutional Review Boards. Informed consent/assent was obtained from both the parent and adolescent at South Oaks Hospital prior to completion of the study. Participants were reminded that participation was voluntary. Eligible and interested participants completed the study protocol at South Oaks Hospital. The study procedure (see Measures section) included a series of interviews (MINI-Kid and SIDP) and self-report measures (ISAS, DERS, UPPS, UCLA, SNAP-SD) that took approximately 1 hour and 15 minutes to complete. A history of NSSI was confirmed in two ways: (a) SIDP interview: using the question that assesses nonsuicidal

behaviors (i.e., "Have you ever been so upset or tense that you deliberately hurt yourself…?), which is distinguished from suicide attempts, and (b) ISAS questionnaire: instructions ask participants to include only behaviors that were performed *on purpose* but *not for suicidal reasons*. After study completion, all adolescents were debriefed about the purpose of the study and thanked for their time. Following the adolescent's debriefing at the hospital, the custodial parent/legal guardian was contacted over the phone for the Parent Version of the MINI-Kid structured interview (see Measures below). Research suggests that telephone interviews, which offer practical advantages, provide comparable diagnostic information to face-to-face interviews (Rohde, Lewinsohn, & Seeley, 1997; Sobin et al., 1993).

Measures

Interview

Mini-International Neuropsychiatric Interview for Children and Adolescents, English Version 6.0 (MINI-Kid; Sheehan, Shytle, Milo, Janavs, & Lecrubier, 2009). The original Mini-International Neuropsychiatric Interview (Sheehan et al., 1997) was designed as a brief diagnostic interview to assess DSM Axis I psychopathology in adults. Since its creation, the MINI has been translated in 43 languages and is a widely used structured interview for assessing Axis I disorders. Previous research (Lecrubier et al., 1997; Sheehan et al., 1997; 1998) has documented the reliability and validity of the MINI against two "gold standard" structured interviews: the Structured Clinical Interview for DSM-IV Disorders (SCID-IV; First, Spitzer, Gibbon, & Williams, 1997) and the Composite International Diagnostic Interview (CIDI; WHO, 1990).

The MINI-Kid is a brief diagnostic structured interview that assesses all DSM-IV Axis I disorders diagnosed during childhood and adolescence. The MINI-Kid was developed to assess

DSM-IV disorders specific to children/adolescents, and to adjust the language of the interview to be suitable for this population. The MINI-Kid has demonstrated good reliability and diagnostic sensitivity (Judit et al., 2004). In addition, the MINI-Kid has been utilized in numerous studies to assess Axis I psychopathology in children and adolescents (Ariga et al., 2008; Buckner, Lopez, Dunkel, & Joiner, 2008; Douglas, Herbozo, Poythress, Belfrage, & Edens, 2006; Kar & Bastia, 2006; Wilkinson, Marshall, & Curtwright, 2008). In the current study, the MINI-Kid was used to assess the following *current* Axis I disorders: major depressive disorder, dysthymia, bipolar disorder I and II, panic disorder (with or without agoraphobia), agoraphobia (without a history of panic disorder), social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, generalized anxiety disorder, alcohol abuse and dependence, substance abuse and dependence, attention-deficit hyperactivity disorder (ADHD; combined, inattentive, and hyper/impulsive subtypes), conduct disorder, oppositional defiant disorder, anorexia nervosa (restricting subtype or binge-purge subtype), bulimia nervosa, and suicidality (ideation and attempts). The MINI-Kid took approximately 30 minutes to administer.

Mini-International Neuropsychiatric Interview for Children and Adolescents-Parent Version, English Version 6.0 (MINI-Kid Parent Version; Sheehan, Shytle, Milo, Janavs, Lecrubier, & Hergueta, 2008). The Parent Version of the MINI-Kid measures the same DSM-IV Axis I disorders as the version for children and adolescents, but assesses the parent's report of the child/adolescent's symptomatology. Therefore, the parent interview provides a second and, in theory, more objective perspective on the child/adolescent's psychological condition. The parent version of the MINI-Kid was administered over the phone to the custodial parent or legal guardian (i.e., the parent or guardian who admitted the adolescent to the hospital). The MINI-Kid Parent Version took approximately 30 minutes to administer.

Only 37.5% of parents/legal guardians were able to be contacted and willing to complete the parent interview. Most informants were biological mothers (75.7%). Other informants included biological fathers (9.5%), adoptive mothers (8.1%), biological grandmothers/legal guardians (4.0%), and biological aunts/legal guardians (2.7%). Because parent data was only available for a subset of adolescents, and these data are likely to not be missing at random, the parent data was not included in the main study analyses. Importantly, a large study assessing correspondence between parent and adolescent diagnostic report suggests that the adolescent report provides detection of the most diagnosed cases (Cantwell, Lewinsohn, Rohde, & Seeley, 1997), thus supporting the use of adolescent report in the current project. However, for descriptive purposes, correspondence between parent and adolescent report for the self-injuring participants is presented in Table 8. The average kappa across disorders and suicidality was fair, κ = .38 (κs ranged from 0 for ADHD to .57 for anxiety disorders).

Structured Interview for DSM-IV Personality—Borderline Personality Disorder Module (SIDP-IV; Pfohl, Blum, & Zimmerman, 1997). The SIDP-IV is a semi-structured interview that assesses each of the 10 DSM-IV personality disorders including borderline personality disorder (BPD). Only the BPD module, which includes separate sets of questions for each of the nine BPD criteria, was administered to participants in the present study. Each BPD criterion is rated on a scale from 0-3 where 0 = *criterion is not at all present*, 1 = *subthreshold criterion/ some evidence of the trait*, 2 = *criterion is present for most of the last 5 years*, and 3 = *strongly present--criterion is associated with subjective distress*. A BPD criterion is considered present if rated as 2 or 3. If five or more criteria are endorsed, the patient receives a BPD diagnosis. Reliability and validity of the SIDP-IV have been verified in both non-treatment-seeking and patient populations (Jane, Pagan, Turkheimer, Fiedler, & Oltmanns, 2006; Pilkonis

et al., 1995). The SIDP-BPD module took approximately 15 minutes to administer, and was only completed by the adolescent.

Questionnaire

Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2009; Klonsky & Olino, 2008). The ISAS measures the frequency and functions of NSSI. Recent studies have found the ISAS to be a reliable and valid measure of NSSI frequency and functions in young adult samples (Glenn & Klonsky, in press; Klonsky & Glenn, 2009). The first section of the ISAS assesses the lifetime frequency of 12 different NSSI behaviors performed "intentionally (i.e., on purpose) and without suicidal intent" (i.e., banging/hitting body parts, biting, burning, carving, cutting, interfering with wound healing, sticking self with needles, pinching, pulling hair, rubbing skin against rough surfaces, severe scratching, and swallowing dangerous chemicals). In addition, the questionnaire assesses descriptive features of NSSI including the age of NSSI onset, date of most recent NSSI episode, experience of physical pain during NSSI, time between the initial urge to self-injure and the NSSI act, and the tendency to self-injure while alone.

The second section of the ISAS measures the functions of NSSI. The ISAS assesses 13 functions of NSSI that have been proposed in the empirical and theoretical mental health literature (Klonsky, 2007). Each NSSI function is assessed, across NSSI episodes and methods, by three items (for a total of 39 items), rated as *0 = not relevant*, *1 = somewhat relevant*, or *2 = very relevant* to the individual's "experience of [nonsuicidal] self-harm." Thus, scores for each of the 13 ISAS functions can range from 0 to 6. As indicated above, in a previous factor analysis (Klonsky & Glenn, 2009), the 13 functions of NSSI fell into two superordinate factors: (a) intrapersonal functions (i.e., affect regulation, anti-dissociation, anti-suicide, marking distress,

and self-punishment) and (b) interpersonal functions (i.e., autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, self-care, sensation-seeking, and toughness). The two superordinate scales (i.e., intrapersonal and interpersonal) were derived by summing the subscales that belong to each scale (see above) and then dividing by the number of subscales in order to obtain a mean score. Following the exploratory factor analysis in the current study, the superordinate scales will be derived using the same method.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS was utilized to examine negative emotionality and a variety of difficulties with emotion regulation. The DERS consists of 36 items that assess six different aspects (i.e., subscales) of emotional difficulties. Sample items from the subscales include: "When I'm upset, I become angry with myself for feeling that way" (Nonacceptance), "When I'm upset, I have difficulty concentrating" (Goals), "When I'm upset, I have difficulty controlling my behaviors" (Impulse), "When I'm upset, I acknowledge my emotions" (reverse-scored, Awareness), "When I'm upset, I believe that there is nothing I can do to make myself feel better" (Strategies), and "I have difficulty making sense out of my feelings" (Clarity). Each item is rated by "how often the following statements apply to you" on a scale from *1 = almost never* to *5 = almost always*. The DERS has demonstrated good internal consistency and test-retest reliability, as well as adequate construct validity when compared to other measures of emotion regulation (Gratz & Roemer, 2004).

