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The pursuit of death versus escape from negative affect: An examination of the nature of the relationship between emotion dysregulation and both suicidal behavior and non-suicidal self-injury

Michael D. Anestis[a,*], Evan M. Kleiman[b], Jason M. Lavender[c], Matthew T. Tull[d], Kim L. Gratz[d]

[a]University of Southern Mississippi, USA
[b]George Mason University, USA
[c]Neuropsychiatric Research Institute & University of North Dakota School of Medicine and Health Sciences, USA
[d]University of Mississippi Medical Center, USA

Abstract

Across three studies, we tested a model in which the relationship between emotion dysregulation and suicidal behavior is accounted for by non-suicidal self-injury (NSSI). Whereas some models posit that suicide attempts serve as an escape from acute aversive states, our model proposes that NSSI accounts for the relationship between emotion dysregulation and suicide attempts. To test our model, we recruited two large nonclinical samples of adults and a clinical sample of adults seeking inpatient treatment for substance use disorders. To increase generalizability, we used four different measures of emotion dysregulation across the three studies: broad emotion regulation, distress tolerance, negative urgency, and grit (i.e., the persistent, passionate pursuit of long-term goals). Results were largely supportive of our hypothesized model, revealing significant indirect effects of emotion dysregulation on suicide attempts through NSSI in all three samples. Specifically, NSSI fully mediated the relationship between emotion dysregulation and suicide attempts in three of six analyses, and partially mediated this relation in the other three. Overall, findings are supportive of an emotion regulation model of NSSI and suggest that the relation between certain aspects of emotion dysregulation and suicide attempts may be indirect through NSSI.

Suicide is the 10th leading cause of death in the United States [1] and unquestionably a topic of great clinical importance. Despite substantial levels of research attention, however, the field of Suicidology is divided with respect to how best to conceptualize the nature of suicide risk and the process through which individuals become vulnerable to engaging in suicide attempts [2]. Some prominent theories posit that suicide represents an effort to escape, driven by intense negative affective states and often emerging with little to no planning (e.g., [3]). Other theories emphasizing the substantial emotional (e.g., fear) and physical (e.g., pain) distress that accompanies suicide attempts posit that individuals must gradually develop the capacity to engage in lethal self-harm and are likely to do so through planned efforts to pursue death rather than frantic efforts to escape aversive states (e.g., interpersonal–psychological theory of suicidal behavior [IPTS]; [4]).

If suicide attempts do, in fact, represent an effort to escape aversive affective states, emotion dysregulation would represent a plausible mechanism driving this behavior. Indeed, dialectical behavior therapy is posited to impact suicidal behavior in part through the development of more adaptive emotion regulation skills [5]. The definition of emotion dysregulation used here conceptualizes emotion dysregulation as a multidimensional construct encompassing maladaptive ways of responding to negative affective states, including a lack of awareness and understanding of emotions, nonacceptance or avoidance of emotions, an unwillingness to experience negative affective states as part of pursuing desired goals, difficulties controlling behaviors in the face of emotional distress, and deficits in the modulation of emotional arousal (for reviews, see [6,7]). As such, the broader construct of emotion dysregulation as

* Corresponding author.

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defined here is considered to encompass several more specific affect-related constructs, including distress tolerance (DT; i.e., the ability to experience, tolerate, and function in the context of negative affective states; e.g., [8]) and negative urgency (i.e., the tendency to act rashly in the context of negative affective states; [9]), among others. Emotion dysregulation has repeatedly been shown to be associated with a range of maladaptive behaviors, including substance use (e.g., [10]), binge eating (e.g., [11]), and risky sexual behavior (e.g., [12,13]). The nature of the relationship between emotion dysregulation and suicidal behavior, however, is less clear. For instance, Anestis et al. [14] reported that elevated levels of emotion dysregulation were associated with suicidal desire, but inversely associated with the acquired capability for suicide. Additionally, research has demonstrated that the relationships between suicide attempts and both borderline personality disorder [15] and posttraumatic stress disorder [16] increase in magnitude at lower levels of certain components of emotion dysregulation (e.g., distress intolerance). Such findings suggest that the relationship between emotion dysregulation and suicide attempts may be more complex, with greater emotion dysregulation potentially contributing to an increase in suicidal desire, but a limited capacity to act on such desires. In this sense, emotion dysregulation may be directly related to certain components of suicidality (e.g., ideation, desire), but may not facilitate the transition from ideation to action. As such, these findings represent a challenge for models that conceptualize suicide attempts as primarily an effort to escape aversive states.

A more consistent picture has emerged in the relationship between emotion dysregulation and non-suicidal self-injury (NSSI). Defined as the intentional self-inflicted destruction of body tissue in the absence of any suicidal intent (e.g., [17,18]), NSSI is associated with higher levels of overall emotion dysregulation (e.g., [19,20]) and a range of emotion dysregulation components (e.g., distress intolerance; [21]). Furthermore, the most frequently endorsed motive for engaging in NSSI is to avoid, escape, or reduce unwanted aversive affective states (e.g., [22,23]). Thus, whereas an escape model of suicide attempts is supported by primarily theoretical literature (e.g., [3]), both theoretical and empirical literature provide strong support for such a model of NSSI.

