Emotional Dysregulation, Internalizing Symptoms, and Self-Injurious and Suicidal Behavior: Structural Equation Modeling Analysis

Amy Kranzler MS, Kara B. Fehling BA, Michael D. Anestis PhD & Edward A. Selby PhD

To cite this article: Amy Kranzler MS, Kara B. Fehling BA, Michael D. Anestis PhD & Edward A. Selby PhD (2016): Emotional Dysregulation, Internalizing Symptoms, and Self-Injurious and Suicidal Behavior: Structural Equation Modeling Analysis, Death Studies, DOI: 10.1080/07481187.2016.1145156

To link to this article: http://dx.doi.org/10.1080/07481187.2016.1145156

Accepted author version posted online: 25 Jan 2016.

Submit your article to this journal

Article views: 11

View related articles

View Crossmark data
Emotional Dysregulation and Suicidal Behavior

Emotional Dysregulation, Internalizing Symptoms, and Self-Injurious and Suicidal Behavior: Structural Equation Modeling Analysis

Amy Kranzler, MS
Department of Psychology, Rutgers, The State University of New Jersey, Piscataway, NJ

Kara B. Fehling, BA
Department of Psychology, Rutgers, The State University of New Jersey, Piscataway, NJ

Michael D. Anestis, PhD
Department of Psychology, University of Southern Mississippi, Hattiesburg, MS

Edward A. Selby, PhD*
Department of Psychology, Rutgers, The State University of New Jersey, Piscataway, NJ

*Address Correspondence to Edward A. Selby, PhD, Department of Psychology, Rutgers, the State University of New Jersey, 53 Avenue E, Tillett Hall, Piscataway, NJ 08854. Tele: 848-445-2201. Fax: 732-445-0036. E-mail: Edward.selby@rutgers.edu

Abstract
This study used structural equation modeling to examine the relationships between emotion dysregulation, internalizing symptoms, non-suicidal self-injury (NSSI), and suicide. 148 undergraduates completed a brief structured interview and self-report measures of emotion dysregulation, internalizing symptoms, and NSSI and suicidal behaviors. Results indicated a significant indirect effect of emotion dysregulation on NSSI via internalizing symptoms and on suicide attempts via NSSI. Findings provide a more nuanced understanding of the indirect association between emotion dysregulation and NSSI and suicidal behaviors. Implications for the potential utility of targeting internalizing symptoms as well as emotion dysregulation in interventions addressing NSSI and suicidal behaviors are discussed.

**Keywords:** emotion regulation, non-suicidal self-injury, suicide

Suicide and non-suicidal self-injury (NSSI) are important areas of concern within the field of mental health. Suicide is a leading cause of death among adults (Centers for Disease Control and Prevention, 2013), children, and adolescents (Anderson, 2002), and NSSI is associated with numerous deleterious consequences, including academic difficulties, peer rejection, and increased risk of suicide (Asarnow et al., 2011; Favazza, 1998; Klonsky, 2009). Yet suicide and NSSI remain poorly understood and clinicians struggle to accurately predict and prevent these behaviors (Nock, 2012). In particular, although previous research has examined the various risk factors that lead to NSSI and suicide (Wichstrom, 2009), the literature is limited by the absence of a cohesive model that incorporates all of these factors.

Suicide and NSSI have been intimately tied in the literature. NSSI is associated with both past suicide attempts (Laye-Gindhu & Schonert-Reichl, 2005; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006) and future suicide attempts (Asarnow et al., 2011), in community (Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007) and clinical populations (Dulit, Fyer, Leon,
Brodsky, & Frances, 1994). Individuals engaging in NSSI may be at elevated risk for suicide because NSSI contributes to acquired capability to attempt suicide by increasing habituation to pain (Joiner, 2005). Consistent with this theory, longer history of NSSI, greater number of NSSI methods used, and the absence of physical pain during NSSI are associated with increased suicide attempts among adolescents (Nock et al., 2006). Although NSSI and suicidal behavior often co-occur and share risk factors, research has begun to identify risk factors that are unique to either NSSI or suicidal behavior among adolescents and young adults (Wichstrom, 2009). However it continues to remain unclear which risk factors are associated with increased suicidal behavior directly and which are associated with suicide indirectly, by leading to NSSI behaviors, which then confer risk for suicidal behavior.

