

**Examining Perceived Public Stigma of Nonsuicidal Self-Injury:  
Development and Validation of the Stigma of Nonsuicidal Self-Injury (STONSI) Scale in  
Two Samples**

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### Author Note

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### CRedit Statement:

**SEV:** Conceptualization, data curation, formal analysis, methodology, project administration, supervision, writing (original). **AB:** formal analysis, writing (review and editing). **MM:** investigation, writing (review and editing). **SMM:** conceptualization, methodology, writing (review and editing). **PBI:** conceptualization, data curation, funding acquisition, methodology, project administration, resources, supervision, writing (review and editing)

### Abstract

Nonsuicidal self-injury (NSSI) is highly stigmatized and increasingly prevalent among young adults. Perceived public NSSI stigma may hamper help-seeking, decrease social support, and impede development of effective public health interventions to address NSSI. Research has been limited, however, by the lack of validated measures of perceived public NSSI stigma, which may be less prone to social desirability biases than other self-report measures of stigma. Thus, we adapted an existing measure of suicide attempt stigma (Scocco et al., 2012) to develop a measure of perceived public NSSI stigma (Stigma of Nonsuicidal Self-Injury [STONSI] Scale). In two samples of young adult university students (one not screened and one prescreened for elevated depressive symptoms), we found support for a two-factor structure of the STONSI (one factor with reverse coded items and one factor with non-reverse coded items), which is used to create an average of all items, consistent with that identified for the suicide attempt stigma measure from which it was adapted. The STONSI exhibited strong internal consistency, as well as within-person stability over a six-week follow-up period. STONSI scores did not differ by lifetime history of NSSI; however, perceived public NSSI stigma was associated with indicators of NSSI severity. Future work is needed to test the validity and reliability of the STONSI in diverse samples with respect to age, clinical setting, and cultural context. If results are replicated, the STONSI may be a valuable tool for future research on NSSI stigma, its correlates, and the development of NSSI stigma interventions.

**Clinical Impact Statement:** Self-injury is a common and often stigmatized behavior that can lead to negative reactions from others and negative views of oneself. We developed a new measure of perceived stigma towards self-injury to better understand these beliefs. This questionnaire can be

used to understand individuals' perceptions of self-injury stigma in future research to clarify what contributes to these perceptions and how they might impact willingness to seek help for self-injury.

**Keywords:** nonsuicidal self-injury; stigma; questionnaire; NSSI

Nonsuicidal self-injury (NSSI) is deliberate, direct self-inflicted bodily damage that is not suicidal in nature and not socially sanctioned (International Society for the Study of Self-Injury, 2018). NSSI is common, especially among adolescents and young adults (Swannell et al., 2014), and associated with varied types of psychopathology (Bentley et al., 2014). Of great concern, engagement in NSSI appears to confer elevated risk of subsequent suicidal behavior, including death by suicide (Ribeiro et al., 2016). Risk for NSSI is high among emerging adults with elevated depressive symptoms in national samples from the Netherlands and the United States (Kiekens et al., 2018; Taliaferro & Muehlenkamp, 2015), and evidence suggests that these concerns are increasing in prevalence over time (Duffy et al., 2019). However, many college students struggling with NSSI do not receive mental health treatment of any kind, and among U.S. and Australian college students, few disclose NSSI to a professional (Armiento et al., 2014; Whitlock et al., 2006), this is consistent with systematic reviews which suggest disclosure of NSSI to formal sources, such as mental health professionals, is typically less common than disclosure to informal sources, such as family and friends (Simone & Hamza, 2020). Prior qualitative work suggests that fears of encountering stigmatizing attitudes serve as a barrier to help-seeking among those engaging in NSSI in both population-based samples (New Zealand young adults; Nada-Raja et al., 2003) and in higher education settings (Canadian university students; Rosenrot & Lewis, 2020). In this study, we developed and evaluated a measure of perceived public stigma of NSSI, with implications for identifying drivers of prejudiced behaviors towards those with NSSI and meeting treatment needs of emerging adults engaging in NSSI.

The language used by clinicians, researchers, and the public often frames NSSI as pathological and disordered, which can increase negative evaluations of the NSSI behavior and the individuals who engage in it (Hasking & Boyes, 2018). Negative evaluations of those who

engage in NSSI are common among college students in the United States (Burke et al., 2019), the United Kingdom (Law et al., 2009), and Australia (Lloyd et al., 2018), including those with a personal history of NSSI (Piccirillo et al., 2020). These negative attitudes can have significant harmful consequences. Feelings of shame and fears of negative responses are common barriers to disclosure of NSSI in university students (Rosenrot & Lewis, 2020), which can impact one's ability to access social support and mental health care. Health care professionals who report more negative attitudes towards NSSI also report reduced effectiveness at working with people engaging in NSSI in health care and educational settings (Timson et al., 2012). Of note, young adults who engage in NSSI often describe it as a salient piece of their identity (Breen et al., 2013; Steele et al., 2020) and thus may be conceptualized as a concealable stigmatized identity (Quinn & Earnshaw, 2011), which is associated with global psychological distress (Quinn & Chaudoir, 2009).

Numerous methods exist to measure stigma, and a variety of strategies have been used in prior research with NSSI. In one study of American college students, Burke et al. (2019) used both explicit and implicit measures of stigma, finding converging evidence for broad negative evaluations of people who engage in NSSI across domains. This negative bias appears quite specific in that evidence of stigma towards NSSI was observed when comparing individuals with NSSI scarring to those with scarring from unintentional injuries (e.g., accidents) as well as those with intentional body modifications unrelated to NSSI (e.g., tattoos; Burke et al., 2019). Other studies have directly assessed participants' attitudes; for instance, in one study of a psychiatric and general hospital in New Zealand, over half of health care staff reported agreeing with the statements "patients use self-harm as a way to get sympathy and/or attention" and "self-harm patients make me feel frustrated and irritated" (Gibb et al., 2010). In studies that have used

responses to vignettes as a measure of NSSI stigma in college students, perceiving NSSI as “manipulative” is specifically associated with more negative emotional and behavioral responses to NSSI (Law et al., 2009; Lloyd et al., 2018).