It is therefore plausible that escape motives and elevated levels of emotion dysregulation are mechanisms that differentiate the two clinically important and phenotypically similar behaviors of NSSI and suicide attempts. Indeed, consistent with the IPTS [4], it may be that NSSI facilitates suicide attempts through repeated experiences with self-inflicted injury that, over time, increase an individual's capacity for lethal self-harm. Thus, although the emotion dysregulation that underlies NSSI would be associated with suicide attempts as well, this association would be indirect through NSSI.

To test this theory, we recruited two large samples of nonclinical young adults, an age range at elevated risk for both NSSI and suicidal behavior (e.g., [24,25]). Additionally, we recruited a clinical sample of adult inpatients receiving treatment for substance use disorders, a population that has also been found to be at elevated risk for both NSSI (e.g., [26]) and suicide attempts (e.g., [27]), and characterized by elevated levels of emotion dysregulation (e.g., [28,29]). These three geographically and demographically diverse samples were recruited to enhance generalizability. Participants in the young adult samples were undergraduates who completed self-report questionnaires assessing emotion dysregulation, NSSI, and suicide attempts. We utilized two measures of emotion dysregulation in each undergraduate sample with no overlapping measures across samples. Participants in the clinical sample completed a similar protocol, but with suicide attempts assessed through a structured interview. In our clinical sample, we were able to include two of the four total emotion dysregulation measures, thereby tying together results from each of the undergraduate samples. Finally, we evaluated the generalizability of our model by utilizing different self-report measures for our outcomes (NSSI and suicide attempts) in each undergraduate sample, and a structured interview assessing suicide attempts in our clinical sample.

We predicted that lifetime history of NSSI would fully mediate the relationship between emotion dysregulation and suicide attempts, with emotion dysregulation demonstrating only an indirect association with suicide attempts through NSSI history. Such results would indicate that emotion dysregulation is related to suicide attempts only through its relation to NSSI.

2. Study 1

In study 1, we sought to conduct a preliminary test of our proposed model in an undergraduate sample. To assess the construct of emotion dysregulation, we included measures of both overall emotion dysregulation and the specific emotion dysregulation dimension of low distress tolerance, both of which have previously been found to be associated with both NSSI and suicidal behavior (e.g., [14,19-21,27]). As defined here, emotion dysregulation is conceptualized as maladaptive responses to negative affective states, including difficulties identifying, understanding, accepting, and modulating negative emotions, as well as difficulties controlling behaviors in the context of negative affective states [7]. Distress tolerance (DT) refers to an individual's willingness and/or ability to experience, tolerate, and function in the context of negative affective states, including the ability to persist in goal directed behavior when experiencing negative affect (e.g., [8,18]).

2.1. Method

2.1.1. Participants

Participants were 1317 undergraduates (78.8% female; 55.2% White; and 38.5% African American) recruited from a mid-sized university in the southern United States. Ages

Table 1
Demographic characteristics across samples.

Study 1		Study 2		Study 3	
Gender	*n* (%)	Gender	*n* (%)	Gender	*n* (%)
Male	274 (20.8)	Male	122 (17.2)	Male	51 (54.8)
Female	1038 (78.8)	Female	549 (77.8)	Female	41 (44.1)
Undeclared	5 (0.4)	Undeclared	35 (5.0)	Undeclared	1 (1.1)
Annual income	*n* (%)	Annual income	*n* (%)	Annual income	*n* (%)
$0–$10,000	123 (9.3)	Not available in sample 2		$0–$9999	45 (48.4)
$10,001–$25,000	189 (14.4)			$10,000–$29,999	26 (27.9)
$25,001–$50,000	324 (24.6)			$30,000–$49,999	5 (5.4)
$50,001–$75,000	296 (22.5)			$50,000–$69,999	6 (6.5)
$75,001–$100,000	199 (15.1)			$70,000–$89,999	1 (1.1)
Greater than $100,000	182 (13.8)			$90,000–$99,999	8 (8.6)
Undeclared	4 (0.3)			Undeclared	2 (2.2)
Race/Ethnicity	*n* (%)	Race/Ethnicity	*n* (%)	Race/Ethnicity	*n* (%)
White	727 (55.2)	White (non-Hispanic)	332 (47.0)	White	71 (76.3)
African American	507 (38.5)	African American	72 (10.2)	African American	15 (16.1)
Hispanic/Latino	21 (1.6)	Hispanic/Latino	85 (12.0)	Hispanic/Latino	2 (2.2)
Asian/Pacific Islander	17 (1.3)	Asian/Pacific Islander	128 (18.1)	Asian/Pacific Islander	0 (0.0)
Other	37 (2.8)	Other/mixed	42 (5.9)	Other	3 (3.2)
Undeclared	8 (0.6)	Undeclared	36 (5.1)	Undeclared	2 (2.2)

ranged from 18 to 69 years (mean [*M*] = 21.12; standard deviation [*SD*] = 5.46). Additional demographic information is available in Table 1.