For example, emotion dysregulation is a frequently cited risk factor for both NSSI and suicidal behavior. NSSI is often conceptualized as a maladaptive method of emotion regulation (Brown, Comtois, & Linehan, 2002; Gratz, 2003), and emotion regulation deficits are associated with NSSI among adolescents and young adults (Gratz & Roemer, 2008; Laye-Gindhu & Schonert-Reichl, 2005). However, although some studies have found a significant association between emotion dysregulation and suicide attempts among adolescents and young adults (Rajappa, Gallagher, & Miranda, 2012), other studies have failed to find a significant relationship among youth and adults (Anestis, Bagge, Tull, & Joiner, 2011). One explanation for this inconsistency may be that emotion dysregulation is associated with suicidal behavior indirectly by increasing engagement in NSSI, which is used to escape emotional distress and confers greater risk for suicidal behavior by increasing acquired capability (Anestis, Pennings, Lavender, Tull, & Gratz, 2013). Consistent with this model, there was a significant indirect relationship between one
component of emotion dysregulation, low distress tolerance, and lifetime suicide attempts through NSSI frequency (Anestis et al., 2013).

Internalizing disorders have also been implicated in both NSSI and suicide attempts. Depression is associated with suicide, both concurrently (Hawton, Comabella, Haw, & Saunders, 2013) and predictively (Brown, Beck, Steer, & Grisham, 2000) among adults and youth respectively. Similarly, depression and anxiety are associated with NSSI within clinical (Asarnow et al., 2011; Dulit et al., 1994) and nonclinical populations (Klonsky, Oltmanns, & Turkheimer, 2003; Muehlenkamp & Gutierrez, 2007; Ross & Heath, 2003) of both adolescents and adults. Internalizing disorders have also been associated with emotion dysregulation among adolescents and young adults (Daughters et al., 2009; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). Most studies have been cross-sectional, but one recent longitudinal study demonstrated that emotion dysregulation predicts subsequent internalizing symptoms among adolescents (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). In particular, low distress tolerance has been associated with internalizing symptoms (Daughters et al., 2009), depression (Buckner, Keough, & Schmidt, 2007), and anxiety sensitivity (Anestis, Selby, Fink, & Joiner, 2007). When faced with stress or negative affect, individuals low in distress tolerance may be less able to tolerate these difficult sensations and more likely to internalize their distress.

However existing research has examined the relationship between these factors in an isolated fashion, without examining their interplay in a unified model. To our knowledge, no previous study has examined emotion dysregulation, internalizing symptoms, NSSI, and suicide in one cohesive model. A better understanding of the direct and indirect relationships between emotion dysregulation, internalizing symptoms, NSSI and suicidal behaviors is needed to inform the development of effective interventions. In particular, research is needed to clarify whether
internalizing symptoms and emotion dysregulation are associated directly with suicidal behavior or indirectly through NSSI behaviors, which then increase risk for suicidal behavior.

Our objective, therefore, was to evaluate an integrative model examining NSSI and suicidal behaviors using structural equation modeling (SEM). SEM allowed for the examination of multiple relationships between emotion dysregulation, internalizing symptoms, NSSI, and suicide, providing a better understanding of the interrelationships between these factors as well as an estimate of how well such a model fits the sample data. We hypothesized that, consistent with previous research, emotion dysregulation would be directly associated with increased internalizing symptoms and NSSI but not suicide attempts. Second, because both internalizing symptoms and NSSI behaviors increase risk for suicide (Brown et al., 2000; Joiner, 2005), we hypothesized that each would be directly associated with suicide attempts. Lastly, we expected that there would be a significant indirect relationship between emotion dysregulation and suicide attempts, via internalizing symptoms and NSSI behaviors.

METHOD

Participants

Participants were 148 undergraduates, 105 (70.9%) women and 43 (29.1%) men, aged 18 to 57 ($M = 21.48$, $SD = 4.85$). In terms of ethnicity, participants were 52.7% Caucasian, 41.2% African American, 2.7% Asian/Pacific Islander, and 2.7% other. 54.1% of participants reported an annual family household income of $50,000 or less, 37.1% reported an income of $50,000–$100,000, and 8.8% reported an income of greater than $100,000. 40 participants (27.03%) reported at least one prior episode of NSSI.
Procedure

As part of participation in a larger study conducted at a southern university, participants signed informed consent forms after the nature of the study was fully explained and completed self-report questionnaires and a semi-structured interview about NSSI behaviors. All interviews were conducted by doctoral students and undergraduate and post-baccalaureate research assistants trained extensively in the assessment measure. Following study procedures, all participants were debriefed about the purpose of the study. Participants received course credit for study participation. This study was approved by the university Institutional Review Board and was conducted in accordance with the latest version of the Declaration of Helsinki.

