

## The relationship between nonsuicidal self-injury and suicidal ideation

By: [Kelly L. Wester](#), Nathaniel Ivers, José A. Villalba, Heather C. Trepal, and Robert Henson

**This is the peer reviewed version of the following article:**

Wester, K. L., Ivers, N., Villalba, J. A., Trepal, H. C., & Henson, B. (2016). The relationship between nonsuicidal self-injury and suicidal ideation. *Journal of Counseling & Development*, 94, 3-12.

which has been published in final form at <https://doi.org/10.1002/jcad.12057>. This article may be used for non-commercial purposes in accordance with [Wiley Terms and Conditions for Use of Self-Archived Versions](#).

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### **Abstract:**

This correlational study was conducted with 403 undergraduate college students from 2 universities. The authors used path analysis and bootstrap regression to analyze the relationships between variables. Locus of control and family connectedness related to current nonsuicidal self-injury (NSSI) engagement. However, when entered into the same regression, the variables current NSSI engagement and current NSSI number of methods used mediated all other relationships with suicidal ideation. Implications to current theories and clinical practice are provided.

**Keywords:** suicidal ideation | nonsuicidal self-injury | family | locus of control | suicide theory

### **Article:**

Self-injurious behaviors (SIBs), sometimes referred to as *self-directed violence*, occur when an individual engages in behaviors that harm oneself, such as nonsuicidal self-injury (NSSI) and suicidal behaviors (Centers for Disease Control and Prevention, 2015; Hamza, Stewart, & Willoughby, 2012). Although both NSSI and suicidal behaviors are considered SIBs, they are distinctly different. By definition, NSSI is intentional bodily harm that causes immediate tissue damage without the individual having the intent to die (Ross & Heath, 2002). Suicidal behaviors, however, have been defined as behaviors that may or may not have a nonfatal outcome, but for which there is evidence that the person intended at some level to kill him- or herself (O'Carroll, Berman, Maris & Moscicki, 1996) or desired to give the appearance of a wanting to kill him- or herself (Nock & Kessler, 2006). Both suicidal behaviors and NSSI have an onset in adolescence, with NSSI having an earlier onset than suicidal behaviors (Darke, Torok, Kaye, & Ross, 2010).

NSSI and suicidal behaviors overlap, such that 10% to 37% of people who engaged in NSSI also attempted suicide at some point in their lives (Asarnow et al., 2011; Glenn & Klonsky, 2009; Hilt, Nock, Lloyd-Richardson, & Prinstein, 2008; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Wilcox et al., 2011; Stanley, Winchell, Molcho, Simeon, and Stanley (1992) suggested that NSSI and suicide exist on a continuum, with NSSI being a gateway to engagement in suicidal behavior or being a tool that desensitizes an individual to self-harm, thereby increasing his or her acquired capability to attempt suicide (Joiner, 2005). Hamza et al. 2012 combined these theoretical ideas and developed the integrated model, which indicates that it is the combination of NSSI engagement and severity (e.g., frequency, methods used) and a third variable (e.g., familial factors, diagnoses) that would lead a person to suicidal behavior.

Although there have been some conflicting results, more often than not NSSI has been found to predict or relate to suicidal behaviors and ideation. In fact, regardless of how engagement in NSSI has been measured (e.g., checklist, yes/no questions), researchers have observed relationships between suicidal behaviors and ideation (see Hamza et al., 2012). However, researchers have found nuances when further exploring the relationship between suicidal behavior, frequency of NSSI engagement, and the severity of methods used. First, in regard to the frequency of NSSI engagement, conflicting results have emerged finding either a positive relationship (Andover & Gibb, 2010; Brunner et al., 2007; Darke et al., 2010; Prinstein et al., 2008) or no relationship (Nock et al., 2006) with suicidal behavior. These findings may be explained by the fact that researchers who have found a positive relationship with suicidal behavior have explored the lifetime frequency of NSSI (e.g., Andover & Gibb, 2010; Brunner et al., 2007; Darke et al., 2010) whereas those assessing for more current NSSI frequency (Nock et al., 2006) have not found a relationship with current suicidal behavior. What is not understood at this point is whether the relationship between suicidal behaviors and lifetime NSSI arises because of distortions that may result because of either recall bias and errors (for more on recall bias, see Hasson [2005]) or because of a longer time engagement leading to desensitization of self-harm behaviors, as suggested by Joiner (2005). One exception to the nonrelationship found with current NSSI frequency was Prinstein et al. 2008 who assessed for NSSI and suicidal behaviors for the previous 12 months; however, this sample consisted of current inpatient adolescents who may have been at a higher risk for suicide than were individuals in the general population. Thus, with the conflicting information, it appears that the nuances between current and lifetime NSSI need to be parceled out.