2.1.2. Measures

2.1.2.1. Deliberate Self-Harm Inventory. The Deliberate Self-Harm Inventory (DSHI; [30]) is a 17-item self-report measure that assesses an individual's lifetime history of NSSI. Items ask whether an individual has engaged in any of 16 different methods of NSSI (e.g., cutting, burning, severe scratching, not allowing wounds to heal, dripping acid or corrosives on skin), with an additional item asking about other forms of NSSI not captured by the original 16 items. For any NSSI method endorsed, follow-up questions assess the frequency, duration, and severity of that particular behavior. Participants' scores on the frequency questions for each of the 17 items were summed to create a variable of the total number of self-reported NSSI episodes across methods.

2.1.2.2. Measure of episodic planning of suicide. The Measure of Episodic Planning of Suicide (MEPOS; [31]) is a 4-item self-report questionnaire that assesses frequency and characteristics of prior suicide attempts. Participants are first asked whether they have ever intentionally harmed themselves with at least some intent to die. Participants who endorse a history of at least one such behavior are then asked a series of follow-up questions regarding intent, method, and planning for suicidal behavior. For the purposes of this study, responses to the question assessing the frequency of intentional self-inflicted injury with clear intent to die were used to assess lifetime number of suicide attempts. We opted to restrict our definition of suicide attempts to attempts with clear intent to die to avoid any potential criterion contamination with our measure of NSSI. This measure has previously been utilized in undergraduate samples [31].

2.1.2.3. Difficulties in Emotion Regulation Scale. The Difficulties in Emotion Regulation Scale (DERS; [7]) is a 36-item self-report measure that assesses individuals' general capacity for identifying, understanding, accepting, and adaptively responding to negative affective states. The scale yields six subscale scores as well as a total score indicative of overall emotion dysregulation. Items are scored on a Likert-type scale ranging from 1 (almost never [0–10%]) to 5 (almost always [91–100%]), with higher scores indicating greater emotion dysregulation. In this study, the total score was used as one of the primary outcome variables. The alpha coefficient for the total score in this sample was .94.

2.1.2.4. Distress Tolerance Scale. The Distress Tolerance Scale (DTS; [8]) is a 15-item self-report measure that assesses an individual's willingness or ability to experience, tolerate, and function in the context of negative affective states. Items are scored on a Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree), with lower scores indicative of greater difficulties tolerating negative affect. In this study, the DTS was one of the primary outcome variables. The alpha coefficient in this sample was .93.

Table 2
Descriptive data and intercorrelations for variables utilized in primary analyses across samples.

	Study 1					
	1	2	3	4	5	6
1. Age	–					
2. Income	** − .16	–				
3. Distress tolerance	**.17	.01	–			
4. Emotion dysregulation	** − .16	−.02	** − .62	–		
5. NSSI frequency	.01	.01	** − .20	**.26	–	
6. Number of suicide attempts	.01	** − .08	** − .18	**.21	**.50	–
Mean	21.11	–	49.63	79.50	11.76	.11
Standard deviation	5.46	–	12.39	23.40	181.73	.48
Minimum	18	–	15	36	0	0
Maximum	69	–	75	159	6036	5

	Study 2				
		2	3	4	5
1. Age	–				
2. Negative urgency	* − .09	–			
3. Grit	**.12	** − .41	–		
4. NSSI history	** − .11	**.26	** − .19	–	
5. Suicide attempt history	*.09	**.15	−.07	**.22	–
Mean	21.17	25.1	3.33	–	–
Standard deviation	5.20	6.93	0.48	–	–
Minimum	17	11	1.75	–	–
Maximum	60	43	5	–	–

	Study 3						
	1	2	3	4	5	6	7
1. Age	–						
2. Income	−.05	–					
3. Distress tolerance	−.02	.12	–				
4. Emotion dysregulation	−.05	−.17	** − .66	–			
5. Negative urgency	−.15	−.18	** − .48	**.70	–		
6. NSSI frequency	* − .26	* − .23	** − .27	**.46	**.40	–	
7. Number of suicide attempts	−.07	−.06	** − .34	**.36	*.23	**.38	–
Mean	36.25	–	46.96	90.74	34.59	7.76	0.81
Standard deviation	11.45	–	14.75	26.44	7.84	22.25	2.52
Minimum	18	–	17	40	13	0	0
Maximum	62	–	75	152	48	138	20

NSSI = non-suicidal self-injury.
* $P < 0.05$.
** $P < 0.01$.

2.2. Procedure

This protocol was approved by the Institutional Review Board of the participating university. Participants were recruited from an undergraduate psychology course and granted course credit as compensation for their participation. All data were collected online and all participants provided informed consent prior to participation.