Measures

_Urgency, (lack of) Premediation, (lack of) Perseverance, and Sensation Seeking Impulsive Behavior Scale-P_ (UPPS-P; Lynam, Miller, Miller, Bornovalova, & Lejuez, 2011) is 59 self-report items scored on a Likert scale from 1–4, with high scores indicating more negative behaviors. The subscales have demonstrated good convergent and discriminant validity in clinical adult and non-clinical undergraduate samples (Cyders et al., 2007; Smith et al., 2007). In this study, only Negative Urgency (tendency to act impulsively when experiencing negative affect) and Positive Urgency (tendency to act impulsively when experiencing positive affect) were examined. Internal consistencies on the negative and positive urgency subscales were .90 and .95 respectively.

_Distress Tolerance Scale_ (DTS; Simons & Gaher, 2005) is 15 self-report items scored on a Likert scale ranging from 1 to 5, with lower scores indicating a tendency to experience distress as unacceptable. In the current study, for ease of interpretability and consistency across emotion dysregulation measures, items were reverse coded so that higher scores reflect greater distress.
intolerance. The DTS has demonstrated good internal consistency and convergent validity, and adequate test-retest reliability in a sample of non-clinical undergraduates (Simons & Gaher, 2005). In the current study, only the DTS total score was examined and internal consistency was .90.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is 36 self-report questions in six domains: nonacceptance of negative emotions, inability to engage in goal-directed behaviors when experiencing negative emotions, difficulties controlling impulsive behaviors when experiencing negative emotions, limited access to emotion regulation strategies perceived as effective, lack of emotional awareness, and lack of emotional clarity. Items are scored on a Likert scale ranging from 1 to 5, with higher scores indicating increased difficulties. The DERS has demonstrated good test-retest reliability and adequate construct and predictive validity in a sample of non-clinical undergraduates (Gratz & Roemer, 2004). Internal consistency for the subscales ranged from .79 to .90 in the current study. Only two subscales were examined in the current study, inability to engage in goal-directed behaviors and difficulties controlling impulsive behaviors, as the other DERS subscales did not load significantly onto the emotion dysregulation latent variable, which reflects related constructs of distress intolerance, impulsivity and urgency.

Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) is 21-item version of the DASS (Antony, Bieling, Cox, Enns, & Swinson, 1998). Items are rated on a 4-point severity scale, with higher scores indicating increased symptoms. The DASS has demonstrated good internal consistency and test-retest reliability (Brown, Chorpita, Korotitsch, & Barlow, 1997), and adequate construct and discriminant validity among both clinical and non-clinical adult samples (Antony et al., 1998; Brown et al., 1997; Lovibond & Lovibond, 1995). Internal consistency for the anxiety and depression subscales were .77 and .85 respectively.
Deliberate Self-Harm Inventory (DSHI; Gratz, 2001) is 17 self-report questions. For this study, a continuous variable measuring frequency of reported self-harm was created by summing participants’ scores on the frequency questions for each of 16 specific forms of self-harm behavior (excluding the last item assessing “anything else”). The DSHI has demonstrated high internal consistency, adequate construct, convergent, and discriminant validity, and test-retest reliability in a sample of non-clinical undergraduates (Gratz, 2001).

Lifetime-Suicide Attempts Self-Injury (L-SASI; Linehan & Comtois, 2006) is a brief structured interview. Items on the L-SASI are drawn from a longer measure, the Suicide Attempt Self-Injury Interview, which has demonstrated good inter-rater reliability and adequate validity in clinical samples of adult inpatients and outpatients (Linehan, Comtois, Brown, Heard, & Wagner, 2006). A suicide attempt frequency score was calculated by summing total suicide attempts reported by each participant. NSSI frequency score was calculated by summing the number of times they engaged in each type of NSSI. Total NSSI frequency was computed by creating a composite of participants’ scores on the DSHI and LSASI measures. Scores on each measure were transformed into z-scores and then averaged to create a composite score of NSSI frequency for each participant. Of note, this variable is better conceptualized as reflecting the frequency of NSSI behaviors, rather than NSSI episodes, as neither the DSHI nor the L-SASI were designed to determine whether multiple behaviors were engaged in within the same episode of NSSI.

