Examining the Relationship Between Mindfulness, Self-Compassion, and Emotion Regulation in Self- Injury

ABSTRACT

Objective: The objective of the current study was to investigate whether mindfulness and self-compassion are negatively associated with engagement in non-suicidal self-injury (NSSI) and whether emotion dysregulation would mediate this relation.

Method: 343 participants (82.2% female; M_{age} = 23.98; *SD* = 7.47) were recruited from university and community settings, and completed online questionnaires. Two groups of participants were created: those with lifetime engagement in NSSI (*n* = 153) and a comparison group with no prior engagement in NSSI (*n* = 190).

Results: First, two one-way MANOVAs revealed significant mean differences (NSSI/comparison) across the self-compassion dimensions and specific mindfulness facets. Second, logistic regressions revealed that the self-coldness dimension of self-compassion significantly predicted engagement in NSSI, and specific mindfulness facets (non- judging and acting with awareness) were found to negatively predict NSSI engagement. Lastly, mediation analyses revealed that emotion dysregulation fully mediated the relationships between both mindfulness total and self-coldness, and NSSI group status.

Conclusion: The present study demonstrates preliminary support for the protective role of key mindfulness facets and potential risk of the self-coldness aspect of self-compassion in NSSI engagement. Implications for potential use of treatment protocols may include teaching key aspects of mindfulness and self-compassion as healthier and kinder alternatives to coping with dysregulated emotions.

KEYWORDS Emotion regulation; mindfulness; non-suicidal self-injury; self-compassion

INTRODUCTION

Non-suicidal self-injury (NSSI) is defined as the deliberate and intentional destruction of one's own bodily tissue without suicidal intent and for reasons that are not socially sanctioned (e.g., not tattoos, body piercings; International Society for the Study of Self- Injury, 2007). Engagement in NSSI is highly prevalent, with a meta-analysis demonstrating lifetime prevalence rates up to 17.2% among adolescents, 13.4% among young adults, and 5.5% among adults (Swannell, Martin, Page, Hasking, & St John, 2014). The most commonly reported methods of engaging in NSSI are cutting, hitting oneself, and burning, which may result in superficial to severe wounds (Klonsky & Muehlenkamp, 2007). Although suicidal self-injury is viewed as different from NSSI, engagement in NSSI is a strong predictor of suicidal thoughts and behaviors (Hamza, Stewart, & Willoughby, 2012; Ribeiro et al., 2016). Similar to NSSI, deliberate self-harm (DSH) is used to describe a pattern of behavior that includes a larger range of behaviors (i.e., substance abuse) that are not considered in NSSI (Nock, 2010; Pattison & Kahan, 1983).

The current paradigms of NSSI highlight the importance of emotion regulation as a primary motive for engagement in NSSI—individuals who engage in NSSI often do so in order to manage intense and/or unwanted emotions (Gratz, 2007; You et al., 2018). For example, individuals may manage intense internal experiences with coping strategies, such as NSSI, which serves as an automatic negative reinforcement function (Brereton & McGlinchey, 2020). The reduction or removal of unpleasant or intense affect provides temporary emotional relief while resulting in potential negative long- term outcomes (Chapman, Gratz, & Brown, 2006; Gratz, Chapman, Dixon-Gordon, & Tull, 2016; Klonsky, 2011). Despite this evidence, there remains substantial gaps in our understanding of the mechanisms associated with emotion

regulation in NSSI engagement.

Based on recent theoretical and empirical evidence, mindfulness is suggested to be a protective factor and potentially a promising avenue of support for this behavior. Within a Western context, mindfulness has been operationalized as the deliberate, non- judgmental awareness of the present moment (Kabat-Zinn, 2003). When assessing trait mindfulness (e.g., a predisposition to be mindful in daily life), it is commonly operationalized using five facets: (1) observation of internal and external experiences; (2) description of such experiences; (3) acting with awareness by engaging in purposeful attention; (4) adoption of a non-judgmental stance toward personal sensations, cognitions, and emotions; and (5) non-reactivity to experiences (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). As the research on mindfulness has determined that these five facets exist rather than a unidimensional mindfulness construct, it is beneficial for researchers to examine mindfulness in this way.

In a related area, self-compassion has been considered an overlapping construct with mindfulness involving affective, cognitive, behavioral, and interpersonal processes (Khoury, 2019). Although there are several conceptualizations and a lack of consensus on the definition of self-compassion (see review by Khoury, 2019; Strauss et al., 2016), a commonly used definition in research is based on Neff's (2003a) conceptualization which involves three parts: showing kindness toward oneself in the face of distress or adversity rather than judgment, understanding difficulties as part of a larger human experience rather than feeling isolated, and holding painful thoughts in mindful aware- ness rather than over-identifying with them. However, other definitions conceptualize self-compassion as an essential part of an interconnected and dynamic flow, involving directing compassion to others, compassion from others, and compassion for self (Gilbert et al., 2017; Gilbert, McEwan, Matos, & Rivis, 2011).

The Self-Compassion Scale (SCS; Neff, 2003b) is the most widely used measure to assess self-compassion, however, there is significant debate regarding the theoretical and empirical structure of the scale (Muris & Otgaar, 2020; Neff, 2020c). Based on Neff's definition of self-compassion, the SCS contains 26-items to measure six components of self-compassion: three positive SCS subscales (self-kindness, common humanity, mindfulness) and negative subscales (self-judgment, isolation, over-identification). Factor analytic studies support examining self-compassion using *two factors* of the SCS by summing all the positive subscales together and the negative subscales together, referring to *self-coldness* and *self-warmth* (e.g., Brenner, Heath, Vogel, & Cred'e, 2017; Halamov'a et al., 2021; Lo'pez et al., 2015; Muris & Petrocchi, 2017). Thus, the two sub- dimensions of the SCS measure two theoretically distinct self-responding processes: self- compassion (self-warmth) and self-criticism (self-coldness). However, recent studies have linked the negative self-compassion subscales (self-coldness) to psychological difficulties, maladaptive coping, and psychopathology which may inflate the relationship between self-compassion and these constructs (MacBeth & Gumley, 2012; Muris, van den Broek, Otgaar, Oudenhoven, & Lennartz, 2018). Of importance, self-criticism is robustly associated with engagement in NSSI (e.g., Xavier, Pinto-Gouveia, & Cunha 2016a). Indeed, individuals who engage in NSSI as a form of emotion regulation report high self-criticism and self-hate, further highlighting the need to examine the self- coldness facet of self-compassion with engagement in NSSI (Hooley, Ho, Slater, & Lockshin, 2010).

