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Anxiety, Uncertainty, Distress Tolerance, and Eating Disorder Symptoms as Related to Non-Suicidal Self-Injury in Young Adults

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ANXIETY, UNCERTAINTY, DISTRESS TOLERANCE, AND EATING DISORDER
SYMPSTOMS AS RELATED TO NON-SUICIDAL SELF-INJURY IN YOUNG
ADULTS

A Capstone Experience/Thesis Project

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By

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* * * * *

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ABSTRACT

Adolescents and college-aged individuals are particularly at risk for non-suicidal self-injury (NSSI) and eating disorders. Research is lacking regarding the cognitive and emotional factors behind the formation and maintenance of both types of pathology. This study examines anxiety, intolerance to uncertainty (IU), and distress tolerance in relation to both constructs in two separate samples (Sample 1: n=364, 58.5% freshmen, 75.8% female; Sample 2: n=156, 52.6% freshman, 66.0% female) with 32.4% and 40% reporting any history of NSSI, respectively. Participants completed a packet of questionnaires regarding the variables of interest and were debriefed and referred as necessary. In the first sample, it was hypothesized that anxiety, distress tolerance, and eating disorder symptoms would predict NSSI lifetime frequency and that distress tolerance would mediate the relationship between anxiety and NSSI. In the second sample, it was hypothesized that IU would be positively correlated with both NSSI and disordered eating. Results indicated that distress tolerance did mediate the relationship between anxiety and NSSI. Disordered eating was not significantly related to NSSI in either sample. IU was significantly related to both NSSI and disordered eating. Considering the impact uncertainty can have on young adults and adolescents and the

increased rates in both groups, these results provide important implications for future

research and treatment.

Dedicated to my mother and great-grandmother

ACKNOWLEDGEMENTS

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INTRODUCTION

Adolescents and young adults are particularly at risk for the development of

eating disorder behaviors and non-suicidal self-injury (Bailey et al., 2014; Nock, 2010),

two maladaptive behaviors with detrimental physical and psychological consequences.

Non-suicidal self-injury (NSSI) is defined as the deliberate destruction of one's own body

tissue in the absence of suicidal intent and for reasons not socially sanctioned (Favazza,

1996; Nock & Favazza, 2009). In addition to the obvious physical harm resulting from

NSSI, research has demonstrated that individuals who self-harm experience heightened

negative emotions (e.g., anger, guilt, shame) and face increased academic difficulties

(Briere & Gil, 1998; Klonsky, 2009). NSSI has also been found empirically to predict

subsequent suicide attempts (Asarnow et al., 2011; Guan, Fox, & Prinstein, 2012;

Klonsky, May, & Glenn, 2013). Similarly, eating disorders have been associated with

increased risk for suicidality (Franko & Keel, 2006) and other unfavorable outcomes

including alcohol use disorder, depression, and pregnancy complications (Franko et al.,

2005; Berkman, Lohr, & Bulik, 2007; Kouba et al., 2007). Furthermore, NSSI and eating

disorders have been found to have high rates of comorbidity (Muehlenkamp, Peat, Claes,

& Smits, 2012). Even more concerning is the fact that evidence-based treatments for both

forms of pathology are lacking (Merwin et al., 2011; Nock, 2009). Given the increased

rates and severe consequences of NSSI and eating disorders among adolescents and young adults, it is important to build upon current models to better understand the mechanisms behind each construct and the relationship between the two.

NSSI Functions

The recent increase in the study of self-injury has prompted researchers to develop the Four-Function Model (FFM) of self-injury (Nock, 2009; 2010; Nock & Prinstein, 2004), which theorizes that NSSI is maintained by four functional reinforcement processes including automatic negative reinforcement, automatic positive reinforcement, social negative reinforcement, and social positive reinforcement. The FFM also emphasizes that difficulty regulating one's affective/cognitive states increases the risk of NSSI (Nock, 2010). Individuals who experience difficulty regulating negative emotions are particularly prone to endorse the automatic negative reinforcement (ANR) function of NSSI in an attempt to regulate or avoid undesirable emotional experiences (Bentley et al., 2014). The emotional cascade model describes NSSI as a mechanism used to distract from "emotional cascades" which are described as cycles of rumination and negative affect (Selby, Anestis, Bender, & Joiner, 2009; Selby, Anestis, & Joiner, 2008; Selby & Joiner, 2009).