Although there are multiple methods and modalities for measuring stigma, asking respondents about their *perceptions* of the general public’s stigma towards a behavior is considered particularly useful due to a variety of social desirability influences on one’s willingness to report one’s own stigmatizing views (e.g., Calear et al., 2011; Scocco et al., 2012). This strategy asks participants about their perceptions of the negative attitudes of others toward the devalued behavior, allowing for a degree of separation between the participants and the attitudes that they are reporting. To address these issues and to follow the precedents set in prior research on suicide stigma (Scocco et al., 2012) we elected to evaluate stigma towards NSSI by asking participants about the perceived stigma of others, which may also be especially relevant to help-seeking, regardless of one’s own views of NSSI.

### **Study Aims and Hypotheses**

In this study, we adapted a well-validated measure of perceived public stigma related to suicide attempts, the Stigma of Suicide Attempt (STOSA) scale (Scocco et al., 2012), to examine perceived public stigma of NSSI in two samples of emerging adult university students who varied with respect to personal history of NSSI. First, we examined the psychometric characteristics of the new measure, the Stigma of NSSI (STONSI) scale, including factor structure, internal consistency, and test-retest reliability (Aim 1). Second, we evaluated whether demographic characteristics, such as gender and race/ethnicity, were associated with perceived public NSSI stigma (Aim 2). We did not hypothesize an association between gender identity and STONSI scores, as prior research has failed to find evidence of associations between gender and perceived

stigma using the STOSA (Kearns et al., 2015; Scocco et al., 2016) and in examining NSSI stigma (Burke et al., 2019). Given the lack of prior research examining racial and ethnic differences in NSSI or suicide-related stigma, we treated these analyses as exploratory. Finally, we compared perceived public NSSI stigma between participants with, and without, a personal history of NSSI (Aim 3). Although prior work has shown that U.S. undergraduates with a history of NSSI exhibit reduced negative *personal* bias towards NSSI (Piccirillo et al., 2020), it is possible that people who have engaged in NSSI might report greater *perceived public* stigma towards NSSI, due to their own experiences receiving negative judgments of others, as has been observed in relation to perceived public stigma of suicide amongst Italian adults with multiple suicide attempts (Scocco et al., 2016). Thus, we hypothesized that individuals with a significant personal history of NSSI would report greater perceived public stigma towards NSSI in this study.

## Methods

### Study Design and Procedures

Two datasets were used to examine the properties of the STONSI in undergraduate students. The larger dataset (sample 1) was collected in spring 2021 as part of a mass survey administered to undergraduate introductory psychology students at a large, public university in the southern United States ( $N = 467$ ) who received course credit for their time. The second dataset (sample 2) was collected from September 2019 to April 2020 ( $N = 137$ ), with enrollment occurring in-person prior to campus closure due to the COVID-19 pandemic. These participants were recruited using physical and digital flyers advertising for students 18-26 years old with depressive symptoms in the recent past. Interested individuals completed a prescreening assessment using the Patient Health Questionnaire 9-item version (PHQ-9; Spitzer et al., 1999), a well-validated self-report measure of recent (past two weeks) depression symptoms keyed to the diagnostic criteria



for a major depressive episode in the DSM-5 (American Psychiatric Association, 2013). Individuals whose screening scores indicated at least moderate depression symptoms (scores of 10 or higher) were invited to complete an in-person research session, including the STONSI and additional self-report measures, for which they received a gift card as compensation. The use of depressive symptoms as an inclusion criterion in sample 2 was based upon larger study aims related to depressive disorders rather than an indirect way to screen for NSSI.

Following the in-person (baseline) session, sample 2 participants were invited to complete follow-up surveys two, four, and six weeks after study enrollment. These survey links were sent to participants' preferred email address, and the survey was open for 24 hours following dissemination of the survey link. Participants were provided with additional compensation (gift cards) for every follow-up survey they completed. All research procedures were conducted in accordance with American Psychological Association and international ethical standards for human subject research, as well as with the protocols and procedures approved by the host university's institutional review board (#IRB2019-625). Data are not available in a public repository, as participants did not consent to make their data publicly available, but can be obtained from the corresponding author upon request.

### **Participants**

A total of 564 individuals consented to the mass survey for sample 1, with 467 completing any portion of the STONSI. Because of the nature of the mass survey, we are unable to determine what, if any, other parts of the survey were completed by those who did not start the STONSI or whether they ended participation upon being presented with the STONSI; however, participants were able to skip any questions they did not wish to answer without penalty. Those participants who completed at least part of the STONSI were primarily cisgender women (65.52%) and non-

Hispanic/Latinx white (56.65%), with a mean age of 19.66 ( $SD = 2.33$ ). Additional descriptive characteristics for both samples are available in Table 1.

A total of 327 students completed the prescreening assessment for sample 2. Of these, 290 scored above the threshold for recent depression symptoms, and were invited to participate, with 152 of those completing the baseline session. A small number of participants ( $n = 13$ ) were excluded from further analysis due to invalidity indicators on the Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008/2011), which was concurrently administered as part of this data collection. Specifically, the following scores were used as indicators of invalid responding: cannot say (CNS)  $< 18$ , variable response inconsistency (VRIN-r)  $< 80$ , true response inconsistency (TRIN-r)  $< 80$ , infrequent responses (F-r)  $< 120$ , and infrequent psychopathology responses (Fp-r)  $< 100$ ; these are recommended cutoffs for invalid responding provided developers of the MMPI-2-RF (see Ben-Porath & Tellegen, 2008/2011). An additional two participants were excluded for failing two or more (of five) attention checks embedded into the self-report battery, leaving a total analytic sample of 137 participants. Almost all sample 2 participants were undergraduate students (99.27%), with the majority identifying as cisgender women (70.01%) with White racial identity (77.27%), and a mean age of 20.1 ( $SD = 1.8$ ).

