The relationship between trait impulsivity, negative affective states, and urge for nonsuicidal self-injury: A daily diary study

Konrad Bresin a,*, Darren L. Carter b, Kathryn H. Gordon b

a Psychology Department, University of Illinois Urbana-Champaign, 603 East Daniel Street, Champaign, IL 61820, USA
b North Dakota State University, USA

Abstract

Theories of nonsuicidal self-injury (NSSI) and impulsivity suggest that individuals with high levels of negative urgency (e.g., those with a propensity to act rashly while experiencing negative affect) should experience the urge to engage in NSSI during negative affect states. However, previous research has not directly tested these predictions. This study used a daily diary methodology in a sample of individuals who engaged in NSSI in the last year. Participants completed self-report measures of trait impulsivity and subsequently made daily ratings of negative affect, sadness, guilt, and urge to engage in NSSI for 14 days. Our results indicated that for individuals high in negative urgency, daily sadness, but not guilt or general negative affect, was a positive predictor of urge to engage in NSSI. Meanwhile, for those low in negative urgency, sadness was unrelated to NSSI urge. Implications for theories of NSSI and treatment are discussed.

© 2012 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Nonsuicidal self-injury (NSSI) is the intentional destruction of body tissue without suicidal intent (Nock, 2009). One theory as to why people engage in NSSI is that the behavior functions as a maladaptive strategy for coping with intense negative affect (NA; Chapman et al., 2006). Theories of impulsivity suggest that certain individuals may be more likely to engage in rash actions (e.g., NSSI) while experiencing intense affect (Cyders and Smith, 2008). Consistent with this, previous research has found evidence of increased levels of trait impulsivity in individuals with a history of NSSI (Glenn and Klonsky, 2010). However, to date, these studies have been cross-sectional and have not tested the trait by state interactions proposed by theory. To address limitations of the current research, we conducted a daily diary study to test the hypothesis that negative urgency and state affect would interact to predict daily NSSI outcomes.

1.1. The affect regulation function of nonsuicidal self-injury

One of the many proposed functions of NSSI is to reduce NA (Nock and Prinstein, 2004). More specifically, it has been proposed that the urge to engage in NSSI may occur during high NA states, and following the actual act of NSSI, NA states may be momentarily reduced (Chapman et al., 2006; Nock, 2009).

Support for the affect regulation function of NSSI comes from multiple lines of research. Retrospective recall studies suggest that feelings such as tension, sadness, and anger towards the self precede NSSI (Kamphuis et al., 2007; Klonsky, 2009). However, these studies are subject to recall bias. Laboratory studies suggest that proxies for NSSI (imagery scripts, pain) led to a reduction in NA (Haines et al., 1995; Franklin et al., 2010). Still, there may be important differences between the experience of laboratory pain and actual NSSI.

To reduce the impact of these limitations, some researchers have used ecological momentary assessment (EMA), which consists of repeated assessments in the participant’s natural environment. This method allows for assessment of affect in the moment (Shiffman et al., 2008). Moreover, researchers can measure changes in NA in relation to actual NSSI urges and incidents. Using EMA in a sample of adolescents, Nock et al. (2009) found that feelings such as anger towards the self and others predicted engagement in NSSI. Muehlenkamp et al. (2009) found a significant increase in NA in the hours leading up to NSSI, but no significant change in NA following the incident. Finally, Arney et al. (2011) found a significant quadratic slope for both NA and guilt (but not hostility) around NSSI incidents, meaning that in the hours leading up to engagement in NSSI, participants experienced an increase in NA and guilt and following NSSI these feelings decreased. Taken together, these results indicate that increased momentary NA may increase the likelihood of NSSI.

One limitation of the current literature is that studies have not tested the interaction between trait and state predictors proposed by theoretical models (e.g., Chapman et al., 2006). Another

Keywords: NSSI, Self-injury, Self-harm, Impulsivity, Negative urgency

Article info

Article history:
Received 23 August 2011
Received in revised form 28 May 2012
Accepted 20 September 2012

Acknowledgements

The authors would like to thank the participants of this study and the funding provided by the National Science Foundation (Grant #1108264).
limitation is many studies have focused on NA in general. NA is composed of other lower order factors including: sadness, guilt, fear, and hostility (Watson and Clark, 1994). As the results of Armey et al. (2011) indicate, particular NA states may have a stronger relationship to NSSI than others. Finally, current research has largely focused on actual NSSI engagement. It seems probable that there would also be clinical utility in examining urges to engage NSSI as they may provide an opportunity for intervention prior to NSSI.