Emotional Cascade Model

The emotional cascade model has been theorized to explain both NSSI and eating disorder behaviors (EDBs; Arbuthnott et al., 2015). The high comorbidity rates of NSSI and ED have led researchers to propose that the two may share certain risk factors or vulnerabilities (Muehlenkamp et al., 2012). Similarly to NSSI, EDBs are associated with heightened negative affect, lower levels of distress tolerance, and difficulty regulating

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negative emotions (e.g., Nock & Mendes, 2008; Sim & Zeman, 2006). Furthermore, rumination strongly predicts both behaviors (Borril, Fox, Flynn, & Roger, 2009; Rawal, Park, & Williams, 2010); within the emotional cascade model (Selby et al., 2008), rumination increases negative emotion and negative emotion cyclically provokes further rumination. NSSI and EDBs have been posited as a mechanism to escape the unbearable negative emotionality elicited through the cycle.

Although NSSI and eating disorders are both conceptualized as a tool for controlling negative emotions, recent research suggests that there are differences among the two. More specifically, individuals who report increases in negative emotions more commonly endorsed NSSI behaviors, whereas those who reported decreases in positive emotions were more likely to endorse EDBs (Arbuthnott et al., 2015). Findings such as these challenge researchers to continue to explore the mechanisms behind both forms of pathology in order to determine shared and distinct characteristics.

Psychological Inflexibility

Although eating disorders do not necessarily entail explicit self-harm, severe illnesses such as anorexia nervosa have been characterized in and of themselves as a relentless fight against the body (Merwin et al., 2011). Individuals suffering from the disorder have been found empirically to demonstrate increased fear of negative evaluations from others and enhanced interpersonal sensitivity (Broberg, Hjalmers, & Nevonen, 2001; Herpertz-Dahlmann et al., 2001; Kaye, Bulik, Thornton, Barbarich, & Masters, 2004). Experts have attempted to clarify the etiology and phenomenology of AN by proposing a model centered around psychological inflexibility, "an inability to behave flexibly in the presence of difficult thoughts, feelings, and bodily sensations" (Merwin et

al., 2011, p. 63). Moreover, they suggest that the high demand for certainty leads AN individuals to rely heavily on rules to minimize uncertainty, avoid mistakes, and provide a sense of control over uncontrollable aspects of experience (Merwin et al., 2011). According to this model, AN symptoms are a result of psychological inflexibility that provide a temporary sense of certainty and control. For instance, behavioral features of AN such as body checking and obsessive weighing function to reduce distress caused by uncertainty and lack of control (Merwin et al., 2011).

Intolerance to Uncertainty

Although uncertainty in general can be perceived as threatening (Epstein, 1972), individuals vary in their ability to tolerate uncertain situations. Intolerance to uncertainty (IU) is defined as "a dispositional characteristic that results from a set of negative beliefs about uncertainty and its implications and involves a tendency to react negatively on an emotional, cognitive, and behavioral level to uncertain situations and events" (Buhr & Dugas, 2009, p. 216). Recently, research has differentiated between the state experience of uncertainty and intolerance to uncertainty, which is understood to describe individual trait differences (Gentes & Ruscio, 2011). A vast amount of research regarding IU has emphasized its association with anxiety disorders (Grenier et al., 2005). Symptoms of disorders such as obsessive-compulsive disorder (OCD) and generalized anxiety disorder (GAD) are suggested as a means to reduce or control feelings of uncertainty and anxiety (Freeston et al., 1994; Steketee, Frost, & Cohen, 1998).

Anxiety versus IU

Although anxiety and IU are related, research suggests that IU is more than just a factor of anxiety. A study comparing IU to anxiety sensitivity (AS) found that IU was in

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fact a related but independent construct (Carleton et al., 2007). Results led researchers to posit that IU may represent a basic component of anxiety. Nonetheless, other findings have demonstrated that IU should not be limited to anxiety disorders considering its association with mood disorders such as major depressive disorder (MDD; Gentes & Ruscio, 2011) and other problematic coping methods such as alcohol use (Oglesby et al., 2015). Furthermore, individuals high in IU are prone to over-identify potential problems and endorse a negative problem orientation (Freeston et al., 1994). Because IU is not specific to anxiety disorders, researchers have proposed that the construct may be correlated to negative affect in general (Gentes & Ruscio, 2011). However, research demonstrating that IU explains variance in anxiety symptoms beyond that of negative affect complicates that theory (Boelen & Reijntes, 2009) and warrants further attention.