Completion rates for follow-up surveys were high, with 75.91% ( $n = 104$ ), 75.18% ( $n = 103$ ), and 72.26% ( $n = 99$ ) of participants in sample 2 completing the two-week, four-week, and six-week follow-up surveys, respectively. Across all assessments, 89.78% ( $n = 123$ ) of sample 2 participants had data from at least one follow-up survey.

## **Measures**

### ***Demographics and Clinical History***

Sample 1 participants completed a self-report measure of gender identity, race, ethnicity, age, and international student status. Sample 2 participants completed a self-report measure of demographic characteristics including age, gender identity, race, ethnicity, academic year, and first-generation student status (e.g., whether the student has a parent who completed a university degree). Descriptive information for these variables is provided in Table 1.

### ***Personal History of Nonsuicidal Self-Injury***

Sample 1 participants were asked, “have you actually done anything to hurt yourself on purpose, where you weren’t intending to die?” with answer choices of “no” ( $n = 315$ , 68.93%), “yes, in my lifetime but not in the last year” ( $n = 100$ , 21.88%), “yes, within the last year but not the past month” ( $n = 31$ , 6.78%), and “yes, within the past month” ( $n = 11$ , 2.41%). We categorized participants into those with and without any lifetime history of NSSI for subsequent analyses.

For sample 2, at the baseline session, participants were asked to provide the number of times in their life they had engaged in twelve methods of NSSI (plus an “other” category) included on the Inventory of Statements About Self-Injury (Klonsky & Olino, 2008). Lifetime history of NSSI was operationalized as a non-zero response to any of the twelve methods of NSSI assessed ( $n = 104$ , 75.91%). For those who reported at least some lifetime NSSI, follow-up items from the NSSI Disorder Scale (Victor et al., 2017) were asked to assess frequency of NSSI in the past year and/or prior to the past year. As an additional indicator of clinical severity of NSSI, we considered whether perceived public NSSI stigma differed between participants who did or did not endorse engaging in NSSI on five or more days in any given year as a measure of recurrent NSSI based on the DSM-5 NSSI Disorder criterion A (American Psychiatric Association, 2013); 69 (51.11%) participants met this threshold for recurrent NSSI.

### ***Perceived Public Stigma of Nonsuicidal Self-Injury***

The Stigma of Nonsuicidal Self-Injury (STONSI) scale was created for this study based on the Stigma of Suicide Attempt (STOSA) scale developed by Scocco et al. (2012). The STOSA itself was adapted from the Beliefs about Devaluation-Discrimination Scale (Link et al., 1989), which was designed to measure stigma of depression. The STOSA yielded a single-factor structure and stable test-retest reliability over four weeks in prior research (Scocco et al., 2012).

The STONSI includes twelve items that ask how “most people” feel about someone who has engaged in NSSI (e.g., “most people would be reluctant to date a person who has self-harmed”). Participants were informed that the term “self-harm” on this measure referred to non-suicidal behaviors specifically; we elected to use the term “self-harm” rather than “NSSI” because of its greater familiarity and use among community members. There is also a 13<sup>th</sup> control item that assesses the perceived association between NSSI and mental illness which is not included in the total score. Items are rated on a 4-point scale (1 = “strongly disagree”, 4 = “strongly agree”); some items are reverse scored (e.g., “most employers will hire a person who has self-harmed if he or she is qualified for the job”). Higher average scores indicate a greater perceived public stigma of NSSI. The STONSI items and mean endorsement of each item are provided in Table 2, and the endorsement of each response option per item is provided in Table 3.

### **Data Analytic Procedures**

As data were collected using computerized surveys, missing data were uncommon. In sample 1, one participant had missing data for race and ethnicity, and 10 participants had missing data for NSSI history. A total of 15 STONSI items were missing responses across 6,071 expected responses for all participants (0.25%), and only one participant had more than a single item missing. As the scores on the STONSI are calculated using an average, we allowed these participants with missing data to be retained for analyses. In sample 2, across the 137 participants

who completed the baseline session, none were missing data on demographics, personal history of NSSI, or the STONSI.

To examine the factor structure of the STONSI, confirmatory factor analysis (CFA) was conducted using MPlus version 8.6 (Muthén & Muthén, 1998). Prior work has found support for a two-factor structure of the STOSA, but uses a single, unidimensional score as an index of perceived suicide stigma, as the two factors differ only in whether they contain reverse-scored or non-reverse-scored items (Kearns et al., 2015; Scocco et al., 2012; Scocco et al., 2016); thus, we evaluated and compared (using the MPlus DIFFTEST) both single- and two-factor models. In each case, factor variance was set to one, and in the two-factor model, these factors were allowed to correlate. Following best practice recommendations for the use of Likert-type scales (Lubke & Muthén, 2004), items were specified as categorical, and a robust weighted least square estimator (WLSMV) was used, which allows for the retention of participants with missing data unless they are missing all items. Items were expected to demonstrate statistical significance, as well as a standardized loading greater than or equal to .4 (Brown, 2015). Models were compared with respect to root mean squared error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis Index (TLI), and maximum likelihood based standardized root mean squared residual (SRMR) relative to recommended cutoff criteria proposed by Hu and Bentler (1999), specifically, RMSEA values below .06, CFI values above .95, TLI values above .95, and SRMR values below .08.