The second nuance in understanding the relationship between NSSI and suicidal behavior is the number and type of methods used. In general, the number and type of methods used in NSSI related to suicidal behaviors. Specifically, the more NSSI methods used, the more likely one was to attempt suicide or have suicidal ideation (Nock et al., 2006). In addition, individuals using more moderate/severe NSSI methods (e.g., cut, burn, erase skin) were more likely to have suicidal ideation or attempt suicide than those using more minor NSSI methods (e.g., pull hair, pick skin, hit self; Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007). What is unknown is whether NSSI behaviors (including frequency, methods, and engagement) in one's lifetime or currently relate to suicidal ideation in a college population, as well as what specific methods relate to suicidal ideation. When exploring NSSI methods, researchers have typically examined the relationship of the number of methods used to suicidal behaviors, or they have combined the NSSI methods into one of two categories: (a) moderate to severe or (b) minor. This means that methods such as

cutting and burning skin have been combined together into one category of moderate to severe NSSI methods, which may be hiding the true relationships of the specific methods that predict or relate to suicidal ideation and behaviors. Further exploration into the specific methods that increase the risk of suicidal ideation is needed, as well as a clarification of the relationships between current and lifetime NSSI to suicidal ideation.

Although researchers consistently find relationships between NSSI engagement, NSSI methods used, and suicidal behaviors, there are conflicting results for the relationship between NSSI frequency of engagement and suicidal behaviors. This may be due to researchers exploring either NSSI lifetime engagement or current engagement, which could lead to differing results. In his interpersonal-psychological theory of suicidal behavior, Joiner (2005) suggested that the longer or more frequently an individual engages in self-harming or self-violent behavior, such as NSSI, the more the individual becomes desensitized to the idea of suicidal ideation and actual suicide attempts. This would suggest that lifetime engagement, or a history of engagement, in NSSI, as opposed to a current or more recent engagement only, may be a stronger predictor; however, this remains unknown because lifetime and current NSSI behaviors have not been explored in the same study, and engagement, methods used, and frequency of engagement have also not been included at the same time in the same analysis. These findings of these potential studies would have implications for the clinical assessment of suicidal behavior risk.

### **Cultural Contexts to SIBs**

As is the case with most mental health concerns, SIBs cannot be considered in a vacuum, immune from the influences of societal and cultural factors. As a result, NSSI was found to predict suicidal ideation and actions above and beyond that of other factors, such as hopelessness and depression (Andover & Gibb, 2010). Yet both NSSI and suicide have similar environmental and cultural predictors. For example, research indicates that family connectedness (i.e., the degree of closeness one feels toward one's family; Zayas & Pilat, 2008) is related to both NSSI and suicidal ideation and behaviors, with individuals who self-injure reporting low family connectedness (Bureau et al., 2010; Crowell et al., 2008; Di Pierro, Sarno, Perego, Gallucci, & Madeddu, 2012; Martin, Bureau, Cloutier, & Lafontaine, 2011; Yates, Tracy, & Luthar, 2008). Similar findings exist between family connectedness and suicidal behavior (Nolle, Gulbas, Kuhlberg, & Zayas, 2012); most researchers have found that family connectedness serves as a protective factor against suicide risk (Kuhlberg, Pena, & Zayas, 2010; Miller, King, Shain, & Naylor, 1992).

Locus of control, the degree to which individuals believe they are in control of their lives (Rotter, 1975), also predicted suicidal behavior and ideation (Evans, Owens, & Marsh, 2005). Locus of control lies on a spectrum from external locus of control to internal locus of control. Concerning suicide, an adolescent with an external locus of control has a greater suicide risk than one with an internal locus of control (Evans et al., 2005; Spann, Molock, Barksdale, Matlin, & Puri, 2006). Locus of control has not been examined specifically in reference to NSSI. However, on the basis of the relationship between NSSI and suicidal ideation and attempts, as well as the associations between external locus of control and other factors that are strongly correlated with NSSI (e.g., hopelessness and depression), it appears reasonable to investigate the potential association between locus of control and NSSI.

## **Purpose of the Current Study**

Considering the support for NSSI as a predictor of suicide and the conflicting empirical findings regarding how exactly NSSI increases suicidal risk, more information is needed about the relationship between NSSI and suicide. Specifically, it is important to parcel out the relationship between lifetime NSSI and current NSSI engagement. This includes further exploration of the number of NSSI methods used in one's life versus the number of methods a person is currently using. Thus, the specific NSSI methods related to suicidal ideation need to be clarified. Finally, researchers need to further explore the frequency of NSSI engagement to determine the true relationship of NSSI frequency and suicidal behaviors. This means focusing not only on lifetime NSSI but also on current, more recent NSSI behaviors. Researchers need to explore all of the areas while also controlling for factors that have been found to predict SIBs (e.g., family connectedness and locus of control). This information would help to further understand the relationship between NSSI and suicidal behaviors, determine individuals who complete NSSI and who might be at greater risk of suicidal behaviors, and provide additional points of assessment in therapy.

The specific research questions for the current investigation included (a) Are there relationships between suicidal ideation and NSSI behaviors (i.e., NSSI lifetime engagement, NSSI current engagement, NSSI lifetime number of methods, NSSI current number of methods, and NSSI current frequency)? (b) If so, which NSSI behavior is the stronger predictor of current suicidal ideation (i.e., risk)? (c) Does family connectedness and locus of control relate to NSSI behaviors or suicidal ideation? and (d) Which NSSI methods specifically relate to suicidal ideation?