IU and ED

Due to the high comorbidity rates of EDs and anxiety disorders (Kaye et al., 2004), studies of IU have extended to ED populations. As expected, individuals with anorexia nervosa (AN) and bulimia nervosa (BN) report higher levels of IU than healthy controls (Frank et al., 2012). Depression and anxiety did not account for the group differences; ED individuals without anxiety or depression still reported heightened IU compared to healthy controls. To avoid the uncomfortable emotions resulting from IU, ED individuals report finding a sense of security and control through EDBs. In a qualitative examination of uncertainty in anorexia, participants described uncertainty as a threat, a lack of control, and a suffocating construct (Sternheim et al., 2011). Furthermore, participants acknowledged that EDBs were more pronounced when facing uncertain situations. Although these individuals reported using EDBs to cope, they did

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acknowledge other ways to cope, including maladaptive behaviors such as excessive alcohol use (Sternheim et al., 2011).

IU, ED, & NSSI

As mentioned previously, both ED and NSSI have been proposed as maladaptive methods for coping with dysregulated and intense emotions. The two pathologies share a number of risk factors and correlates. However, despite the vast research linking ED to intolerance to uncertainty, no study has examined the relationship between intolerance to uncertainty and NSSI. Considering the Four-Function Model of NSSI, particularly the automatic negative reinforcement function, and the negative emotions elicited by heightened intolerance to uncertainty, a better understanding of the relationship between the two constructs could provide valuable information regarding the mechanisms behind NSSI and the cognitive features that maintain the behavior. Additionally, if intolerance to uncertainty is in fact a predisposition for NSSI, it would add to the current literature suggesting that IU might be a general feature behind a number of forms of pathology, which could in turn inform effective and universal treatments.

Rationale and Hypotheses

Due to the significant amount of uncertainty experienced during adolescence and young adulthood and high prevalence rates of both ED and NSSI, this study sought to examine how uncertainty, NSSI, and EDBs might interact with each other. To most efficiently and accurately examine the relationships between IU, NSSI, and ED, this study aimed to clarify the associations among all three constructs in addition to other common covariates such as distress tolerance and anxiety. Based on past research, it was first hypothesized that anxiety, distress tolerance, and eating disorder symptoms would be

significantly related to NSSI lifetime frequency. Second, it was hypothesized that distress tolerance, which was conceptualized similarly to IU, would mediate the relationship between anxiety and NSSI. In a separate study focusing on IU, it was hypothesized that IU would be significantly related to both NSSI frequency and eating disorder symptoms, such that as IU increased, NSSI/ED pathology would increase.

Method

Participants

Study 1. Participants for Study 1 included 364 college undergraduate students (58.5% freshman, 75.8% female, 76.6% white, and 94% heterosexual). The mean age was 19.31 (SD = 2.16). Participants volunteered through undergraduate psychology courses at a university in the south-central region of the United States.

Study 2. The sample for Study 2 included data from 156 undergraduate students (52.6% freshman, 66.0% female, 67.9% white, and 85.9% heterosexual). The mean age was 20.38 (SD = 4.68). Similarly to the first study, participants volunteered through undergraduate psychology courses at the same university. Data for the two studies were collected at different time points and represent distinct samples.

Procedure

Study 1. Upon volunteering, participants scheduled a time through an on-line study board to complete the study. Data collection occurred in classroom settings, and all participants signed informed consent forms prior to beginning the study. Participants completed a packet of self-report questionnaires including a basic demographics section, the Zung Self-Report Anxiety Scale (Z-SAS), the Distress Tolerance Scale (DTS), the Eating Attitudes Test-26 (EAT-26), and the Inventory of Statements about Self-Injury

Scale (ISAS). The survey packets did not contain any identifying information; however, packets were coded with unique numbers so that each student could be linked to a packet for referral purposes. Each participant was properly debriefed following completion of the packet, and trained graduate students screened completed packets for suicide risk. Students determined to be at risk based on responses on specific critical items and through a brief individual suicide risk screening were referred as necessary. All consent forms were securely stored separately from the raw data.

  Study 2. Procedure for Study 2 was identical to Study 1 with the exception of two additions to the survey packet. The survey packet for Study 2 included a basic demographic section, the Z-SAS, the DTS, the EAT-26, the ISAS, the Eating Disorder Inventory-3 (EDI-3), and the Intolerance to Uncertainty Scale (IUS; Buhr & Dugas, 2002).

Measures

  Demographic factors. Participants were asked to complete a brief demographics questionnaire. The demographics questionnaire included factors such as age, sex, race/ethnicity, sexual orientation, academic status, and religious affiliation.