2.3. Results

2.3.1. Preliminary analyses

A total of 90 (6.8%) participants endorsed a history of at least one suicide attempt with clear intent to die. Of those with at least one prior attempt, the mean number of previous attempts was 1.59 (*SD* = .99), with a range of 1 to 5 lifetime attempts. In our analyses, we examined only suicide attempts with clear intent to die; however, 53 individuals in our sample without any attempts with clear intent did report at least one attempt with ambiguous intent to die.

More than a quarter of participants (n = 354; 26.9%) endorsed a history of at least one episode of NSSI. Of those with a prior history of NSSI, the average number of NSSI episodes was 43.47 (median = 2; *SD* = 347.71; interquartile range = 1), with a range of 1 to 6036. The most frequently endorsed methods of NSSI were cutting (n = 152; 42.9%), severe scratching (n = 89; 25.1%), carving (n = 63; 17.8%), and needle-sticking (n = 47; 13.3%). A total of 72 participants (80.0% of individuals reporting a

Table 3
Results from mediation analyses.

			Direct effects				Indirect effects						
Independent variable	Dependent variable	Adjusted R^2	Path	Coefficient	SE	*P*	Mediator	Bootstrap coefficient	SE	95% CI lower	95% CI upper	Ratio I:T	κ^2
Sample 1													
DERS	Suicide attempts	0.18	a	0.0082	0.0009	0.000	NSSI	0.002	0.001	0.001	0.003	.50	.10
			b	0.2626	0.0179	0.000							
			c	0.0043	0.0006	0.000							
			c’	0.0021	0.0006	0.002							
DT	Suicide attempts	0.18	a	−0.0119	0.0017	0.000	NSSI	−0.003	0.001	−0.005	−0.002	.40	.08
			b	0.2601	0.0186	0.000							
			c	−0.0078	0.0012	0.000							
			c’	−0.0047	0.0011	0.000							
Sample 2													
N.Urgency	Suicide attempt history	0.32	a	0.0569	0.0082	0.000	NSSI	0.028	0.008	0.016	0.045	.46	–
			b	0.5062	0.1474	0.001							
			c	0.0466	0.0127	0.000							
			c’	0.0243	0.0144	0.076							
Grit	Suicide attempt history	0.33	a	−0.5989	0.1123	0.000	NSSI	−0.329	0.105	−0.527	−0.164	.78	–
			b	0.5492	0.1341	0.000							
			c	−0.3897	0.1592	0.000							
			c’	−0.1143	0.1592	0.558							
Sample 3													
N.Urgency	Suicide attempts	0.16	a	0.0380	0.0099	0.000	NSSI	0.012	0.005	0.004	0.024	.66	.14
			b	0.3080	0.0942	0.002							
			c	0.0177	0.0088	0.049							
			c’	0.0059	0.0091	0.515							
DERS	Suicide attempts	0.20	a	0.0134	0.0027	0.000	NSSI	0.009	0.002	0.004	0.013	.35	.13
			b	0.2268	0.0855	0.009							
			c	0.0087	0.0023	0.000							
			c’	0.0057	0.0025	0.024							

DERS = Difficulties in Emotion Regulation Scale; DT = Distress Tolerance; N.Urgency = negative urgency; Ratio SE = standard error; I:T = ratio of the indirect effect to the total effect.

history of suicide attempts; 20.3% of individuals reporting a history of NSSI) reported a history of both suicide attempts and NSSI.

2.3.2. Examination of distributions

Each independent and dependent variable was examined for skewness and kurtosis. Results revealed that only lifetime NSSI frequency and lifetime number of suicide attempts were significantly skewed (>4.9) and kurtotic (>28.7). To approximate a normal distribution, we utilized rank transformations using Blom’s formula on each of these variables. For ease of interpretation, non-transformed descriptive data are presented in Table 2; however, all analyses utilized the transformed variables.

2.3.3. Primary analyses

We utilized the PROCESS macro for SPSS developed by Hayes [32] to implement bootstrapping procedures in the test of the indirect effect of emotion dysregulation components on suicide attempts through NSSI. In each case, we utilized 10,000 bootstrap resamples and examined 95% confidence intervals (CIs). These results are presented in Table 3.

Results of these analyses revealed that the indirect effect of global emotion dysregulation on suicide attempts through NSSI was significant (95% CI: lower = .001, upper = .003). Contrary to hypotheses, however, the direct effect of emotion dysregulation on suicide attempts remained significant when NSSI was entered into the model (indicative of partial vs. full mediation). The κ^2 value for the indirect effect was .10 (95% CI: lower = .07, upper = .13), which is indicative of a medium-sized effect (small = .01, medium =.09, large = .25; [33]).

