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To link to this article: https://doi.org/10.1080/87568225.2019.1601048

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Symptoms of Anxiety and Depression and Suicidal Behavior in College Students: Conditional Indirect Effects of Non-Suicidal Self-Injury and Self-Compassion

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ABSTRACT

Adults of college age are at particular risk for psychopathology, non-suicidal self-injury (NSSI), and suicidal behavior, but protective factors (e.g., self-compassion) may buffer risk. We examined the mediating effect of NSSI on the relation between anxiety/depressive symptoms and suicide risk, and the moderating role of self-compassion. Students (N = 338) with greater psychopathology reported more engagement in NSSI and, consequently, more suicide risk; self-compassion weakened the psychopathology-NSSI linkage. Therapeutically addressing psychopathology and NSSI, perhaps via Cognitive Behavioral Therapy, and promoting self-compassion via compassion-focused and mindful self-compassion therapy, may halt progression from symptomology to self-harm, ultimately reducing suicide risk in college students.

ARTICLE HISTORY

Received 08 Aug 2018
Accepted 26 Mar 2019
Revised 04 Nov 2018

KEYWORDS
Suicide; self-compassion; non-suicidal self-injury; anxiety; depression; psychopathology

Young adults attending college may be at particular risk for suicide-related behavior (Barrios, Everett, Simon, & Brener, 2000), possibly due to the stressors unique to this age and environment, such as interpersonal difficulties, academic pressures, and the transition to the college setting (Hirsch & Ellis, 1996; Hurst, Baranik, & Daniel, 2013). Conceptually, suicide-related behavior encompasses a continuum, ranging from suicidal ideation, or thoughts of suicide, to planning for suicide and, last, suicide attempts and death by suicide (Kachur, Potter, Powell, & Rosenberg, 1995; Silverman, Berman, Sanddal, O’Carroll, & Joiner, 2007). In the United States, suicidal ideation within the past twelve months is reported by 6% of undergraduate students (Drum, Brownson, Burton Denmark, & Smith, 2009), compared to 3.7% of the general adult population (Crosby, Han, Ortega, Parks, & Gfroerer, 2011). Beyond ideation, 92% of students who report suicidal
ideation in the past year also report a plan for suicide (Drum et al., 2009), a higher rate compared to the adult U.S. population (1%) (Crosby et al., 2011).

Despite its public health significance, suicide remains difficult to predict; however, the identification of risk and protective factors may inform the development of targeted prevention and intervention efforts. Common risk factors for suicide-related behavior include demographic characteristics, such as age and sex, and psychopathology, such as symptoms of depression and anxiety (Barrios et al., 2000; Kessler et al., 2005; Nepon, Belik, Bolton, & Sareen, 2010). As well, non-suicidal self-injury (NSSI), or deliberate self-harm (Kerr, Muehlenkamp, & Turner, 2010), which differs from suicide due to a lack of lethal intent, is associated with increased likelihood of engaging in suicide-related behavior (Andover, Morris, Wren, & Bruzzese, 2012; Nock & Favazza, 2009). In fact, NSSI, which is more prevalent than suicide, is often referred to as a “gateway” to suicide (Whitlock et al., 2012) and, as suggested by a recent meta-analysis, is predictive of future suicide-related behavior, with repetitive NSSI reducing inhibition related to, and increasing acquired capacity for, suicide (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Whitlock et al., 2012). For example, in clinical samples, approximately 70% of adolescents who report past engagement in NSSI attempt suicide (Nock et al., 2006) and, across the lifespan, 50 to 85% of individuals who engage in NSSI have also attempted suicide (Stanley, Winchel, Molco, Simeon, & Stanley, 1992). However, although a risk factor, not all individuals who engage in NSSI go on to engage in suicide-related behavior (Muehlenkamp & Gutierrez, 2004; Whitlock & Knox, 2007).

What is less established are the factors differentiating those who go on to engage in suicide-related behavior from those who do not (Hamza, Stewart, & Willoughby, 2012). Not all individuals who experience symptoms of anxiety or depression, or who engage in NSSI, also engage in suicide-related behavior, perhaps due to individual-level protective factors that buffer risk. One such protective factor is self-compassion, which is conceptualized as a sense of kindness and understanding toward oneself, an acceptance of negative experiences and “an emotionally positive self-attitude” (Neff, 2003a), and encompasses three factors: self-kindness, common humanity, and mindfulness (Neff, 2003a). Self-kindness refers to an understanding and accepting approach to self-appraisal, as opposed to viewing oneself in a highly critical manner, while common humanity refers to the perception that one’s experiences are universal to the human experience. Finally, mindfulness refers to awareness of one’s thoughts and feelings, but allowing distance from these thoughts (Neff, 2003). Given that self-criticism is highly predictive of suicide-related behavior (Donaldson, Spirito, & Farnett, 2000), and considering that self-compassion is, in some ways, the conceptual opposite of self-criticism, it may be that self-compassion is a critical component to be utilized in the prevention of suicide.
In general, individuals high in self-compassion experience psychological resilience and positive mental health (Neff & McGehee, 2010), including decreased anxiety and depression, and better interpersonal functioning (MacBeth & Gumley, 2012; Neff & Beretvas, 2013). Conversely, individuals low in self-compassion more often manifest negative mental and physical health outcomes, including emotional distress and increased alcohol abuse (Vettese, Dyer, Li, & Wekerle, 2011), compared to individuals high in self-compassion, who are more likely to engage in health promoting behaviors (Sirois, Kitner, & Hirsch, 2015).