Bivariate and descriptive analyses in both samples were conducted using SPSS version 29. To compare STONSI scores across individuals with different characteristics (e.g. race/ethnicity, NSSI history), independent samples *t*-tests were used. To examine associations between STONSI scores and dimensional variables (e.g., age), bivariate correlation coefficients were calculated. For

these analyses, results were converted to a standardized effect size metric, Cohen's  $d$  (Cohen, 1998). Meta-scientific work in social psychology research observes distributions of Cohen's  $d$  effect sizes in published literature whereby a  $d$  of 0.15 falls at the 25<sup>th</sup> percentile (relatively small),  $d$  of 0.26 falls at the 50<sup>th</sup> percentile (relatively typical), and a  $d$  of 0.65 falls at the 75<sup>th</sup> percentile (relatively large; Lovakov & Agadullina, 2021); these values are somewhat higher in examination of individual differences research ( $d = 0.22$  at 25<sup>th</sup> percentile,  $d = 0.39$  at 50<sup>th</sup> percentile,  $d = 0.61$  at 75<sup>th</sup> percentile; Gignac & Szordai, 2016). When evaluating Cohen's  $d$ , we will refer to effect sizes of 0.15 to 0.20 as relatively small, 0.25 to 0.40 as relatively typical, and 0.65 and above as relatively large in magnitude.

To examine internal consistency of the STONSI, we used McDonald's omega ( $\omega$ ), which is recommended as a preferred measure of reliability relative to Cronbach's alpha (Hayes & Coutts, 2020; Revelle & Condon, 2019). We derived McDonald's  $\omega$  estimates using the OMEGA macro (Hancock & An, 2020; Hayes, 2020) in SPSS version 29, which uses maximum likelihood estimation and bootstrapping (10,000 samples).

Finally, to examine test-retest stability over multiple waves of follow-up surveys in sample 2, we calculated multilevel intraclass correlation coefficients (ICCs) in MPlus version 8.3. This method allows for variable amounts of follow-up data across participants, and establishes the relative proportion of variance in STONSI scores attributable to between- versus within-person effects. In this context, the ICC value indicates the proportion of variance attributable to between-person differences, with higher values indicating greater stability in STONSI scores (e.g., reduced variance attributable to within-person changes over time).

## Results

### Aim 1: Psychometric Characteristics of the STONSI

Detailed information regarding item characteristics and endorsement rates is provided in Table 2. After reverse scoring, items with the highest endorsement of responses indicative of perceived public NSSI stigma were those capturing global negative evaluation (item 7), reluctance to date someone with a history of NSSI (item 11), unwillingness to accept a person with a history of NSSI as a teacher or childcare provider (items 4 and 6), and perception of NSSI as a sign of personal failure (item 5). Consistent with the intent of the “control” item (13), at least some level of agreement with the connection between NSSI and mental illness was very high (83.51% in sample 1, 94.16% in sample 2).

In both samples, a one-factor model exhibited significant ( $ps < .001$ ) loadings for all items, each of which was above .5 (sample 1 average = .64, sample 2 average = .70). However, overall fit estimates for the one-factor model were poor (sample 1:  $\chi^2(54) = 696.04, p < .001$ , RMSEA = .16, 90% CI = [.15, .17], CFI = .86, TLI = .83, SRMR = .09; sample 2:  $\chi^2(54) = 236.66, p < .001$ , RMSEA = .16, 90% CI = [.14, .18], CFI = .88, TLI = .86, SRMR = .09). We also attempted to replicate the two-factor structure identified by Scocco et al. (2012), but item 10, which was allowed to cross-load in their analyses, did not have a factor loading greater than .5 on either factor. We subsequently tested a model in which item 10 (a reverse-coded item) loaded only onto the factor with all other reverse-coded items, where it loaded as expected ( $p < .001$ ). All other items also exhibited significant ( $ps < .001$ ) loadings on expected factors above .5. Overall fit estimates for the two-factor model were relatively close to the Hu and Bentler (1999) proposed cut-offs but indicative of adequate, rather than good, fit in sample 1 ( $\chi^2(53) = 315.10, p < .001$ , RMSEA = .10, 90% CI = [.09, .11], CFI = .94, TLI = .93, SRMR = .05), while

fit remained poor in sample 2 ( $\chi^2(53) = 220.75, p < .001, RMSEA = .15, 90\% CI = [.13, .17], CFI = .89, TLI = .87, SRMR = .08$ ). Factors were significantly correlated (sample 1  $r = .62$ , sample 2  $r = .87$ ).

As  $\chi^2$  difference testing is not appropriate for models using WLSMV estimators for categorical data, the MPlus DIFFTEST function was used to examine comparative model fit. This test was significant in both samples (sample 1:  $\chi^2(1) = 85.77, p < .001$ ; sample 2:  $\chi^2(1) = 12.11, p < .001$ ), indicating that the two-factor model exhibited significantly improved fit relative to the one-factor model. Results for the two-factor model are presented in Table 4.

We examined the internal consistency of the STONSI using McDonald's  $\omega$  in both samples for two-factor and one-factor solutions. Reliability was good for a single factor score (sample 1  $\omega = .85, 95\% CI = [.82, .87]$ ; sample 2  $\omega = .88, 95\% CI = [.84, .91]$ ;) and for two separate factors (sample 1 factor 1  $\omega = .82, 95\% CI = [.79, .85]$ ; sample 1 factor 2:  $\omega = .80, 95\% CI = [.76, .83]$ ; sample 2 factor 1  $\omega = .83, 95\% CI = [.77, .87]$ ; sample 2 factor 2  $\omega = .80, 95\% CI = [.73, .85]$ ).