1.2. Nonsuicidal self-injury and impulsivity

Impulsivity is an individual difference that has been proposed as theoretically important for NSSI (Chapman et al., 2006). However, the relationship between impulsivity and NSSI in research has been inconsistent. Studies using behavioral measures of impulsivity (e.g., the continuous performance task) have found no significant differences between individuals with and without a history of NSSI (Glenn and Klonsky, 2010; Janis and Nock, 2009). On the other hand, studies have found that individuals with a history of NSSI report higher levels of self-reported impulsivity (Glenn and Klonsky, 2010; Herpertz, et al., 1997). One possible explanation for these divergent results is that individuals who engage in NSSI only perceive themselves to be more impulsive. Still, the results of a recent meta-analysis indicate that the relationship between self-report and behavioral measures of impulsivity is small (Cyders and Coskunpinar, 2011). Furthermore, each may explain unique variance in psychopathology (Bornovolova et al., 2008). An alternative explanation is that individuals who engage in NSSI are only more impulsive behaviorally while experiencing intense NA.

Psychometric work has indicated that self-report impulsivity is a multi-faceted construct consisting of five factors (Whiteside and Lynam, 2001; Cyders et al., 2007). Of these factors, negative urgency, or the tendency to engage in risky behavior during periods of NA, appears most likely to be related to NSSI. For instance, Glenn and Klonsky (2010) found that college undergraduates with a history of NSSI reported higher levels of negative urgency than those with no history of NSSI. Similarly, Snorrason et al. (2011) found that when controlling for the other impulsivity factors, negative urgency was a significant predictor of pathological skin picking, a possible form of NSSI. However, these studies are limited in that they are cross-sectional and do not examine the interaction with state affect predicted by NSSI models.

1.3. Current study

Theories of NSSI propose that the urge to engage in NSSI is likely to occur for certain individuals in negative affective states (e.g., Chapman et al., 2006). Similarly, models of impulsivity predict that individuals high in negative urgency will have a propensity to act rashly when experiencing intense levels of NA (Cyders and Smith, 2008). In spite of the parallel hypotheses of these theories, no previous study to our knowledge has tested these interactive predictions. Therefore, we conducted a daily diary study to test these predictions in a sample of participants with a history of NSSI in the last year. Participants completed self-report measures of trait impulsivity and subsequently made daily ratings of affect, NSSI, and NSSI engagement for 14 days. As mentioned below, the frequency of NSSI engagement was too low to be used in analyses. Hence, we focus our predictions on NSSI urge.

We examined three different types of NA. We focused on a subset of NA types to reduce participant burden in our daily diary protocol. To be most consistent with theories of NSSI and negative urgency (Chapman et al., 2006; Cyders and Smith, 2008), we first tested if negative urgency moderated the effect between general NA and NSSI urge. We also explored two specific types of NA: guilt and sadness. Guilt was chosen for theoretical reasons, based on the self-punishment hypothesis, which suggests that NSSI is a form of punishment meant to alleviate anger towards the self (Chapman et al., 2006; Schoenleber and Berenbaum, 2012). Also, as reviewed above, Armey et al. (2011) found that guilt, but not hostility, significantly increased leading up to NSSI. Sadness was chosen because individuals retrospectively report experiencing sadness, depression, and loneliness prior to NSSI (Kamphuis et al., 2007; Klonsky, 2009). Furthermore, sadness is a form of deactivated displeasure, which differs from other types of NA, which are activated displeasure (Yik, et al., 2011). Therefore, sadness provided an interesting contrast in terms of arousal (or activation) at negative valence. We chose not to measure daily fear because, to our knowledge, previous research has not indicated a relationship between fear and NSSI (Kamphuis et al., 2007; Klonsky, 2009). We chose not to measure daily hostility due to the theoretical argument that anger directed toward the self should be related to NSSI, while anger in general should be related to other-directed aggression (Schoenleber and Berenbaum, 2012). Furthermore, Armey et al. (2011) did not find an increase in hostility in relation to NSSI incidents. Our prediction in all three types of affect measured was that negative urgency would interact with state NA to predict NSSI urge, such that at high levels of negative urgency, higher levels of state NA would be related to an increased NSSI urge.

2. Method

2.1. Participants

We screened 1612 college undergraduates using the Deliberate Self-Harm Inventory (DSHI; see below; Gratz, 2001) for participation in this study. Eight percent of participants indicated that they had engaged in NSSI in the past 12 months, 15% indicated engaging in NSSI more than 12 months ago. To ensure the clinical relevance of the sample, we recruited individuals with at least one NSSI incident in the last year (e.g., Glenn and Klonsky, 2010; Nock and Banaji, 2007).