Data Analytic Strategy

SEM was used to examine study hypotheses (Arbuckle, 2005). To address the pattern of missing data (less than 4% of data was missing at random for the whole sample), analyses were conducted using the full information maximum likelihood estimation method, a robust and model-
based approach, which estimates means and intercepts to handle missing data (Anderson, 1957) and has been shown to allow for less biased results than other methods (Schafer, 1997).

A two-stage approach to the examination of the SEM model was used, in which the measurement model is first examined, followed by the full structural model (Kline, 2005). Figure 1 displays the full model tested. Gender, race, and SES were included as covariates. This model is recursive, and as such it is an identified model (Kline, 2011). In order to evaluate the overall model, several goodness-of-fit indices were utilized. The maximum likelihood chi-square index was used, with low and insignificant scores indicating better fit, as well as the comparative fit index (CFI) with values greater than .95, the Tucker–Lewis fit index (TLI) with values greater than .90, and root mean square error of approximation (RMSEA) with values less than .06 considered to equal good fit (Hu & Bentler, 1999). Individual parameter estimates were tested using a cutoff criterion of alpha = .05. The PRODCLIN program (MacKinnon, Fritz, Williams, & Lockwood, 2007) was used to test the significance of indirect effects without some of the problems inherent in other methods (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

After assessing model fit, two nested models were examined to determine whether the proposed model offered a significantly better fit to the data. The chi-square difference test was used to evaluate the models, with a significant chi-square justifying the less parsimonious model by indicating significant improvement in model fit. The Akaike information criterion (AIC) was also used to distinguish differences in model fit, as compared to a non-nested model, with a decrease in 10 AIC units indicating significantly better model fit (Burnham & Anderson, 2004).

RESULTS
The means, standard deviations, and intercorrelations for all variables are displayed in Table 1. 27.03% (n = 40) of participants reported at least one prior episode of NSSI, and among them there was a mean lifetime frequency of NSSI of 22.85 (SD = 33.80, range = 1–154). Of all participants 11(7.5%) reported at least one suicide attempt, and all had a history of NSSI. The lifetime number of suicide attempts averaged 2.73 among these 11 attempters (SD = 2.45, range = 1–8). Several variables, including NSSI frequency, suicide attempt frequency, and DERS impulsivity included outliers. All outlier scores were transformed into three standard deviations from the mean. All study variables, except Negative Urgency, contained significant skew or kurtosis. So, we applied square root and log transformations applied to all variables.

The measurement model consisted of the latent variables Emotion Dysregulation and Internalizing Symptoms, displayed in Figure 1. Emotion Dysregulation included the UPPS-P Negative Urgency, UPPS-P Positive Urgency, the total score for the DTS, and two of the DERS subscales: inability to engage in goal-directed behaviors and difficulties controlling impulsive behaviors. The other DERS subscales did not load significantly onto the latent variable, nor did they load significantly onto a separate latent variable. This finding is consistent with an Emotion Dysregulation latent variable measuring attitudes and behavioral responses to emotions, rather than cognitive skills of emotion awareness, clarity and knowledge of adaptive strategies. The measurement model met criteria for excellent fit ($\chi^2 = 19.87$, df = 13, $p = .10$, CFI = .98, TLI = .97, RMSEA = .06). All factor loadings of the manifest indicators were significant ($p < .001$) and were between .69 and .90. There was a significant positive correlation between the two latent variables ($r = .68$, $p < .001$).