Given the significant correlations between factors, and the fact that the factors do not measure conceptually distinct constructs, but rather differ by whether the items are reverse-coded, remaining analyses use the total (average) score for all items. As expected, the STONSI evidenced high levels of between-person (relative to within-person) variability in sample 2, indicating stability over time ( $ICC = .76, 95\% CI = [.69, .83]$ ).

### **Aim 2: Perceived Public NSSI Stigma and Demographic and Clinical Characteristics**

There were only small and not statistically significant differences between cisgender men and women in STONSI scores across samples, with higher scores for cisgender men in sample 1 ( $d = 0.14, 95\% CI = [-0.05, 0.33], p = .15$ ) and the reverse in sample 2 ( $d = -.20, 95\% CI = [-0.58, 0.18], p = .31$ ). Unfortunately, the number of individuals with other gender identities was



too small for comparison. There was also no statistically significant difference in perceived NSSI stigma when comparing non-Hispanic White individuals with participants of other racial/ethnic backgrounds (sample 1  $d = 0.03$ , 95% CI = [-0.16, 0.21],  $p = .79$ ; sample 2  $d = 0.14$ , 95% CI = [-0.19, 0.48],  $p = .41$ ); however, heterogeneity within the group of individuals who did not identify as non-Hispanic White may have obscured racial/ethnic differences in perceived public NSSI stigma. We also tested whether STONSI scores would differ between non-Hispanic individuals and people of Hispanic or Latinx descent of any race, but no significant differences were found (sample 1  $d = 0.02$ , 95% CI = [-0.18, 0.22],  $p = .84$ ; sample 2  $d = 0.11$ , 95% CI = [-0.25, 0.48],  $p = .54$ ). Although there was no statistically significant association between NSSI stigma and age (sample 1  $d = 0.16$ , 95% CI = [-0.03, 0.34],  $p = .09$ ; sample 2  $d = 0.29$ , 95% CI = [-0.06, 0.63],  $p = .1$ ), the relatively restricted age range of our sample limits strong inferences in this regard. In sum, we did not observe associations between NSSI stigma and gender, race, ethnic identity, or age in either sample.

### **Aim 3: Perceived Public NSSI Stigma and Personal NSSI History**

We first examined whether perceived public NSSI stigma varied based on any lifetime history of NSSI, with nonsignificant results (sample 1  $d = 0.05$ , 95% CI = [-0.15, 0.25],  $p = .63$ ; sample 2  $d = -0.25$ , 95% CI = [-0.65, 0.14],  $p = .20$ ). This was also the case when comparing individuals with less recent NSSI (occurring more than a year ago) to individuals with recent NSSI (within the past year) in both samples (sample 1  $d = 0.02$ , 95% CI = [-0.34, 0.38],  $p = .91$ ; sample 2  $d = 0.14$ , 95% CI = [-0.25, 0.53],  $p = .49$ ).

As more NSSI characteristics were assessed in sample 2, additional analyses examining NSSI severity and NSSI stigma were possible for those participants with any history of NSSI ( $n = 104$ ). There were no statistically significant differences in STONSI scores between participants

with five or more episodes of NSSI in a single year, an indicator of severity used in the DSM-5 NSSI Disorder criteria, compared to those with fewer ( $d = 0.35$ , 95% CI = [-0.07, 0.76],  $p = .11$ ) or between participants with and without NSSI behaviors over the six-week follow-up ( $d = 0.38$ , 95% CI = [-0.24, 1.00],  $p = .23$ ). However, number of NSSI methods over one's lifetime ( $M = 4.13$ ,  $SD = 2.26$ ) was positively correlated with STONSI scores among individuals with any NSSI history ( $d = 0.71$ , 95% CI = [0.31, 1.14],  $p < .001$ ). Overall, most aspects of personal NSSI history, other than number of NSSI methods, were not associated with NSSI stigma.

### Discussion

The focus of this work was two-fold: 1) to develop and test the psychometric properties of a novel measure of perceived public stigma of NSSI, and 2) to examine demographic and clinical correlates of perceived public NSSI stigma in young adults, as a group that is at elevated risk of NSSI (Kiekens et al., 2018; Swannell et al., 2014) and for whom perceived stigma may impact help-seeking (Kearns et al., 2015). We modified an existing measure of perceived public stigma towards suicidal behavior, the STOSA (Scocco et al., 2012) to address perceived public stigma towards NSSI, and administered the adapted measure (STONSI) to two samples of undergraduate students, one larger and unselected for clinical symptoms (sample 1) and one smaller with clinically elevated depressive symptoms enrolled in a short-term prospective study (sample 2).

We found some support for both one- and two-factor models of the STONSI, consistent with prior work by Scocco et al. (2012). In this case, comparative model fit indices provided support for a two-factor structure, although these factors were highly correlated, differentiated only by the type of item (reverse-scored versus non-reverse-scored), and internal consistency was greater when examined using a single factor, leading us to use a total score for remaining

analyses. We also found that the scale exhibits good test-retest stability over four assessments across a six-week period, expanding on prior work with the STOSA which was examined over two assessments (Scocco et al., 2012).

Poorer model fit, relative to the STOSA, may be due to the use of CFA, rather than Principal Components Analysis (PCA), which was used by the STOSA's developers. Although PCA is often described as factor analysis, it is actually designed to reduce data into fewer variables (e.g., to maximize the amount of variance explained by retained variables), rather than to identify latent constructs; thus, results may not be comparable across methodologies (Brown, 2015). We also observed generally low endorsement of NSSI stigma across items (see Table 2), which may be unique to our samples and could have influenced model fit for factor analyses. Future research in diverse samples may clarify whether there is added utility in examining the STONSI with two subscale scores; however, given that the factors differ primarily in whether the items required reverse coding, and not in other substantive ways, we recommend that a full-scale total score be used to capture the construct of perceived public NSSI stigma.