## **Method**

### **Sample**

The final sample consisted of 403 undergraduate college students from two universities in the southern United States (University 1,  $n = 262$ ; University 2,  $n = 141$ ). The majority of the sample was European American (58.6%), followed by Hispanic (17.9%), African American (12.2%), Asian (5.2%), multiracial (4.2%), other (0.5%), and Native American (0.2%); five individuals (1.2%) did not report their ethnicity or race. The majority of the sample were women (72%), with 27% men; 1% did not report their biological sex. The average age was 21.46 years ( $SD = 4.63$ ), with a range from 18 to 58 years.

### **Procedure**

For this study, we targeted undergraduates because suicide is the second leading cause of death among college students (Suicide.org, 2005) and they tend to have the highest rates of NSSI outside of inpatient populations. After obtaining permission from each university's institutional review board, we used convenience sampling to recruit participants in undergraduate courses, including teacher education, kinesiology, and political science courses. We read participants a recruitment script and provided an informed consent form, followed by the survey. This process took approximately 20 minutes. No incentives were provided to participants.

## Instruments

*NSSI.* We measured NSSI using the Deliberate Self-Harm Inventory (DSHI; Gratz, 2001). The DSHI is a self-report measure that consists of 17 behavioral items and results in two variables: (a) frequency of NSSI (a sum of the number of times participants have engaged in each type of NSSI) and (b) engagement in NSSI (yes/no). The original DSHI provides a lifetime engagement of NSSI; however, additional studies adapted the DSHI by combining repeated forms of NSSI to a total of 12 NSSI methods and asking participants about current NSSI engagement (e.g., within the past 3 months and the past 12 months; Wester & Trepal, 2010). The scores from the original DSHI were found to have adequate reliability estimates (Cronbach's  $\alpha = .82$ ; test-retest reliability,  $r = .92$ ), and the evidence of the relationship to other variables was measured through convergent evidence with other self-harm measures ( $r$  ranged between .35 and .49; Gratz, 2001). The scores for the adapted version of the DSHI were adequate estimates of reliability (Cronbach's  $\alpha = .70$ ), with correlations with other measures of violence victimization being appropriately low ( $r = .13$ ; Murray, Wester, & Paladino, 2008). For the current study, the internal consistency scores were adequate (Cronbach's  $\alpha = .72$  for current NSSI engagement and .90 for lifetime engagement).

*Family connectedness.* We used the Attitudinal Familism Scale (AFS; Steidel & Contreras, 2003) to measure family connectedness. We asked respondents to indicate the degree to which they agreed or disagreed on a 10-point Likert-type scale for the 18 items designed to assess family support and obligation, family interconnectedness, honor, and subjugation. For the current study, we used only the full-scale score of the AFS. The scores from the full scale have been found to have adequate estimates for reliability (Cronbach's  $\alpha = .83$ ), and the AFS has been used with both Latino/a and European American students (Steidel & Contreras, 2003). Item factor loadings ranged from .40 to .72 on the AFS, and the overall scale score was found to have a low, positive correlation to acculturation for Latino college students and a negative correlation to acculturation for European American students (Steidel & Contreras, 2003). These relationships provided evidence of internal structure and relationships to other variables for the AFS because the scores indicated that higher adherence to European American orientation or the independent culture of the United States was related to less adherence to familism or family connectedness (Steidel & Contreras, 2003).

*Suicidal ideation.* We assessed the dependent variable, suicidal ideation, using the Suicide Ideation Scale (SIS; Rudd, 1989), which is a 10-item, self-report measure that assesses a range of covert and overt suicidal thoughts and behaviors and indicates the frequency of occurrence on a 5-point Likert-type scale. Scores on the SIS were found to have strong estimates of reliability (Cronbach's  $\alpha = .86$ ), with adequate item-total correlations ( $r = .45$  to .74) and moderate correlations with measures of depression (e.g.,  $r = .55$  with the Center for Epidemiologic Studies-Depression scale [Radloff, 1977] and  $r = .49$  with the Beck Hopelessness Scale [Beck & Steer, 1988]; Rudd, 1990). In addition, scores on the SIS were found to be higher for individuals who have attempted suicide (Rudd, 1990).

*Locus of control.* We measured the locus of control using the Internal-External Scale (IES; Rotter, 1966). The IES scale has 29 items consisting of paired statements. Participants indicate

which statement, or option, they believe to be true for each item. One item is indicative of an internal expectancy or locus of control, and the other item is indicative of an external expectancy. Lower scores indicate more internal locus of control, and higher scores indicate a greater external locus of control. Reliability estimates for scores on the IES were found to be adequate, with Kuder–Richardson scores ranging between .70 and .73 for college students and split-half correlations ranging from .65 to .79 (Rotter, 1966). Evidence of validity for the IES was found, with low correlations with measures of intelligence and social desirability. This finding indicates discriminant evidence and predictive validity of behavior with internal locus of control for the IES, which leads to an individual paying more attention to the environment, taking steps to improve conditions in the environment, and resisting the attempts of others to influence behavior (Rotter, 1966).