Preliminary evidence also suggests that self-compassion is beneficially related to suicidal behavior. Research with youth indicates that children and adolescents with higher levels of self-compassion are less likely to attempt suicide (Tanaka, Wekerle, Schmuck, & Paglia-Boak, 2011; Vettese et al., 2011). Further, among a sample of youth at risk for trauma-related psychopathology, at a 6-month follow-up, self-compassion was related to lower levels of posttraumatic stress, depression, and suicide-related behavior (Zeller, Yuval, Nitzan-Assayag, & Bernstein, 2014). As well, mindfulness and self-compassion have been suggested, but not tested, as potential protective factors among victims of intimate partner abuse and military veterans (Bryan, Graham, & Roberge, 2015; Tesh, Learman, & Pulliam, 2013), warranting further research on the clinical utility of implementing self-compassion toward the reduction of suicide-related behavior.

As of yet, no published research has examined a comprehensive model of suicide risk that attempts to explain the progression from symptoms of psychopathology to NSSI to suicide-related behavior, accounting for protective factors that might ameliorate such effects. In a sample of college students, we examined the associations between symptoms of depression and anxiety and suicide-related behavior, and the potential mediating role of non-suicidal self-injury. In addition, we examined the potential buffering effect of self-compassion, and its three sub-components, as hypothesized moderators of these associations.

**Methods**

**Participants and procedure**

In this Institutional Review Board (IRB) approved study, undergraduate college students from a mid-size, Southeastern University completed an online battery of self-report questionnaires. Participants provided informed consent, were compensated with course credit for their participation, and were provided a list of campus, local, and national mental health resources at the conclusion of the study.
Our sample consisted of 338 undergraduate students who ranged in age from 18 to 58, with an average age of 21.81 years old ($SD = 5.33$). Our sample was primarily female ($n = 225; 67\%$), with 2 students identifying as transgender (.6%). Participants were predominantly White ($n = 294; 87\%$), with Black ($n = 18; 5.5\%$), Asian ($n = 10; 3\%$), and Hispanic/Latino ($n = 6; 1.8\%$) students comprising the remainder of the sample. Student participants, overall, were first year undergraduates ($n = 119, 35.2\%$), full-time ($n = 313, 92.6\%$), and U.S. citizens ($n = 327, 97\%$). Approximately one-third of students lived on-campus ($n = 111; 32.8\%$), one-third off-campus on their own ($n = 118; 34.9\%$), and one-third off-campus with family ($n = 109; 32.2\%$).

**Measures**

In addition to self-report measures of our variables of interest, participants completed a demographic questionnaire assessing, among other characteristics, sex, age, and race.

**Depressive symptoms**

The Beck Depression Inventory-2 (BDI-2; Beck, Steer, & Brown, 1996) is a 21-item self-report questionnaire which assesses depressive symptomatology, including changes in sleep and appetite, fatigue, and difficulty concentrating. Each item is scored on a four-point Likert scale, from 0 to 3, with the exception of two items that contain only one response choice. For example, a participant is prompted to rate their loss of pleasure on a scale of 0 (“I get as much pleasure as I ever did from the things I enjoy”) to 3 (“I can’t get any pleasure from the things I used to enjoy”). Responses are scored through summation, with higher scores representing the greater presence and severity of depressive symptoms (0–13: minimal, 14–19: mild, 20–28: moderate, 29–57: severe). The BDI-2 has excellent reliability in college samples ($\alpha = .93$), including our own ($\alpha = .95$).

**Anxiety symptoms**

The Beck Anxiety Inventory (BAI; Beck & Steer, 1993) is a 21-item self-report questionnaire which assesses common anxiety symptoms including “numbness or tingling,” “heart pounding/racing,” “hands trembling,” and “difficulty in breathing.” Participants are prompted to report the extent to which a symptom has bothered them over the past month. Each item is scored on a four-point Likert scale ranging from 0 (“not at all”) to 3 (“severely – it bothered me a lot”), with a total score (0 to 63) generated by summing all items, and higher scores representing greater presence and severity of anxiety symptoms (0–21: low, 22–35: moderate, 36–63: severe). The internal consistency of the BAI across samples, including college
students, is excellent ($\alpha = .91$) (DeAyala, Vonderharr-Carlson, & Kim, 2005), and was comparably excellent in our sample ($\alpha = .94$).