UPPS Impulsive Behavior Scale (UPPS; Whiteside & Lynam, 2001). The UPPS was used to measure four distinct pathways to impulsive behavior. In an attempt to organize the multiple definitions of impulsivity into a comprehensive measure, Whiteside and Lynam (2001) created the UPPS Impulsive Behavior Scale through a series of factor analyses that incorporated

the Five Factor Model of personality (FFM; McCrae & Costa, 1990) and eight impulsivity scales, such as the Barratt Impulsiveness Scale (BIS; Barratt, 1985) and Impulsiveness items from the Eysenck IVE questionnaire (Eysenck & Eysenck, 1991). Four superordinate domains associated with impulsive behavior were identified: (a) Urgency: the tendency to commit rash, regrettable actions in the face of negative affect ("When I feel bad, I will often do things I later regret in order to make myself feel better now"), (b) (lack of) Perseverance: the ability (or inability) to stay with a task through completion ("I tend to give up easily"), (c) (lack of) Premeditation: the ability (or inability) to delay action in order to deliberate and plan ("I usually think carefully before doing anything"), and (d) Sensation Seeking: the tendency to seek excitement and adventure ("I'll try anything once"). The UPPS scale consists of 45 items that are rated on a 4-point scale from *1 = agree strongly* to *4 = disagree strongly*. The UPPS model has been used to clarify the nature of impulsivity in a variety of disorders, including ADHD (Miller, Flory, Lynam, & Leukfield, 2003), alcohol abuse (Whiteside & Lynam, 2003), borderline personality disorder (Whiteside, Lynam, Miller, & Reynolds, 2005), bulimia nervosa (Fischer, Smith, & Anderson, 2003), and major depression (d'Acremont & van der Linden, 2007).

UCLA Loneliness Scale (Russell, 1996). The UCLA Loneliness Scale was used to assess loneliness and social isolation in the sample. The Loneliness Scale is comprised of 10 questions rated on 4-point scale from *1 = never* to *4 = always*. Sample items include, "How often do you feel left out?" and "How often do you feel there are people you can talk to?" The UCLA Loneliness Scale has demonstrated excellent internal consistency and one-year test-retest reliability (Russell, 1996). In addition, the scale has displayed good construct validity with measures of interpersonal relationships and well-being, as well as specific convergent validity

with other measures of loneliness (Russell, 1996).

Schedule for Nonadaptive and Adaptive Personality—Self-Derogation Scale (SNAP SD; Clark, 1993). The Self-Derogation scale of the SNAP was utilized to assess self-regard in the current project. The full SNAP includes 375 true/false items that assess 12 traits and 3 temperament dimensions related to personality pathology. Previous research has documented the good psychometric properties of the SNAP including its excellent internal consistency (Reynolds & Clark, 2001) and convergent validity with other personality disorder measures (Clark, Livesley, Schroeder, & Irish, 1996). The Self-Derogation scale is one of 12 SNAP trait scales containing seven true/false items. Sample scale items include, "I haven't made much of my life" and "My future looks bright to me". The battery of self-report questionnaires took approximately 30 minutes to complete.

Results

NSSI and Clinical Control Group Comparisons

Most participants (83.5%) were receiving inpatient (as opposed to partial hospitalization) treatment at the time of assessment. There were no significant differences between inpatient and partial hospitalization participants in age, gender, or ethnicity (*p*s > .10). In addition, the proportion of self-injurers in the inpatient (63.5%) and partial hospitalization groups (66.7%) was relatively equal (χ^2 [1, N = 200] = 0.12, p = .727, Φ = .02). Table 1 displays the descriptive and diagnostic features, as well as the emotion and personality measures in the nonsuicidal self-injuring (NSSI) and clinical control (noninjuring) groups. The NSSI and control groups were similar in age, ethnicity, and grade in school. However, the NSSI group had significantly more female participants than the control group (p < .001).

In order to minimize the number of diagnostic group comparisons, most clinical disorders were clustered into groups: (a) *Anxiety disorder* includes presence of *current* panic disorder, agoraphobia, social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, or generalized anxiety disorder, (b) *Disruptive behavior* includes presence of *current* conduct disorder or oppositional defiant disorder, (c) *Mood disorder* includes presence of *current* bipolar I, bipolar II, major depressive disorder, or dysthymia, (d) *Substance use disorder* includes presence of *current* alcohol abuse/dependence or substance abuse/dependence (see Table 1 footnote). In addition, the presence of *current* attention-deficit hyperactivity disorder (ADHD), borderline personality disorder (BPD), recent (past month) suicidal ideation, and recent (past month) suicide attempts were also examined. Pearson chi-square analyses were used to make group comparisons for the DSM-IV Axis I disorders and Axis II BPD. Due to multiple comparisons, results will focus on reporting and interpreting patterns of effect sizes, keeping in

mind the possibility of Type I error. Table 1 displays statistical tests and effect sizes for all between-groups diagnostic analyses. The NSSI group had significantly more participants who met criteria for an anxiety disorder ($p = .002$), mood disorder ($p < .001$), and borderline personality disorder ($p = .001$). In addition, the NSSI group was more likely to have recent (past month) suicidal ideation ($p = .001$) and to have attempted suicide within the past month ($p = .048$). The NSSI and control groups were comparable on rates of ADHD, disruptive behavior disorders, and substance use disorders (*p*s ranged from .319 to .493).

Next, independent-samples *t*-tests were used to compare emotion and personality variables between the NSSI and control groups. First, all emotion and personality scales demonstrated excellent internal consistency in the current sample (DERS subscales: αs ranged from .80 to .90; UPPS subscales: αs ranged from .75 to .86; UCLA Loneliness scale: $\alpha = .90$; SNAP Self-Derogation scale: $\alpha = .86$). For convenience, group comparisons that were significant at $p < .01$ will be highlighted here. However, statistical tests and effect sizes for all analyses are presented in Table 1. The NSSI group reported greater negative emotionality/ emotion dysregulation on all DERS subscales compared to the control group. This difference was statistically significant, at $p < .01$, for the Awareness ($p = .005$), Strategies ($p < .001$), and Clarity ($p < .001$) subscales. On the UPPS impulsive behavior scale, self-injures reported greater impulsive Urgency ($p < .001$) and lack of Perseverance ($p = .006$). Finally, the NSSI group reported greater Loneliness ($p = .001$) and Self-Derogation ($p < .001$) than the control group.

NSSI Behaviors and Features

The average age of NSSI onset was 12.9 years old ($SD = 2$). The most common NSSI behaviors were cutting (85.2%), banging/hitting (53.1%), and severe scratching (42.2%) (see Table 2 for prevalence, as well as means and standard deviations of all NSSI behaviors).

Most self-injurers (85.9%) had engaged in more than one NSSI method (behavior) over their lifetime (M = 4.08, SD = 2.61), and approximately half the sample (50.8%) had engaged in four or more NSSI methods. There were no significant differences between inpatient and partial hospitalization self-injurers in the frequency of NSSI behaviors or the number of NSSI methods used (ps > .10). The majority of adolescents (88.9%) had engaged in NSSI in the past year and most (59.2%) had engaged in NSSI in the past month.

Next, we examined descriptive features of NSSI assessed with the ISAS. The majority of self-injurers (82%) reported engaging in self-injury when alone. In regard to experiencing pain during self-injury, 30.5% reported always experiencing pain during NSSI, 43% reported experiencing pain sometimes but not always, and the remaining 26.5% reported that they did not experience pain during NSSI. Finally, the ISAS assessed how much time passes from the urge to engage in NSSI until the actual NSSI act (this variable will be referred to as 'Urge to Act'). Most participants (57.9%) reported that less than one hour passed from NSSI Urge to Act. Another 23% reported 1-3 hours passed from Urge and Act, 10.4% reported between 3 and 24 hours from Urge to Act, and the remaining 8.7% reported that more than one day passed from NSSI Urge to Act.

NSSI Functions

First, the 13 ISAS subscales were created by summing the three items (rated from 0 to 2) for each subscale. Therefore, each ISAS subscale ranged from 0 to 6. The means and standards deviations of the 13 ISAS subscales are displayed in Table 3. The most highly endorsed subscales were affect regulation (M = 4.23, SD = 1.77), self-punishment (M = 3.29, SD = 2.13), and anti-dissociation (M = 2.81, SD = 2). Inpatient self-injurers were more likely to endorse the interpersonal influence function of NSSI than partial hospitalization self-injurers (inpatient: M =

1.64, *SD* = 1.70 vs. partial hospitalization: *M* = 0.91, *SD* = 1.19; *t*[126] = 1.93, *p* = .020, *d* = 0.34). There were no other differences in ISAS functional endorsement between inpatient and partial hospitalization self-injurers (*p*s > .10).

Next, associations between NSSI functions and demographic features were examined. Again, due to multiple comparisons, results will focus on reporting and interpreting patterns of effect sizes, keeping in mind the possibility of Type I error. A series of Pearson correlations revealed nonsignificant relationships between participant age and endorsement of the ISAS subscales (*p*s ranged from .186 to .960). Functional endorsement differences based on gender were examined with a series of independent-samples *t*-tests. However, because the self-injuring sample was mainly female (85.2%), these analyses should be interpreted with caution. Results suggest that female self-injurers reported higher scores on the following ISAS subscales: affect regulation (female: *M* = 4.43, *SD* = 1.67 vs. male: *M* = 3.05, *SD* = 1.87; *t*[126] = 3.26, *p* = .001, *d* = 0.58), anti-dissociation (female: *M* = 3.00, *SD* = 2.03 vs. male: *M* = 1.68, *SD* = 1.42; *t*[126] = 2.72, *p* = .001, *d* = 0.48), anti-suicide (female: *M* = 2.72, *SD* = 2.02 vs. male: *M* = 1.37, *SD* = 1.54; *t*[126] = 2.78, *p* = .006, *d* = 0.50), and self-care (female: *M* = 1.40, *SD* = 1.46 vs. male: *M* = 1.06, *SD* = 0.24; *t*[126] = 2.55, *p* = .016, *d* = 0.45). All other subscale differences did not reach statistical significance (*p*s ranged from .097 for marking distress to .787 for interpersonal influence). A series of one-way ANOVA were used to compare the functions endorsed by the largest ethnic groups: Caucasian (61.7%), Hispanic (15.6%), Mixed ethnicity (12.5%), and African American (8.6%). There were no differences in ISAS functions based on ethnicity when the four largest (*p*s ranged from .128 for self-care to .949 for interpersonal influence) and three largest (*p*s ranged from .079 for self-care to .976 for anti-suicide) ethnic groups were compared.