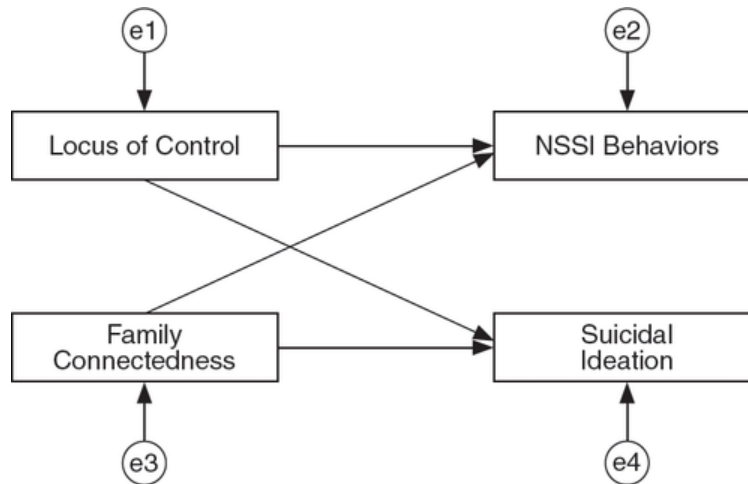
*Demographics.* Participants were asked to report their biological sex and race. Participants were also asked to self-report if they had a history of suicide attempts (yes/no).

## Results

In the current sample, 16 students (4%) reported having attempted suicide in their lifetime, with 7 students (2%) reporting they had attempted suicide within the past year. In regard to NSSI, 25% ( $n = 100$ ) of the students reported engaging in NSSI at some point in their lives and using an average of 3.40 ( $SD = 3.55$ , range = 1–12) different methods to harm themselves. Thirty-five students (9%) reported currently engaging in NSSI within the past year. Of these 35 students, 32 had a history of NSSI in addition to currently engaging, whereas three reported only engaging within the past year. Those who currently self-injured reported an average of 1.80 ( $SD = 1.23$ , range = 1–6) different methods. The average frequency of current NSSI engagement was 35.87 ( $SD = 90.55$ , range = 1–365) times within the past 12 months. Because of conflicting findings indicating NSSI and suicide differing across race and sex, we conducted preliminary analyses to explore if this was the case in the current sample. Because of the data not meeting the normality assumption of an analysis of variance, we used a Welch test, which is a robust test of equality of means. No significant differences were found across men and women for total suicidal ideation, NSSI lifetime number of methods, NSSI current number of methods, or current NSSI frequency, Welch's  $F(1, 288.18) = 0.27, p > .05$ ; Welch's  $F(1, 145.24) = 2.66, p > .05$ ; Welch's  $F(1, 280.81) = 0.81, p > .05$ ; and Welch's  $F(1, 340.11) = 1.43, p > .05$ , respectively. For race/ethnicity, no significant differences were found for total suicidal ideation, NSSI current number of methods, and NSSI current frequency, Welch's  $F(4, 72.52) = 2.07, p > .05$ ; Welch's  $F(4, 62.54) = 1.47, p > .05$ ; and Welch's  $F(4, 75.05) = 1.30, p > .05$ , respectively. However, a significant difference was found between racial/ethnic groups and NSSI lifetime number of methods, Welch's  $F(4, 74.05) = 5.05, p < .01$ . Exploring the means of NSSI lifetime number of methods used, we found that Asian or Asian American students used more methods ( $M = 1.62, SD = 3.54$ ) compared with other racial/ethnic individuals (Black or African American,  $M = 0.22, SD = 0.59$ ; Hispanic/Latino/a,  $M = 0.80, SD = 2.02$ ; White/European American,  $M = 0.87, SD = 2.32$ ; multiracial,  $M = 0.24, SD = 0.56$ ).

We used a path model to explore if family connectedness and locus of control related to NSSI behaviors or suicidal ideation and to further examine the relationship between NSSI behaviors and suicidal ideation (see Figure 1). We conducted a total of five path models to explore all NSSI

behaviors (i.e., NSSI lifetime and current engagement, NSSI lifetime and current number of methods, and NSSI current frequency) in relation to suicidal ideation.



**Figure 1.** Path Model of Family Connectedness and Locus of Control to Nonsuicidal Self-Injury (NSSI) Behaviors and Suicidal Ideation

*Note.* NSSI behaviors include (a) NSSI lifetime engagement (Model 1); (b) NSSI current engagement (Model 2); (c) NSSI lifetime number of methods (Model 3); (d) NSSI current number of methods (Model 4); and (e) NSSI current frequency (Model 5).

The fit of Model 1 (NSSI lifetime engagement) was adequate. The chi-square was not significant,  $\chi^2(13) = 0.86, p = .88$ ; Tucker–Lewis index (TLI) = 1.05; comparative fit index (CFI) = 1.00; and root mean square error of approximation (RMSEA) = .00, 95% confidence interval (CI) [0.00, 0.13],  $p = .56$ . Table 1 provides the unstandardized and standardized regression paths of the path models. Neither locus of control nor family connectedness predicted NSSI lifetime engagement. Although locus of control did positively relate to suicidal ideation, family connectedness was not significantly related. However, NSSI lifetime engagement was the strongest predictor of suicidal ideation.