The initial structural model included direct paths from Internalizing Symptoms ($\beta = -.11$, $B = .00$, SE = .00, $p = .35$) and Emotion Dysregulation ($\beta = .05$, $B = .02$, SE = .04, $p = .71$) to
suicide attempt frequency. However, these paths were not significant and were therefore removed from the final model. The final hypothesized model (Figure 1) met criteria for excellent fit, \((\chi^2 = 57.36, \text{df} = 43, p = .07, \text{CFI} = .97, \text{TLI} = .95, \text{RMSEA} = .05)\). Of note, even when these direct paths were included in the model, model fit continued to be excellent and was relatively unchanged, \((\chi^2 = 56.23, \text{df} = 41, p = .06, \text{CFI} = .97, \text{TLI} = .94, \text{RMSEA} = .05)\). All indicators significantly loaded onto their latent variables \((p < .001)\). As displayed in Figure 1, the path from Emotion Dysregulation to Internalizing Symptoms was significant \((\beta = .67, B = .03, \text{SE} = .005, p < .001)\), as was the path from Internalizing Symptoms to NSSI frequency \((\beta = .37, B = .16, \text{SE} = .07, p = .015)\). In addition, the path from NSSI frequency to suicide attempt frequency was significant \((\beta = .55, B = .39, \text{SE} = .05, p < .001)\). The direct path from Emotion Dysregulation to NSSI frequency was not significant \((\beta = .02, B < .001, \text{SE} = .003, p = .87)\).

The insignificant direct path from Emotion Dysregulation to NSSI frequency suggests that the effects of Emotion Dysregulation on NSSI frequency may flow through Internalizing Symptoms. The significance of this indirect effect \((\beta = .25)\) was examined using the PRODCLIN program (MacKinnon et al., 2007). PRODCLIN examines the product of the unstandardized path coefficients divided by the pooled standard error of the path coefficients and a confidence interval is generated. If the values between the upper and lower confidence limits include zero, this suggests the absence of a significant indirect effect. PRODCLIN analyses yielded lower and upper 95% confidence limits of .001 and .01, suggesting a significant indirect association between Emotion Dysregulation and NSSI frequency via Internalizing Symptoms. Next, the indirect association between Internalizing Symptoms and suicide attempts \((\beta = .20)\) via NSSI frequency was examined. PRODCLIN analyses yielded lower and upper 95% confidence limits of .012 and .118, suggesting a significant indirect relationship between Internalizing Symptoms and suicide
attempt frequency. Both Internalizing Symptoms and NSSI frequency were examined as mediators of the indirect association between Emotion Dysregulation and suicide attempt frequency ($\beta = .15$). To examine whether the indirect relationship between Emotion Dysregulation and suicide attempts flowed through Internalizing Symptoms, the path from NSSI frequency to suicide attempt frequency was constrained to zero to obtain unstandardized path coefficients and standard errors for the effect of Internalizing Symptoms. PRODCLIN analyses yielded lower and upper 95% confidence limits of 0.001 and 0.005, suggesting the presence of a significant indirect association between Emotion Dysregulation and suicide attempt frequency via Internalizing Symptoms. To examine whether the indirect relationship between Emotion Dysregulation and suicide attempts also flowed through NSSI frequency, Internalizing Symptoms was constrained to zero. PRODCLIN analyses yielded lower and upper 95% confidence limits of 0.01 and 0.004, suggesting the presence of a significant indirect association between Emotion Dysregulation and suicide attempt frequency via NSSI frequency.

The first alternative model consisted of internalizing symptoms as the source variable, which led to NSSI and emotion dysregulation, with NSSI then leading to suicide attempts indirectly through emotion dysregulation. Two nested models were also examined in which (a) the paths leading to and from the Internalizing Symptoms latent variable were constrained to zero, so that the model included the Emotion Dysregulation latent variable indirectly associated with suicide attempts through NSSI frequency, and (b) the two paths from the Emotion Dysregulation latent variable were constrained to zero, so that the model examined only the effects of the Internalizing Symptoms latent variable on suicide attempts via NSSI frequency. The first alternative did not provide good fit, ($\chi^2 = 106.723$, df = 43, $p < .001$, CFI = .87, TLI = .77, RMSEA = .10), and the hypothesized model provided significantly better fit (AIC diff = 49.37).
The two nested models were examined using the Chi-Square ($\chi^2$) Difference Test, which tests the significance of the decrease in overall model fit as free parameters are eliminated. The $\chi^2$ difference test between the study model and nested model A, ($\Delta \chi^2 = 57.00; \Delta df = 2$) was significant, suggesting that the study hypothesized model was performing significantly better than the alternative model. Similarly, the $\chi^2$ difference test between the study model and nested model B, ($\Delta \chi^2 = 49.59; \Delta df = 2$) was also significant, suggesting that the study hypothesized model was performing significantly better than this second nested model. These comparisons suggest that the hypothesized model provides the best fit for the data.