Finally, ISAS functions were compared based on NSSI features (i.e., alone during NSSI,

pain during NSSI, time between NSSI urge and act). First, ISAS functions were compared between individuals who reported always being alone during NSSI (n = 105) and those who sometimes injured around others (the Sometimes Alone and Never Alone groups were combined, due to small sample sizes in these cells, to create a Not Alone group: n = 23) with a series of independent-samples t-tests. The Not Alone group endorsed significantly higher scores on the interpersonal boundaries (Not Alone: M = 2.35, SD = 2.21 vs. Alone: M = 1.25, SD = 1.85; t[126] = 2.49, p = .014, d = 0.44) and peer bonding (Not Alone: M = 1.26, SD = 1.63 vs. Alone: M = 0.46, SD = 1.08; t[126] = 2.26, p = .032, d = 0.40) function scales. No other subscale differences reached statistical significance (ps ranged from .165 for sensation seeking to .910 for toughness).

Next, a series of one-way ANOVA were used to examine ISAS functional endorsement depending on whether pain was experienced during NSSI (i.e., Yes Pain: n = 39, Sometimes Pain: n = 55, No Pain: n = 34). Only the toughness function was endorsed differently across the three groups (F[2, 127] = 3.84, p = .024, η_p^2 = .058). Follow-up independent-samples t-tests revealed that self-injurers who *sometimes* experienced pain during NSSI endorsed the toughness subscale more than self-injurers who did *not* experience pain during NSSI (Sometimes Pain: M = 1.76, SD = 1.84 vs. No Pain: M = 0.78, SD = 1.02; t[126] = 3.23, p = .002, d = 0.58). However, the Yes Pain group did not endorse toughness significantly more than the No pain group (Yes Pain: M = 1.28, SD = 1.76; t[126] = 1.51, p = .135, d = 0.27). Finally, there was no difference in endorsement of the toughness function between the Yes pain and Sometimes pain groups (t[126] = 1.27, p = .207, d = 0.23). The remaining ISAS function scales did not significantly differ based on whether pain was experienced during NSSI (ps ranged from .149 for interpersonal boundaries to .755 for anti-dissociation).

Finally, the relationship between ISAS functions and Urge to Act was examined using a series of Spearman correlations (because time from NSSI urge to act is an ordinal variable: *1 = less than one hour* to *6 = more than one day*). There was a significant relationship between Urge to Act and the interpersonal boundaries function subscale, (ρ [126] = .24, p = .006), indicating that more time between NSSI urge and act was related to greater endorsement of the interpersonal boundaries function of NSSI. None of the other correlations reached statistical significance (*p*s ranged from .079 for sensation seeking to .842 for anti-suicide).

Structure of NSSI Functions

An exploratory factor analysis (EFA), principal axis factoring with promax rotation in SPSS, was used to examine the structure of the 13 NSSI functions measured by the ISAS. An EFA was chosen for the analysis, over a confirmatory factor analysis, because the structure of NSSI functions has not yet been examined in a clinical population using a comprehensive measure of NSSI functions. Principal axis factoring was utilized because it has shown to be a superior method for estimating population factor loadings in small samples, as compared to principal components analysis (Gorsuch, 1990). In addition, principal axis factoring is appropriate for uncovering latent structures, whereas principal components analysis is not (Fabrigar et al., 1999). Consistent with the guidelines proposed by Nunnally (1978) and Everitt (1975) (see review: Fabrigar et al., 1999), the analysis included approximately a 10-to-1 ratio between participants and measured variables (n = 128: 13 ISAS subscales). Factors were extracted based on inspection of the eigenvalues (i.e., values greater than 1) and scree plot. Previous research has demonstrated that the intrapersonal and interpersonal function factors are correlated (Klonksy & Glenn, 2009; Lloyd-Richardson et al., 2007; Nock & Prinstein, 2004). Therefore, promax rotation, an oblique rotation, was used because it allows the factors to

correlate (Fabrigar et al., 1999).

Based on the eigenvalues and scree plot, both a two-factor and three-factor solution were considered. However, the three-factor solution was driven by one subscale, interpersonal influence, loading on the third factor. Therefore, in an effort to obtain a more parsimonious solution, a two-factor solution was retained (see Table 3). This two-factor solution accounted for 52.2% of variance in NSSI functions. All ISAS subscales exhibited loadings on only one factor, except for self-care which exhibited relatively equal loadings on both factors. Factor 1 (eigenvalue = 4.73) represented interpersonal functions: autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, sensation seeking, and toughness. Factor 2 (eigenvalue = 2.06) represented intrapersonal functions: affect regulation, anti-dissociation, anti-suicide, marking distress, and self-punishment.

Next, superordinate function factor scores were created by averaging the relevant subscale scores (i.e., seven subscales for interpersonal and five subscales for intrapersonal). Superordinate function scale scores ranged from 0 to 6. The self-care subscale was not included in either superordinate functions score to minimize inflating correlations between the two factors. The interpersonal and intrapersonal function scores exhibited excellent internal consistency (αs = .83 and .78, respectively). In addition, interpersonal and intrapersonal scales were moderately correlated ($r[128] = .40$, $p < .001$), suggesting that the factors assess non-redundant functions of NSSI. Intrapersonal functions ($M = 3.07$, $SD = 1.43$) were more highly endorsed than interpersonal functions ($M = 1.19$, $SD = 1.67$; paired-samples $t[127] = 14.71$, $p < .001$, $d = 2.71$).

Diagnostic Correlates

Associations between NSSI functions and Axis I diagnoses and Axis II BPD were tested

separately. First, we examined the relationship between NSSI functions and Axis I diagnostic variables. There was high diagnostic comorbidity in this sample. The average number of disorders was 3.81 (*SD* = 2.53). In addition, 62% of self-injurers had both current internalizing and externalizing disorders. Therefore, in order to examine the relationship between NSSI functions and diagnostic variables while taking comorbidity into account, we created internalizing and externalizing scores for each participant (i.e., the number of disorders each participant met diagnostic criteria for within the internalizing and externalizing spectrums; see Achenbach & Edelbrock, 1978; Kramer, Krueger, & Hicks, 2008; Krueger, Caspi, Moffitt, & Silva, 1998).[2] The internalizing disorders score (scale 0-9) included *current*: major depressive disorder (MDD) or dysthymia (only assessed in participants without MDD, based on MINI structure), generalized anxiety disorder (assessed regardless of MDD status), panic disorder, agoraphobia (assessed regardless of panic disorder status), social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, and bulimia nervosa. No participants met criteria for anorexia nervosa, so it was not included in any of the analyses. In addition, internalizing disorders were further divided into distress (scale 0-3; major depressive disorder or dysthymia, generalized anxiety disorder, and posttraumatic stress disorder) and fear (scale 0-5; panic disorder, agoraphobia, social phobia, specific phobia, and obsessive-compulsive disorder) subclasses (see Krueger, 1999). The externalizing disorders score (scale 0-4) included: attention-deficit hyperactivity disorder, conduct disorder (CD) or oppositional defiant disorder (only assessed in participants without CD, based on MINI structure), alcohol abuse or dependence, and substance abuse or dependence. There were no differences between inpatient and partial hospitalization adolescents in fear disorders (inpatient: $M = 0.99$, $SD = 1.07$ vs. partial hospitalization: $M = 1.48$, $SD = 1.50$; $t[107] = 1.40$, $p = .173$, $d = 0.27$), distress disorders

(inpatient: M = 0.91, SD = 0.85 vs. partial hospitalization: M = 1.29, SD = 0.78; t[107] = 1.85, p =.068, d = 0.36), or externalizing disorders (inpatient: M = 1.63, SD = 1.19 vs. partial hospitalization: M = 1.52, SD = 1.17; t[107] = 0.35, p =.725, d = 0.07). However, partial hospitalization adolescents had higher internalizing disorders scores than inpatient adolescents (partial hospitalization: M = 3.00, SD = 1.92 vs. inpatient: M = 2.01, SD = 1.77; t[107] = 2.27, p =.025, d = 0.44).

Because the diagnostic scores were ordinal variables, Spearman correlations were used to examine relationships between the ISAS superordinate function scales and diagnostic variables (see Table 4). The internalizing disorders scale and, specifically, the distress disorders scale were significantly related to both the intrapersonal and interpersonal functions scales (all ps < .001). The fear disorders scale was also significantly related to intrapersonal functions (p < .001), and to a lesser extent interpersonal functions (p = .013). However, the externalizing disorders scale was not significantly related to either ISAS functions scale (ps > .095).

Next, the difference in correlations between each superordinate functions scale and diagnostic scale was examined (e.g., comparing the correlation between intrapersonal functions and internalizing disorders with the correlation between interpersonal functions and internalizing disorders). This procedure was repeated for the distress, fear, and externalizing correlations. Analyses were conducted using an online calculator (www.stat-help.com), which utilizes the method suggested by Steiger (1980) for comparing dependent correlation coefficients. Results indicate that the internalizing disorders scale was significantly more related to intrapersonal functions than interpersonal functions (p = .002). In addition, distress disorders exhibited a trend (p = .051) towards a stronger relationship with intrapersonal compared to interpersonal functions. However, there were no significant differences in the relationship between the functions scales

and fear disorders (p = .362) or externalizing disorders (p = .499).