The fit of Model 2 (NSSI current engagement) was adequate,  $\chi^2(13) = 0.88, p = .35$ ; TLI = 1.02; CFI = 1.00; and RMSEA = .00, 95% CI [0.00, 0.13],  $p = .55$ . Unlike Model 1, locus of control and family connectedness were both significantly related to NSSI current engagement. Locus of control was positively related, indicating that those with an external locus of control were more likely to engage in NSSI currently than those with an internal locus of control. Family connectedness had a negative relationship, indicating that a greater emotional connection to family resulted in less NSSI current engagement. As with Model 1, locus of control and NSSI current engagement significantly related to suicidal ideation.

The fit of Model 3 (NSSI lifetime number of methods) was adequate,  $\chi^2(13) = 0.84, p = .36$ ; TLI = 1.18; CFI = 1.00; and RMSEA = .00, 95% CI [0.00, 0.13],  $p = .56$ . Locus of control and family connectedness were not found to relate to the number of NSSI methods used in one's lifetime. Similar to the previous models, locus of control and NSSI lifetime number of methods used were significantly and positively related to suicidal ideation. Family connectedness was not related to suicidal ideation.

**Table 1.** Unstandardized and Standardized Regression Paths of Nonsuicidal Self-Injury (NSSI) Behaviors and Suicidal Ideation

Dependent Variable and Step	USR	SE	SR
<b>Model 1</b>			
NSSI lifetime engagement			
Locus of control	0.01	0.01	0.08
Family connectedness	0.00	0.00	-0.05
Suicidal ideation			
Locus of control	0.09	0.04	0.14**
Family connectedness	0.00	0.01	-0.01
NSSI lifetime engagement	1.18	0.27	0.22***
<b>Model 2</b>			
NSSI current engagement			
Locus of control	0.01	0.00	0.15**
Family connectedness	0.00	0.00	-0.11*
Suicidal ideation			
Locus of control	0.07	0.04	0.10*
Family connectedness	0.00	0.01	0.02
NSSI current engagement	3.08	0.39	0.37***
<b>Model 3</b>			
NSSI lifetime number of methods			
Locus of control	0.01	0.04	0.03
Family connectedness	0.00	0.00	-0.03
Suicidal ideation			
Locus of control	0.10	0.04	0.16*
Family connectedness	0.00	0.01	-0.02
NSSI lifetime number of methods	0.15	0.05	0.14*
<b>Model 4</b>			
NSSI current number of methods			
Locus of control	0.01	0.01	0.05
Family connectedness	0.00	0.00	-0.10
Suicidal ideation			
Locus of control	0.09	0.03	0.13**
Family connectedness	0.00	0.01	0.02
NSSI lifetime number of methods	1.61	0.17	0.43***
<b>Model 5</b>			
NSSI current frequency			
Locus of control	0.33	0.41	-0.04
Family connectedness	0.03	0.06	0.02
Suicidal ideation			
Locus of control	0.11	0.04	0.16**
Family connectedness	0.00	0.01	-0.02
NSSI current frequency	0.01	0.00	0.07

Note. USR = unstandardized regression path; SR = standardized regression path.

\* $p \leq .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

The fit of Model 4 (NSSI current number of methods) was adequate,  $\chi^2(13) = 0.85$ ,  $p = .36$ ; TLI = 1.02; CFI = 1.00; and RMSEA = .00, 95% CI [0.00, 0.13],  $p = .56$ . Similar to Model 3 with NSSI lifetime number of methods, locus of control and family connectedness did not significantly relate to NSSI current number of methods. However, locus of control and NSSI current number of methods were positively related to suicidal ideation, whereas family connectedness was not related to suicidal ideation.



The fit of Model 5 (NSSI current frequency) was adequate,  $\chi^2(13) = 0.91, p = .34$ ; TLI = 1.29; CFI = 1.00; and RMSEA = .00, 95% CI [0.00, 0.13],  $p = .55$ . Locus of control and family connectedness did not relate to NSSI current frequency. Locus of control was the only variable that significantly related to suicidal ideation in this model. NSSI current frequency and family connectedness did not significantly relate to suicidal ideation.

Because the majority of NSSI factors (NSSI lifetime engagement, NSSI current engagement, NSSI lifetime number of methods, and NSSI current number of methods) were significantly related to suicidal ideation, while controlling for locus of control, we conducted a post hoc bootstrap regression analysis to determine which variable was the strongest predictor of NSSI and the amount of variance associated with it. Bootstrap regression is used as a robust approach to test for significant effects in the context regression. Specifically, bootstrapping is a resampling method that is used to empirically estimate the sampling distribution for the estimated statistics (in this case, regression weights). This sampling distribution can be used to compute CIs based on the 2.5% and 97.5% percentiles, which do not rely on the typical assumptions of regression (Fox, 2008). Therefore, in addition to traditional statistics, such as measures of effect size, the CIs can be used to determine the effects that are significantly different from zero.