**DISCUSSION**

Using SEM analyses, this study found that there was no direct association between emotion dysregulation and either NSSI or suicide attempts. However, emotion dysregulation was indirectly associated with NSSI frequency via internalizing symptoms. In addition, emotion dysregulation was indirectly associated with suicide attempt frequency, via internalizing symptoms and NSSI frequency. This study contributes to existing research by examining the role of internalizing symptoms and NSSI in the association between emotion dysregulation and suicidal behavior, and suggests that the relationship between emotion dysregulation and suicidal behaviors may be more complex than previously thought.

Our finding that emotion dysregulation was indirectly associated with NSSI via internalizing symptoms is consistent with previous research, demonstrating the associations between emotion dysregulation and internalizing symptoms (Abela, Brozina, & Haigh, 2002; McLaughlin et al., 2011), and between internalizing symptoms and NSSI (e.g., Ross & Heath, 2002). When faced with stress or negative affect, individuals with emotion regulation deficits may
be less able to tolerate these difficult emotions and more likely to internalize their distress. Internalizing symptoms may in turn increase an individual’s likelihood of engaging in self-injurious behavior (Ross & Heath, 2002). This finding is consistent with the idea that self-injury functions as an escape from the experience of negative emotions (Klonsky, 2009) and suggests that the presence of internalizing symptoms may increase the likelihood of engagement in self-injury for negative reinforcement. Indeed, research suggests that elevated levels of negative affect often precedes self-injury and that engaging in self-injury often reduces negative affect (Klonsky, 2007). Individuals with poor emotion regulation skills may therefore be more prone to internalizing symptoms, and the experience of elevated and persistent negative affect associated with internalizing symptoms may increase the frequency with which a person turns to NSSI as a maladaptive attempt to reduce distress.

Contrary to our expectations, there was no direct association between emotion dysregulation and NSSI. This finding is surprising in light of research highlighting a strong association between emotion dysregulation and NSSI (Gratz & Chapman, 2007; Gratz & Roemer, 2004). However, given that self-injury is often conceptualized as a maladaptive emotion regulation strategy (Gratz, 2003; Klonsky, 2007), it may be the case that deficits in emotion regulation are only associated with NSSI frequency in the presence of heightened negative affect or internalizing symptoms that require increased regulation.

Our finding that emotion dysregulation was indirectly associated with suicide attempt frequency via NSSI is also consistent with previous research (Anestis et al., 2013). The nonsignificant direct relationship between emotion dysregulation and suicide attempt frequency is consistent with findings that emotion dysregulation may be associated only with suicidal desire and not the capacity to actually enact a suicidal attempt (Anestis et al., 2011; Anestis & Joiner,
Contrary to our expectations, the direct relationship between internalizing symptoms and suicide attempts was also insignificant. Together these results suggest that the relationships between both emotion dysregulation and internalizing symptoms with suicide may be flow through NSSI, with deficits in emotion regulation increasing the use of NSSI as an escape in the presence of internalizing symptoms and aversive emotional states (Klonsky, 2009) and NSSI in turn placing an individual at heightened risk for the acquired capability to enact lethal behaviors (Joiner, 2005). Inconsistencies in previous research may reflect the complexity of these relationships, and highlight the importance of considering the interrelationships between multiple factors in the prediction of suicidal behaviors.

There were several limitations that should be considered. Results from this study are based on self-report measures of internalizing symptoms and emotion dysregulation and research should replicate these findings using semi-structured interviews and psychophysiological and behavioral measures. Second, this study was conducted using cross-sectional data, limiting our ability to interpret the causal relationship between variables. As such the current study was only able to examine cross-sectional indirect associations and future research should use longitudinal data to conduct a temporal analysis of meditational effects. Third, SEM analyses were designed for larger samples and the current study is underpowered. Despite this limitation, our model still provided good fit to the data, suggesting that in a larger sample these effects may be even more robust. Lastly, this study was conducted using an undergraduate sample and findings should be replicated in a clinical sample of young adults.