Because NSSI severity is related to greater endorsement of NSSI functions as well as greater psychopathology, we controlled for NSSI severity in the analyses between NSSI functions and diagnostic scales. NSSI severity was operationalized in two ways: (a) number of lifetime NSSI methods (behaviors) and (b) lifetime NSSI frequency across behaviors. Because the distribution of many NSSI behaviors was highly skewed, a composite lifetime NSSI frequency variable was created by rank-ordering each of the 12 NSSI behaviors and then summing the rank-ordered scores. To control for NSSI severity in the diagnostic analyses, we conducted partial correlations with lifetime NSSI methods and lifetime NSSI frequency entered separately as covariates (Table 4). Results indicate that the relationship between intrapersonal functions and internalizing, distress, and fear disorders remained significant after controlling for lifetime NSSI methods or frequency (all ps < .05). In addition, interpersonal functions remained significantly related to the distress disorders when controlling for lifetime NSSI methods or frequency (p < .05). However, the association between interpersonal functions and internalizing disorders (ps > .05) and fear disorders (ps > .05) became nonsignificant when controlling for NSSI severity.

Next, because a main goal of this study was to examine NSSI functions endorsed by participants with externalizing disorders, we compared the endorsement of ISAS functions in self-injurers reporting only internalizing disorders (n = 15) to self-injurers reporting only externalizing disorders (n = 17). Independent-samples t-tests revealed that self-injurers with only internalizing disorders endorsed more intrapersonal functions than self-injurers with only externalizing disorders (internalizing: M = 3.03, SD = 1.06 vs. externalizing: M = 1.65, SD = 1.48; t[30] = 3.00, p = .005, d = 1.01). However, there were no differences between the two

groups in interpersonal functions endorsement (internalizing: $M = 1.02$, $SD = 1.21$ vs. externalizing: $M = 0.75$, $SD = 1.03$; $t[30] = 0.69$, $p = .497$, $d = 0.25$). Analyses were then conducted controlling for NSSI severity. Results indicated that after controlling for NSSI methods or frequency, the difference in intrapersonal functions between internalizing and externalizing self-injurers remained significant ($F[1, 29] = 5.87$, $p = .022$, $\eta_p^2 = .168$ and $F[1, 29] = 5.62$, $p = .025$, $\eta_p^2 = .162$, respectively). However, the difference in interpersonal functions between internalizing and externalizing self-injurers remained nonsignificant after controlling for NSSI methods or frequency ($F[1, 29] = 0.32$, $p = .575$, $\eta_p^2 = .011$ and $F[1, 29] = 0.30$, $p = .585$, $\eta_p^2 = .010$, respectively).

In order to assess NSSI functions associated with BPD, the self-injuring group was divided into those with ($n = 52$) and without ($n = 62$) a BPD diagnosis. Rates of BPD in inpatients (46.7%) and partial hospitalization patients (40.9%) were not significantly different ($\chi^2 [1, N = 114] = 0.24$, $p = .622$, $\Phi = .04$). A series of independent-samples *t*-tests were used to compare the ISAS functions endorsed by self-injurers with and without BPD (see Table 5). Because both the superordinate and individual subscales were compared, a more conservative significance level ($p < .01$) was used for interpreting analyses here (however, see Table 5 for all statistical tests and effect sizes). Overall, self-injurers with BPD endorsed both more intrapersonal and more interpersonal functions than self-injurers without BPD (*p*s = .001 and .004, respectively). Specifically, self-injurers with BPD reported higher scores on the anti-dissociation ($p = .002$) and interpersonal boundaries ($p = .002$) subscales. Analyses were then conducted controlling for NSSI severity (see Table 5). Results indicated that after controlling for NSSI methods or frequency, the difference in intrapersonal functions between BPD and non-BPD self-injurers was no longer significant (*p*s = .175 and .264, respectively; see Table 5

footnote). However, the difference in interpersonal functions between BPD and non-BPD self-injurers remained after controlling for NSSI methods or frequency (*p*s = .045 and .035, respectively; see Table 5 footnote).

In addition to group differences, we also examined the relationship between ISAS superordinate function scales and BPD symptoms across all self-injurers (i.e., with and without BPD). BPD symptoms were positively related to both intrapersonal ($r[114] = .41$, $p < .001$) and interpersonal function scales ($r[114] = .35$, $p < .001$), indicating that as BPD symptoms increased, ISAS functional endorsement increased. Then partial correlations were conducted controlling for NSSI severity. The relationship between BPD symptoms and intrapersonal functions decreased but remained significant when controlling for NSSI methods ($r[111] = .24$, $p = .010$) or NSSI frequency ($r[111] = .22$, $p = .020$). Similarly, the relationship between BPD symptoms and interpersonal functions was somewhat reduced, but remained statistically significant, after controlling for NSSI methods ($r[111] = .27$, $p = .004$) or NSSI frequency ($r[111] = .28$, $p = .002$).

Next, we examined how NSSI functions related to recent suicidality (i.e., past month suicidal ideation and past month suicide attempts). First, independent samples *t*-tests were used to compare functional endorsement of self-injurers with and without recent suicidal ideation (see Table 6). Results indicated that self-injurers with recent suicidal ideation ($n = 61$) endorsed significantly more intrapersonal functions ($p < .001$), but not more interpersonal functions ($p = .423$) than self-injurers without recent suicidal ideation ($n = 46$). These differences remained after controlling for NSSI severity (see Table 6). However, self-injurers who had attempted suicide in the past month ($n = 22$) did not endorse significantly more intrapersonal functions (attempt: $M = 3.46$, $SD = 1.35$ vs. no attempt: $M = 3.08$, $SD = 1.48$; $t[105] = 1.11$, $p = .268$, $d =$

0.22) or interpersonal functions (attempt: M = 1.19, SD = 1.27 vs. no attempt: M = 1.11, SD = 1.04; t[105] = 0.31, p = .755, d = 0.06) than self-injurers who had not attempted suicide in the past month (n = 85).

Emotion and Personality Correlates

Finally, associations between the superordinate function scales and the emotion and personality measures (i.e., Difficulties in Emotion Regulation, UPPS Impulsive Behavior Scale, UCLA Loneliness Scale, and SNAP-Self Derogation) were examined using a series of Pearson correlations (see Table 7). Higher scores on these scales indicated greater negative emotionality/ emotion dysregulation, impulsivity, loneliness, and self-derogation, respectively. Due to the number of statistical tests, only correlations significant at $p < .01$ are reported here. The intrapersonal functions factor was positively associated with all six DERS subscales (all ps ≤ .002), UPPS Urgency (p = .002), UCLA Loneliness ($p < .001$), and SNAP Self-Derogation ($p <$ .001). The interpersonal functions factor was significantly related to DERS Nonacceptance (p = .001) and UPPS Urgency (p = .006). (For more detailed information, see Table 9 for correlations between ISAS function subscales and the emotion and personality measures.)

The difference in correlations between each functions factor and the emotion and personality variables was examined (e.g., comparing the correlation between intrapersonal functions and DERS Nonacceptance with the correlation between interpersonal functions and DERS Nonacceptance). This procedure was repeated for the impulsivity, loneliness, and self-derogation correlations. Again, analyses were conducted using an online calculator (www.stat-help.com), which utilizes the method suggested by Steiger (1980) for comparing dependent Pearson correlation coefficients. Table 7 displays the results of these correlation comparisons. Because this was a more stringent statistical test, correlations significant at $p < .05$ will be

reported here. Three of the six DERS subscales exhibited a stronger relationship with intrapersonal functions than with interpersonal functions: Strategies scale (p = .001), Awareness scale (p = .027), and Nonacceptance scale (p = .043). In addition, UCLA Loneliness (p = .029) and SNAP Self-Derogation (p = .027) also demonstrated stronger relationships with intrapersonal functions than with interpersonal functions. None of the other correlations were significantly different from each other (ps > .05). Analyses controlling for NSSI severity were conducted with a series of partial correlations with lifetime NSSI methods and lifetime NSSI frequency entered separately as covariates. Results indicated that almost all correlations significant at p < .01 remained significant when controlling for NSSI severity (see Table 7).

Discussion

The current study sought to address limitations of previous research on the functions of nonsuicidal self-injury (NSSI) by (a) improving measurement (i.e., comprehensive and validated assessment instrument) of NSSI functions and structure, and (b) examining a wider range of key clinical correlates. In particular, this is the first study to compare functions endorsed by self-injurers with externalizing versus internalizing psychopathology as well as injurers with versus without borderline personality disorder (BPD). In regard to the first aim, findings concerning the most common NSSI behaviors, NSSI functions, and structure of NSSI functions are largely in line with previous studies. In regard to the second aim, results indicate that, overall, intrapersonal functions (e.g., affect regulation) were related to more severe psychological correlates, including internalizing disorders and suicidality, even when controlling NSSI severity (i.e., lifetime NSSI methods and frequency). In addition, self-injurers with BPD endorsed more intrapersonal functions than injurers without BPD, but these differences did not remain after controlling for NSSI severity. Notably, self-injurers with BPD also endorsed more interpersonal NSSI functions than injurers without BPD, and this difference remained even when controlling for NSSI severity. Finally, intrapersonal functions were also more strongly related to a range of emotion and personality variables, including negative emotionality, impulsive urgency, loneliness, and self-derogation, compared to interpersonal functions.