NSSI current frequency was not included in the post hoc regression model because of the nonsignificant relationship in the path model. Because of the possible nature of NSSI behaviors being correlated, we checked the correlations and tolerance levels. Most correlations between NSSI variables fell below  $r = .40$ ; however, NSSI lifetime engagement and NSSI lifetime number of methods had a high correlation ( $r = .64$ ), as did NSSI current engagement and NSSI current number of methods ( $r = .81$ ). In addition, the tolerance statistics for NSSI current engagement and NSSI current number of methods were low and of concern (.26 and .27, respectively). Therefore, we examined the NSSI variables for engagement and number of methods in separate regressions. Thus, we conducted three bootstrap regressions. The first explored the degree that locus of control explained suicidal ideation in isolation. The second regression included NSSI lifetime and current engagement, whereas the third regression included NSSI lifetime and current number of methods.

In Model 1, locus of control significantly predicted suicidal ideation. We determined this because the upper and lower bounds of the CIs did not include zero (lower CI 0.03, upper CI 0.24; see Table 2), with the model accounting for 2.9% of the variance. In Model 2, when NSSI lifetime engagement and NSSI current engagement were added into the model, locus of control was no longer significantly related to suicidal ideation. NSSI lifetime engagement was also not significantly related, and the only statistically significant predictor was NSSI current engagement (see Table 2). This suggests that current engagement in NSSI relates to suicidal ideation, which mediates the influence of NSSI lifetime engagement and locus of control. Thus, when individuals engaged in NSSI within the previous 12 months, they reported a higher level of suicidal ideation than those who did not. NSSI current engagement was the only statistical predictor in the model, with the overall model explaining 21% of the variance. Similarly, in Model 3, NSSI current number of methods was the only statistically significant predictor of suicidal ideation (see Table 2), with the model explaining 21% of the variance of suicidal ideation. Thus, the more methods one uses to self-injure within a 12-month time period, the higher the level of suicidal ideation.

**Table 2.** Bootstrap Regression Models Exploring Predictors of Suicidal Ideation

Variable	<i>B</i>	<i>SE</i>	95% CI	<i>R</i> <sup>2</sup>
Model 1				.03
Locus of control	0.13*	0.05	[0.03, 0.24]	
Model 2				.21
Locus of control	0.08	0.05	[-0.03, 0.18]	
NSSI lifetime engagement	0.40	0.23	[-0.03, 0.86]	
NSSI current engagement	3.75*	1.33	[1.29, 6.47]	
Model 3				.21
Locus of control	0.11	0.05	[-0.01, 0.20]	
NSSI lifetime number of methods	-0.02	0.08	[-0.18, 0.11]	
NSSI current number of methods	1.68*	0.87	[0.35, 3.79]	

*Note.* 95% CI (confidence interval) is computed from the 1,000 bootstrap samples. Intervals that do not include 0 would typically be considered significant at the  $\alpha = .05$  level. NSSI = nonsuicidal self-injury.

\* $p \leq .05$ .

We originally proposed an additional regression analysis to explore the relationship between each NSSI method and suicidal ideation. Although 9.0% of the sample reported that they currently engaged in NSSI behaviors in the past year, the most frequently used method was cutting (4.0%,  $n = 16$ ). The other NSSI methods, however, had a lower frequency of being endorsed. The next most frequently endorsed methods were scratching self to the extent of scarring or bleeding (2.2%,  $n = 9$ ); hitting, punching, or banging a wall with a body part to hurt or bruise oneself (2.0%,  $n = 8$ ); and pulling out one's own hair (2.0%,  $n = 8$ ). The following NSSI methods had an even lower frequency of being endorsed: carving words, designs, or pictures into skin (1.2%,  $n = 5$ ); preventing wounds from healing (1.2%,  $n = 5$ ); burning own skin (1.0%,  $n = 4$ ); sticking sharp objects into one's skin (1.0%,  $n = 4$ ); and biting oneself (0.5%,  $n = 2$ ). None of the participants endorsed rubbing skin raw or breaking their bones within the past 12 months. Because of the lower frequency of endorsement of some of the methods, we did not run these NSSI methods in a regression.

## Discussion

The rates of suicidal behaviors and NSSI in the current sample match the prevalence found in previous studies among college students (e.g., American College Health Association, 2007; Favazza, 1989; Gratz, 2001; Gutierrez, Osman, Kopper, Barrios, & Bagge, 2000; Murray et al., 2008; Wester & Trepal, 2010). In the path model, suicidal ideation was predicted by NSSI behaviors in four of the five models. This included NSSI lifetime engagement, NSSI current engagement, NSSI lifetime number of methods, and NSSI current number of methods, but suicidal ideation was not explained by NSSI current frequency. This relationship between NSSI and suicidal ideation is consistent with previous research indicating that individuals who engaged in NSSI were eight to 25 times more likely to have suicidal ideation or attempt suicide (Glenn & Klonsky, 2009). In the current study, when entered into a regression equation with locus of control, NSSI behaviors and locus of control provided evidence of a moderate to strong relationship to suicidal ideation.