Given psychometric support for the STONSI in these samples, we then examined whether perceived public NSSI stigma was associated with a variety of demographic and clinical features relevant to our understanding of NSSI stigma. Consistent with prior research on suicide (Kearns et al., 2015; Scocco et al., 2016) and NSSI (Burke et al., 2019) stigma, we found no significant gender effects in perceived public NSSI stigma in this sample. There was also no significant relationship to age, although the samples were restricted in this domain.

We also found no significant association between racial/ethnic background and NSSI stigma, although the number of individuals who identified as a race other than White (whether Hispanic/Latinx or not) limits our ability to make inferences about NSSI stigma across the entire

spectrum of racial identities. As racial and ethnic minority students are more likely to endorse perceived stigma and privacy concerns as barriers to mental health treatment (Horwitz et al., 2020), understanding perceived NSSI stigma in minoritized people is especially important, and future studies should continue to examine this construct in diverse samples. Of note, about one-third of our samples identified as Hispanic/Latinx ethnic descent, and those individuals did not differ from non-Hispanic/Latinx White participants in perceived NSSI stigma. In prior research, Hispanic college students had the highest endorsement of mental health treatment barriers related to privacy and perceived stigma across all ethnic groups (Horwitz et al., 2020), although this could be due to differences in the *implications* of perceived stigma for willingness to seek treatment, rather than differences in the *perceived magnitude* of stigma. Our results suggest that interventions with this population to improve help-seeking may be most fruitful if focused on the consequences and appraisals of perceived stigma, rather than stigma itself, as a contributor to help-seeking disparities.

Finally, we considered how a personal history of NSSI may relate to perceived public NSSI stigma. In general, personal experiences with NSSI were not associated with differences in perceived public NSSI stigma, other than the number of NSSI methods in one's lifetime, or NSSI versatility. This finding is noteworthy, as NSSI versatility appears to be one of the most robust indicators of clinical severity and suicide risk among individuals who engage in NSSI (Robertson et al., 2013; Turner et al., 2013; Victor & Klonsky, 2014). NSSI versatility may also be a better indicator of medical severity of NSSI than frequency or other characteristics, as low-severity NSSI methods (such as interference with wound healing) are typically engaged in much more frequently than higher-severity NSSI methods (such as swallowing dangerous substances or carving oneself; Saraff & Pepper, 2014), which may impact the relationship between omnibus

measures of NSSI frequency and clinical outcomes. Finally, NSSI versatility has been associated with sensitivity to punishment, which may exacerbate perceptions of public stigma towards a personally relevant experience, such as NSSI (Robertson et al., 2013). Clarifying the impact of perceived public NSSI stigma on help-seeking in individuals who use more methods of NSSI is an important direction for future research.

Prior research has observed that, among people with a history of NSSI, increased engagement in NSSI was associated with lower explicit stigma towards the behavior, but no effect on implicit stigma (Piccirillo et al., 2020). Our findings may provide support for an association between NSSI severity (indexed by versatility) as a predictor of more implicit biases towards NSSI, which can be more effectively captured using measures tied to perceived stigma due to the reduced influence of social desirability biases. It is also possible, however, that our findings are driven by differential experiences with others, which increase perceived public stigma of NSSI. Individuals with a more extensive history of NSSI may be more likely to disclose their NSSI to others (Armiento et al., 2014) or to have others become aware of their NSSI unintentionally, for instance, because of the necessity to seek medical attention. It is plausible that such disclosures may lead to overt discrimination or prejudice based on their experiences with NSSI (Simone & Hamza, 2020), which could contribute to greater perceived public stigma. This is consistent with recent work that demonstrated, among adults with a history of NSSI, perceived negative reactions to NSSI disclosure were positively associated with internalized stigma of mental illness (Ammerman & McCloskey, 2020). It is important to note, however, that perceived public stigma of mental illness is only weakly correlated with personal stigma towards mental illness (Griffiths et al., 2008), highlighting the need to disentangle associations between perceived public and personal stigma of NSSI among those with a history

of these behaviors. Further research using prospective study designs is needed to rigorously evaluate these possibilities.

Like any empirical research study, ours has several limitations that should be considered when interpreting our results. First, our samples were comprised almost entirely of undergraduate students from a single university. Despite the use of two different sampling strategies, enhancing generalizability for college students, it is possible that the perceptions of NSSI stigma observed in our samples may differ from young adults who are not enrolled in higher education, as well as from other age groups. Further, our second sample was recruited for recent depressive symptoms; although depression and NSSI frequently co-occur (Bentley et al., 2015), findings may differ in samples with other, or no, related psychopathology. Second, our examination of perceived public NSSI stigma and clinical features was based on cross-sectional findings; future research should investigate the possibility of unidirectional or bidirectional longitudinal associations between perceived NSSI stigma and NSSI severity. Third, the STONSI taps perceived public stigma, which may be less prone to reporting biases than assessments of an individual's own endorsement of stigmatizing views, but also leaves us with additional questions regarding the extent to which these prejudices are, in fact, common in the population, and to what extent they reflect personally held views of our participants. Fourth, we did not investigate the predictive utility of the STONSI in relation to other relevant outcomes, such as help-seeking; although an important area of further study, these questions speak to the relative impact of perceived public NSSI stigma on clinically meaningful outcomes, rather than the validity and reliability of the STONSI itself. In spite of these limitations, these results further our ability to investigate NSSI stigma through the development of a valid and reliable measure of perceived

public stigma of NSSI, as well as inform our understanding of how perceived NSSI stigma may relate to clinical severity in the high-risk population of young adults.