  Anxiety. The Zung Self-Rating Anxiety Scale (Z-SAS; Zung, 1971) was administered to measure participants' levels of anxiety. The Z-SAS is a 20 item self-report measure that asks participants to rate on a 4-point Likert-scale from 1 (*none or a little of the time*) to 4 (*most or all of the time*) how often they have felt specific symptoms in the past week. Items include statements such as "I feel more nervous and anxious than usual" and "I get upset easily or feel panicky." The scale includes both positively- and negatively- worded items to prevent response bias and identify inconsistencies. Items are

summed for a total score ranging from 20 to 80 with higher scores indicating more symptoms of anxiety (Bitsika et al., 2009). The Z-SAS correlates at .75 with the Hamilton Anxiety Scale, significantly discriminates normal samples from those with anxiety disorders, and demonstrates good reliability (split half = 0.71; Zung, 1971). In the current study, the Z-SAS demonstrated high reliability (α=.88).

Distress Tolerance. The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) was administered to measure participants' ability to tolerate distress. The DTS contains fifteen statements and asks participants to rate them each on a 5-point Likert-scale from 1 (*strongly agree*) to 5 (*strongly disagree*). Items were developed to measure perceived ability to tolerate emotional distress, appraisal of distress, attention being absorbed by negative emotions, and efforts to regulate or alleviate distress. These items included statements such as "Feeling distressed or upset is unbearable to me," "I am ashamed of myself when I feel distressed," and "My feelings of distress are so intense that they completely take over." Items are summed for a total score and higher scores represent higher distress tolerance. The DTS has been found to be a valid and reliable self-report measure of the ability to tolerate distress (α=.82-.85; Simons & Gaher, 2005). Within our study, the DTS demonstrated reliability comparable to that of previous research (α=.86).

NSSI. All participants were administered the Inventory of Statements about Self-Injury Scale (ISAS; Klonsky & Glenn, 2009), a two-part self-report measure assessing NSSI. The ISAS contains a comprehensive assessment of NSSI behavior, including items regarding methods, frequency, age of onset, the experience of pain during self-injury, whether it occurs alone or in the presence of others, time between the urge to self-injure and the act, the desire to stop self-injuring, and functional purposes (Klonsky & Glenn,

2009; Klonsky & Olino, 2008). The ISAS has been found to have excellent internal consistency for both interpersonal (α=.88) and intrapersonal (α=.80) functions (Klonsky & Glenn, 2009). For the purpose of this study, the ISAS was used only to determine NSSI prevalence and overall lifetime frequency.

Eating Disorder Behaviors. The Eating Attitudes Test (EAT-26; Garner et al., 1982) was developed as a screening tool for identifying individuals who exhibit symptoms of eating disorders and was administered to participants in Study 1 to assess these symptoms. The EAT-26 contains 26 items on a 6-point Likert-scale from 1 (*never*) to 6 (*always*). Items include statements such as "Am terrified of being overweight," "Feel that food controls my life," and "Have the impulse to vomit after meals." The items form three subscales: 1) Dieting 2) Bulimia and Food Preoccupation, and 3) Oral Control. All items are coded and summed for a total score, and a score of 20 or higher is indicative of problematic eating behaviors, concern with body weight, and attitudes about dieting. The EAT-26 has been found to be reliable and valid in identifying individuals with eating disorder symptoms (Garner et al., 1982), and the test-retest reliability has been found to be 0.84 over a 2- to 3-week period (Allison, 1995). The reliability statistic for this study was similar and acceptable (α=.81).

Study 2 Measures

Eating Disorder Behaviors. The Eating Disorder Inventory-3 (EDI-3; Garner, 2004) was designed as a diagnostic measure for anorexia and bulimia and was administered to assess eating disorder symptoms for participants in Study 2. The EDI-3 is an improved and expanded version of previous EDI scales, containing 91 self-report measures of eating disorder relevant subscales including *drive for thinness* (DT), *bulimia* (B), *body*