When entered into the same regression model, only current NSSI behaviors remained significant predictors of suicidal ideation. Therefore, current engagement (yes/no) and current number of methods used to self-injure were both positively related to suicidal ideation, thereby mediating

the relationships between suicidal ideation and lifetime NSSI behaviors and locus of control. These mediations are evident for a variety of reasons. First, individuals who currently engage in NSSI may have also previously engaged in NSSI to control or regulate emotions. In the current study, we found that 35 individuals were currently engaged in NSSI, with 32 of them having engaged in NSSI for longer than 12 months (thus, both current and lifetime). Therefore, those currently engaging in NSSI may have been attempting to cope for multiple years, which possibly led to higher levels of suicidal ideation. In addition, it seems sensible that engaging in NSSI for a year or longer may not be predictive of the degree or amount of suicidal ideation one may be currently experiencing, thereby creating a situation in which NSSI current engagement may actually be mediating the relationship between NSSI lifetime engagement. In addition, those who are not currently engaging may not be experiencing suicidal ideation because they may have developed more adaptive coping strategies to regulate their emotions.

Using NSSI number of methods as the predictor, we found that individuals who only use one method of self-injury may not be at high risk of suicidal ideation, whereas individuals using more than one method may be more likely to have higher levels of suicidal ideation and, in turn, may be at a greater risk of a suicide attempt. This finding supports Stanley et al.'s 1992 theory that NSSI and suicide rest on an SIB continuum in which NSSI is a gateway to suicidal behavior. It also supports Joiner's (2005) interpersonal-psychological theory and Hamza et al.'s 2012 integrated model that indicates that the more methods one uses to engage in NSSI behavior, the greater the acquired capability to carry through a suicide attempt.

By taking Chapman, Gratz, and Brown's (2006) Experiential Avoidance Model of deliberate self-harm and Nock's (2009) Integrated Theoretical Vulnerabilities model into consideration, counselors can understand why the number of NSSI methods explains suicidal ideation; an individual engages in NSSI behavior because of the inability to regulate aversive emotions or cognitions. Therefore, it may be that the engagement in multiple methods is a sign that someone may be continually trying different ways to regulate their emotions. This is supported by Klonsky and Olin (2008), who found that individuals participating in a greater variety of NSSI methods had higher levels of anxiety when compared with individuals who primarily engaged in cutting behaviors to self-injure. In addition, in a more recent study, Anestis, Pennings, Lavender, Tull, and Gratz (2013) found that NSSI mediates the relationship between distress tolerance and suicide, which suggests that NSSI may be one way that the suicide risk increases for individuals unable to regulate emotions. Their finding supports Joiner's (2005) model indicating that self-harm may increase acquired capability of suicidal behavior.

Conversely, the use of one method, even if used multiple times across the same day or week, may be successful at regulating one's emotions. This ability to regulate one's emotions through NSSI may provide a buffer against a desire to escape the presenting problem through more forceful and absolute means, such as suicide. This lines up with our finding that frequency of NSSI during the previous 12 months was not related to suicidal ideation. Although the positive relationship between the number of methods does support Hamza et al.'s 2012 and Joiner's (2005) models of acquired capability, the lack of relationship between frequency of NSSI engagement in the current study (along with Nock et al.'s 2006 study) is counter to that argument. This lack of relationship suggests that the frequency of engagement may not matter if NSSI is potentially successful at achieving emotion regulation or alleviating aversive cognitions.

and emotions within a person—thus achieving its purpose or end goal. However, it may be that the use of multiple NSSI methods is an indication that one is not achieving his or her goals for engaging in NSSI, which, in turn, may lead to increased hopelessness and helplessness in one's ability to regulate or resolve the presenting concern or emotion, thus leading one to consider suicide as a greater possibility.

Although NSSI is a strong predictor of suicidal ideation, specifically of the current engagement and number of NSSI methods used in the past 12 months, it is important to note that locus of control and family connectedness were predictors of NSSI current engagement but were not predictors of NSSI in any other path model. Thus, it appears that individuals who reported less of a family connection or bond with the family were more likely to currently engage in NSSI. In addition, those who reported having a higher external locus of control, or feeling like they had no effect on the world around them, were more likely to currently engage in NSSI. We placed these two variables (i.e., locus of control and family connectedness) into a regression model with NSSI current engagement to explore the related variance, and we found that the two variables explained 18% of the variance of NSSI current engagement. Conducting a commonality analysis revealed that family connectedness explained 2% unique variance in current NSSI engagement, whereas locus of control provided 7% unique variance, which indicates that these two variables share 9% of the variance in current NSSI engagement. This finding suggests that locus of control and family connectedness are related. It also implies that locus of control may be a state factor rather than a trait factor, which aligns with the belief that locus of control is learned through social experiences, such as family relationships (MacDonald, 1971; Rotter, 1966). Associations have been found between internal locus of control and high family nurturance, as well as between external locus of control and low family nurturance (de Man, Hall, & Stout, 1990; MacDonald, 1971). These studies may explain, at least to some degree, the shared variance between locus of control and family connectedness and current NSSI in the current study.

Locus of control and family connectedness did not relate to any other NSSI behavior, and, more pointedly, they did not predict the current number of NSSI methods used. So although these variables may explain why an individual currently engages in self-injury, they do not determine the number of methods used to self-harm. In addition to NSSI, family connectedness did not relate to suicidal ideation in any model, which contradicts what previous researchers have found in studies exploring the impact of family relations and suicidal behavior. This contradiction may be due to a failure to include NSSI behaviors in previous explorations of family connectedness and suicidal behaviors. Therefore, family connectedness or cohesion may be a better predictor of NSSI behavior (i.e., Hamza et al.'s 2012 third variable) than of suicidal behavior, with NSSI behavior, particularly current NSSI engagement, being a stronger predictor of suicidal behavior than family factors. It should be noted that although a direct relationship may not have been found to suicidal behaviors, family connectedness appears to still be important. More specifically, in the current study, we found that family connectedness was negatively related to NSSI current engagement, and NSSI current number of methods was a strong predictor of suicidal ideation.