**Non-suicidal self-injury**
Non-suicidal self-injury was assessed using the Self-Harm Inventory (SHI; Sansone, Wiederman, & Sansone, 1998), a 22-item self-report questionnaire which assesses, broadly, the presence of deliberate self-harm including self-injurious behaviors. Participants are prompted to respond either yes (0) or no (1) to whether they have intentionally participated in a variety of self-harm behaviors, including “burning yourself,” “had accidents on purpose,” and “cutting yourself.” Although the SHI items require acknowledgment of intentionality to engage in self-harm, they do not discern the presence or absence of suicidal intent. A total score is generated by summing all of the affirmative responses and can range from 0 to 22. A score of 5 is considered the clinical cut-off for self-harm behaviors (Sansone et al., 1998), but research within non-clinical college populations concluded that a score of 5 typically indicates mild self-harm behavior and a score of 11 indicates more severe self-harm behavior. In a study with college samples, the SHI exhibited expected external validity, convergent with scores on measures of stress, depression and anxiety, and internal consistency was good ($\alpha = .83$) (Latimer, Covic, Cumming, & Tennant, 2009), as it was in our study ($\alpha = .87$).

**Suicidal behavior**
The Suicidal Behaviors Questionnaire- Revised (SBQ-R; Osman et al., 2001) is a four-item self-report questionnaire used to assess the presence of symptoms of suicidal behavior and their severity, including lifetime suicidal behavior (“Have you ever thought about or attempted to kill yourself?”), suicidal behavior in the past year (“How often have you thought about killing yourself in the past year?”), communication of intent (“Have you ever told someone that you were going to commit suicide, or that you might do it?”), and likelihood of future suicide attempt (“How likely is it that you will attempt suicide someday?”). Responses are summed for a total score ranging from 0 (no suicidal behavior or ideation) to 19, with higher scores indicating greater suicide risk. Among college samples, a cutoff score of 7 is used to distinguish suicidal and non-suicidal individuals (Osman et al., 2001). The SBQ-R has high internal consistency among college students ($\alpha = .97$) (Osman et al., 2001) and, in the current study, the internal consistency of the SBQ-R was good ($\alpha = .81$).

**Self-compassion scale**
Self-compassion was measured using the Self-Compassion Scale (SCS; Neff, 2003b), a 26-item self-report questionnaire which assesses the 3 components
of self-compassion, including self-kindness (10-items), common humanity (8-items), and mindfulness (8-items). Sample items include “I try to be understanding and patient towards the aspects of my personality I don’t like” and “I try to see my failings as part of the human condition.” Responses are scored on a 5-point Likert-scale, ranging from 1 (“almost never”) to 5 (“almost always”). An overall self-compassion score is generated by averaging mean subscale scores, with a maximum possible score of 30. Among college students, the internal consistency of the overall measure is excellent (α = .92), and adequate for the subscales of self-kindness (α = .77), common humanity (α = .79), and mindfulness (α = .75) (Neff, 2003b). In our sample, total internal consistency was good (α = .80), and subscale internal consistency ranged from adequate to good (self-kindness (α = .85); common humanity (α = .78); mindfulness (α = .78)).

Statistical analyses

Bivariate analyses

We used Pearson’s product-moment correlations to assess the association between, and independence of, study variables, with a coefficient of $r \geq .80$ as a cut-off for multicollinearity (Field, 2005).

Mediation and moderated mediation (conditional indirect effects model)

Simple mediation analyses, consistent with Hayes (2013), were used to examine the potential mediating role of NSSI on the relation between symptoms of anxiety and depression and suicidal behavior. All analyses were conducted using model 4 of “PROCESS,” (Hayes, 2013) with bootstrap resampling (10,000 samples), to yield 95% confidence intervals of the indirect effect.

Further, we developed moderated-mediation models to assess the potential moderating effect of self-compassion on all paths of our simple mediation models. Analyses were conducted using model 59 of “PROCESS,” with bootstrap resampling (10,000 samples), to yield 95% confidence intervals of conditional indirect effects. Age, race, and sex were covaried for all models.

Results

Bivariate correlations among study variables

Supporting hypotheses, all bivariate correlations were in anticipated directions. Suicidal behavior was significantly positively related to depressive symptoms ($r = .51$, $p < .001$), anxiety symptoms ($r = .46$, $p < .001$), and NSSI ($r = .46$, $p < .001$) and negatively related to self-compassion ($r = -.37$, $p < .001$). Similarly, depressive symptoms were positively related to anxiety symptoms ($r = .63$, $p < .001$) and NSSI ($r = .45$, $p < .001$) and negatively
related to self-compassion \((r = -0.50, p < 0.001)\). Anxiety symptoms were positively related to NSSI \((r = 0.39, p < 0.001)\) and negatively related to self-compassion \((r = -0.37, p < 0.001)\). NSSI was negatively related to self-compassion \((r = -0.37, p < 0.001)\).