NSSI Characteristics

Characteristics of the self-injuring sample were generally consistent with previous research. The age of NSSI onset in our sample was in early adolescence (age 13), which is line with other NSSI studies (Muehlenkamp & Gutierrez, 2004; Nock & Prinstein, 2004; Rodham et al., 2004). Also consistent with NSSI research, most self-injurers had engaged in more than one

NSSI method (behavior) in their lifetime and the most common NSSI behaviors endorsed were cutting, banging/hitting, and severe scratching (Heath et al., 2008; Nock & Prinstein, 2004; Ross & Heath, 2002; Whitlock et al., 2006).

In regard to features of NSSI, most self-injurers engaged in NSSI exclusively while alone, consistent with a previous study in college student self-injurers (Glenn & Klonsky, 2009). Further, the majority of the sample reported not experiencing pain (i.e., pain analgesia) or only sometimes experiencing pain during NSSI, which has been found in other NSSI studies (Nock & Prinstein, 2005; Nock et al., 2006). As for time spent contemplating NSSI, the majority of self-injurers indicated that only a few hours or less passed between the urge to engage in NSSI and the NSSI act. Nock and Prinstein (2005) also found that most self-injurers spend little time thinking about NSSI before they act. Taken together, these findings suggest that most self-injurers engage in NSSI alone, without experiencing pain, and without much deliberation. Importantly, both being alone (Glenn & Klonsky, 2009) and pain analgesia (Nock et al., 2006) during NSSI have been linked to greater risk for suicidal behaviors. Further, NSSI becomes even more difficult to treat when self-injurers spend only minutes contemplating their behavior because there is little time to intervene.

Diagnostic/Clinical Comparison between NSSI and Control Groups

Compared to a noninjuring clinical control group, the self-injuring group exhibited higher rates of anxiety disorders, mood disorders, borderline personality disorder, and suicidality, which is consistent with previous research (Andover et al., 2005; Hawton et al., 2002; Klonsky et al., 2003). However, the self-injuring group was comparable to the clinical control group in rates of attention-deficit and disruptive behavior disorders and substance use disorders. Therefore, in general, self-injurers exhibited higher rates of internalizing disorders, but comparable rates of

externalizing disorders. It is somewhat surprising that externalizing disorders were not higher in the self-injuring group given that high rates of these disorders were found in previous studies (Favazza & Conterio, 1989; Hawton et al., 2002; Nock et al., 2006). However, only one previous study directly compared self-injurers to a noninjuring control group on externalizing behaviors, and that study only included substance use behaviors and not substance use disorders (Hawton et al., 2002). Therefore, although rates of attention-deficit and disruptive behavior disorders and substance use disorders may be sizeable in NSSI, they may not exceed rates found in noninjuring clinical populations.

In addition to greater Axis I internalizing disorders and Axis II BPD, self-injurers also reported higher scores on most emotion and personality measures. Replicating previous studies with the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2008; Heath et al., 2008), self-injurers reported more negative emotionality and difficulties in emotion regulation than the noninjuring control group. In addition, self-injurers endorsed greater impulsive urgency (i.e., engaging in rash decisions when faced with negative affect) and low perseverance (i.e., inability to stay with a task through completion). These impulsivity findings are mainly consistent with a previous study in college student self-injurers (Glenn & Klonsky, 2010). That is, similar to the adolescent NSSI group, young adult self-injurers also endorsed more impulsive urgency than controls. However, in this previous study, low perseverance did not distinguish self-injurers from controls, but was instead related to more recent self-injury (i.e., low perseverance was greater in current compared to past self-injurers). This discrepancy could be due to the nature of the two samples. The college student sample was nonclinical and only half the sample had engaged in NSSI during the previous 12 months. In contrast, the current study sample was clinical and almost all self-injurers had engaged in NSSI in the previous 12 months. Therefore, it

is possible that low perseverance distinguishes more severe self-injurers from noninjurers. Taken together, both impulsive urgency and low perseverance demonstrate conceptual overlap with poor distress tolerance (i.e., an inability to endure uncomfortable emotional or physical states in order to complete a task), which is well-known problem in NSSI (Nock & Mendes, 2008). Therefore, it is not surprising that these facets of impulsivity would be endorsed more by self-injurers.

Finally, self-injurers also reported greater loneliness and self-derogation than noninjuring controls. Loneliness experienced by self-injurers may be related to a lack of social support and could potentially explain why some adolescents resort to engaging in NSSI, often alone, in order to reduce negative affect. However, it is possible that greater loneliness in self-injurers is a result of higher rates of depression in this sample compared to controls. Greater self-derogation in NSSI is consistent with research indicating that self-punishment is the second most common NSSI function (Laye-Gindhu, & Schonert-Reichl, 2005; Nixon et al., 2002; Nock & Prinstein, 2004). However, it is important to note that the self-injuring group was significantly more female than the control group, which could account for some of the emotion and personality group differences.

NSSI Functions

In line with previous research, the most commonly endorsed functions of NSSI were affect regulation and self-punishment (Klonsky, 2007; Laye-Gindhu & Schonert-Reichl, 2005; Nock & Prinstsein, 2004). In addition, results support a two-factor structure of NSSI functions – intrapersonal functions and interpersonal functions – found in previous studies (Klonsky & Glenn, 2009; Nock & Prinstein, 2004). The self-care subscale (i.e., creating a physical injury that is easier to care for than my emotional distress) demonstrated relatively equal loadings on

both the intrapersonal and interpersonal functions factors and therefore was not included in the function factor scores. However, this is not surprising given that the self-care subscale also exhibited a cross-loading in the original ISAS study (Klonsky & Glenn, 2009).

Compared to young adult self-injurers (Klonsky & Glenn, 2009), adolescent self-injurers endorsed more functions, both intrapersonal and interpersonal. However, these differences are likely due to the severity of the samples (i.e., college student vs. adolescent clinical). Although a recent study suggests that younger adolescents may be more likely to self-injure for interpersonal reasons (Lloyd-Richardson et al., 2007), in the current sample, functional endorsement did not differ by age. Consistent with previous studies (Klonsky & Glenn, 2009; Rodham et al., 2004), female self-injurers reported more intrapersonal functions than male self-injurers. However, in contrast to Klonsky and Glenn (2009), male participants did not report higher scores on the sensation seeking subscale. The absence of functional differences for males could be due to the small percentage of males in the current sample. Finally, there were no differences in functions across ethnic groups, consistent with previous research (Klonsky & Glenn, 2009; Lloyd-Richardson et al., 2007; Nock & Prinstein, 2005).

Findings related to the features of NSSI provide empirical support for the construct validity of the interpersonal functions. First, self-injurers who did not injure exclusively while alone (i.e., sometimes or always around others) endorsed more interpersonal functions of NSSI, specifically interpersonal boundaries (i.e., establishing a barrier between myself and others) and peer bonding (i.e., fitting in with others). Klonsky and Glenn (2009) previously found that being alone during NSSI was related to more intrapersonal functions of NSSI. Taken together, these results provide further construct validity for the two superordinate function factors. That is, self-injuring while alone is related to more intrapersonal functions that are self-reinforcing, whereas

self-injuring around others is more associated with interpersonal functions that are other-reinforcing.

Further support for the construct validity of the interpersonal functions comes from the relationship between pain during NSSI and the toughness function. Self-injurers who *sometimes* experienced pain during NSSI indicated that they were more motivated by the toughness function of NSSI (i.e., seeing if I can stand the pain) than self-injurers who *never* experienced pain during NSSI. However, self-injurers who *always* experienced pain during NSSI did not endorse the toughness function more than self-injurers who *never* experienced pain. Because endorsement of the toughness function was not higher in both the *sometimes* and *always* pain groups compared to the *never* pain group, results should be interpreted with caution. Finally, more time spent contemplating NSSI (i.e., more time elapsed between NSSI urge and act) was related to greater endorsement of interpersonal boundaries, but not to other interpersonal functions. In contrast, Nock and Prinstein (2005) found that more time between NSSI urge and act was related to the total interpersonal (social) functions scales. Findings from the current study suggest that the time from NSSI urge to act is not reliably or robustly related to the functions of NSSI.

Diagnostic Correlates

This study is the first to examine NSSI functional endorsement across internalizing and externalizing disorders. As would be expected in a clinical population, there was high diagnostic comorbidity in the current sample. Therefore, instead of examining disorders individually, we examined disorders dimensionally focusing on hierarchical groupings of disorders. A central aim of this study was to examine the relationship between NSSI functions and externalizing disorders, which have been underrepresented in the literature. In these analyses, intrapersonal

functions were related to more internalizing disorders (i.e., anxiety disorders, depressive disorders, and bulimia), as well as with the subsets of both distress disorders (i.e., depressive disorders, generalized anxiety disorder, and posttraumatic stress disorder), and fear disorders (i.e., panic disorder, agoraphobia, social phobia, specific phobia, and obsessive-compulsive disorder), but not with externalizing disorders (i.e., attention-deficit and disruptive behavior disorders and substance use disorders). These associations held when controlling for NSSI severity. The relationship between intrapersonal functions and internalizing disorders is consistent with previous research on diagnoses associated with NSSI (Andover et al., 2005; Darche, 1990; Favazza & Conterio, 1989; Hawton et al., 2002; Klonsky et al., 2003; Nock et al., 2006).