In all path models, locus of control was significantly and positively related to suicidal ideation. Thus, external locus of control was related to a higher degree of suicidal ideation than internal locus of control. In other words, those who felt they had control over their lives or had an impact

on their surroundings were less likely to indicate having current suicidal ideation. This is similar to previous findings throughout the past few decades (e.g., Evans et al., 2005). Nevertheless, when interpreting this result, it is important to take into account cultural meanings related to locus of control (Sue & Sue, 2008). It may be that external locus of control represents the view that one's life is determined by outside forces. It also may represent the belief that one has little control over his or her life because of political forces, such as racism and discrimination. In addition, external locus of control may represent a more collectivistic value (Sue & Sue, 2008). Future studies examining the influence of locus of control should attempt to parcel out these different types of external loci of control. Although locus of control was related to suicidal ideation in the path models, when entered into the bootstrap regression with both lifetime and current NSSI behaviors (i.e., engagement and number of methods), it was no longer statistically significant. NSSI current engagement and number of methods used mediated the relationship between locus of control and suicidal ideation in the bootstrap regression. In addition, when explored in isolation, locus of control explained minimal variance, which indicates that it is not a strong predictor of suicidal ideation.

This study has several limitations. First, although the sample size was large, participants came from two separate midsized universities in the South. Thus, the generalizability to universities in other geographical locations or larger university settings may be limited. In addition, we used in-class convenience sampling, which limited the ability of individuals who did not attend class to participate in the study. Individuals experiencing higher levels of suicidal ideation, family concerns, or other mental health symptoms may not have been present, thereby limiting the current sample to those functioning at a higher level. However, it should be noted that the current sample's engagement in NSSI and suicidal behaviors was similar to that found in previous studies.

### **Implications for Counseling Practice**

The results of the current study have a number of implications for counseling practice. First, on the basis of these results, counselors working with clients who engage in NSSI should assess the current engagement (within 12 months) and the number of NSSI methods their clients are using to better evaluate their risk for suicidal ideation. As mentioned previously, clients may experiment with multiple methods of NSSI if the self-injury is not effectively regulating negative client emotions. The inability of NSSI to help individuals cope with their emotions can result in feelings of hopelessness and despair, which, in turn, may increase thoughts of suicide. Counselors may consider helping clients decrease the number of NSSI methods they are using in concert with facilitating the development of healthier forms of coping. Wester and Trepal (2005) have suggested alternative forms of coping.

Second, it may be helpful for counselors working with clients who currently engage in NSSI and who have suicidal ideation to assess their clients' locus of control. Results indicated that a relationship exists between external locus of control and current NSSI engagement as well as suicidal ideation. To help reduce current engagement in NSSI and suicidal ideation in clients whose locus of control is more externalized, counselors may consider using counseling techniques that emphasize the development of a strong internal locus of control. This might include humanistic approaches, such as person-centered counseling, or postmodern approaches,

such as narrative therapy. Narrative therapy, in particular, may be beneficial because other researchers have found that the majority of individuals who self-injure engage in magical thinking, which is defined as “pre-symbolic language that lacks differentiation between the real and the symbolic signifier and signified” (Gregory & Mustata, 2012, p. 1047). More specifically, they found that individuals who self-injured see NSSI as a magical substitute for emotion regulation, have a split between perceptions of the external and internal person, and experience a transformation of objects or process of self-injury. Therefore, using narrative therapy to rewrite a narrative can help the individual change his or her language and relationship with NSSI and other individuals (DiMaggio, Salvatore, Azzara, & Catania, 2003). Rewriting a narrative can add strength to characters in a relationship (e.g., give more strength to the emotion versus the blood or pain in self-injury), may assist in a client gaining control over the NSSI, and can increase success in other coping methods.

Finally, when working with clients who currently engage in NSSI, counselors may also consider assessing for family connectedness. Results revealed that participants who indicated lower family connectedness were more likely to engage currently in NSSI, with current NSSI also being a predictor for suicidal ideation. Thus, it might be beneficial for counselors to help clients to process feelings of disconnectedness with family. Where appropriate, counselors may also help clients take steps toward increasing their connectedness to their families. Improving family connections and building positive future orientations have been suggested as being helpful among suicidal adolescents who self-injure (Meuhlenkamp & Gutierrez, 2007).

## **Conclusion**

The current study supports some of the existing theories on suicidal behavior and NSSI, as well as adds to the knowledge of the relationship between NSSI and suicidal ideation. More specifically, NSSI current behaviors and NSSI current number of methods explained 18% to 21% of the variance in suicidal ideation. This has important clinical implications with regard to the assessment and treatment of individuals in mental health settings, along with the assessment and crisis intervention and management in other settings (e.g., schools, colleges).

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