There has been a growing interest in the application of mindfulness and self-compassion-based programs for a variety of clinical and non-clinical populations (e.g., Khoury et al., 2013; Kirby, 2017; Per et al., 2020). Teaching mindfulness-based skills is a component of the standardized group-based intervention Dialectical Behavioral Therapy (DBT) and has been

found to effectively decrease acts of NSSI (e.g., Linehan et al., 2006; Pasieczny & Connor, 2011). However, as mindfulness represents only one module of DBT, the specific influence of mindfulness skills for individuals with a history of NSSI remains unclear. Conceptually, the goals of mindfulness (i.e., to accept experiences in the present moment, whether pleasant or painful) contrasts with the commonly reported motivation of NSSI engagement, to reduce or escape unwanted, intense, or unpleasant internal experiences. Moreover, it is suggested that teaching self-compassion skills can encourage individuals who engage in NSSI to tolerate their emotional states and engage in more healthy, self-compassionate ways of regulating these negatively self- labeled emotions (Van Vliet & Kalnins, 2011). Cumulative electrophysiological, neuro- biological, and psychological evidence supports a link between both mindfulness and self-compassion with emotion regulation suggesting that these constructs are associated with the enhanced ability to adaptively regulate emotions (e.g., Finlay-Jones, 2017; Lin, Fisher, Roberts, & Moser, 2016; Lutz et al., 2014; Roemer, Williston, & Rollins, 2015). Given the relationship between NSSI and emotion regulation, there is a strong theoretical foundation suggesting that emotion regulation may serve as a mechanism in explaining the relationship between mindfulness, self-compassion and engagement in NSSI.

Research examining the associations between mindfulness, self-compassion and NSSI are becoming more prominent. Studies have found a negative relationship between mindfulness and DSH (Xavier, Pinto-Gouveia, & Cunha, 2016b). Similarly, a negative relationship was found between self-compassion and both DSH and NSSI (Garisch & Wilson, 2015; Heath, Carsley, De Riggi, Mills, & Mettler, 2016; Lundh, Karim, & Quilisch, 2007). This pattern of inverse relationships is similar to recent findings in university and adult populations demonstrating that individuals who engage in NSSI tend to report lower traits of mindfulness than those with no

history of NSSI (Caltabiano & Martin, 2017; Heath, Joly, & Carsley, 2016). Caltabiano and Martin (2017) examined which facets of mindfulness specifically predicted NSSI engagement and found that the nonjudging, non-reacting, and acting with awareness facets negatively predicted NSSI group status. Most recently, a systematic review revealed that higher levels of self- compassion were related to lower levels of self-harm behaviors (Cleare, Gumley, & O'Connor, 2019). As such, the existing research may suggest that low levels of self- compassion may independently predict NSSI; however, studies included in the review used either the SCS (Neff, 2003b) total score or subscale scores. Due to the mixed evidence regarding the validity of the SCS total score, an investigation of the two dimensions of self-compassion (self-coldness and self-warmth) is highly warranted (e.g., Muris et al., 2018). While these studies have shed light on the relationship between mindfulness, self-compassion and NSSI, the associations underlying these constructs have yet to be explored.

Research on the relationship between mindfulness, self-compassion and engagement in NSSI is limited in the number of existing studies. As engagement in NSSI continues to be highly prevalent and is associated with several mental health concerns, an investigation of the positive components of mental health such as mindfulness and self-com- passion is warranted (Cleare et al., 2019). Building on the current literature, the objectives of the present study are: (1) to investigate whether specific mindfulness facets and self-compassion dimensions differ between individuals with a history of NSSI and a comparison group; (2) to explore whether the mindfulness facets and self-compassion dimensions predict a history of NSSI; and (3) to investigate whether emotion dysregulation mediates the relationship between mindfulness and NSSI group status, and self- coldness and NSSI group status. Given that self-coldness is associated with NSSI, our mediation model assessed self-coldness as a predictor of NSSI. The

corresponding hypotheses pertaining to the objectives are as follows: in line with previous research (i.e., Caltabiano & Martin, 2017) the acting with awareness facet, nonjudging, and non-reacting facets of mindfulness (H_{1A}) would significantly differ between NSSI group status, and (H_{2A}) negatively predict a lifetime history of NSSI; only the self-coldness dimension of self-compassion would (H_{1B}) significantly differ between individuals with a history of NSSI and a comparison group, and (H_{2B}) predict a lifetime history of NSSI; and emotion dysregulation would fully mediate the relationship between (H3A) mindful- ness total and NSSI group status, and (H_{3B}) self-coldness and NSSI group status.

METHODS

Participants and Procedure

A total of 363 participants were recruited through locally distributed posters, social media outlets, participant research pools to receive course credit for participation, an existing database of university students who participated in previous studies, and university listservs that advertised the research project in Montreal, an urban downtown area. Participants were predominantly female (n = 297; 81.8%) and ranged in age from 18 to 69, with a mean age of 23.97 (SD = 7.46). Ethical approval was obtained through the University's Research Ethics Board. Individuals that expressed interest in the study were invited to complete an online pre-screen questionnaire using Limesurvey (i.e., using an anonymized link to a secured online platform), to determine eligibility. Participants 18 or older were placed in the NSSI group if they indicated they had intentionally injured themselves at least once in their lifetime and this self-injury was not related to a suicide attempt or intent to die (Nock, 2010) and those with no lifetime history of NSSI were assigned to the comparison group. Participants were then sent a link through Limesurvey to complete informed consent, demographics, and a battery of

questionnaires. Participation was completely confidential. Given that participants with a history of NSSI are considered difficult to recruit and will be completing additional NSSI questionnaires constituting a greater time commitment, participants with a history of NSSI were compensated $20 for their participation while participants in the comparison group were entered in a raffle to win gift cards.