Regarding the subscales of self-compassion, the three constructs were related but independent, with no correlations greater than .80. Self-kindness was significantly positively related to common humanity \((r = 0.55, p < 0.001)\) and mindfulness \((r = 0.69, p < 0.001)\), and common humanity was positively related to mindfulness \((r = 0.60, p < 0.001); \text{ See Table 1}\).

**Mediation analyses**

In a simple mediation model examining the mediating role of NSSI on the relation between depressive symptoms and suicidal behavior, hypotheses were supported. Greater depressive symptoms were significantly related to greater engagement in NSSI \((a = 0.15, \text{SE} = 0.02, p < 0.001)\), as well as to greater suicidal behavior \((c = 0.12, \text{SE} = 0.01, p < 0.001)\). Additionally, NSSI was significantly positively associated with suicidal behavior \((b = 0.23, \text{SE} = 0.04, p < 0.001)\). The direct effect of depressive symptoms on suicidal behavior decreased in significance after accounting for NSSI \((c' = 0.11, \text{SE} = 0.01, p < 0.001)\), indicating mediation. Also, a specific indirect effect \((ab = 0.03)\) was significant. In order to determine the presence of a true significant indirect effect, the biased confidence intervals must not contain a true zero, as was the case in our model (BCa 95% CIs \([0.02, 0.05]\)). Individuals who reported greater depressive symptoms reported greater engagement in NSSI and, in turn, more suicidal behavior (**Table 2; Figure 1**).

Similarly, greater anxiety symptoms were significantly related to greater engagement in NSSI \((a = 0.13, \text{SE} = 0.02, p < 0.001)\), as well as to greater suicide risk \((c = 0.10, \text{SE} = 0.01, p < 0.001)\). Additionally, NSSI was positively associated with suicidal behavior \((b = 0.27, \text{SE} = 0.05, p < 0.001)\). The direct effect of anxiety symptoms on suicidal behavior decreased in significance after accounting for the effect of NSSI \((c' = 0.10, \text{SE} = 0.01, p < 0.001)\), indicating mediation. Given that the biased confidence intervals did not contain a true zero (BCa 95% CIs \([0.02, 0.06]\)), a true significant indirect effect was present \((ab = 0.04)\). Individuals who reported greater anxiety symptoms reported greater engagement in NSSI and, in turn, more suicidal behavior (**Table 2; Figure 1**).

**Conditional indirect effect analyses**

In a conditional indirect effects model examining the moderating role of the total self-compassion score on all paths of the depression model, self-compassion significantly moderated the relation of depressive symptoms and NSSI \((\beta = -0.01, \text{SE} = 0.004, t(315) = -3.21, p < 0.01)\), but did not significantly
Table 1. Means, Standard deviations, and bivariate correlations of study variables.

<table>
<thead>
<tr>
<th></th>
<th>Mean [SD]</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Suicidal Behavior</td>
<td>2.23 [3.30]</td>
<td>.51</td>
<td>.46</td>
<td>.46</td>
<td>−.35</td>
<td>−.27</td>
<td>−.21</td>
<td>−.23</td>
</tr>
<tr>
<td>2. Depressive Symptoms</td>
<td>10.58 [11.39]</td>
<td>-</td>
<td>.63</td>
<td>.45</td>
<td>−.50</td>
<td>−.35</td>
<td>−.33</td>
<td>−.35</td>
</tr>
<tr>
<td>4. NSSI</td>
<td>3.27 [3.93]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>−.37</td>
<td>−.30</td>
<td>−.20</td>
<td>−.18</td>
</tr>
<tr>
<td>5. Self-Compassion</td>
<td>17.88 [3.52]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.77</td>
<td>.55</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td>6. Self-Kindness</td>
<td>14.41 [3.87]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.55</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td>7. Common Humanity</td>
<td>12.60 [3.22]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>8. Mindfulness</td>
<td>12.69 [2.90]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Suicidal Behavior = Suicidal Behavior Questionnaire – Revised, Depressive Symptoms = Beck Depression Inventory- 2nd Edition, Anxiety Symptoms = Beck Anxiety Inventory, NSSI = Self-Harm Inventory, Self-Compassion = Self-Compassion Scale. All correlations were significant at \( p < .001 \).
Table 2. Conditional indirect effects of self-compassion and subscales: depressive and anxiety symptom models.

<table>
<thead>
<tr>
<th>Path</th>
<th>Depressive Symptom Model</th>
<th>Anxiety Symptom Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>a (Depressive Symptoms x Self-Compassion → NSSI)</td>
<td>$-0.01(0.004)$</td>
<td>$-0.01(0.01)$</td>
</tr>
<tr>
<td>b (NSSI x Self-Compassion → Suicidal Behavior)</td>
<td>$0.02(0.01)$</td>
<td>$0.01(0.01)$</td>
</tr>
<tr>
<td>c (Depressive Symptoms x Self-Compassion → Suicidal Behavior)</td>
<td>$0.01(0.004)$</td>
<td>$-0.002(0.004)$</td>
</tr>
</tbody>
</table>