Interpersonal functions were also related to internalizing, distress, and fear disorders. However, only the relationship between interpersonal functions and distress disorders remained after controlling for NSSI severity. In addition, contrary to expectation, interpersonal functions did not exhibit a significant relationship with externalizing disorders. Because we were particularly interested in NSSI functional endorsement differences between self-injurers with externalizing disorders versus internalizing disorders, we compared a subset of self-injurers with only externalizing disorders to self-injurers with only internalizing disorders. As would be expected based on the patterns of analyses above, endorsement of intrapersonal functions was greater in the internalizing group than the externalizing group. However, there were no differences in interpersonal functions between self-injurers with externalizing versus internalizing psychopathology. Although these results were contrary to expectation, this is the first study to explicitly examine NSSI functional endorsement differences between self-injurers with internalizing disorders and injurers with externalizing disorders. Interestingly, results

suggest that it was not externalizing psychopathology, but distress disorders that demonstrated the strongest relationship with interpersonal functions of NSSI. These findings could have important clinical implications (see Implications and Limitations below).

In addition to Axis I disorders, this study was the first to examine NSSI functions in adolescents with and without borderline personality disorder (BPD). As hypothesized, BPD exhibited a relationship with both intrapersonal and intrapersonal functions. Interestingly, after controlling for NSSI severity, only the interpersonal functions difference between self-injurers with and self-injurers without BPD remained significant. Taken together with the Axis I disorder findings, interpersonal functions were uniquely related to BPD instead of externalizing disorders. In addition, we also examined the relationship between BPD symptoms and NSSI functions across all self-injurers (with or without BPD). BPD symptoms were related to more intrapersonal and interpersonal functions, and these relationships maintained after controlling for NSSI severity. Treatment implications of these findings are discussed below (see Implications and Limitations).

Next, we examined the relationship between NSSI functions and suicidality (recent ideation and attempts). Intrapersonal functions, but not interpersonal functions, related to more recent (past month) suicidal ideation. More specifically, affect regulation, anti-dissociation, and self-punishment exhibited the strongest relationship with suicidal ideation. Importantly, intrapersonal functions were related to suicidal ideation after controlling for NSSI severity. Findings build upon previous research on the relationship between NSSI and suicidality, suggesting that NSSI functions are another variable to consider when assessing risk for suicide. It is surprisingly that anti-suicide (i.e., avoiding the impulse to attempt suicide) did not exhibit a stronger relationship with suicidal ideation. However, perhaps the lack of a relationship

indicates that NSSI worked as intended (i.e., to distract oneself from suicidal thoughts).

Emotion and Personality Correlates

Finally, the current study also examined NSSI functions in relation to a wide range of emotion and personality correlates. Findings suggest that intrapersonal functions were related to greater negative emotionality/emotion dysregulation, impulsive urgency, loneliness, and self-derogation. Given that the most common intrapersonal function is affect regulation, and that intrapersonal functions are related to greater psychopathology and self-injuring while alone (Klonsky & Glenn, 2009; Klonsky & Olino, 2008; Nock & Prinstein, 2005), it stands to reason that intrapersonal functions would be related to greater negative affect, impulsive behavior when faced with negative affect, and loneliness. In addition, because self-punishment is the second most commonly endorsed intrapersonal function (Klonsky, 2007), it is not surprising that intrapersonal functions were related to lower self-regard.

In contrast, but consistent with hypotheses, the interpersonal functions of NSSI were related to fewer of the emotion and personality correlates examined. However, contrary to expectations, interpersonal functions were associated with a specific facet of negative emotionality (i.e., nonacceptance of emotional responses) and impulsive urgency, but not to the sensation seeking facet of impulsivity (i.e., seeking excitement and adventure). The relationship between interpersonal functions and emotional nonacceptance could indicate that self-injurers who are unaccepting of their emotions engage in NSSI to gain assistance from others. For example, one of the interpersonal function scales driving the relationship with nonacceptance was interpersonal influence (i.e., keeping a loved one from leaving or abandoning me). The association with impulsive urgency (i.e., making rash decisions when faced with negative affect) was also driven by the interpersonal influence function, suggesting that self-injurers make rash

decisions to engage in NSSI, when negative affect is high, in order to influence other people. Contrary to prediction, the sensation seeking function of NSSI (an interpersonal function) was not related to the sensation seeking facet of impulsivity. However, it may be that the reduction of negative affect is the most important factor in reinforcing NSSI, whereas sensation seeking is more related to the production of positive affect and therefore has little to with NSSI. Nevertheless, it is important to note that the relationships between functional variables and emotion and personality correlates were not simply due to NSSI severity.

Implications and Limitations

The current study provides the most comprehensive assessment of NSSI functions and psychological correlates to date. Taken together with previous research, findings suggest that the most common functions of NSSI are affect regulation and self-punishment. In addition, NSSI functions reliably exhibit a two-factor structure consisting of intrapersonal (self-reinforcing) and interpersonal functions (other-reinforcing). The current study also provides important data on the psychological correlates of NSSI functions. In the current sample, intrapersonal functions exhibited a stronger relationship with psychological variables, including internalizing disorders and suicide, as well as negative emotionality, impulsive urgency, loneliness, and self-derogation, compared to interpersonal functions. In contrast, interpersonal functions did not demonstrate a strong relationship with most of these variables, but instead were related to distress disorders and were endorsed more by self-injurers with compared to those without BPD.

Findings from this study could have important implications for the treatment of NSSI. First, consistent with previous research, this study found that intrapersonal functions were related to more severe psychopathology and psychological correlates. Therefore, self-injurers who engage in NSSI for strong intrapersonal reasons are likely to be a more severe group, and

potentially at higher suicide risk. Moreover, these self-injurers may require more aggressive clinical interventions and more frequent suicide risk assessments during the course of treatment. Second, findings suggest that self-injurers endorse a wide range of NSSI functions. Thus, it is important to thoroughly assess all functions of NSSI and not just those that are most prevalent. Although interpersonal functions are not as common as intrapersonal functions, they were still endorsed by some self-injurers. To the extent that interpersonal functions (e.g., interpersonal influence) are a motivation for NSSI, it stands to reason that effective treatment would need to focus on interpersonal effectiveness training (e.g., communication skills or assertiveness training) in order to achieve NSSI remission. Third, contrary to expectation, externalizing disorders did not exhibit a unique relationship with interpersonal functions of NSSI. In fact, severity of externalizing disorders was not related to greater endorsement of any NSSI functions. Follow-up analyses suggest that self-injurers with externalizing psychopathology endorse similar amounts of interpersonal functions, but less intrapersonal functions than self-injurers with internalizing disorders. Given that intrapersonal functions are related to more severe psychological correlates, it is possible that self-injurers with externalizing psychopathology may be at less risk for negative outcomes, such as suicide. Moreover, it important clinically to note that externalizing disorders were not associated with more interpersonal functions. Although adolescents with externalizing pathology might be viewed as more attention seeking (e.g., hyperactivity due to ADHD) than those with internalizing pathology, it does not appear that their NSSI is more motivated by interpersonal reinforcement. However, both distress disorders and BPD were related to greater endorsement of both intrapersonal and interpersonal NSSI functions, suggesting that self-injurers with these forms of psychopathology may be more likely to use both types of NSSI functions compared to self-injurers without these diagnoses. Notably, BPD was

the only disorder to exhibit a unique relationship with interpersonal functions of NSSI (i.e., after controlling for NSSI severity). As interpersonal instability is present in multiple criteria of BPD (i.e., frantic efforts to avoid abandonment and unstable interpersonal relationships), it is well-known that individuals with BPD have difficulty maintaining healthy relationships. It is noteworthy that interpersonal functions maintained a unique relationship with BPD after controlling for NSSI severity, whereas intrapersonal functions did not. This is the first study to demonstrate that the functions of NSSI may be different in self-injurers with and without BPD. Findings suggest that, for adolescent self-injurers with BPD, treatment may have to address interpersonal functions of NSSI in addition to intrapersonal functions.

Although this is the first study to assess the full scope of NSSI functions and a wide range of psychological correlates in an adolescent clinical sample, there are important limitations to this research that warrant discussion. First, although the current study is unique in its assessment of a wide range of psychological correlates, the large number of analyses conducted makes the chance of Type I error more likely. Therefore, future research should seek to replicate results in other clinical samples. Second, the present study assessed current but not lifetime diagnoses. Given that diagnoses in childhood and adolescence wax and wane over time (see review: Angold, Costello, & Erkanli, 1999), the current cross-sectional study design, that only assessed disorders present at one particular time point, may have underestimated relationships between NSSI functions and diagnostic correlates. Future studies would benefit from also assessing lifetime diagnoses. Third, this study was not able to obtain information about patients' treatment, current or past (e.g., medications or number of hospitalizations). Length or intensity of patient treatment could be useful markers of patient severity that may be related to NSSI functional endorsement. It would be beneficial for future studies to obtain this treatment

information. Finally, this study was not able to follow-up with adolescents to investigate whether NSSI functions were related to NSSI course. Future studies should examine whether certain NSSI functions are more predictive of NSSI relapse and remission. For instance, given that intrapersonal NSSI functions (e.g., affect regulation) are related to more severe psychological correlates, it is possible that these functions may indicate a more severe group of self-injurers whose NSSI may persistent over time.

Footnotes

[1] Demographic data was not available for participants whose parents refused participation in the study. Therefore, demographic comparisons between adolescents whose parents consented or refused study participation could not be made.

[2] Before computing internalizing and externalizing count scores, Mplus was utilized (both exploratory factor analysis and confirmatory factor analysis) to obtain internalizing and externalizing factor scores. However, a model could not be created that met the guidelines for a reasonable model fit (i.e., chi-square values were significant, CFI values less than 0.90, and RSMEA values greater than 0.06).