This study contributes to existing literature by evaluating an integrative model that incorporates the interrelationships between internalizing symptoms and NSSI behaviors in the pathway between emotion dysregulation and suicidal behaviors. Importantly, results from this
study suggest that the relationship between emotion dysregulation and greater NSSI frequency may flow through internalizing symptoms. This finding highlights the potential importance of targeting internalizing symptoms, in addition to deficits in emotion regulation, in NSSI treatments. Similarly, our finding that the relationship between emotion dysregulation and suicide attempt frequency is indirect through NSSI frequency suggests that interventions designed to prevent suicidal behavior may benefit from a focus on NSSI, which may confer the greatest risk of an individual acquiring the capability to enact lethal self-injury. Results from this study also support recent treatments for NSSI and suicidal behaviors, which have begun to focus on emotion dysregulation (Gratz & Gunderson, 2006; Rathus & Miller, 2002), while highlighting the continued importance of focusing on other factors such as internalizing symptoms and NSSI behaviors. In sum, this study highlights several important areas for intervention by providing a more nuanced understanding of the way in which emotion dysregulation is associated with NSSI and suicidal behaviors.

References


Anestis, M. D., Pennings, S. M., Lavender, J. M., Tull, M. T., & Gratz, K. L. (2013). Low distress tolerance as an indirect risk factor for suicidal behavior: Considering the explanatory role


17


Table 1. Means, standard deviations, and intercorrelations of all measures

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Neg. urgency</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Positive urgency</td>
<td>.73*</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. DERS imp.</td>
<td>.66*</td>
<td>.62*</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. DERS goals</td>
<td>.62*</td>
<td>.47*</td>
<td>.50*</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. DTS</td>
<td>54**</td>
<td>.51*</td>
<td>.62*</td>
<td>.55*</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. DASS depression</td>
<td>.38*</td>
<td>.35*</td>
<td>.46*</td>
<td>.38*</td>
<td>.42**</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. DASS anxiety</td>
<td>.44*</td>
<td>.44*</td>
<td>.47*</td>
<td>.41*</td>
<td>.46**</td>
<td>.65*</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. NSSI frequency</td>
<td>.25*</td>
<td>.08</td>
<td>.17*</td>
<td>.21*</td>
<td>.16</td>
<td>.29*</td>
<td>.27*</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Denotes significance at p < .05
** Denotes significance at p < .01
<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Suicide</td>
<td>26.3 (7.7)</td>
<td>24.9 (5.4)</td>
<td>10.2 (3)</td>
<td>12.8 (4.9)</td>
<td>38.06 (38.1)</td>
<td>5.56 (7.2)</td>
<td>6.23 (6.8)</td>
<td>6.18 (20.1)</td>
</tr>
<tr>
<td>attempt frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Age</td>
<td>0.02</td>
<td>-0.06</td>
<td>0.07</td>
<td>-0.02</td>
<td>-0.07</td>
<td>-0.06</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>11. Gender</td>
<td>-0.02</td>
<td>-0.19</td>
<td>-0.02</td>
<td>-0.10</td>
<td>0.03</td>
<td>-0.08</td>
<td>-0.10</td>
<td>0.04</td>
</tr>
<tr>
<td>12. Race</td>
<td>0.18*</td>
<td>0.13</td>
<td>0.10</td>
<td>0.13</td>
<td>0.16</td>
<td>0.07</td>
<td>0.07</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>21.4</td>
<td>1.4</td>
<td>2.0</td>
<td>4.0</td>
<td>5.56</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.4</td>
<td>1.4</td>
<td>2.0</td>
<td>4.0</td>
<td>5.56</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *p < 0.05, **p < 0.01. DERS = Difficulties in Emotion Regulation Scale; DTS = Distress Tolerance Scale; DASS = Depression Anxiety Stress Scales; NSSI = Nonsuicidal self-injury; NSSI Frequency = Total NSSI Frequency score on Deliberate Self Harm Index (DSHI); Suicide Attempt Frequency = Total lifetime suicide attempt frequency on Lifetime Suicide Attempts Self-Injury (L-SASI); Gender= Males coded as 0, Females coded as 1. All values displayed are for variables in their untransformed forms.
Figure 1. Structural equation model testing the direct and indirect relationships between emotion dysregulation and NSSI and suicide attempt frequency. Age, gender, and race were included as covariates in the model but are not displayed in the figure due to space constraints. NSSI Frequency = composite of NSSI frequency from the DSHI and L-SASI measures. Suicide Attempt Frequency = total number of times attempted suicide as reported on the L-SASI interview. Anxiety Sxs = Anxiety subscale of the Depression Anxiety Stress Scales (DASS). Depress. Sxs = Depression subscale of the DASS. *p < 0.05, **p < 0.01.