dissatisfaction (BD), *low self-esteem* (LSE), *personal alienation* (PA), *interpersonal insecurity* (II), *interpersonal alienation* (IA), *interoceptive deficits* (ID), *emotional dysregulation* (ED), *perfectionism* (P), *asceticism* (AS), and *maturity fear* (MF). Responses are scored on a 6-point Likert-scale from 1 (*never*) to 6 (*always*). Scores on the EDI-3 are recalibrated to a 0-4 format with symptomatic responses being weighted more than asymptomatic responses, and items are summed for a total score. Items include statements such as "I am preoccupied with the desire to be thinner," I feel inadequate," and "When I am upset, I worry that I will start eating." The 12 primary subscales are summarized into two second order factors representing: 1) a general risk factor for the three primary factors *drive for thinness, body dissatisfaction, and bulimia,* and 2) a general psychological disturbance factor accounting for the remaining nine primary factors (Clausen et al., 2011; Garner, 2004). For the purpose of this study, numerical responses on the three primary subscales *drive for thinness, body dissatisfaction, and bulimia* were summed to yield an eating disorder composite score. Items 1, 12, 19, 31, 55, and 62 were reverse coded. The EDI has been found to have excellent reliability (Cronbach's $\alpha = .90–.97$; test–retest $r = .98$; Garner, 2004; Wildes et al., 2010), and it is intended for use with older adolescent and adult females (Garner, 2004), which makes up the majority of the current sample. The ED composite score used in this study demonstrated adequate reliability ($\alpha=.77$). Higher scores represent increased psychological traits or symptom clusters relevant to the development and maintenance of eating disorders (Garner, 2004).

   Intolerance of Uncertainty. The Intolerance of Uncertainty Scale (IUS) was administered to more directly measure intolerance to uncertainty and also to compare and

contrast the construct with other variables of interest (e.g., anxiety and distress tolerance).

The IUS is a 27-item self-report measure and is commonly used in IU research. The scale

was first developed in French (Freeston et al., 1994) and subsequently translated to

English (Buhr & Dugas, 2002). The measure includes items such as "Uncertainty makes

me uneasy, anxious, or stressed," and "I can't stand being undecided about my future."

Responses are reported on a Likert-scale from 1 (*not at all characteristic of* me) to 5

(*entirely characteristic of* me). Scores on all items are summed for a total score, and

higher scores represent greater intolerance to uncertainty. Previous research has

demonstrated that the IUS has good convergent and discriminant validity, exceptional

internal consistency (α=.91) and good test-retest reliability (r=.78; Buhr & Dugas, 2002;

Dugas et al., 1997; Freeston et al., 1994). The IUS also demonstrated good reliability

within the current sample (α=.94).

Results

Study 1

Data Management

Of the 364 participants, not all participants completed all measures of the survey,

and any incomplete data was excluded from the analyses. Only complete data measures

were used, so the total number varies (n=345-361) depending on the specific measures.

Thirty-two percent (n=118) of all participants endorsed engaging in NSSI at least once,

and among those with a history of NSSI, the mean frequency was 40.29 ($SD = 145.64$)

acts. The NSSI frequency values were transformed to help normalize the distribution as

well as correct initial skew and kurtosis values (skew = 6.30; kurtosis = 47.86). Prior to

summing the frequency across NSSI methods, a square root transformation was used on

the total frequency for each NSSI method. The transformed frequencies of each NSSI method were then summed for a total NSSI frequency score. The transformed NSSI frequency score had a mean frequency of 2.74 (SD = 5.73). Skew and kurtosis values also improved (skew = 3.05; kurtosis = 11.13). This approach to scoring the total NSSI frequency using the ISAS has been utilized by the author of the measure (Glenn & Klonsky, 2011). See Table 1 for frequencies of NSSI methods.

Anxiety, Disordered Eating, and NSSI

The first overall model was tested using linear regression and examined the relationships between anxiety, eating disorder behaviors, and NSSI. Total scores were used in the analysis for both anxiety (Z-SAS) and eating disorder behaviors (EAT-26), which were entered as predictors of lifetime NSSI frequency. The overall model was significant [$F(2,344)$ =18.559, $p<.001$] and was responsible for 9.7% of the variance. However, only anxiety was a significant predictor of NSSI (β = .31, $t(344)$ = 5.656, $p<.001$). The relationship between disordered eating and NSSI lifetime frequency was not significant (β = .018, $p=.73$).

Anxiety, Distress Tolerance, and NSSI

The second overall model examined the relationships between anxiety, distress tolerance, and NSSI and also used linear regression in order to determine whether distress tolerance mediated the relationship between anxiety and NSSI. Transformed NSSI lifetime frequency was entered as the outcome variable. The overall model was significant [$F(2, 342)$ = 24.08, $p<.001$] and was responsible for 12.3% of the variance. In the full model, both distress tolerance (b=-.09, $p<.01$) and anxiety (b=.135, $p<.001$) were significantly related to NSSI. The indirect effect of distress tolerance was also significant

(b=.05, 95% CI: .02, .10). The confidence interval did not include zero, which provides additional evidence that distress tolerance was a significant mediator.