**Self-Kindness**

| a (Depressive Symptoms x Self-Kindness → NSSI) | $-0.02(0.004)$ | $-0.01(0.004)$ |
| b (NSSI x Self-Kindness → Suicidal Behavior) | $0.02(0.01)$ | $0.007(0.01)$ |
| c (Depressive Symptoms x Self-Kindness → Suicidal Behavior) | $0.01(0.004)$ | $-0.003(0.004)$ |

**Common Humanity**

| a (Depressive Symptoms x Common Humanity → NSSI) | $-0.01(0.01)$ | $-0.01(0.005)$ |
| b (NSSI x Common Humanity → Suicidal Behavior) | $0.01(0.01)$ | $0.007(0.01)$ |
| c (Depressive Symptoms x Common Humanity → Suicidal Behavior) | $-0.02(0.01)$ | $-0.003(0.005)$ |

**Mindfulness**

| a (Depressive Symptoms x Mindfulness → NSSI) | $-0.01(0.01)$ | $-0.01(0.01)$ |
| b (NSSI x Mindfulness → Suicidal Behavior) | $-0.002(0.004)$ | $-0.003(0.005)$ |
| c (Depressive Symptoms x Mindfulness → Suicidal Behavior) | $0.001(0.01)$ | $-0.003(0.01)$ |

Suicidal Behavior = Suicidal Behavior Questionnaire – Revised, Depressive Symptoms = Beck Depression Inventory- 2nd Edition, Anxiety Symptoms = Beck Anxiety Inventory, NSSI = Self-Harm Inventory, Self-Compassion = Self-Compassion Scale. *p < .05, ** p < .01, *** p < .001

Moderate the relation between NSSI and suicidal behavior ($\beta = -0.02$, SE = .01, t(315) = -1.71, $p = .09$) or between depressive symptoms and suicidal behavior ($\beta = .01$, SE = .004, t(315) = 1.77, $p = .08$). Self-compassion
operates as a protective factor on the “a” path of the model, weakening the association between depressive symptoms and NSSI, thereby ultimately decreasing suicide risk (Table 2; Figure 2).

In a conditional indirect effects model examining the moderating role of total self-compassion score on all paths of the anxiety model, self-compassion significantly moderated the relation of anxiety symptoms and NSSI ($\beta = -.01$, SE = .01, t(315) = -2.50, $p < .01$), but did not significantly moderate the relation between NSSI and suicidal behavior ($\beta = -.01$, SE = .01, t(315) = -1.03, $p = .31$), or between anxiety symptoms and suicidal behavior ($\beta = -.002$, SE = .004, t(315) = -.52, $p = .60$). Self-compassion operates as a protective factor on the “a” path of the model, weakening the association between anxiety symptoms and NSSI, consequently reducing risk for suicidal behavior (Table 2; Figure 2).

When the subscales of self-compassion were examined as independent moderators in the depressive symptom model, self-kindness moderated the
depressive symptom-NSSI linkage ($\beta = -0.02$, SE = .004, $t(315) = -4.05$, $p < .001$), but did not significantly moderate the relation between NSSI and suicidal behavior or between depressive symptoms and suicidal behavior. Common humanity moderated the depressive symptom-NSSI linkage ($\beta = -0.01$, SE = .01, $t(315) = -2.19$, $p = .03$) and the relation between depressive symptoms and suicidal behavior ($\beta = .01$, SE = .01, $t(315) = 2.29$, $p = .02$), but did not significantly moderate the relation between NSSI and suicidal behavior. Mindfulness did not significantly moderate any paths of the model (Table 2; Figure 3).

When the subscales of self-compassion were examined independently in the anxiety symptom model, self-kindness moderated the anxiety symptom-NSSI linkage ($\beta = -0.01$, SE = .004, $t(315) = -3.27$, $p < .01$), but did not significantly moderate the relations between NSSI and suicidal behavior or anxiety symptoms and suicidal behavior. Similarly, common humanity moderated the anxiety symptom-NSSI linkage ($\beta = -0.01$, SE = .005, $t(315) = -2.15$, $p = .03$), but did not significantly moderate the relation between NSSI and suicidal behavior, or anxiety symptoms and suicidal behavior. Mindfulness did not significantly moderate any paths of the model (Table 2; Figure 4).
Discussion

Given that suicide is a significant public health concern, and that college students represent a population at heightened risk, the identification of risk factors (e.g., psychopathology, NSSI), as well as protective factors (e.g., self-compassion), is imperative. In our collegiate sample, we examined the associations between symptoms of anxiety and depression and suicide-related behavior, as well as the potential mediating role of non-suicidal self-injury. Further, we examined the potential moderating role of self-compassion on these mediated relations; that is, between psychopathology and NSSI, between NSSI and suicidal behavior, and between psychopathology and suicidal behavior.