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Table 1

Descriptive and diagnostic features, as well as emotion and personality correlates of the nonsuicidal self-injuring (NSSI) and clinical control (noninjuring) groups.

	NSSI	Control	*Group comparison*[1]		
	(*n* = 128)	(*n* = 72)	*Statistical Test*	*p*	*ES*
Descriptive Features:					
Age: *M(SD)*	15.2 (1.3)	14.9 (1.5)	$t(198) = 1.39$	.165	$d = 0.21$
Gender: (% female)	85.2%	54.2%	$\chi^2 (1, N = 200) = 23.00$	<.001	$\Phi = .34$
Ethnicity: (%)	61.7%	68.1%	$\chi^2 (1, N = 200) = 0.80$	.370	$\Phi = .06$
Caucasian					
Hispanic	15.6%	11.1%	$\chi^2 (1, N = 200) = 0.78$	.377	$\Phi = .06$
African American	8.6%	12.5%	$\chi^2 (1, N = 200) = 0.78$	.377	$\Phi = .06$
Mixed ethnicity	12.5%	6.9%	$\chi^2 (1, N = 200) = 1.51$	.219	$\Phi = .09$
Grade[2]: *M(SD)*	9.0 (1.4)	8.6 (1.6)	$t(193) = 1.64$	.104	$d = 0.27$
Diagnostic Features[3]: % (total *n*) of participants meeting criteria for the *current* DSM-IV disorder					
Anxiety disorder	65.1% (109)	41.0% (61)	$\chi^2 (1, N = 170) = 9.28$	.002	$\Phi = .23$
ADHD	28.1% (110)	23.3% (60)	$\chi^2 (1, N = 170) = 0.47$	.493	$\Phi = .05$
BPD	57.0% (107)	31.0% (58)	$\chi^2 (1, N = 165) = 10.17$	.001	$\Phi = .24$
Disruptive behavior	69.4% (108)	62.3% (61)	$\chi^2 (1, N = 169) = 0.90$	.343	$\Phi = .02$
Mood disorder	59.6% (109)	31.7% (63)	$\chi^2 (1, N = 172) = 12.42$	<.001	$\Phi = .26$
Substance use disorder	43.9% (107)	36.1% (61)	$\chi^2 (1, N = 168) = 0.99$	.319	$\Phi = .08$
Suicidal ideation	57.0% (107)	31.0% (58)	$\chi^2 (1, N = 165) = 10.20$	.001	$\Phi = .25$
Suicide attempts	20.6% (107)	8.6% (58)	$\chi^2 (1, N = 165) = 3.92$	.048	$\Phi = .15$

Table 1 continued	NSSI	Control	*Statistical Test*	*p*	*ES*
Emotion and Personality Correlates: *M* (*SD*)					
DERS Nonacceptance	15.6 (7.4)	12.7 (6.3)	$t(159) = 2.48$	.014	$d = 0.42$
DERS Goals	18.2 (5.3)	15.9 (6.0)	$t(159) = 2.41$	.017	$d = 0.41$
DERS Impulse	18.4 (6.9)	16.2 (6.7)	$t(159) = 1.95$	.053	$d = 0.32$
DERS Awareness	19.1 (5.6)	16.4 (5.9)	$t(159) = 2.88$	.005	$d = 0.47$
DERS Strategies	25.5 (9.3)	18.5 (7.1)	$t(159) = 4.94$	<.001	$d = 0.85$
DERS Clarity	14.6 (5.3)	10.8 (4.2)	$t(159) = 4.59$	<.001	$d = 0.79$
UPPS Urgency	36.6 (6.6)	30.8 (7.3)	$t(160) = 5.15$	<.001	$d = 0.83$
UPPS lack Perseverance	26.0 (5.4)	23.6 (4.9)	$t(160) = 2.79$	.006	$d = 0.47$
UPPS lack Premeditation	26.9 (7.1)	27.5 (7.3)	$t(160) = 0.51$	.610	$d = 0.08$
UPPS Sensation Seeking	32.4 (7.7)	30.1 (8.4)	$t(160) = 1.72$	.087	$d = 0.29$
UCLA Loneliness	26.1 (6.7)	22.4 (6.4)	$t(156) = 3.29$	.001	$d = 0.56$
SNAP-Self Derogation	4.1 (2.5)	2.1 (2.2)	$t(153) = 4.89$	<.001	$d = 0.85$

ADHD = attention-deficit hyperactivity disorder; BPD = borderline personality disorder

[1] Dimensional group differences were examined using independent-samples *t*-tests and Cohen's *d* for effect size. Categorical group differences were examined using Pearson chi-square tests and Cramer's phi coefficients (Φ) for effect size.

[2] Grade refers to the last grade of school completed.

[3] *Anxiety disorder* includes presence of any of the following *current* disorders: panic disorder, agoraphobia, social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, or generalized anxiety disorder. *Disruptive behavior* includes presence of *current* conduct disorder or oppositional defiant disorder. *Mood disorder* includes presence of *current* bipolar I, bipolar II, major depressive disorder, or dysthymia. *Substance use* disorder includes presence of *current* alcohol abuse/dependence or substance abuse/dependence.

Table 2

ISAS behavior scales endorsed by nonsuicidal self-injuring sample (n = 128).

ISAS Behavior scales	*% engaged in behavior*	*Lifetime frequency M (SD)*
Banging/Hitting	53.1%	14.47 (50.84)
Biting	26.6%	12.67 (64.46)
Burning	27.3%	2.16 (6.05)
Carving	32%	9.93 (50.14)
Cutting	85.2%	92.49 (324.74)
Pinching	22.7%	8.30 (48.92)
Pulling Hair	30.5%	11.84 (89.15)
Interfering w/ Wound Healing	31.2%	22.30 (110.39)
Rubbing Skin Against Rough Surfaces	20.3%	2.70 (12.94)
Severe Scratching	42.2%	10.77 (48.53)
Sticking Self with Needles	24.2%	5.43 (25.68)
Swallowing Dangerous Chemicals	12.5%	0.48 (2.21)

Table 3

Exploratory factor analysis of the ISAS function scales using principal axis factoring with promax rotation (pattern matrix).

Function[1]	*M (SD)*	*Factor 1: Interpersonal (eigenvalue = 4.73)*[2]	*Factor 2: Intrapersonal (eigenvalue = 2.06)*[2]
Affect Regulation	4.23 (1.77)	-.26	**.79**
Anti-Dissociation	2.81 (2.00)	-.05	**.71**
Anti-Suicide	2.52 (2.01)	.17	**.50**
Marking Distress	2.52 (1.92)	.30	**.53**
Self-Punishment	3.29 (2.13)	-.03	**.66**
Autonomy	1.15 (1.71)	**.77**	.09
Interpersonal Boundaries	1.45 (1.95)	**.70**	.11
Interpersonal Influence	1.52 (1.64)	**.51**	.06
Peer Bonding	0.60 (1.23)	**.70**	-.31
Revenge	1.20 (1.82)	**.63**	-.09
Sensation Seeking	1.07 (1.39)	**.55**	.01
Toughness	1.36 (1.68)	**.71**	.06
Self-Care	1.29 (1.43)	.29	.34

[1] ISAS subscale scores range from 0 to 6.

[2] The interpersonal functions scale score was created by averaging the following scales: autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, sensation seeking, and toughness. The intrapersonal functions scale score was created by averaging the following scales: affect regulation, anti-dissociation, anti-suicide, marking distress, and self-

punishment. Because the self-care subscale exhibited a cross-loading on both factors, it was not included in either of the superordinate function scales. Both superordinate function scales range from 0 to 6.

Table 4

Spearman correlations (ρ) between ISAS function scales and Axis I diagnostic variables.

		Interpersonal Functions	*Intrapersonal Functions*	*Comparing Correlations*[2]	
Disorder scale[1]	*M (SD)*			*Z*	*p*
Internalizing	2.20 (1.83)	.21***	.50***[a]	3.09	.002
Distress	0.98 (0.85)	.31***[a]	.49***[a]	1.95	.051
Fear	1.08 (1.17)	.24*	.33***[a]	0.91	.362
Externalizing	1.61 (1.18)	.16	.09	-0.68	.499

*$p < .05$, **$p < .01$, ***$p < .001$

[a] Partial correlation remained significant ($p < .05$) after controlling for lifetime NSSI methods or lifetime NSSI frequency.

[1] Internalizing (scale 0-9) = major depressive disorder or dysthymia, generalized anxiety disorder, panic disorder, agoraphobia, social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, and bulimia nervosa. Distress (scale 0-3) = major depressive disorder or dysthymia, generalized anxiety disorder, and posttraumatic stress disorder. Fear (scale 0-5) = panic disorder, agoraphobia, social phobia, specific phobia, and obsessive-compulsive disorder. Externalizing (scale 0-4) = attention-deficit hyperactivity disorder, conduct disorder or oppositional defiant disorder, alcohol abuse or dependence, and substance abuse or dependence.

[2] Correlations were compared using an online calculator (www.stat-help.com) for comparing two dependent correlations measured on the same subjects.

Table 5

ISAS functions endorsed by self-injurers with and without borderline personality disorder (BPD).