Likewise, although the indirect effect of distress tolerance on suicide attempts through NSSI was significant (95% CI: lower = −.005, upper = −.002), the direct effect of DT on suicide attempts remained significant with NSSI in the model (suggestive of partial mediation). The κ^2 value for the indirect effect was .08 (95% CI: lower = .05, upper = .11), which is indicative of a small effect size.[1]

[1] Within each sample, we also ran these analyses utilizing covariates (e.g., demographics, depressive symptoms) determined through empirical associations with the independent and/or dependent variable. In each case, the results did not change in terms of statistical significance or effect size. More information on these results is available from the first author (M.D.A.).

2.4. Discussion

The primary aim of study 1 was to establish preliminary support for our proposed model by utilizing two widely used measures of emotion dysregulation (both overall emotion dysregulation and the specific emotion dysregulation dimension of low DT). Contrary to our hypotheses, although the indirect effects of our emotion dysregulation variables (global emotion dysregulation, DT) on suicide attempts through NSSI were significant, the direct paths from global emotion dysregulation and DT to suicide attempts remained significant when NSSI was included in the model. These results suggest that NSSI partially mediates the association between emotion dysregulation and suicide attempts. Although these findings provide only partial support for our hypotheses, the indirect effect of global emotion dysregulation on suicide attempts through NSSI was associated with a medium effect size.

3. Study 2

In study 2, we sought to extend the general findings from study 1 by examining two additional emotion dysregulation dimensions: negative urgency and grit. Negative urgency refers to the tendency to act impulsively in the face of negative affect [9], which has been conceptualized as one dimension of emotion dysregulation [7]. Research indicates that negative urgency is related to both NSSI [6,34] and suicidal ideation and attempts [6,35]. Grit is a personality trait involving the persistent, passionate pursuit of long-term goals [36]. As such, this construct overlaps with the emotion dysregulation dimension of difficulties engaging in goal-directed behavior when experiencing negative affect [7]. It is likely that high levels of grit correspond to a greater ability to pursue goals in the context of negative affect. This construct also overlaps with definitions of DT that emphasize the ability to persist in goal-directed behavior when experiencing negative affect (e.g., [8,18]). Although grit has only recently been examined with regard to suicidality, a recent study provides support for an inverse association between grit and suicidal ideation [37]. Whether and to what extent grit is associated with both NSSI and suicide attempts *per se* remains to be determined, and is the secondary goal of study 2.

3.1. Method

3.1.1. Participants

Participants were 706 undergraduates (77.8% female; 47.0% White) recruited from a large university in the Mid-Atlantic region of the United States. Ages ranged from 17 to 60 years (M = 21.16; SD = 5.19). Parental consent was obtained for participants under 18 years of age. Additional demographic information is available in Table 1.

3.1.2. Measures

Unlike study 1, the measures of NSSI and suicide attempts included in this study did not assess lifetime frequency of these behaviors. Therefore, all analyses include only dichotomous variables of NSSI and suicide attempts, distinguishing between individuals with and without a history of these behaviors.

3.1.2.1. Functional Assessment of Self-Mutilation. The Functional Assessment of Self-Mutilation (FASM; [38]) is a self-report measure of the methods and functions of NSSI. Participants are asked to indicate whether they have engaged in any of 11 distinct NSSI methods in their lifetime. For the present study, responses to these items were used to create a dichotomous NSSI variable, with individuals endorsing at least one prior lifetime episode of NSSI assigned a "1" and those reporting no lifetime history of NSSI assigned a "0."

3.1.2.2. Suicidal Behaviors Questionnaire–Revised. The Suicidal Behaviors Questionnaire–Revised (SBQ-R; [39]) is a 4-item multi-dimensional self-report measure of suicidality. For the present study, we used the item assessing lifetime suicide attempts to create a dichotomous variable distinguishing participants with at least one prior suicide attempt (scored a "1") from those without any history of suicide attempts (scored a "0").

3.1.2.3. UPPS-P Impulsive Behavior Scale. The UPPS-P [40,41] is a 59-item self-report measure of five distinct facets of impulsivity: (lack of) perseverance, negative urgency, positive urgency, (lack of) premeditation, and sensation seeking. For the present study, we used only the 12-item negative urgency subscale. Items are scored on a 1 (agree strongly) to 4 (disagree strongly) scale and coded such that higher scores reflect greater levels of negative urgency. The alpha for this scale was .88 in the current study.

3.1.2.4. Short Grit Scale. The Short Grit Scale (Grit-S; [42]) is an 8-item self-report measure of the pursuit of goals with perseverance and passion. Items are scored on a 1 (not at all like me) to 5 (very much like me) scale such that higher scores equal higher levels of grit. The alpha for this measure was .80 in the current study.

3.1.3. Procedure

This protocol was approved by the Institutional Review Board of the participating university. Participants were recruited from an undergraduate psychology course and granted course credit as compensation for their participation. All data were collected online and all participants provided informed consent prior to participation.