According to the gateway theory of NSSI and suicide risk (Linehan, 1986; Whitlock et al., 2012), NSSI and suicide-related behavior exist on a continuum of self-injurious and increasingly lethal behaviors. The gateway theory posits that suicide-related behavior develops after engagement in NSSI, as repetitive engagement in NSSI may lead to “more extreme” self-injury,
meaning suicide attempts and death by suicide. As well, this progression along the continuum of suicidality, from NSSI to suicidal behavior, is representative of Joiner’s notion of acquired capacity for suicide, in which repetitive exposure to harm and pain (e.g., NSSI) increasingly permits engagement in lethal self-harming behaviors (Joiner, 2005).

As our findings suggest, anxiety and depression represent at least one potential pathway to engagement in NSSI (Bentley, Nock, & Barlow, 2014). Students experiencing symptoms of anxiety or depression may engage in NSSI to distract from or cope with negative emotions and ruminative thoughts (Bentley et al., 2014). This process of “movement,” from psychopathological symptoms to engagement in NSSI, may continue to progress, resulting in suicidal behavior (Whitlock et al., 2012). Ultimately, individuals who experience symptoms of anxiety and depression may engage in NSSI as a form of affective regulation to alleviate their emotional suffering; such actions may provide temporary relief, but can eventually result in additional sadness, guilt, and anxiety (Klonsky, 2007; Nixon, Cloutier, & Aggarwal, 2002). As well, this repeated engagement in NSSI does not decrease symptoms of anxiety and depression but, rather, increases negative emotions over time and increases risk for suicidal behavior. For example, as we noted

Figure 4. Moderated mediation model: anxiety symptoms and suicidal behavior: conditional indirect effects of NSSI and self-kindness, common humanity, and mindfulness. $a_{sk}$, $a_{ch}$, $a_{m}$ = indirect effect (anxiety symptoms related to non-suicidal self-injury), $b_{sk}$, $b_{ch}$, $b_{m}$ = indirect effect (NSSI related to suicidal behavior), $d_{1sk}$, $d_{1ch}$, $d_{1m}$ = conditional effect (self-kindness/common humanity/mindfulness on the relation between anxiety symptoms and non-suicidal self-injury), $d_{2sk}$, $d_{2ch}$, $d_{2m}$ = conditional effect (self-kindness/common humanity/mindfulness on the relation between anxiety symptoms and suicidal behavior), $d_{3sk}$, $d_{3ch}$, $d_{3m}$ = conditional effect (self-kindness/common humanity/mindfulness on the relation between non-suicidal self-injury and suicidal behavior), $c_{sk}$, $c_{ch}$, $c_{m}$ = direct effect (anxiety symptoms related to suicidal behavior).
earlier, up to 70% of adolescents being treated for psychiatric illness who also engage in NSSI progress to engaging in suicidal behavior, perhaps due to the repetitive nature of their NSSI, as indicated by a longer history of NSSI and use of a greater number of methods.

We found that self-compassion buffers suicide risk along the psychopathology-NSSI linkage. Self-compassion may function as an adaptive coping mechanism, effectively decreasing emotional distress and precluding the need to engage in NSSI as a maladaptive form of coping. Given that NSSI is often employed as a form of emotion regulation and distraction from painful thoughts, engaging in self-compassion may allow a person to accept and process negative feelings and emotions, rather than simply distracting from such feelings via self-injury. Importantly, engaging in self-compassion as a coping strategy, rather than NSSI, appears to promote positive emotions and counteract psychophysiological reactions to stress, whereas engaging in NSSI produces more negative emotions over time (Klonsky, 2007; Nixon et al., 2002).

Contrary to our hypotheses, self-compassion did not significantly moderate the relation between symptoms of psychopathology and suicide-related behavior (c path), perhaps because self-compassion is more salient at higher levels of distress than exhibited by our sample (Leary, Tate, Adams, Allen, & Hancock, 2007; Neff, 2003). Given that our sample was non-clinical, and despite an inverse bivariate association between self-compassion and suicide-related behavior, it may be that levels of distress for our respondents were not severe enough to activate the protective buffering effect of self-compassion.

Similarly, we also failed to find a significant moderating effect for self-compassion in the linkage between NSSI and suicide-related behavior. Once an individual is engaging in NSSI, self-injury may become reinforced as an effective means of coping, becoming an acquired capability, per the Interpersonal Theory of Suicide (IPTS) (Joiner, 2005), and making the transition to more-severe and potentially lethal forms of self-injury along the suicidality continuum a greater likelihood. Such perceptual changes regarding self-injury, pain and death by suicide, may be a stronger influence than the beneficial effect of self-compassion; for instance, individuals who are already engaging in NSSI may be at a point of severity and conditioning, where positive cognitive-emotional factors have limited impact (e.g., a strong negativity-to-positivity ratio; Fredrickson, 2004). In fact, compared to the other components of the IPTS (i.e., thwarted belongingness and perceived burdensomeness), acquired capability is the most difficult to treat clinically because a clinician cannot modify an individual’s history of self-harm (Van Orden et al., 2010).