Study 2

Data Management

Of the 156 participants, not all participants completed all measures of the survey, and any incomplete data was again excluded from the analysis. Only complete data measures were used, so the total number varies (n=149-155). Forty percent (n=62) of all participants endorsed engaging in NSSI at least once, and among those with a history of NSSI, the mean frequency was 35.40 ($SD = 98.40$) acts. NSSI frequency values were again transformed to help normalize the distribution and correct initial skew and kurtosis values (skew = 3.93; kurtosis = 16.92). The transformed NSSI frequency score had a mean frequency of 2.88 ($SD = 5.22$). Skew and kurtosis values also improved (skew = 2.29; kurtosis = 5.01). See Table 2 for mean frequencies of NSSI methods.

Intolerance to Uncertainty

To test the hypothesis that intolerance to uncertainty would be related to NSSI, linear regression was used and demonstrated that IU significantly predicted NSSI frequency [$F(1, 147) = 7.86$, $p<.05$], explaining 5.1% of the total variance. Results indicated that an increase in intolerance to uncertainty was associated with an increase in NSSI frequency ($\beta = .23$, $p < .01$). To test the hypothesis that intolerance to uncertainty would be related to overall disordered eating symptoms, another linear regression was used and found that the overall model was significant [$F(1, 145) = 36.75$, $p < .001$], explaining 20.2% of the variance. Again, results indicated that increased IU was associated with an increase in eating disorder behaviors ($\beta =.450$, $p <.001$). The last

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hypothesis for study two was that disordered eating symptoms would be related to NSSI frequency; regression analysis indicated that there was no significant relationship [$F(1, 149) = 3.35$, $p=.07$].

Discussion

The primary aims of this study were to expand upon existing research regarding the relationships between anxiety, distress tolerance, eating disorder behaviors, and NSSI while also exploring the impact intolerance to uncertainty may have on both disordered eating and NSSI. The first hypothesis was that anxiety, distress tolerance, and disordered eating would all be significantly related to NSSI lifetime frequency. This hypothesis was partly supported in that both anxiety and distress tolerance were significant predictors of NSSI, which is what would be expected based on past research regarding these constructs (Kerr & Muehlenkamp, 2010; Nock & Mendez, 2008). In accordance with the Four-Function Model of NSSI, one possible function of self-injurious behaviors is to regulate negative affect stemming from anxiety-provoking situations and low distress tolerance. Thus, as anxiety increases, NSSI also increases, whereas distress tolerance is inversely related to NSSI. Findings from our study are in agreement with this theoretical model. However, contradictory to our hypothesis and the findings of existing research, the relationship between NSSI and disordered eating was not significant in either Study 1 or Study 2.

Although these findings are inconsistent with much of the current literature regarding NSSI and ED, a few studies have demonstrated distinctions between the two behaviors that may explain our confounding results. For instance, researchers have found that although emotion dysregulation in general is a risk factor for both NSSI and ED,

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there are still differences in the cognitions associated with each such that NSSI is correlated with a greater increase in negative emotions, whereas disordered eating is correlated with a greater decrease in positive emotions (Arbuthnott et al., 2014). Both factors are associated with a general increase in negative affect, which could explain why the two behaviors do occur together; however, the differences between the cognitive processes behind each may shed light on the situations that lead to differentiated behaviors. Other researchers have supported this notion, positing that while distal risk factors may predispose individuals to emotion regulation difficulties, there may be self-injury specific risk factors that cause an individual to choose NSSI over other maladaptive coping skills such as drinking, drug use, and disordered eating (Bentley et al., 2014). Future research should continue to explore possible distinctions between these harmful behaviors in order to better understand when and why they co-occur and possible protective factors for both behaviors.

We also hypothesized that distress tolerance, which was conceptualized similarly to IU, would mediate the relationship between anxiety and NSSI. Results indicated that the mediation was significant. These results suggest that both constructs are important and should be considered in NSSI pathology. Interventions that emphasize increasing an individual's ability to tolerate distress have been proposed as a way to specifically target the unwillingness to experience and accept negative emotions that serve the ANR function of NSSI (Bentley et al., 2014). Our results suggest that interventions targeting distress tolerance might also indirectly impact anxiety and its influence on NSSI.

In an effort to find a risk factor that might incorporate both distress tolerance and anxiety, we sought to explore the relationships between intolerance to uncertainty,

disordered eating, and NSSI. Considering the impact uncertainty can have on young adults and adolescents in particular, along with higher rates of NSSI and eating disorder pathology in both groups, it is critical that individuals have the ability to tolerate uncertain situations. In a separate study focusing on IU, it was hypothesized that IU would be significantly related to both NSSI frequency and disordered eating, such that as IU increases, NSSI/ED pathology increases. Results indicated that IU was significantly related to both forms of pathology. However, the relationship between NSSI and disordered eating again did not reach the level of significance. As mentioned previously, this is contradictory to the majority of existing research, although a few studies have specified distinctions between the two constructs (Arbuthnott et al., 2014; Bentley et al., 2014).