Measures

Mindfulness

The Five Facet Mindfulness Questionnaire (Baer et al., 2006) is a 39-item self-report scale that measures five facets of mindfulness: observing, describing, acting with awareness, nonjudging, and non-reacting. Participants rate themselves on a five-point Likert scale from 1 (never or very rarely true) to 5 (very often or always true). A sample item is, *"I'm good at finding words to describe my feelings."* Higher total scores on the overall scale are representative of higher levels of mindfulness. In the current sample, psychometric properties of this measure are good for the total score and all facets (Cronbach's $\alpha = .83 – .92$) and demonstrated good reliability and validity for each of the five facets (e.g., Christopher, Neuser, Michael, & Baitmangalkar, 2012).

Emotion Dysregulation

The Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) is a 36-item self-report scale measuring the ability to regulate intense emotions. A higher total score is indicative of an individual's increased difficulty in regulating emotions. Participants rate themselves on a five-point Likert scale from 1 (never true) to 5 (always true). A sample item is, *"I am attentive to my feelings."* This measure had good psychometric properties in this sample (Cronbach's $\alpha = .96$) and good test-retest reliability (Gratz & Roemer, 2004).

Self-Compassion

The SCS (Neff, 2003b) is a 26-item self-report scale consisting of 6 subscales. Three subscales are positively phrased: common-humanity, self-kindness, and mindfulness. Three subscales are negatively phrased: self-judgment, isolation, and over-identification. The total score is frequently used as a measure of total self-compassion (Neff, Kirkpatrick, & Rude, 2007) and more recently, as two sub-dimensions (self-coldness and self-warmth; López et al., 2015; Muris & Petrocchi, 2017). The current study investigated the two sub-dimensions (self-warmth and self-coldness) separately. Participants rate themselves on a 5-point Likert scale from 1 (not like me at all) to 5 (like me very much). A sample item is, *"I try to see my failings as part of the human condition."* The current study demonstrated good psychometric properties (Cronbach's α = .92 for both dimensions).

NSSI

The Deliberate Self-Harm Inventory (Gratz, 2001) is a 17-item self-report scale assessing various aspects of self-injury behavior (frequency and versatility). This measure has demonstrated adequate test-retest reliability, validity, and good internal consistency (Gratz, 2001). A sample item is, *"Have you intentionally (i.e., on purpose) cut your wrist, arms, or other area(s) of your body (without intending to kill yourself), if yes, how often?."*

Analysis Plan

The results were analyzed using the SPSS software (Version 25.0; IBM Corp., 2017). The Little's (1988) missing values analysis revealed that the data were missing completely at random (MCAR). Missing values were imputed with values using the expectation-maximization algorithm. No violations of normality were identified and all relationships between variables were linear. Levene's Test of Homogeneity of Variance was significant for the SCS self-coldness

dimension, thereby violating the assumption of equal variances across groups. To investigate between-group differences in mindfulness and self-compassion, two separate one-way multivariate analysis of variances (MANOVA) were conducted. To ascertain the effects of the mindfulness facets and self-compassion dimensions on the likelihood that individuals have a history of NSSI, two logistic regressions were conducted. Finally, the Preacher and Hayes (2008) bootstrapping procedure with 5,000 resamples was used to derive a 95% confidence interval for the indirect effects (via emotion dysregulation) of self-coldness and mindfulness on NSSI-group status (Preacher & Hayes, 2008).

Of the 363 participants that completed the online survey, 20 participants were excluded from the analyses either because (a) they were a multivariate outlier or univariate outlier outside ±3.5 SDs (Iglewicz & Hoaglin, 1993; $n = 2$), (c) their history of NSSI could not be confirmed (i.e., reported yes to a history of NSSI in the prescreen questionnaire but did not report a history on the DSHI; $n = 5$), and (d) they completed the online survey more than once ($n = 13$). The final sample consisted of 153 participants who self-reported a lifetime history of NSSI ($M_{age} = 22.94$; $SD = 4.68$) and 190 participants as a comparison group with no history of NSSI ($M_{age} = 24.84$; $SD = 9.06$). Refer to Table 1 for between-group demographic variables.

RESULTS

Descriptive Statistics and Correlations

Means, standard deviations (*SD*), and correlations among main variables are shown in Tables 2 and 3. A Pearson Chi-Square test was used to examine possible differences in prevalence between history of NSSI with (1) gender and (2) community versus student participants. There were no significant differences found with gender ($\chi2[1] = .11$, $p = .74$) and between community and student participants ($\chi2[1] = 3.53$, $p = .06$). Participants engaged in

various forms of NSSI, the most commonly reported methods were cutting (77.78%), severely scratching (52.94%), and 24.84% of participants reported engaging in "other" forms of NSSI not listed on the DSHI. The majority of participants (78.43%) reported engaging in more than one type of self-injury behavior in their lifetime and reported having engaged in NSSI more than once (93.36%), and 24.5% engaged in NSSI within the past year.

Objective 1

A one-way MANOVA (H_{1A}) revealed that the differences between the groups on the combined mindfulness facets were statistically significant, $F(5, 337) = 11.06$, $p < .001$; Wilks' $\Lambda = .86$; partial $\eta 2 = .14$. Follow-up univariate ANOVAs with a Bonferroni adjusted α of .01 demonstrated that there was a statistically significant difference between groups with the nonjudging [$F(1, 341) = 42.75$, $p < .001$; partial $\eta 2 = .11$, representing a medium effect], acting with awareness [$F(1, 341) = 23.88$, $p < .001$; partial $\eta 2 = .07$, representing a medium to large effect], and the non-reacting facets [$F(1, 341) = 16.34$, $p < .001$; partial $\eta 2 = .05$, representing a medium effect]. The observing and describing facets were not significant.