3.2. Results

As in study 1, we conducted a mediational model examining the indirect effect of emotion dysregulation components (i.e., negative urgency and grit) on suicide

attempts through NSSI. Because this study included a categorical mediator, we were not able to use the PROCESS macro. Thus, we used Mplus version 7.11 [43], which is capable of using categorical mediators. Indirect effects were calculated using biased-corrected bootstrapping via the BCBOOTSTRAP option in Mplus. Effect size was assessed through the ratio of the indirect to total effect, as κ^2 is not applicable to models with binary mediators or outcomes (K. J. Preacher, personal communication, April 17, 2014). It warrants mention, however, that standardized cut points corresponding to small, medium, and large effect sizes for this ratio are not currently available. These results are presented in Table 3.

3.2.1. Preliminary analyses

Thirty-nine participants (5.5%) endorsed a history of at least one prior suicide attempt with some intent to die, and 169 participants (24.1%) endorsed a history of at least one episode of NSSI. A total of 23 participants (59.0% of individuals reporting a history of suicide attempts; 13.6% of individuals reporting a history of NSSI) reported a history of both suicide attempts and NSSI. Of those with a history of NSSI, 76 participants (10.1% of the full sample) reported having engaged in this behavior in the past year. The most frequently endorsed method of NSSI was cutting or carving skin (n = 40; 52.6%).

3.2.2. Primary analyses

Results indicated that the indirect effect of negative urgency on suicide attempts through NSSI was significant (95% CI: lower = .013, upper = .053). Further, consistent with hypotheses, the direct effect of negative urgency on suicide attempts was not significant when NSSI was included in the model, suggestive of full mediation. The ratio of the indirect effect to the total effect was .459.

A similar pattern of findings was obtained when examining grit. Specifically, results indicated that both the indirect effect of grit on suicide attempts through NSSI was significant (95% CI: lower = −.663, upper = −.168), and the direct effect of grit on suicide attempts was not significant with NSSI in the model. Moreover, the ratio of the indirect effect to the total effect was .784.

3.3. Discussion

The primary goal of study 2 was to extend the findings of study 1 to two additional dimensions of emotion dysregulation: negative urgency and grit. Consistent with our hypotheses, NSSI fully mediated the relations between both emotion dysregulation dimensions (i.e., negative urgency and grit) and suicide attempts. Moreover, results revealed that 46–78% of the effects of these emotion dysregulation components on suicide attempts were indirect through NSSI.

4. Study 3

The primary goals of this study were to (1) extend the generalizability of the proposed model by examining these relations within a more severe clinical population and (2) link the findings from the first two samples by utilizing two of the four measures of emotion dysregulation dimensions: overall emotion dysregulation and negative urgency.

4.1. Method

4.1.1. Participants

Participants were 93 adult inpatients (54.8% male; 76.8% White) receiving residential substance use disorder treatment in central Mississippi. Ages ranged from 18 to 62 (M = 36.25; SD = 11.45). Additional demographic information is available in Table 1.

4.1.2. Measures

4.1.2.1. Deliberate Self-Harm Inventory. The DSHI was again used to assess lifetime NSSI status and lifetime frequency of NSSI.

4.1.2.2. Lifetime Suicide Attempt Self-Injury Interview. The Lifetime Suicide Attempt Self Injury Interview (L-SASI; [44]) is a structured interview designed to assess individuals' lifetime history of both suicide attempts and NSSI. Various characteristics of these behaviors are assessed, including the frequency of each behavior, type of method used, intent to die (none, clear, or ambivalent), type of medical attention received (if applicable), and level of severity and lethality. Consistent with studies 1 and 2 in this manuscript, as well as common definitions of suicide attempts (e.g., [45]), suicide attempts were defined as intentional self-inflicted injury with at least some level of intent to die (i.e., clear or ambivalent).

4.1.2.3. Difficulties in Emotion Regulation Scale. The DERS was again used to assess overall emotion dysregulation. The alpha coefficient in this sample was .94.

4.1.2.4. UPPS-P Impulsive Behavior Scale. The Negative Urgency subscale of the UPPS-P was again used to assess negative urgency. The alpha coefficient for this subscale in this sample was .88.

4.1.3. Procedure

This protocol was approved by the institutional review boards of the participating medical center and treatment facility. Participants were recruited from a residential substance use treatment facility; no compensation was provided for participation. All data were collected on-site. Participants completed hard copies of the self-report measures and research assistants trained to reliability administered the structured interview. All participants provided informed consent prior to participation.

4.2. Results

4.2.1. Preliminary analyses

Twenty-four participants (25.8%) endorsed a history of at least one suicide attempt with some intent to die (clear or ambivalent). Of those with at least one prior attempt, the mean number of previous attempts was 3.13 (standard deviation = 4.23), with a range of 1 to 20 lifetime attempts. Thirty-one participants (33.3%) reported a history of at least one episode of NSSI. Of those with a history of NSSI, the average number of NSSI episodes was 23.29 (median = 8; standard deviation = 33.83; interquartile range = 1.5), with a range of 1 to 138. The most frequently endorsed methods of NSSI were cutting (n = 18; 58.1%), carving (n = 8; 25.8%), severe scratching (n = 7; 22.6%), and needle-sticking (n = 6; 19.4%). A total of 17 participants (70.8% of individuals reporting a history of suicide attempts; 54.8% of individuals reporting a history of NSSI) reported a history of both suicide attempts and NSSI.