	BPD	No BPD	*Group comparison*[2,3]		
	(*n* = 52)	(*n* = 62)			
ISAS Functions[1]	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*d*
Intrapersonal Functions	3.59 (1.20)	2.75 (1.49)	3.26	.001	0.62
Affect Regulation	4.77 (1.38)	4.03 (1.84)	2.44	.016	0.46
Anti-Dissociation	3.46 (2.04)	2.32 (1.86)	3.11	.002	0.59
Anti-Suicide	2.98 (1.90)	2.27 (2.07)	1.88	.062	0.36
Marking Distress	2.97 (1.91)	2.14 (1.91)	2.32	.022	0.44
Self-Punishment	3.75 (1.94)	2.98 (2.19)	1.98	.050	0.37
Interpersonal Functions	1.46 (1.20)	0.87 (0.90)	3.00	.004	0.57
Autonomy	1.52 (1.89)	0.84 (1.52)	2.09	.039	0.39
Interpersonal Boundaries	2.06 (2.06)	0.94 (1.68)	3.15	.002	0.60
Interpersonal Influence	1.62 (1.76)	1.39 (1.54)	0.74	.462	0.14
Peer Bonding	0.73 (1.27)	0.35 (0.91)	1.79	.077	0.34
Revenge	1.38 (1.81)	0.74 (1.39)	2.10	.039	0.40
Sensation Seeking	1.27 (1.40)	0.76 (1.21)	2.09	.039	0.39
Toughness	1.65 (1.81)	1.09 (1.53)	1.78	.078	0.34

[1] ISAS superordinate scales and subscales range from 0 to 6.

[2] Independent-samples *t*-tests (*df* = 112) were utilized to make group comparisons. Effect size expressed with Cohen's *d*.

[3] Group differences in interpersonal functions remained significant after controlling for lifetime NSSI methods (F[1, 111] = 4.10, p = .045, η_p^2 = .036) or lifetime NSSI frequency and (F[1, 111] = 4.56, p = .035, η_p^2 = .040), but group differences in intrapersonal functions did not remain significant after controlling for lifetime NSSI methods (F[1, 111] = 1.86, p = .175, η_p^2 = .017) or lifetime NSSI frequency (F[1, 111] = 1.26, p = .264, η_p^2 = .011).

Table 6

ISAS functions endorsed by self-injurers with and without current suicidal ideation.

	Suicidal Ideation (n = 61)	No Suicidal Ideation (n = 46)	*Group comparison*[2]		
ISAS Functions[1]	*M* (*SD*)	*M* (*SD*)	*t*	*p*	*d*
Intrapersonal Functions	3.67 (1.13)	2.48 (1.57)	4.37	<.001[a]	0.85
Affect Regulation	4.82 (1.43)	3.70 (1.87)	3.39	.001[a]	0.66
Anti-Dissociation	3.48 (1.93)	2.09 (2.00)	3.63	<.001[a]	0.71
Anti-Suicide	3.02 (1.88)	2.13 (2.15)	2.27	.025	0.44
Marking Distress	2.89 (1.93)	2.03 (1.96)	2.27	.025	0.44
Self-Punishment	4.14 (1.72)	2.43 (2.15)	4.42	<.001[a]	0.86
Interpersonal Functions	1.20 (1.13)	1.03 (1.03)	0.80	.423	0.16
Autonomy	1.20 (1.90)	1.07 (1.51)	0.40	.700	0.08
Interpersonal Boundaries	1.44 (2.00)	1.41 (1.95)	0.08	.939	0.02
Interpersonal Influence	1.64 (1.73)	1.28 (1.54)	1.10	.272	0.21
Peer Bonding	0.38 (0.88)	0.57 (1.09)	0.99	.325	0.19
Revenge	1.20 (1.77)	0.83 (1.43)	1.16	.248	0.23
Sensation Seeking	1.11 (1.44)	0.91 (1.23)	0.76	.446	0.15
Toughness	1.41 (1.77)	1.12 (1.52)	0.89	.376	0.17

[a] Group differences remained significant at $p < .01$ after controlling for lifetime NSSI methods or lifetime NSSI frequency.

[1] ISAS superordinate scales and subscales range from 0 to 6.

[2] Independent-samples *t*-tests $df = 105$; effect size expressed with Cohen's *d*.

Table 7

Correlations between ISAS superordinate function scales and emotion/personality correlates.

Emotion and Personality Correlates	*Interpersonal Functions Scale*	*Intrapersonal Functions Scale*	*Comparing Correlations*[1]	
			Z	*p*
DERS Nonacceptance	.33***[a]	.52***[a]	2.03	.043
DERS Goals	.15	.30**	1.44	.150
DERS Impulse	.24*	.33***[a]	0.88	.379
DERS Awareness	.10	.33***[a]	2.21	.027
DERS Strategies	.21*	.52***[a]	3.23	.001
DERS Clarity	.22*	.39***[a]	1.69	.092
UPPS Urgency	.27**[a]	.30**[a]	0.29	.770
UPPS lack Perseverance	-.01	.19*	1.87	.062
UPPS lack Premeditation	-.04	.02	0.55	.579
UPPS Sensation Seeking	.15	.01	-1.30	.193
UCLA Loneliness	.22*	.44***[a]	2.18	.029
SNAP Self-Derogation	.25*	.47***[a]	2.22	.027

*$p < .05$, **$p < .01$, ***$p < .001$

[a] Partial correlation remained significant ($p < .05$) after controlling for lifetime NSSI methods or lifetime NSSI frequency.

[1] Correlations were compared using an online calculator (www.stat-help.com) for comparing two dependent correlations measured on the same subjects.

Table 8

Correspondence between adolescent and parent diagnostic reports in the self-injuring sample (n = 51).

		Parent Report		Parent-Adolescent Agreement	
Disorder[1] (Adolescent Report)	Absent	Present	Row Total	κ	(95% CI)
Any disorder					
Absent	1	2	3		
Present	1	46	47		
Column Total	2	48	50	.37	(-.32–1.06)
Anxiety Disorder[1]					
Absent	13	3	16		
Present	7	27	34		
Column Total	20	30	50	.57	(.33–.81)
ADHD					
Absent	26	10	36		
Present	9	3	12		
Column Total	35	13	48	-.03	(-.39–.33)
Disruptive behavior disorder[2]					
Absent	11	5	16		
Present	9	24	33		
Column Total	20	29	49	.39	(.12–.66)

Table 8 *continued*

Disorder[1] (Adolescent Report)	Parent Report			Parent/Adolescent Agreement	
	Absent	Present	Row Total	κ	(95% CI)
Mood disorder					
Absent	7	11	18		
Present	7	26	33		
Column Total	14	37	51	.19	(-.12–.49)
Substance use disorder					
Absent	25	1	26		
Present	9	11	20		
Column Total	34	12	46	.54	(.28–.79)
Suicidal ideation					
Absent	16	3	19		
Present	9	18	27		
Column Total	25	21	46	.49	(.24–.74)
Suicide attempts					
Absent	37	3	40		
Present	4	4	8		
Column Total	41	7	48	.45	(.07–.83)

ADHD = attention-deficit hyperactivity disorder

[1] *Anxiety disorder* includes presence of any of the following *current* disorders: panic disorder,

agoraphobia, social phobia, specific phobia, obsessive-compulsive disorder, posttraumatic stress disorder, or generalized anxiety disorder. *Disruptive behavior* disorder includes presence of *current* conduct disorder or oppositional defiant disorder. *Mood disorder* includes presence of *current* bipolar I, bipolar II, major depressive disorder, or dysthymia. *Substance use disorder* includes presence of *current* alcohol abuse/dependence or substance abuse/dependence.

Table 9

Correlations between ISAS function subscales and emotion/personality correlates.

	Intrapersonal Functions					*Interpersonal Functions*						
Correlates	AR	AD	AS	MD	SP	A	IB	II	PB	R	SS	T	SC
DERS subscales													
Nonacceptance	.27**	.33***	.40***	.38***	.57***	.18	.32***	.31***	.11	.20*	.33***	.21*	.14
Goals	.10	.21*	.24*	.28**	.28**	.05	.15	.21*	.03	.08	.24*	.02	.02
Impulse	.20*	.29**	.18	.31***	.28**	.13	.21*	.22*	.06	.18	.30**	.09	.24*
Awareness	.21*	.31***	.24*	.22*	.26**	.14	.09	.02	-.10	.10	.00	.17	.17
Strategies	.33***	.38***	.32***	.38***	.54***	.05	.19	.26**	-.03	.19*	.34***	.05	.13
Clarity	.29**	.32***	.28**	.24*	.34***	.18	.17	.12	.00	.14	.29**	.17	.12
UPPS subscales													
Urgency	.21*	.19	.18	.31***	.25*	.12	.20*	.28**	.08	.25*	.21*	.15	.22*
lack Perseverance	.18	.18	.12	.06	.19	.07	-.04	-.03	-.06	-.04	.12	-.07	.10
lack Premeditation	.07	.08	.01	.00	-.09	.08	-.08	-.15	-.09	.02	.03	-.01	.17
Sensation Seeking	.01	.11	-.04	.09	-.13	.06	.21*	-.10	.12	.17	.19	.11	.13

Table 9 *continued*

	Intrapersonal Functions					*Interpersonal Functions*							
Correlates	AR	AD	AS	MD	SP	A	IB	II	PB	R	SS	T	SC
UCLA Loneliness	.29**	.35***	.27**	.32***	.40***	.17	.21*	.12	-.07	.16	.27**	.18	.09
SNAP-Self Derogation	.35***	.31**	.31**	.40***	.41***	.20	.25*	.17	-.04	.14	.22*	.24	.18

A = autonomy, AD = anti-dissociation, AR = affect regulation, AS = anti-suicide, IB = interpersonal boundaries, II = interpersonal influence, MD = marking distress, PB = peer bonding, R = revenge, SC = self-care, SP = self-punishment, SS = sensation seeking, T = toughness

*$p < .05$, **$p < .01$, ***$p < .001$