Intolerance to uncertainty has been studied in ED populations, and our results support the substantial research finding that ED individuals have increased levels of intolerance to uncertainty compared to healthy controls (Frank et al., 2012; Sternheim et al., 2011). Although IU and ED have been studied previously, research including both constructs as related to NSSI or other maladaptive coping behaviors is scant. Negative urgency, which is defined as the tendency to act rashly when distressed (Settles et al., 2011), has been examined in ED populations and was found to differentiate those who also experienced alcohol-related problems from those who did not (Fischer et al., 2007). Results such as these, along with the suggestion that NSSI involves self-injury specific risk factors, suggest that while maladaptive coping methods share a number of core risk factors, more exclusive factors may contribute to which method is chosen and determine when multiple pathologies are presented.

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To date, no studies have specifically examined the relationship between IU and NSSI. In fact, the majority of IU research has been regarding anxiety disorders such as GAD and panic disorder, although recent research suggests that the construct might be a transdiagnostic risk factor correlating to negative affect in general rather than anxiety disorders (Gentes & Ruscio, 2011). Moreover, intolerance to uncertainty is considered a trait rather than state characteristic and pertains to the way individuals react to uncertain situations on a cognitive, emotional, and behavioral level (Freeston et al., 1994). Research has suggested that high IU is associated with the tendency to overestimate the probability of negative events (Dugas et al., 2004; Dugas et al., 2005; Koerner & Dugas, 2008; Ladouceur Talbot, & Dugas, 1997), thus leading to increased perceptions of threat. A recent study found evidence for "uncertainty based reasoning" in which an individual perceives uncertainty as more threatening and anxiety-provoking and is more likely to have the urge to perform a safety behavior (Reuman et al., 2015). In light of the ANR function of NSSI (Bentley et al., 2014), we would propose that for some individuals, NSSI might serve as a safety behavior in order to regulate negative or uncontrollable emotionality resulting from heightened intolerance to uncertainty. The results support this possibility, finding that IU is relevant to NSSI lifetime frequency.

This proposition would also be in accordance with current research regarding the emotional cascade model (Selby et al., 2008). It is possible that IU, by causing individuals to overestimate the probability of negative events and limiting their ability to tolerate uncertain situations, may intensify the negative emotionality and rumination experienced within the emotional cascade model (Arbuthnott et al., 2015). If this is the

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case, these individuals may turn to maladaptive coping mechanisms such as NSSI and disordered eating as an attempt to escape unbearable thoughts and feelings.

Based on recent research indicating that IU is a transdiagnostic construct and the current study's findings that IU is a key factor in the maintenance of both ED pathology and NSSI, it is possible that IU may be one of the basic constituents preceding anxiety, negative urgency, and negative affect. If this is in fact true, then therapeutic approaches aiming to improve an individual's ability to tolerate uncertainty might have both preventative implications and resiliency benefits. By targeting anxiety, negative urgency, and negative affect at their core, treatments could prevent maladaptive behaviors from occurring by implementing more adaptive ways to appraise and cope with uncertain situations. Considering the inevitable nature of uncertain situations, especially in young adults and adolescents at increased risk for disordered eating and NSSI, IU and its impact on cognitive appraisals and coping behaviors hold valuable research implications. Nonetheless, IU research is still in its infancy, particularly in relation to NSSI, and future research should continue to study this construct in order to better understand its influence and inform empirically supported and universally effective treatments.

<div align="center">**Limitations**</div>

The present study has several limitations. First, the sample consists only of college students. While college students are at an increased risk for disordered eating and NSSI, they represent only a subset of the population endorsing these behaviors. Second, this study included a non-clinical sample. Research examining a clinical sample may provide more stringent results, although it is important to study both clinical and non-clinical samples in order to understand the way that uncertainty, anxiety, and distress

tolerance might impact the general public. This research also included only self-report data, which allows for the possibility of biases and inaccurate reporting. Future studies should examine these constructs using more objective measures in order to gain a better understanding of how they interact and avoid such biases and reporting errors. Finally, due to time constraints, data collection occurred separately for two distinct samples and failed to examine all of the variables of interest together. In a future study, it would be ideal to look at the relationships between NSSI, disordered eating, anxiety, distress tolerance, and intolerance to uncertainty all within the same sample.