We recruited 67 participants (38 female) for the study via e-mail. The mean age was 19.58 years (S.D.=2.94). The median frequency of lifetime NSSI incidents was 15 (range=1–1000). The participants used a mean number of 3.12 methods of NSSI (S.D.=1.94). Table 1 displays the prevalence of specific NSSI methods. The average time since the last NSSI incident was six months (S.D.=4.8).

2.2. Assessment measures

2.2.1. Screening

Potential participants completed the DSHI (Gratz, 2001) on a secure website. The DSHI is a 17-item questionnaire that assesses the lifetime history of deliberate self-injury without the suicidal

<table>
<thead>
<tr>
<th>Method</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting</td>
<td>33</td>
<td>50.77</td>
</tr>
<tr>
<td>Burning</td>
<td>20</td>
<td>30.77</td>
</tr>
<tr>
<td>Carved words into skin</td>
<td>20</td>
<td>30.77</td>
</tr>
<tr>
<td>Carved pictures into skin</td>
<td>19</td>
<td>29.23</td>
</tr>
<tr>
<td>Severe scratching</td>
<td>27</td>
<td>41.54</td>
</tr>
<tr>
<td>Self-biting</td>
<td>5</td>
<td>7.69</td>
</tr>
<tr>
<td>Sticking sharp object into skin</td>
<td>14</td>
<td>21.54</td>
</tr>
<tr>
<td>Head banging</td>
<td>16</td>
<td>24.62</td>
</tr>
<tr>
<td>Self-punching</td>
<td>18</td>
<td>27.69</td>
</tr>
</tbody>
</table>

Note. N=67.
intent (i.e., NSSI). First, participants were asked if they had ever engaged in specific methods of NSSI (e.g., cutting, burning, severe scratching, etc.). If participants indicated they had engaged in a specific NSSI method, they were asked a series of follow-up questions including, “When was the last time you did this?” As mentioned above, we contacted participants that met our study inclusion criteria.

2.2.4. NSSI urge on Nock et al. (2009). Participants rated how strong their urge to harm themselves without wanting to die on that day using a 5-point Likert scale (0 = not present, 4 = agree strongly). The mean (averaged across items) for the current sample was 2.59 (S.D. = 0.62; z = 0.90).

2.2.3. Affect

We assessed daily affect using subscales of the Positive and Negative Affect Schedule Expanded Form (PANAS-X; Watson and Clark, 1994). Specifically, we assessed NA (10 items, sample item: “distressed”, 0 = not present, 4 = agree strongly), guilt (6 items, sample item: “angry at self”, 0 = not present, 4 = agree strongly), and sadness (5 items, sample item: “lonely”, 0 = not present, 4 = agree strongly). Though not reported here, we also collected measures of positive affect and self-assurance. Participants rated items on a 5-point Likert scale (1 = very slightly or not at all, 5 = extremely) as to how they “generally felt today.”

2.2.4. NSSI urge

We assessed urge to engage in NSSI using a single item based on Nock et al. (2009). Participants rated how strong their urge was to harm themselves without wanting to die on that day using a 5-point Likert scale (0 = not present, 4 = very severe). This variable was not normally distributed (skew = 5.04, kurtosis = 26.61). Therefore, we created a dichotomous variable such that 0 = no NSSI urge and 1 = some NSSI urge for that day. We also measured whether or not participants had engaged in NSSI that day. Over the study period, there were only nine incidents of NSSI, which was too low of a frequency to be used in analyses.

2.3. Procedures

All procedures were approved by the university’s Institutional Review Board. After providing informed consent, participants completed the impulsivity assessment and received instructions for the daily diary portion of the study. The daily portion consisted of a total of 14 days of ratings that began the Monday after the impulsivity assessment. Participants received an email at approximately 7 p.m. each evening which allowed them to access the daily survey on a secure website. Participants had until 9 a.m. the following morning to complete the questions. Participants were given course credit for compensation. To encourage compliance, participants were given additional credit for completing at least 11 days. Participants completed an average of 11.06 days (S.D. = 2.63) of ratings.

3. Results

Six participants did not complete ratings on any days and were not used in the analyses. Participants not included in the analysis did not significantly differ from those included in the analysis on negative urgency, t (65) = 1.56, p = 0.12. The remaining participants reported 613 data points. On average, participants reported the urge to engage in NSSI on 1.20 days (S.D. = 2.02). In total, there were 74 reports of some urge to engage in NSSI.