The second MANOVA (H_{1B}) revealed that the differences between the groups on the combined self-compassion dimensions were statistically significant, $F(2, 340) = 20.42$, $p < .001$; Pillai's Trace = .11; partial $\eta 2 = .11$. Pillai's Trace was reported due to the violation of homogeneity of variances. Follow-up univariate ANOVAs with a Bonferroni adjusted α of .025 demonstrated a statistically significant difference between groups on the self-coldness dimension [$F(1, 341) = 40.39$, $p < .001$; partial $\eta 2 = .11$, representing a medium to large effect] and the self-warmth dimension [$F(1, 341) = 21.83$, $p < .001$; partial $\eta 2 = .06$, representing a medium effect].

Objective 2

To ascertain the effect of the mindfulness facets (H_{2A}) on the likelihood that participants

reported a lifetime history of NSSI, a binomial logistic regression was performed. The logistic regression model was statistically significant, $X^2(5) = 52.02$, $p < .001$. The model explained 18.8% (Nagelkerke R^2) of the variance in the NSSI group and correctly classified 65% of cases. Of the predictor variables, only the nonjudging and acting with awareness were significantly associated with an increased likelihood of reporting a history of NSSI (Table 4). The likelihood of having a history of NSSI increased by .95 for every one-unit decrease in acting with awareness, and by .93 for every one-unit decrease in self-judgment.

A binomial logistic regression was conducted to determine the effects of the self-compassion dimensions on the likelihood that participants would report a lifetime history of NSSI (H_{2B}). The model was statistically significant, $X^2(2) = 39.08$, $p < .001$, explained 14.4% (Nagelkerke R^2) of the variance in the NSSI group, and correctly classified 65.3% of cases. Only the self-coldness dimension was statistically significantly associated with an increased likelihood of NSSI engagement. The risk of engaging in NSSI increased by 1.06 for every one-unit increase in self-coldness.

Objective 3

The objective of hypothesis H_{3A} was to investigate whether emotion dysregulation mediates the relationship between mindfulness and NSSI group status. Mindfulness was negatively associated with emotion dysregulation (*a:* $\beta = -1.04$, 95% CI [−1.12, −.95]). Reports of emotion dysregulation were associated with an increased likelihood of NSSI group status (*b:* OR = .04, 95% CI [.03, .06]). The direct effect of mindfulness on NSSI group status when controlling for emotion dysregulation was not significant (*c':* OR = .01, 95% CI [−.008, .030]). The mediating role of emotion dysregulation within this model revealed a significant indirect effect (*c:* OR = −.04, Boot CI [−.06, −.03]), suggesting a full mediation. See Figure 1.

The second mediation model (H3B) with self-coldness as the independent variable, NSSI group status as the dependent variable, and emotion dysregulation as the mediator revealed that self-coldness was associated with emotion dysregulation (*a:* β = 1.82, 95% CI [1.65, 1.99]). Reports of emotion dysregulation were associated with an increased likelihood of NSSI group status (*b:* OR = .03, 95% CI [.02, .05]). The direct effect of self-coldness on NSSI group status when controlling for emotion dysregulation was not significant (*c':* OR = .01, 95% CI [−.02, .04]). The mediating role of emotion dysregulation within this model revealed a significant indirect effect (*c:* OR = −.06, Boot CI [.04, .09]), suggesting a full mediation. See Figure 2.

DISCUSSION

The overarching goal of the present study was to explore self-compassion and mindfulness as they relate to NSSI and emotion dysregulation. Results revealed that there were significant differences in mindfulness and self-compassion between the NSSI and comparison group. The most important mindfulness facets were nonjudging and acting with awareness facets, as they were found to negatively predict engagement in NSSI. The self-coldness dimension of self-compassion was a significant predictor of NSSI engagement, while self-warmth was not a statistically significant predictor. Finally, emotion dysregulation fully mediated the relationship between self-coldness and NSSI group status, and mindfulness and NSSI group status.

The first objective of the present study was to assess whether mindfulness facets differed among those with a history of NSSI and a comparison group and whether these facets negatively predicted the history of NSSI engagement. Consistent with previous research (Caltabiano & Martin, 2017; Dobbins, 2014), individuals in the NSSI group had significantly lower reports for the acting with awareness, non-reacting, and nonjudging facets compared to the comparison

group. These facets, with the exception of the non-reacting facet, were further found to predict a history of NSSI engagement. This may show support that improving key mindfulness facets may in-part serve to protect against engagement in NSSI. The nonsignificant finding for non-reactivity was unexpected. Based on our results, the nonsignificant finding for non-reacting may be due to the shared variance between this facet and the nonjudging and acting with awareness facets. Indeed, there is a potential conceptual overlap between these constructs. Nonreactivity refers to active detachment from negative thoughts and emotions so that we can accept their existence and choose not to react to them. For example, one of the Five Facet Mindfulness Scale (FFMQ) items is "When I have distressing thoughts or images, I am able just to notice them without reacting." If an individual tends to act without awareness, they would have difficulty attending to the present thoughts or images. Furthermore, judging thoughts or images would be a component of reacting to them. Taken together, it can be argued that, conceptually, both acting with awareness and being non-judgmental would be important components of non-reactivity. This assertion is further supported by our results, which found high intercorrelations between non-reacting and acting with awareness (.33) and nonjudging (.41). It is likely that there is a shared variance between non-reacting and nonjudging in the prediction of NSSI status. Furthermore, the mean differences between those with a history of NSSI and without for non-reacting is much smaller than the between-group differences for nonjudging or acting with awareness. Given the smaller difference, to begin with, it is possible that there is not sufficient unique variance for the logistic regression to detect a significant relationship for non-reactivity in the prediction of NSSI. Nevertheless, further research is needed to explore the relationship between these three facets of mindfulness and how they may interact in predicting NSSI engagement.