Exploring the subcomponents of self-compassion, self-kindness moderated the linkage between depressive symptoms and NSSI, and between anxiety symptoms and NSSI. Self-kindness refers to an understanding and accepting approach to self-appraisal, as opposed to self-critique (Neff, 2003a) which is, in past research, related to engagement in NSSI (Hooley & St. Germain,
Thus, our findings suggest that being kind to the self, despite the poor self-worth and feelings of self-doubt that often accompany depression and anxiety, may lessen the likelihood of transitioning from being psychologically symptomatic to self-injuring.

Somewhat similarly, common humanity moderated the depression-NSSI linkage, the depression-suicide linkage, and the anxiety-NSSI linkage. Common humanity refers to the perception that one’s experiences are universal to the human experience, rather than the perception that one is isolated, alienated or suffering alone (Neff, 2003a). Common to both anxiety and depression are feelings of social disconnectedness, loneliness, and perceived isolation (Mushtaq, Shoib, Shah, & Mushtaq, 2014). Thus, it may be that the clinical utility of common humanity arises in providing a cognitive framework, which prompts individuals to recognize that they are not alone; even in our suffering, we can take comfort that others have had similar experiences, and have recovered and even thrived as a result (Kent, Rivers, & Wrenn, 2015; Neff & Dahm, 2014; Zeller et al., 2015). Resolving such existential isolation and, therefore, distress, may also help to facilitate perceived and actual social support, for when an anxious or depressed person comes to understand that they have commonalities with others, even in their suffering, they may begin to reintegrate with their interpersonal networks.

Finally, mindfulness did not significantly moderate any paths of either the anxiety or depressive symptom model. Mindfulness refers to an awareness of, and a distancing from, one’s distressful thoughts and feelings and has demonstrated clinical utility in addressing anxiety and depression (Neff, 2003a); as such, our findings seem contradictory to emerging literature suggesting that mindfulness is therapeutically beneficial across an array of mental health outcomes (Chiesa & Serretti, 2011), including NSSI and suicidal behavior (Heath, Carsley, De Riggi, Mills, & Mettler, 2016; Luoma & Villatte, 2012). One reason for the non-significance of our mindfulness-based findings may be due to the differences between mindfulness and the other sub-components of self-compassion. Whereas self-kindness and common humanity both involve cognitively reframing one’s mindset to direct kindness toward oneself and recognizing the universality of one’s experiences, mindfulness requires active engagement, as individuals must consciously acknowledge, yet distance themselves from, negative thoughts and feelings, so as to avoid over-identification with negative emotions.

Intuitively, and in support of etiological theories of NSSI, it may also be that individuals with anxiety and depression who engage in NSSI are avoiding and distracting from their negative emotions, thereby engaging in non-acceptance, which is contrary to the processes of mindfulness (Gratz & Roemer, 2004; Gross, 2002). Further, for a person who is depressed or anxious, to mindfully focus on negative emotions may be counterproductive unless adequately supervised or trained, as acknowledgment and “releasing” of negative emotions may turn,
instead, to a maladaptive and ruminative focus rather than a calming one (Lustyk, Chawla, Nolan, & Marlatt, 2009; Shapiro, 1992). Indeed, in previous research, among a sample of college students, rumination mediated the relation between self-compassion and depression and anxiety (Raes, 2010).

**Limitations and future research**

Our findings must be interpreted in the context of a few limitations. To begin, the cross-sectional design of our study precludes examination of causality; for instance, we are unable to discern whether symptoms of anxiety and depression truly preceded NSSI and suicidal behavior, or whether NSSI was predictive of suicidal behavior. Future prospective and longitudinal research is necessary to assess the progressive impact of symptoms of psychopathology, over time, on engagement in NSSI, and the action of NSSI as a gateway to subsequent suicidal behavior. Our use of a predominantly White, female sample may limit generalizability of findings. The prevalence of our variables of interest (i.e., NSSI, suicidal behavior) differs greatly across a variety of demographic characteristics, including age, sex, and ethnicity. To address this limitation in our own study, we covaried these variables. However, future research is needed, with diverse samples, to determine if risk and protective factors for suicide operate similarly across populations. As well, our study was conducted with a non-clinical sample, and future research with clinical samples is warranted to substantiate our findings. Finally, we utilized self-report measures, which may limit the accuracy of our measurement. Future research using objective measures (e.g., medical records) is needed to improve validity. As well, technology-based assessments (e.g., ecological moment surveying) could be utilized to assess symptoms of psychopathology or engagement in NSSI in the moment rather than retrospectively via surveys (Donker et al., 2013).

**Implications**

Screening for symptoms of depression and anxiety, and for the presence of NSSI, may help to identify individuals at increased risk for suicidal behaviors, providing a point of action for college campuses and clinicians alike. For example, student health and counseling centers could use screening tools such as the Patient Health Questionnaire (PHQ-9; Kroenke & Spitzer, 2002) and the Generalized Anxiety Disorder 7-Item (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006), to identify at-risk students. Additionally, college campuses may utilize brief self-harm screening questions (e.g., Have you ever had thoughts of purposely hurting yourself without wanting to die?) to identify students at risk for NSSI (Klonsky & Olino, 2008), or the Suicide Behaviors Questionnaire – Revised, which assesses history of and risk for...
suicidal behavior (Osman et al., 2001). Once identified via screening procedures, our findings may inform both campus-wide and individual-level interventions with at-risk students.