To examine the interaction between trait negative urgency and state affect, we used generalized linear mixed modeling (Littell et al., 2006), which allows for days to be nested within participants. All models were run using the PROC NLMMIXED procedure in SAS 9.2 (SAS Institute, 2008). We ran three separate models. First, we examined the interaction between negative urgency and daily negative affect. To do this, negative urgency (grand mean centered; Enders and Tofghi, 2008) was entered as the Level 2 predictor and daily NA (centered within-subject) was entered as the Level 1 predictor, along with the cross-level interaction. In the other two models, we focused on specific types of NA. In these models, the Level 2 predictor was again negative urgency, while daily negative affect and daily guilt (sadness) were the Level 1 predictors. Finally, of most theoretical importance, the negative urgency by daily guilt (sadness) cross-level interaction was used in the prediction of NSSI urge. All tests were two-tailed.

For the first model, there was a significant effect of negative urgency (γ = 1.51, t = 2.04, p = 0.04, OR = 4.52) and daily negative affect (γ = 2.08, t = 5.69, p < 0.001, OR = 8.00). However, contrary to our prediction the interaction was not significant (γ = 0.71, t = 1.16, p = 0.24, OR = 2.03). With guilt as the type of affect, there was a marginally significant effect of negative urgency (γ = 1.37, t = 1.73, p = 0.08, OR = 3.93), and a significant effect of daily NA (γ = 1.68, t = 3.35, p = 0.01, OR = 5.36). The effect of daily guilt (γ = 0.45, t = 1.34, p = 0.18, OR = 1.56) was not significant. Similar to daily NA, the cross-level interaction was not significant (γ = 0.32, t = 0.74, p = 0.46, OR = 1.37).

For sadness, the effect of negative urgency was not significant (γ = 1.21, t = 1.58, p = 0.11, OR = 3.42). However, there were significant effects for daily NA (γ = 1.42, t = 3.30, p = 0.01, OR = 4.22) and daily sadness (γ = 0.84, t = 2.98, p = 0.04, OR = 2.33). Moreover, the interaction between negative urgency and daily sadness was significant (γ = 0.84, t = 1.91, p = 0.03, OR = 2.33).

To follow up this significant interaction, we plotted estimated means for individuals high (+1 S.D.) and low (−1 S.D.) in negative urgency for days high (≥1 S.D. for the sample) and low (<−1 S.D. for the sample) in sadness. We also ran simple slopes tests to see if daily sadness predicted the probability of NSSI urge for individuals high (+1 S.D.) and low (<−1 S.D.) in negative urgency (Preacher et al., 2006). As shown in Fig. 1, for individuals high in negative urgency, daily sadness was a significant predictor of NSSI urge (γ = 1.37, t = 3.71, p < 0.001, OR = 3.93). In contrast, for individuals low in negative urgency, daily sadness was not significantly related to NSSI urge (γ = 0.32, t = 0.77, p = 0.44, OR = 1.37). Since daily sadness was centered within-subject, this indicates that for individuals with high levels of negative urgency, higher levels of daily sadness for that person increase the probability of having an urge to engage in NSSI. Per request from an anonymous reviewer, we examined the interaction between negative urgency and each NA item on the PANAS, in 10 separate analyses. The interaction was only significant in for two items, upset and afraid. For upset, the interaction was similar to that of daily sadness (i.e., more urge for NSSI on higher upset days, for high urgent people). The pattern was the opposite for afraid (i.e., less NSSI urge on high fear days, for high urgent people).

4. Discussion

The primary goal of this study was to test the interaction between trait negative urgency and daily NA (both general and specific) in the prediction of urge to engage in NSSI. We predicted that high levels of NA would be related to the increased probability of urge to engage in NSSI, but more so for those high in negative urgency. This prediction was supported for daily sadness, but not daily NA or guilt. These
results may have interesting theoretical and clinical implications for the relationships between NSSI and impulsivity.