Other studies corroborate the present research suggesting that individuals with a history of NSSI report lower levels of mindfulness (e.g., Garisch & Wilson, 2015; Heath, Carsley, et al., 2016). The current results may inform the future development of targeted and effective treatment strategies for NSSI. Learning to sit with present moment thoughts, feelings, and body sensations nonjudgmentally, regardless of how intense or uncomfortable it may feel, teaches distress tolerance and engagement, rather than avoidance of experience (Teasdale, 1999). Moreover, fostering the ability to withhold judgment of one's inner experience allows individuals to separate negative automatic judgements (i.e., my emotions are bad or inappropriate and I shouldn't feel them) by accepting one's inner experience nonjudgmentally. Mindfulness may teach people who engage in NSSI to gradually face and feel their emotions rather than judge them or feel as though they need to get rid of them (Van Vliet & Kalnins, 2011). Thereafter, choices can be made about the best way to manage emotions in an adaptive and healthier manner or potentially tolerating and bringing awareness to the emotions until they become more manageable. These aspects of mindfulness may address an underlying function of NSSI that often maintains engagement, the need to avoid certain feelings and sensations (Chapman et al., 2006; Wupperman, Neumann, Whitman, & Axelrod, 2009).

To the authors' knowledge, this study is the first to explore the two-factor model of self-compassion in an NSSI population: self-warmth and self-coldness. Due to the mixed evidence regarding the validity of the SCS total score (e.g., Muris & Petrocchi, 2017), this investigation of the two dimensions represents an important contribution to both the self-compassion and NSSI literature as it considered the potentially differential impact of positive and negative ways of compassionately self-relating. Theoretically, considering self-warmth and self-coldness as

having a distinct impact on NSSI helps to distinguish whether enhancing self-warmth or reducing self-coldness is operative in the impact of self-compassion on NSSI. This study found that only self-coldness positively contributed to NSSI group status. This could suggest that those who have adopted an attitude of "self-coldness" (e.g., being judgmental toward oneself, heightened feelings of isolation, and over-identifying with negatively labeled emotions) may be more likely to engage in NSSI. This is consistent with prior research suggesting that self-criticism and fear of compassion toward oneself increase the risk of engagement in NSSI (Xavier, Pinto-Gouveia, & Cunha 2016a). However, it is recommended for future researchers to examine mood and/or other psychopathology measures with the self-coldness dimension in order to inspect the potential presence of an inflation effect (Muris et al., 2018). Ultimately, addressing the self-coldness dimension may be a particularly important strategy to support individuals who report engaging in NSSI, within a therapeutic setting.

Results from mediation analysis revealed there was a negative indirect effect of mindfulness on NSSI through emotion dysregulation. This is congruent with the proposition that mindfulness may reduce the likelihood individuals engage in NSSI by improving emotion regulation skills. This result is in line with the body of research suggesting that the pathway for the psychological effect of mindfulness is through emotion regulation (e.g., Roemer et al., 2015). Similarly, there was an indirect effect of self-coldness on NSSI through emotion dysregulation, suggesting that the relationship between self-coldness and NSSI group status is fully mediated by the degree to which individuals have difficulties in regulating their emotions. These results suggest that emotion regulation difficulties may partly explain the relationship between both self-coldness and mindfulness, and NSSI group status. Individuals who are higher in trait mindfulness and lower in self-coldness may be better equipped to manage their emotions which

in turn, allows them to act with awareness of the present moment, without being overwhelmed with intense or challenging emotions which may potentially reduce the urge to engage in NSSI. The effort to identify how mindfulness and self-coldness might impact engagement in NSSI is an important contribution to the understanding of both mindfulness and self-compassion, and NSSI.

There are important limitations that warrant consideration. First, there is an overrepresentation of females and University students within the sample, which may affect the generalizability of these findings to males and a community sample. This is a common limitation within the literature on NSSI (e.g., Cipriano, Cella, & Cotrufo, 2017). As previous research has found small differences with demographic variables and self-compassion, such as gender (Yarnell et al., 2015), future studies should explore the extent to which gender, sexual orientation, and race/ethnic backgrounds influence the relationship between engagement self-compassion, mindfulness and engagement in NSSI. Additionally, due to the cross-sectional design of the current study, inferences of causality cannot be drawn. In order to identify the exact nature of the associations between the variables, longitudinal studies are needed. Future research would also benefit from the use of an experimental design to investigate the impact of changing self-compassion and mindfulness levels over time. Finally, a longitudinal investigation of differences between individuals across their self-injury journeys (i.e., current engagement and past engagement) is needed to understand the relationship between these factors and NSSI in order to provide further information on NSSI onset, maintenance, and recovery.

Despite the aforementioned methodological limitations, these findings highlight the relationships between self-compassion (self-coldness), mindfulness (specifically the nonjudging and acting with awareness facets) and NSSI engagement. Additionally, the findings show the importance of understanding self-compassion and mindfulness in terms of emotion regulation in

individuals who engage in NSSI. In particular, the current study offers promise for treatment suggesting that key aspects of self-compassion and mindfulness-based interventions may support an individual engaging in NSSI.

REFERENCES

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45. doi:10.1177/ 1073191105283504

Brenner, R. E., Heath, P. J., Vogel, D. L., & Credé, M. (2017). Two is more valid than one: Examining the factor structure of the Self-Compassion Scale (SCS). *Journal of Counseling Psychology*, *64*(6), 696–707. doi:10.1037/cou0000211

Brereton, A., & McGlinchey, E. (2020). Self-harm, emotion regulation, and experiential avoidance: A systematic review. *Archives of Suicide Research, 24*(sup1), 1–24. doi:10.1080/13811118.2018. 1563575

Caltabiano, G., & Martin, G. (2017). Mindless suffering: The relationship between mindfulness and non-suicidal self-injury. *Mindfulness*, *8*(3), 788–796. doi:10.1007/s12671-016-0657-y

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*, *44*(3), 371–394. doi:10. 1016/j.brat.2005.03.005

Christopher, M. S., Neuser, N. J., Michael, P. G., & Baitmangalkar, A. (2012). Exploring the psy- chometric properties of the five facet mindfulness questionnaire. *Mindfulness*, *3*(2), 124–131. doi:10.1007/s12671-011-0086-x

Cipriano, A., Cella, S., & Cotrufo, P. (2017). Nonsuicidal self-injury: A systematic review. *Frontiers in Psychology*, *8*, 1946. doi:10.3389/fpsyg.2017.01946

Cleare, S., Gumley, A., & O'Connor, R. C. (2019). Self-compassion, self-forgiveness, suicidal idea- tion, and self-harm: A systematic review. *Clinical Psychology & Psychotherapy*, *26*(5),

511–530. doi:10.1002/cpp.2372

Dobbins, P. J. (2014). *Five facets of mindfulness and deliberate self-harm in older adolescents* (Doctoral dissertation). Fielding Graduate University.