To test the degree to which our clinical sample (study 3) represented a more severe population than those included in studies 1 and 2, we ran a series of independent z-tests to determine if clinical participants were more likely to report suicide attempts and NSSI. Results indicated that a significantly higher percentage of participants from the clinical sample endorsed a history of suicide attempts (25.8 vs. 10.6% and 5.5%) and NSSI (33.3 vs. 26.82% and 23.9%) than participants from either nonclinical sample (95% confidence interval).

4.2.2. Examination of distributions

Each independent and dependent variable was examined for skewness and kurtosis. Results revealed that only lifetime NSSI frequency and lifetime number of suicide attempts were significantly skewed (>3.9) and kurtotic (>17.5). To approximate a normal distribution, we utilized rank transformations using Blom's formula on each of these variables. For ease of interpretation, non-transformed descriptive data are presented in Table 2; however, all analyses utilized the transformed variables.

4.2.3. Primary analyses

As was the case in study 1, we utilized the PROCESS macro for SPSS developed by Hayes [32] to test the significance of the indirect effect of emotion dysregulation on suicide attempts through NSSI. In each analysis, we utilized 10,000 bootstrap resamples and examined 95% CIs. These results are presented in Table 3.

Results revealed that the indirect effect of global emotion dysregulation on suicide attempts through NSSI was significant (95% CI: lower = .004, upper = .013). Contrary to hypotheses, however, the direct effect of global emotion dysregulation on suicide attempts remained significant with NSSI in the model (consistent with partial mediation). The κ^2 value for the mediation effect was .13 (95% CI: lower = .02, upper = .25), which is indicative of a medium-sized effect.

Consistent with hypotheses, however, the indirect effect of negative urgency on suicide attempts through NSSI was significant (95% CI: lower = .004, upper = .024), and the direct effect of negative urgency on suicide attempts became non-significant when NSSI was entered into the model. These results were consistent with full mediation. The κ^2 value for the mediation effect was .14 (95% CI: lower = .05, upper = .26), which is indicative of a medium-sized effect.

4.3. Discussion

Our primary aim in study 3 was to build upon findings from the first two studies within a more severe clinical sample. Results were partially consistent with our hypotheses and largely replicated the findings of studies 1 and 2. Across both indices of emotion dysregulation (i.e., global emotion dysregulation and negative urgency), the indirect effect of emotion dysregulation on suicide attempts through NSSI was significant. The negative urgency results were consistent with full mediation and the global emotion dysregulation results were consistent with partial mediation. In both cases, the κ^2 value was indicative of a medium sized effect. These results are consistent with our proposed model in which emotion dysregulation facilitates NSSI, which, in turn, may facilitate suicide attempts (e.g., through increased pain tolerance and decrease fear of death/bodily harm).

5. Exploratory analyses across studies

Notably, results of a series of exploratory analyses examining the mediating role of suicide attempts in the relation between emotion dysregulation and NSSI within all three samples provide further support for the specific model proposed here. These analyses speak to the relative utility of the proposed model vis-à-vis an alternative model in which suicide attempts explain the relation between emotion dysregulation and NSSI. Results of these analyses suggest that NSSI is more relevant to the relation between emotion dysregulation and suicide attempts than suicide attempts are to the relation between emotion dysregulation and NSSI. Specifically, and in contrast to the findings reported above, results of all six analyses testing the alternative models revealed significant direct effects of emotion dysregulation on NSSI when suicide attempts were included in the models, suggesting that suicide attempts do not fully explain the relation between emotion dysregulation and NSSI in any of our samples. Furthermore, although evidence for partial mediation was found in five of six models, the indirect effects of emotion dysregulation on NSSI through suicide attempts were generally small in size (and accounted for a lower proportion of the effect of emotion dysregulation on NSSI than reported above for the proposed model).

6. General discussion

The overarching goal of this manuscript was to test a model of emotion dysregulation in non-suicidal and suicidal self-injury in which the relationship between emotion dysregulation and suicide attempts is accounted for by NSSI. In contrast to escape theories of suicide (e.g., [3]), which posit that suicide attempts represent an attempt to escape from aversive affective states with little planning, our model posits that NSSI serves as a mechanism for escape from aversive affective states and accounts for the observed relationship between emotion dysregulation and suicide attempts. Specifically, according to the theory tested here, it is NSSI rather than suicide attempts that functions to escape, avoid, or reduce unwanted emotions, with repeated engagement in NSSI resulting in the habituation to pain and the fear of death/bodily harm and is thought to facilitate suicide attempts among those who desire death. Thus, although we expected higher levels of emotion dysregulation to be associated with both NSSI and suicide attempts, we expected that the relation between emotion dysregulation and suicide attempts would be indirect through NSSI.