4.1. Implications for nonsuicidal self-injury as affect regulation

The results of this study are compatible with some aspects of the affect regulation function of NSSI (e.g., Chapman et al., 2006). The significant main effect of daily NA and sadness indicates that the urge to engage in NSSI is higher on days where individuals experience higher negative emotion, which is in line with previous research that suggests NSSI is likely to occur during periods of high NA (Muehlenkamp et al., 2009; Nock et al., 2009). Further, our results extend previous research by showing specific NA states (sadness) may be more related to NSSI urge among certain individuals (those high in negative urgency). It is interesting that daily sadness, but not guilt or NA, was related to NSSI urge for those high in negative urgency. Because sadness represents a lower arousal form of NA, one possible interpretation of the results is that feelings of deactivated displeasure are a risk for the urge and engagement in NSSI. Another interpretation is that sadness may be related to the urge to engage in NSSI, but not the act itself. In fact, Nock et al. (2009) found that sadness negatively predicted engaging in NSSI. Due to the fact that sadness is a deactivated emotion, when individuals high in negative urgency experience sadness they may feel the urge to engage in NSSI, but lack the drive or motivation to actually do so. On the other hand, it may be that when individuals high in negative urgency experience high arousal NA states they may move from feeling to behavior very quickly, essentially bypassing urge. Hence, arousal may differentiate urge and behavior. It may also be that another personality trait, such as lack of premeditation may play a role in making the transition from urge to behavior (e.g., Glenn and Klonsky, 2010). Unfortunately, due to the low rate of NSSI during the study period, we were not able to test these predictions in this study. Future research investigating these hypotheses may serve to further clarify the relationship between different types of NA and NSSI urges and behaviors.

4.2. Implications for research on impulsivity and nonsuicidal self-injury

Our results may help explain the inconsistent relationship between impulsivity and NSSI across behavioral and self-report measures (Glenn and Klonsky, 2010; Janis and Nock, 2009). Given that negative urgency appears to be the impulsivity trait associated with NSSI, it appears import to take into account the moderating role of affect when considering the relationship between NSSI and impulsivity. Our results may imply that individuals with a history of NSSI might perform more impulsively on behavioral tasks while experiencing sadness, as opposed to other affective states. Future research on the role of behavioral impulsivity in NSSI could benefit from designing studies which examine behavioral measures of impulsivity in the context of affective states (e.g., priming manipulations; Bresin et al., 2012).

4.3. Implications for assessment and treatment of nonsuicidal self-injury

Clinically, our results may suggest that the assessment of negative urgency is important when assessing risk for future NSSI, as it is connected to a precursor to NSSI (urges to engage in NSSI). Also, clinicians may ask clients to be particularly vigilant of sad emotional states (e.g., via self-monitoring) as these states appear to be associated with greater risk for NSSI urges. In terms of treatment, individuals who engage in NSSI who are high in negative urgency may benefit from treatment approaches designed to decrease sadness. For example, the emotion regulation module of Dialectical Behavior Therapy (Linehan, 1993) encourages clients to act opposite to their feelings (e.g., watch a funny movie as opposed to a sad movie when feeling sad). This type of intervention could decrease momentary sadness and thus potentially reduce the urge to engage in NSSI for individuals high in negative urgency.

4.4. Limitations and strengths

Our results should be considered in light of this study’s limitations. The outcome measure in our study was the urge to engage in NSSI rather than actual NSSI engagement. Thought this may be a limitation, precursors of maladaptive behaviors have been the focus of research in other areas of psychopathology and thus may also be useful within the area of NSSI as well. For example, urges and cravings for substance use (Berkman et al., 2011; Ferriter and Ray, 2011) are often targets of treatments aimed at reduction of actual substance use behavior (Florsheim et al., 2008; Loeb et al., 2006). An additional limitation is our reliance on impulsivity assessed through self-report. Future studies may benefit from the inclusion of behavioral impulsivity measures as well. Another limitation is that our sample was college undergraduates. In spite of the fact that we recruited individuals who engaged in NSSI in the last year, it is likely that the range of psychopathology was lower in this sample than a purely clinical sample. Finally, due to the daily nature of our design, daily affect and NSSI urge are confounded by day. Therefore, the temporal order of affect and NSSI urge is difficult to infer from this study. Future research may address these limitations by recruiting samples with a higher base rate of NSSI and using multiple affect and behavior assessments within a single day to reveal the temporal order of the emotional state and NSSI relationship.

In spite of these limitations, this study is to date the strongest test of trait by state NSSI models. Since negative urgency was measured before NSSI urge, our design is an improvement over cross-sectional designs. In addition, by assessing affect over a short time period (i.e., 1 day), we decreased the extent of retrospective bias inherent in some previous studies with longer recall periods (e.g., Klonsky, 2009). This study expanded upon previous EMA NSSI studies (e.g., Muehlenkamp et al., 2009; Nock et al., 2009) by examining trait by state interactions. Finally, this study measured affect and NSSI urge in the participant’s natural environment which should lead to higher external validity than studies taking place solely in a laboratory.
References