Taken together, these results provide not only support for a novel measure of perceived public NSSI stigma for use in future research, but also preliminary evidence for associations between perceived NSSI stigma and NSSI versatility. These data may inform anti-stigma interventions targeted to those most at risk of negative consequences due to perceived stigma, such as those experiencing higher severity NSSI. We were also able to examine test-retest reliability of the STONSI over four assessments at two-week intervals, expanding our understanding of the temporal stability of perceived stigma in young adults. Future work should continue to examine the psychometric properties of the STONSI in diverse samples representative not only of individuals at high likelihood of NSSI engagement, such as young adults, but also among those likely to respond to NSSI disclosures, such as parents, educators, and health care professionals.

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**Table 1***Demographic and Clinical Characteristics*

| Variable                           | Sample 1     | Sample 2     |
|------------------------------------|--------------|--------------|
| <b>Gender Identity</b>             | <i>n</i> (%) | <i>n</i> (%) |
| Man : Cisgender male               | 157 (33.62)  | 37 (27.01)   |
| Woman : Cisgender female           | 306 (65.52)  | 96 (70.01)   |
| Trans Man : Transgender male       | 0 (0.00)     | 0 (0.00)     |
| Trans Woman: Transgender female    | 1 (0.21)     | 1 (0.73)     |
| Other                              | 3 (0.64)     | --           |
| Genderqueer/gender non-conforming  | --           | 2 (1.46)     |
| Prefer not to answer               | --           | 1 (0.73)     |
| <b>Academic Year</b>               |              |              |
| Freshman                           | --           | 40 (29.20)   |
| Sophomore                          | --           | 23 (16.79)   |
| Junior                             | --           | 37 (27.01)   |
| Senior                             | --           | 36 (26.28)   |
| Graduate student                   | --           | 1 (0.73)     |
| First Generation Student           | --           | 43 (33.86)   |
| International Student              | 4 (0.86)     | --           |
| Hispanic/Latino/a Ethnicity        | 133 (28.54)  | 40 (29.20)   |
| <b>Race</b>                        |              |              |
| White                              | 286 (61.37)  | 106 (77.37)  |
| Black/African-American             | 30 (6.44)    | 11 (8.03)    |
| Asian/Asian-American               | 23 (4.94)    | 6 (4.38)     |
| American Indian/Alaska Native      | 1 (0.21)     | 1 (0.73)     |
| Arab/Arab-American                 | 1 (0.21)     |              |
| Native Hawaiian/Pacific Islander   | --           | 0 (0.00)     |
| Multiracial or other               | 30 (6.44)    | 13 (9.49)    |
| <b>NSSI Characteristics</b>        |              |              |
| Any Lifetime History               | 142 (31.07)  | 104 (75.91)  |
| Past Year NSSI                     | 42 (9.19)    | 56 (54.37)   |
| 5+ NSSI Episodes in Any Year       | --           | 69 (67.65)   |
| NSSI Behavior over Follow-Up       | --           | 12 (15.00)   |
| <b>Suicidality Characteristics</b> |              |              |
| Any Lifetime Suicide Ideation      | 229 (50.22)  | 83 (60.58)   |
| Past Year Suicide Ideation         | 101 (22.15)  | 38 (27.74)   |
| Any Lifetime Suicide Attempt       | 65 (14.25)   | 28 (20.44)   |
| Past Year Suicide Attempt          | 20 (4.39)    | 8 (5.84)     |

*Note.* Two dashes (--) indicates that this question or response option was not provided for a particular sample. For gender identity, terms listed before the colon were used for sample 1, and terms following the colon were used for sample 2. In sample 1, items assessing race and ethnicity



were combined, allowing for individuals to select Hispanic/Latino/a only or in combination with other identities, whereas in sample 2, these items were separated.

**Table 2*****STONSI Items and Psychometric Properties***

| Item   | Sample 1<br><i>M (SD)</i> | Sample 2<br><i>M (SD)</i> |
|--|---------------------------|---------------------------|
| 1. Most people would willingly accept a person who self-harmed as a close friend. (R)  | 2.15 (0.73)               | 2.28 (0.81)               |
| 2. Most people believe that a person who has self-harmed is just as intelligent as the average person. (R)                                   | 2.20 (0.77)               | 2.42 (0.87)               |
| 3. Most people believe that a person who has self-harmed is just as trustworthy as the average person. (R)                                   | 2.21 (0.77)               | 2.55 (0.84)               |
| 4. Most people would accept a person who has self-harmed, and is healthy at the time, as a teacher of young children in a public school. (R) | 2.43 (0.85)               | 2.80 (0.93)               |
| 5. Most people feel that self-harm is a sign of personal failure.  | 2.41 (0.84)               | 2.75 (0.93)               |
| 6. Most people would not hire a person who has self-harmed to take care of their children, even if he or she has been well for some time.    | 2.39 (0.81)               | 2.74 (0.89)               |
| 7. Most people think less of a person who has self-harmed.   | 2.46 (0.83)               | 2.74 (0.85)               |
| 8. Most employers will hire a person who has self-harmed if he or she is qualified for the job. (R)  | 2.05 (0.70)               | 2.09 (0.78)               |
| 9. Most employers will pass over the application of a person who has self-harmed in favor of another applicant.                              | 2.30 (0.74)               | 2.47 (0.84)               |
| 10. Most people in my community would treat a person who has self-harmed just as they would treat anyone. (R)                                | 2.27 (0.80)               | 2.66 (0.93)               |
| 11. Most people would be reluctant to date a person who has self-harmed.   | 2.49 (0.74)               | 2.77 (0.84)               |
| 12. Once they know a person is a person who has self-harmed, most people will take their opinion less seriously.                             | 2.08 (0.74)               | 2.20 (0.87)               |
| 13. Most people think that a person who has self-harmed has a mental illness.  | 3.15 (0.77)               | 3.53 (0.68)               |
| Average  | 2.29 (0.48)               | 2.54 (0.58)               |

*Note.* Items that reflect more positive appraisals of individuals with a history of NSSI have been reverse scored, indicated by (R); thus, agreement always indicates *greater* perceived public stigma.