Finlay-Jones, A. L. (2017). The relevance of self-compassion as an intervention target in mood and anxiety disorders: A narrative review based on an emotion regulation framework. *Clinical Psychologist, 21*(2), 90–103. doi:10.1111/cp.12131

Garisch, J. A., & Wilson, M. S. (2015). Prevalence, correlates, and prospective predictors of non- suicidal self-injury among New Zealand adolescents: Cross-sectional and longitudinal survey data. *Child and Adolescent Psychiatry and Mental Health*, *9*(1), 28. doi:10.1186/s13034-015- 0055-6

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., … Basran, J. (2017). The development of compassionate engagement and action scales for self and others. *Journal of Compassionate Health Care*, *4*(1), 4. doi:10.1186/s40639-017-0033-3

Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2011). Fears of compassion: Development of three self-report measures. *Psychology and Psychotherapy*, *84*(3), 239–255. doi:10.1348/147608310X526511

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the deliberate self- harm inventory. *Journal of Psychopathology and Behavioral Assessment*, *23*(4), 253–263. doi:10. 1037/t04163-000

Gratz, K. L. (2007). Targeting emotion dysregulation in the treatment of self-injury. *Journal of Clinical Psychology, 63*(11), 1091–1103. doi:10.1093/oxfordhb/9780190689285.013.25

Gratz, K. L., Chapman, A. L., Dixon-Gordon, K. L., & Tull, M. T. (2016). Exploring the associ- ation of deliberate self-harm with emotional relief using a novel Implicit Association

Test. *Personality Disorders*, *7*(1), 91–102. doi:10.1037/per0000138

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysre- gulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, *26*(1), 41–54. doi:10. 1023/B:JOBA.0000007455.08539.94

Halamová, J., Kanovský, M., Petrocchi, N., Moreira, H., López, A., Barnett, M. D., … Zenger,

M. (2021). Factor structure of the self-compassion scale in 11 international samples. *Measurement and Evaluation in Counseling and Development*, *54*(1), 1–23. doi:10.1080/ 07481756.2020.1735203

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review*, *32*(6), 482–495. doi:10.1016/j.cpr.2012.05.003

Heath, N. L., Carsley, D., De Riggi, M. E., Mills, D., & Mettler, J. (2016). The relationship between mindfulness, depressive symptoms, and non-suicidal self-injury amongst adolescents. *Archives of Suicide Research*, *20*(4), 635–649. doi:10.1080/13811118.2016.1162243

Heath, N. L., Joly, M., & Carsley, D. (2016). Coping self-efficacy and mindfulness in non-suicidal self-injury. *Mindfulness*, *7*(5), 1132–1141. doi:10.1007/s12671-016-0555-3

Hooley, J. M., Ho, D. T., Slater, J., & Lockshin, A. (2010). Pain perception and nonsuicidal self- injury: A laboratory investigation. *Personality Disorders*, *1*(3), 170–179. doi:10.1037/a0020106

IBM Corp. (2017). *IBM SPSS Statistics for Windows. Version Q3 25.0*. Armonk, NY: IBM

Corp. Iglewicz, B., & Hoaglin, D. C. (1993). *How to detect and handle outliers* (Vol. 16). Milwaukee,

WI: Asq Press.

International Society for the Study of Self-Injury (ISSS). (2007). *Definitional issues surrounding our understanding of self-injury*. Conference Proceedings from the Annual Meeting.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10*(2), 144–156. doi:10.1093/clipsy.bpg016

Khoury, B. (2019). Compassion: Embodied and embedded. *Mindfulness, 10*(11), 2363–2312. doi: 10.1007/s12671-019-01211-w

Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., … Hofmann, S. G. (2013). Mindfulness-based therapy: A comprehensive meta-analysis. *Clinical Psychology Review, 33*(6), 763–771. doi:10.1016/j.cpr.2013.05.005

Kirby, J. N. (2017). Compassion interventions: The programmes, the evidence, and implications for research and practice. *Psychology and Psychotherapy*, *90*(3), 432–455. doi:10.1111/papt. 12104

Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemo- graphics, topography and functions. *Psychological Medicine, 41*(9), 1981–1986. doi:10.1017/ s0033291710002497

Klonsky, E. D., & Muehlenkamp, J. J. (2007). Self-injury: A research review for the practitioner.

Journal of Clinical Psychology, *63*(11), 1045–1056. doi:10.1002/jclp.20412

Lin, Y., Fisher, M. E., Roberts, S. M., & Moser, J. S. (2016). Deconstructing the emotion regula- tory properties of mindfulness: An electrophysiological investigation. *Frontiers in Human Neuroscience*, *10*, 451. doi:10.3389/fnhum.2016.00451

Linehan, M. M., Comtois, K. A., Murray, A. M., Brown, M. Z., Gallop, R. J., Heard, H. L., … Lindenboim, N. (2006). Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and borderline personality dis- order. *Archives of General Psychiatry*, *63*(7), 757–766. doi:10.1001/archpsyc.63.7.757

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing val- ues. *Journal of the American Statistical Association*, *83*(404), 1198–1202. doi:10.2307/2290157

López, A., Sanderman, R., Smink, A., Zhang, Y., van Sonderen, E., Ranchor, A., & Schroevers,

M. J. (2015). A reconsideration of the self-compassion Scale's Total Score: Self-compassion ver- sus self-criticism. *PLoS One*, *10*(7), e0132940. doi:10.1371/journal.pone.0132940