Findings from our first two samples largely supported our hypotheses, revealing significant indirect effects of emotion dysregulation on suicide attempts through NSSI in undergraduates. Contrary to our hypotheses, results from study 1 provided support for only partial (vs. full) mediation, although the indirect relation of global emotion dysregulation to suicide attempts through NSSI was associated with a medium-sized effect. Results from study 2, on the other hand, were consistent with hypotheses, indicating that NSSI fully mediated the relation between emotion dysregulation dimensions and suicide attempts. Study 3 expanded upon the findings from the first two studies using a clinical sample of adult inpatients receiving treatment for substance use disorders. Results from this study were partially consistent with our hypotheses, revealing full mediation in the negative urgency model, but only partial mediation in the global emotion dysregulation model (although the indirect effects in both models were associated with medium effect sizes). Taken together, the results of these studies suggest that our proposed model may largely generalize across emotion dysregulation dimensions and levels of clinical severity. Our model also generalized to the trait of grit, a novel construct that overlaps with dimensions of emotion dysregulation and has recently gained attention in suicide research (e.g., [37]). It should also be noted that our model does not discount the possibility that emotion dysregulation directly impacts suicidal desire; however, as noted earlier, prior research has indicated that the positive association between emotion dysregulation and suicidal desire is, in some ways, potentially offset by the negative association between emotion dysregulation and the capability for suicide (e.g., [14]).

Despite our robust findings, there are several limitations—some of which apply to all three studies—that must be acknowledged. First, all studies were cross-sectional, thereby precluding any conclusions regarding causation and directionality. Prospective studies are needed to examine the mediational model proposed here. Second, all of the measures of emotion dysregulation included in these studies were self-report. Future research examining this model would benefit from the use of behavioral and laboratory measures of these emotion dysregulation dimensions (see, e.g., [18,26]). In sample 2, we only had access to a dichotomous assessment of NSSI history, such that we could determine if an individual had ever engaged in NSSI but could not assess how many times NSSI had occurred. It is possible that individuals who engage in NSSI chronically differ from those who engage in NSSI only once (and that those who engage only once may not differ from those who never engage in NSSI). As such, future work that examines NSSI with a higher threshold (e.g., 2 or more episodes) might offer important additional information. Additionally, our results do not speak to the nature of the relationship between emotion dysregulation and suicide attempts among individuals with no prior history of NSSI. Confidence in our general model would thus be strengthened by research examining whether, in such samples, other painful and/or provocative events (e.g., exposure to physical aggression, combat experiences, intravenous drug use) serve the same role as that served by NSSI across our samples. Also, it is unclear to what extent our model is invariant across men and women. Because of limited statistical power for such analyses, we were unable to test this possibility in the current project; however, future work that does so would add clarity to the model. Finally, we did not have a measure of grit in our clinical sample and, as such, we were unable to replicate those findings (similar results for DT in this sample were reported in a prior article; [46]). As such, future research is needed to enhance confidence in the findings involving this construct, as well as to establish their generalizability within more severe clinical populations.

There were several strengths of the three studies as a whole that should also be acknowledged. First, we demonstrated generalizability of our model across a variety of emotion dysregulation dimensions. Second, we used a range of measures of NSSI and suicidal behavior, providing support for the generalizability of our findings across different measures of the same construct. Third, we tested our model across three diverse samples: two large undergraduate samples with diverse racial/ethnic backgrounds and a clinical sample of patients in residential substance use treatment.

The results of these studies have several implications. First, our findings challenge escape theories of suicide that view suicidal behavior as a dysregulated act that functions to escape or alleviate aversive affective states. Although this seems to be true for NSSI [6,17,21], our findings suggest that difficulties accepting, tolerating, managing, and adaptively responding to negative affective states may not be directly associated with suicidal behavior. Rather, the observed associations between emotion dysregulation and suicidal behavior may be largely accounted for by their shared associations with NSSI. These findings highlight the

role of NSSI in suicidal behavior, consistent with the IPTS, which posits the central role of NSSI in the acquired capability for suicide [4]. Finally, our findings emphasize the clinical importance of assessing NSSI when examining suicide risk. Specifically, it may be that among individuals who possess the desire to die by suicide, those who engage in NSSI are at particular risk for serious suicide attempts because they have habituated to the pain involved in suicidal behavior. Although our results do not diminish the importance of targeting emotion dysregulation in the treatment of both suicidal and nonsuicidal self-injury (given past research indicating a significant association between emotion dysregulation and suicidal desire; see, e.g., [14]), they do highlight potentially meaningful differences between NSSI and suicidal behavior. Specifically, with regard to interventions for suicide attempts in particular (and unlike interventions for NSSI; see [47]), findings that emotion dysregulation may be a proximal risk factor for NSSI but only a distal risk factor for suicidal behavior (through NSSI) highlight the importance of closely monitoring behaviors that might increase the capability for suicide in emotionally dysregulated patients with suicidal desire.

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