**Table 3*****STONSI Items Endorsement Rates across Response Options***

| Item   | Sample 1                          |                          |                       |                                | Sample 2                          |                          |                       |                                |
|--------|-----------------------------------|--------------------------|-----------------------|--------------------------------|-----------------------------------|--------------------------|-----------------------|--------------------------------|
|        | Strongly Disagree<br><i>n</i> (%) | Disagree<br><i>n</i> (%) | Agree<br><i>n</i> (%) | Strongly Agree<br><i>n</i> (%) | Strongly Disagree<br><i>n</i> (%) | Disagree<br><i>n</i> (%) | Agree<br><i>n</i> (%) | Strongly Agree<br><i>n</i> (%) |
| 1 (R)  | 13 (2.78)                         | 125 (26.76)              | 247 (52.89)           | 82 (17.55)                     | 9 (6.56)                          | 42 (30.65)               | 64 (46.71)            | 22 (16.05)                     |
| 2 (R)  | 14 (3)                            | 152 (32.61)              | 212 (45.49)           | 88 (18.88)                     | 13 (9.48)                         | 54 (39.41)               | 48 (35.03)            | 22 (16.05)                     |
| 3 (R)  | 14 (2.99)                         | 157 (33.61)              | 210 (44.96)           | 86 (18.41)                     | 13 (9.48)                         | 68 (49.63)               | 38 (27.73)            | 18 (13.13)                     |
| 4 (R)  | 46 (9.89)                         | 169 (36.34)              | 187 (40.21)           | 63 (13.54)                     | 37 (27)                           | 47 (34.3)                | 42 (30.65)            | 11 (8.02)                      |
| 5      | 70 (15.05)                        | 173 (37.2)               | 184 (39.56)           | 38 (8.17)                      | 13 (9.48)                         | 41 (29.92)               | 50 (36.49)            | 33 (24.08)                     |
| 6      | 63 (13.51)                        | 193 (41.41)              | 177 (37.98)           | 33 (7.08)                      | 12 (8.75)                         | 41 (29.92)               | 55 (40.14)            | 29 (21.16)                     |
| 7      | 65 (13.94)                        | 157 (33.69)              | 207 (44.42)           | 37 (7.93)                      | 12 (8.75)                         | 35 (25.54)               | 66 (48.17)            | 24 (17.51)                     |
| 8 (R)  | 8 (1.72)                          | 100 (21.55)              | 262 (56.46)           | 94 (20.25)                     | 6 (4.37)                          | 31 (22.62)               | 70 (51.09)            | 30 (21.89)                     |
| 9      | 63 (13.54)                        | 218 (46.88)              | 167 (35.91)           | 17 (3.65)                      | 16 (11.67)                        | 56 (40.87)               | 50 (36.49)            | 15 (10.94)                     |
| 10 (R) | 25 (5.35)                         | 155 (33.19)              | 208 (44.53)           | 79 (16.91)                     | 28 (20.43)                        | 51 (37.22)               | 42 (30.65)            | 16 (11.67)                     |
| 11     | 46 (9.91)                         | 169 (36.42)              | 226 (48.7)            | 23 (4.95)                      | 9 (6.56)                          | 41 (29.92)               | 60 (43.79)            | 27 (19.7)                      |
| 12     | 96 (20.55)                        | 250 (53.53)              | 107 (22.91)           | 14 (2.99)                      | 29 (21.16)                        | 62 (45.25)               | 35 (25.54)            | 11 (8.02)                      |
| 13     | 15 (3.21)                         | 62 (13.27)               | 229 (49.03)           | 161 (34.47)                    | 3 (2.18)                          | 5 (3.64)                 | 46 (33.57)            | 83 (60.58)                     |

*Note.* For ease of interpretation, items that require reverse scoring are indicated by (R), but endorsement of response options reflects the item as worded.

**Table 4***Standardized Factor Loadings for STONSI Items*

| Item  | Sample 1       |                | Sample 2       |                |
|---|----------------|----------------|----------------|----------------|
|   | Factor 1       | Factor 2       | Factor 1       | Factor 2       |
| 1. willingly accept as a close friend (R)     | .77 [.73, .82] |                | .85 [.79, .91] |                |
| 2. just as intelligent (R)                    | .85 [.82, .89] |                | .78 [.70, .86] |                |
| 3. just as trustworthy (R)                    | .82 [.78, .86] |                | .76 [.68, .83] |                |
| 4. accept as a teacher of young children (R)  | .66 [.61, .72] |                | .69 [.60, .78] |                |
| 5. sign of personal failure                   |                | .63 [.58, .69] |                | .53 [.40, .66] |
| 6. would not hire to take care of children    |                | .67 [.61, .72] |                | .70 [.60, .79] |
| 7. think less of                              |                | .77 [.73, .82] |                | .86 [.79, .92] |
| 8. will hire if qualified for the job (R)     | .63 [.56, .70] |                | .71 [.61, .81] |                |
| 9. will pass over for another applicant       |                | .78 [.73, .83] |                | .70 [.59, .81] |
| 10. treat just as they would treat anyone (R) | .59 [.52, .66] |                | .70 [.60, .80] |                |
| 11. reluctant to date                         |                | .62 [.56, .69] |                | .58 [.47, .70] |
| 12. take their opinion less seriously         |                | .66 [.60, .73] |                | .79 [.72, .87] |

*Note.* All factor loadings were statistically significant at  $p < .05$ . Bracketed values represent 95% confidence intervals. (R) indicates an item that is reverse scored. Factor correlations: sample 1  $r = .62$ , sample 2  $r = .87$ .