At the campus level, in previous research, strategies such as gatekeeper training programs, interactive web-based resources, and awareness-focused outreach programs, have exhibited efficacy in promoting treatment-seeking and preventing suicide, for students (Cimini et al., 2014; Cross, Matthieu, Lezine, & Knox, 2010; Haas, Koestner, Rosenberg, Moore, & Garlow, 2008). This is of importance, because previous research indicates that, among college students who died by suicide, 86% did not seek services at their campus counseling center (Gallagher, 2014).

In terms of clinical interventions, therapeutically targeting symptoms of anxiety and depression, and engagement in NSSI, may decrease risk for suicidal behaviors. Evidence-based interventions, such as Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy, may set in motion a protective effect that extends from a reduction in psychopathology to a lessening of NSSI and, ultimately, to decreased suicide risk (Driessen & Hollon, 2010; Kanter, Baruch, & Gaynor, 2006; Otte, 2011).

To address engagement in NSSI, efficacious interventions include Problem Solving Therapy (e.g., coping skills training and psychoeducation regarding emotion regulation), CBT (e.g., identifying and restructuring maladaptive thoughts and negative self-schemas) and Dialectical Behavior Therapy (e.g., skills training, contingency management, validation and acceptance practices) (Gonzales & Bergstrom, 2013; Stanley, Brodsky, Nelson, & Dulit, 2007). Additionally, behavioral activation and psychosocial skill building (e.g., interpersonal effectiveness, distress tolerance, emotion regulation) can be used to facilitate engagement in adaptive and positive behaviors and events (e.g., exercising, engaging in social activities) as a way to address symptoms of anxiety and depression, instead of engaging in the use of NSSI as a maladaptive means of coping (Hopko, Sanchez, Hopko, Dvir, & Lejuez, 2003). Encouraging healthy social relationships and engagement in rewarding social activities may be important for students with depression and anxiety, as NSSI is often used as a form of social signaling when distressed (Christoffersen, Mohl, DePanfilis, & Vammen, 2015; Kleiman & Liu, 2014; Nock, 2008; Wedig & Nock, 2007).

Finally, therapeutically bolstering self-compassion may decrease risk for engagement in NSSI, given its characterization as a form of self-soothing and emotional regulation (Diedrich, Grant, Hofmann, Hiller, & Berking, 2014); indeed, self-compassion may be most effective in the context of stressors and psychopathology (Neely, Schallert, Mohammed, Roberts, & Chen, 2009). Of importance, we found that self-kindness and common humanity, but not mindfulness, exerted a beneficial moderating effect, which replicates previous research suggesting the particular importance of these two constructs for symptoms of anxiety and depression (Van Dam, Sheppard, Forsyth, &
Earleywine, 2011). Thus, clinical interventions that target these specific facets of self-compassion may be most effective at decreasing suicide risk.

Given that non-suicidal self-injury is often precipitated by negative and critical views of the self, encouraging self-kindness has been suggested as a potential point of intervention, which might be accomplished via implementation of Compassion-Focused Therapy (Van Vliet & Kalnins, 2011), an approach that encourages self-warmth and reduction of punitive views of the self. Similarly, Loving-Kindness and Compassion Meditation (LKCM) is effective in promoting acceptance of the self and reducing negative self-criticism, including in persons with Borderline Personality Disorder, a diagnostic group with increased risk for suicide (Feliu-Soler et al., 2017). Finally, Compassionate Mind Training, which emphasizes compassionate focus, affectionate breathing, and soothing facial expressions and voice tones, is effective in promoting positive emotions and contentment, and reducing shame, self-criticism and psychopathology (Matos et al., 2017). From a public health perspective, college personnel can implement such approaches at the campus level, via the offering of compassion-focused workshops and courses, sessions of yoga and guided meditation, and through the use of compassion-promoting technologies (e.g., mobile applications) (Cieslak et al., 2016).

Conclusion

Until now, no published research has examined a comprehensive model of suicide risk that attempts to explain the progression from psychopathology to NSSI to suicide-related behavior, accounting for protective factors that might ameliorate such effects. We found that NSSI mediated the relation between symptoms of anxiety/depression and suicide-related behavior, and that self-compassion moderated the psychopathology-NSSI linkage, weakening this pathway. Future prospective, longitudinal research with diverse samples and objective measurement techniques is necessary to substantiate our findings. However, despite minor limitations, our findings can guide clinical intervention and prevention initiatives; for instance, screening for and therapeutically targeting anxiety, depression, and NSSI, as well as therapeutically bolstering self-compassion, may be effective strategies to decrease suicide risk among young adults attending college.

Disclosure statement

No potential conflict of interest was reported by the authors.

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