Lundh, L.-G., Karim, J., & Quilisch, E. (2007). Deliberate self-harm in 15-year-old adolescents: A pilot study with a modified version of the Deliberate Self-Harm Inventory. *Scandinavian Journal of Psychology*, *48*(1), 33–41. doi:10.1111/j.1467-9450.2007.00567.x

Lutz, J., Herwig, U., Opialla, S., Hittmeyer, A., Jäncke, L., Rufer, M., … Brühl, A. B. (2014). Mindfulness and emotion regulation-an fMRI study. *Social Cognitive and Affective Neuroscience*, *9*(6), 776–785. doi:10.1093/scan/nst043

MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review*, *32*(6), 545–

552. doi: 10.1016/j.cpr.2012.06.003

Muris, P., & Petrocchi, N. (2017). Protection or vulnerability? A meta-analysis of the relations between the positive and negative components of self-compassion and psychopathology. *Clinical Psychology & Psychotherapy*, *24*(2), 373–383. doi:10.1002/cpp.2005

Muris, P., & Otgaar, H. (2020). The process of science: A critical evaluation of more than 15 years of research on self-compassion with the Self-Compassion Scale. *Mindfulness*, *11*(6), 1469–1482. doi:10.1007/s12671-020-01363-0

Muris, P., van den Broek, M., Otgaar, H., Oudenhoven, I., & Lennartz, J. (2018). Good and bad sides of self-compassion: A face validity check of the self-compassion scale and an investigation of its relations to coping and emotional symptoms in non-clinical adolescents. *Journal of Child and Family Studies*, *27*(8), 2411–2421. doi:10.1007/s10826-018-1099-z

Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, *2*(2), 85–101. doi:10.1080/15298860309032

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223–250. doi:10.1080/15298860309027

Neff, K. D. (2020c). Commentary on Muris and Otgaar (2020): Let the empirical evidence speak on the Self-Compassion Scale. *Mindfulness*, *11*, 1900–1909. doi:10.1007/s12671-020-01411-9

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality*, *41*(1), 139–154. doi:10.1037/e527772014-669

Nock, M. K. (2010). Self-injury. *Annual Review of Clinical Psychology*, *6*, 339–363. doi:10.1146/ annurev.clinpsy.121208.131258

Pasieczny, N., & Connor, J. (2011). The effectiveness of dialectical behaviour therapy in routine public mental health settings: An Australian controlled trial. *Behaviour Research and Therapy*, *49*(1), 4–10. doi:10.1016/j.brat.2010.09.006

Pattison, E. M., & Kahan, J. (1983). The deliberate self-harm syndrome. *The American Journal of Psychiatry*, *140*(7), 867–872. doi:10.1176/ajp.140.7.867

Per, M., Spinelli, C., Sadowski, I., Schmelefske, E., Anand, L., & Khoury, B. (2020). Evaluating the effectiveness of mindfulness-based interventions in incarcerated populations: A meta-ana- lysis. *Criminal Justice and Behavior*, *47*(3), 310–330. doi:10.1177/0093854819891457

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. doi:10.3758/brm.40.3.879

Ribeiro, J., Franklin, J., Fox, K. R., Bentley, K., Kleiman, E. M., Chang, B., & Nock, M. K. (2016). Self-injurious thoughts and behaviors as risk factors for future suicide ideation, attempts, and death: A meta-analysis of longitudinal studies. *Psychological Medicine*, *46*(2), 225–236. doi:10. 1017/S0033291715001804

Roemer, L., Williston, S. K., & Rollins, L. G. (2015). Mindfulness and emotion regulation. *Current Opinion in Psychology, 3*, 52–57. doi:10.1016/j.copsyc.2015.02.006

Strauss, C., Taylor, B. L., Gu, J., Kuyken, W., Baer, R., Jones, F., & Cavanagh, K. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clinical Psychology Review, 47*, 15–27. doi:10.1016/j.cpr.2016.05.004

Swannell, S. V., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of non- suicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-

regres- sion *Suicide & Life-Threatening Behavior*, *44*(3), 273–303. doi:10.1111/sltb.12070

Teasdale, J. D. (1999). Emotional processing, three modes of mind and the prevention of relapse in depression. *Behaviour Research and Therapy*, *37*, S53–S77. doi:10.1016/S0005-7967(99)00050-9

Van Vliet, K., & Kalnins, G. (2011). A compassion-focused approach to nonsuicidal self-injury. *Journal of Mental Health Counseling*, *33*(4), 295–311. doi:10.17744/mehc.33.4.j7540338q223t417

Wupperman, P., Neumann, C. S., Whitman, J. B., & Axelrod, S. R. (2009). The role of mindful- ness in borderline personality disorder features. *The Journal of Nervous and Mental Disease*, *197*(10), 766–771. doi:10.1097/nmd.0b013e3181b97343

Xavier, A., Pinto Gouveia, J., & Cunha, M. (2016a). Non-suicidal self-injury in adolescence: The role of shame, self-criticism and fear of self-compassion. *Child & Youth Care Forum*, *45*(4), 571–586. doi:10.1007/s10566-016-9346-1

Xavier, A., Pinto-Gouveia, J., & Cunha, M. (2016b). The protective role of self-compassion on risk factors for non-suicidal self-injury in adolescence. *School Mental Health*, *8*(4), 476–485. doi:10.1007/s12310-016-9197-9

Yarnell, L. M., Stafford, R. E., Neff, K. D., Reilly, E. D., Knox, M. C., & Mullarkey, M. (2015). Meta-analysis of gender differences in self-compassion. *Self and Identity*, *14*(5), 499–520. doi: 10.1080/15298868.2015.1029966

You, J., Ren, Y., Zhang, X., Wu, Z., Xu, S., & Lin, M.-P. (2018). Emotional dysregulation and nonsuicidal self-injury: A meta-analytic review. *Neuropsychiatry*, *08*(02), 733–748. doi:10.4172/ Neuropsychiatry.1000399

Tables and Figures

TABLE 1. Descriptive statistics by group.