Conclusion

In sum, findings from this study indicate that both anxiety and distress tolerance are relevant to disordered eating and NSSI. Furthermore, intolerance to uncertainty is also significantly related to both behaviors and should be considered in future research. A better understanding of IU along with therapeutic approaches that target this cognitive abnormality may hold valuable implications in the development of more universal, transdiagnostic treatment methods. Considering the substantial amount of uncertainty experienced by adolescents and young adults, the increased risk of disordered eating and NSSI, and the serious nature of both behaviors, continued research regarding these constructs is imperative.

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Table 1

Frequency Statistics of NSSI methods for Study 1

| NSSI method	Mean Frequency* (SD)	% of Sample with NSSI History (n=62)	% of Total Sample (n=156)
Cutting	3.50 (20.65)	51.7	16.9
Biting	2.49 (12.67)	25.39	8.3
Burning	0.70 (5.64)	22.94	7.5
Carving	0.68 (0.30)	11.93	3.9
Pinching	3.47 (28.88)	30.50	10
Pulling Hair	3.65 (37.81)	39.78	13
Sticking Self w/ Needles	0.37 (3.03)	11.93	3.9
Scratching	7.11 (61.12)	33.96	11.1
Banging	4.41 (32.48)	39.78	13
Wound Picking	15.89 (75.16)	62.67	20.6
Rubbing	1.20 (9.265)	19.58	6.4
Swallowing	0.69 (6.86)	13.46	4.4
Other	0.42 (7.91)	0.92	0.3

Note. Non-transformed frequencies are reported for NSSI.

Table 2

Frequency Statistics of NSSI methods for Study 2

NSSI method	Mean Frequency* (SD)	% of Sample with NSSI History (n=62)	% of Total Sample (n=156)
Cutting	2.77 (18.24)	29	11.6
Biting	2.51 (12.67)	29	11.6
Burning	0.59 (2.67)	21	8.4
Carving	.04 (0.30)	4.8	1.9
Pinching	2.05 (10.18)	29	11.6
Pulling Hair	8.66 (52.99)	42.47	16.9
Sticking Self w/ Needles	1.29 (9.12)	16.25	6.5
Scratching	1.53 (8.37)	37	14.9
Banging	4.83 (22.48)	42	16.8
Wound Picking	16.28 (66.79)	56.5	22.6
Rubbing	2.57 (12.73)	29	11.6
Swallowing	0.71 (8.04)	5.51	3.9
Other	0.07 (0.80)	1.5	0.6

Note. Non-transformed frequencies are reported for NSSI.
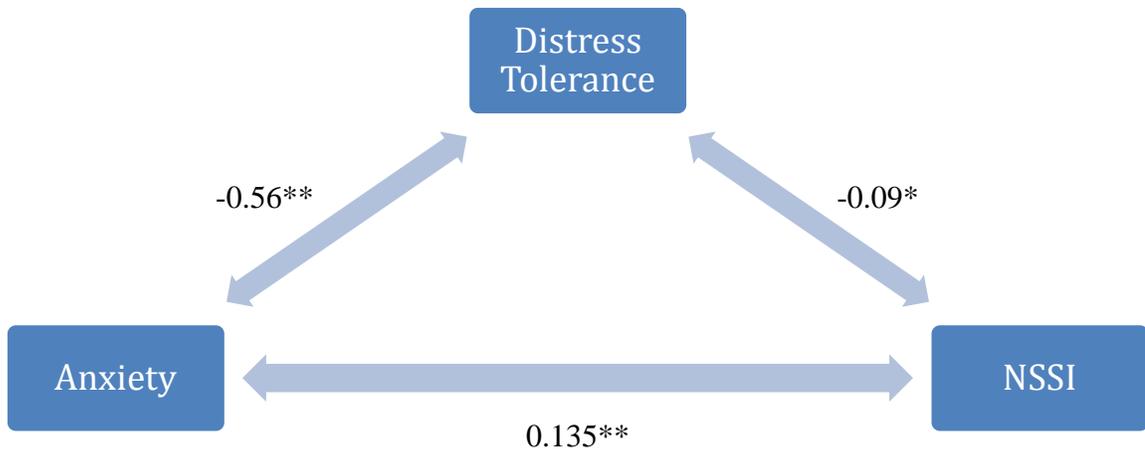
Figure 1. Interactions between anxiety, distress tolerance, and NSSI. All variables were significantly related to each other. The indirect effect was significant, suggesting that distress tolerance mediated the relationship between anxiety and NSSI (*b*=.05, 95% CI: .02, .10).

p < .01. **p* < .001