	NSSI (n=153) **M (SD)**	**Comparison (n=190)** **M (SD)**
Age	22.94 (4.68)	24.84 (9.06)
Gender		
Female	81.0%	83.20%
Male	17%	15.80%
Trans	.7%	0%
Agender	0%	0.50%
Non-binary	1.3%	0%
Race/ethnicity		
White	45.8%	51.60%
Chinese	19.0%	15.80%
South Asian	11.1%	10.50%
Latin American	4.6%	2.60%
South East Asian	2.6%	2.10%
Black	2.6%	2.60%
Not listed the above	14.3%	14.80%
University student (yes)	83.7%	75.80%
Canadian citizen (yes)	68%	66.30%
Sexual Orientation		
Heterosexual	71.2%	84.20%
Lesbian	4.6%	2.10%
Bisexual	16.3%	7.90%
Gay	2.6%	2.10%
Other	3.9%	1.60%

TABLE 2. Correlations between variables of interest.

Variables	1	2	3	4	5	6	7	8
1. FFMQ Nonjudging	-							
2. FFMQ Acting with awareness	.42**	-						
3. FFMQ Describing	.22**	.29**	-					
4. FFMQ Non-reacting	.41**	.33**	.26**	-				
5. FFMQ Observing	0.05	.18**	.25**	.34**	-			
6. SCS Self-warmth	.36**	.29**	.36**	.64**	.39**	-		

7. SCS Self-coldness	-.57**	-.46**	-.30**	-.55**	-.17**	-.67**	-	
8. NSSI Frequency	-.65**	-.54**	-.44**	-.63**	-.25**	-.64**	.75**	-

TABLE 3. Means, standard deviations across groups and MANOVA between-subject effects on mindfulness facets and self-compassion dimensions.

Variables	NSSI group (n=153) M (SD)	Control group (n=190)M (SD)	F(1, 341)	p
FFMQ				
Observing	27.03 (5.87)	26.67 (5.64)	0.322	0.571
Describing	24.86 (7.03)	26.38 (6.27)	4.45	0.036
Acting with awareness	21.98 (6.12)	25.16 (5.89)	23.88	<.001*
Nonjudging	21.38 (6.26)	26.12 (7.01)	42.75	<.001*
Non-reacting	18.57 (4.89)	20.61 (4.47)	16.34	<.001*
SCS				
Self-warmth	35.46 (9.10)	40.46 (10.43)	21.83	<.001*
Self-coldness	48.84 (8.88)	41.74 (11.28)	40.39	<.001*
DERS (Total)	108.99 (23.17)	87.37 (24.67)		

Note. A Bonferroni correction was used to obtain an alpha level of .025 to test for significance in the SCS subscales and an alpha level of .01 for the FFMQ. DERS: Difficulties in Emotional Regulation Scale; FFMQ: Five Facet Mindfulness Scale; SCS: Self-Compassion Scale.

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p < .001

TABLE 4. Logistic Regression Analysis Examining Unique Contributions of the Independent Variables to the Prediction of Engagement in Self-Injury.

							Confidence Intervals	
Variables	***B***	***SE***	**Wald**	***df***	***p***	**Odds Ratio**	**Lower Limit**	**Upper Limit**
FFMQ								
Observing	0.05	0.02	3.79	1	0.052	1.05	1	1.09
Describing	-.008	0.02	0.18	1	0.673	0.99	0.96	1.03
Acting with awareness	-.05	0.02	5.34	1	.021*	0.95	0.91	0.99
Nonjudging	-.08	0.02	14.46	1	<.001***	0.93	0.89	0.96
Non-reacting	-.05	0.03	3.07	1	0.08	0.95	0.9	1.01
SCS								
Self-coldness	0.06	0.02	16.49	1	<.001***	1.06	1.03	1.1

Self-warmth	âˆ’.01	0.02	0.47	1	0.494	0.99	0.96	1.02
Note. FFMQ: Five Facet Mindfulness Questionnaire; OR: Odds Ratio; eB exponentiated B; SCS: Self-Compassion Scale. Coding for history of NSSI: yes = 1, no = 0. *p <.05, ***p <.001.								

FIGURE 1. The mediating effects of emotion dysregulation on the relationship between mindfulness and history of NSSI. Note. *p < .001; b = unstandardized path coefficients. NSSI was coded as 1 = history of NSSI and 0 = control.

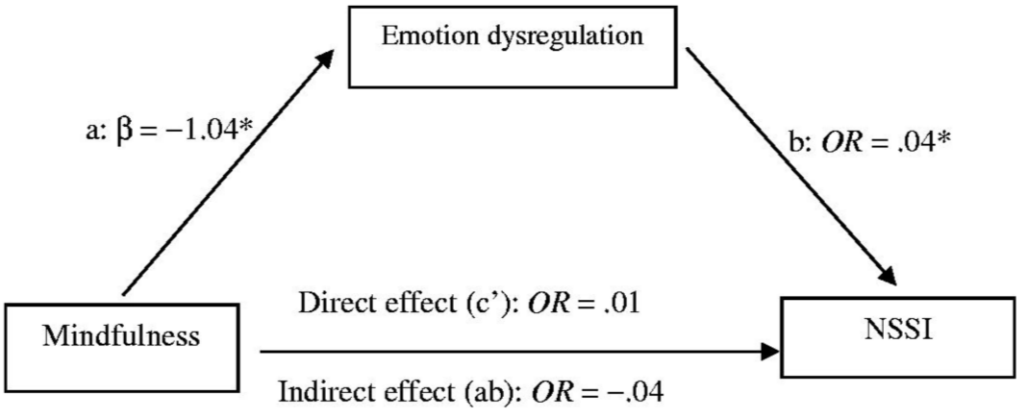

FIGURE 2. The mediating effects of emotion dysregulation on the relationship between the self-coldness and history of NSSI. Note. *p < .001; b = unstandardized path coefficients. NSSI was coded as 1 = history of NSSI and 0 = control.