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Explicit and implicit measurement of nonsuicidal self-injury in the prediction of concurrent and prospective self-injury

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Abstract

Objective: The relationship between explicit nonsuicidal self-injury (NSSI) behavior and implicit identification with NSSI is important to understand considering the under-reported nature of NSSI and the subsequent elevated risk of more severe NSSI. It was expected that implicit assessment of NSSI at baseline would be associated with past-year NSSI frequency assessed at baseline and that it would more strongly associate with NSSI frequency than self-reported future likelihood of NSSI at a 6-month follow-up.

Method: Data were collected from 420 young adults (mean age = 19; 83% women, 87% White) with recent NSSI at baseline, and 324 were assessed at 6-month follow-up. Participants completed self-report measures and the Self-Injury Implicit Association Task (SI-IAT) at each time point.

Results: Baseline implicit NSSI scores significantly predicted NSSI frequency at baseline but not at 6-month follow-up. However, explicit ratings were strongly and significantly associated with future NSSI frequency.

Conclusions: These findings suggest that although implicit identification with oneself and NSSI is important to understand, there are limitations regarding the possible utility of the SI-IAT in predicting future NSSI engagement and further research is needed to fully understand why NSSI continues to be such a strong predictor of future NSSI behavior, and suicidal ideation and behavior.

INTRODUCTION

Suicide remains a public health concern as the second leading cause of death for 15- to 29-year-olds in the United States (Centers for Disease Control and Prevention [CDC], 2018); thus, it is important to investigate a robust risk factor for suicidal thoughts and behaviors: nonsuicidal self-injury (NSSI). NSSI is intentional self-inflicted damage to the surface of the

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ETHICS APPROVAL

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

CONFLICTS OF INTEREST

None.

body in the absence of lethal intent, such as cutting or burning of the skin (Nock, 2010). Typical age of onset for NSSI is around 14, and 9–18% of college students report engaging in NSSI during their time at university (Taliaferro & Muehlenkamp, 2014). Clinicians and researchers often rely on explicit self-report measures to gauge the presence, features, and functions of NSSI, but these disclosures are fraught with problems such as accuracy and fear of social stigmatization. Using a more objective-based measurement of NSSI, such as an implicit association task, could be utilized to supplement self-report measures, particularly with young adults who may be hesitant to disclose self-injury. The current study sought to evaluate how well an implicit measurement of NSSI associated with past-year and future NSSI frequency compared to explicit self-report assessments of NSSI in a sample of young adults with past-year NSSI.

Relying on self-report to assess NSSI is often limited by retrospective memory of these specific behaviors and reluctance to explicitly acknowledge self-injurious or suicidal thoughts, due to stigmatization or fear of hospitalization (Lloyd et al., 2018; Rosenrot & Lewis, 2020). One study found that 78% of patients who died by suicide explicitly denied suicidal thoughts in their last communication before killing themselves (Busch et al., 2003). Disclosure data are similar for NSSI, as large portions of self-injuring college students (57%) reported that they had never disclosed their NSSI behavior to anyone (Armiento et al., 2014). Furthermore, initial research suggests that disclosure of severe NSSI and suicide ideation may be more likely to be made to peers or romantic partners and not mental health or medical professionals (Armiento et al., 2014). The tendency to not disclose NSSI and suicidal thoughts encouraged researchers to examine more objective behavioral markers of NSSI and suicide risk, such as implicit testing, in an effort to improve assessment.

The death/suicide IAT (d/s-IAT; Nock & Banaji, 2007b) is a computer-based implicit association task that assesses individuals' automatic mental associations they hold about death/suicide and life. The task measures how long it takes an individual to categorize words associated with each of the following four categories: *death*/*suicide*, *life*, *me*, and *not me*. Research indicates that individuals who repeatedly perform specific behaviors, such as those related to self-harm, have physiological changes in neural activity. These changes promote more neural activity in response to the habitual behavior which theoretically means that individuals should have stronger attentional bias toward stimuli associated with the repetitive behavior. Therefore, they will hold stronger mental associations regarding their implicit association with the construct being measured in the IAT. Responses to pairs of stimuli are faster when the combined stimuli categories are strongly associated in memory. Nock et al. (2010) measured implicit associations to death/suicide in patients in emergency psychiatric departments who did or did not make a suicide attempt in the previous week. Implicit associations toward death/suicide were stronger for those with a recent suicide attempt than individuals who had no suicide attempt. Additionally, higher death/suicide association corresponded to a nearly sixfold increase in odds of a suicide attempt in the following 6 months, which exceeded the patient and clinicians' predictions. Thus, there is initial evidence for the potential clinical utility of the IAT to measure potential suicide risk in addition to self-report measures.

The IAT has been used extensively to examine nonclinical constructs such as gender (Nosek, Banaji, & Greenwald, 2002) and racial stereotypes (Olsson et al., 2005). The IAT has been shown to have strong reliability (Cunningham et al., 2001), construct validity (Lane et al., 2007), sensitivity to clinical change (Teachman & Woody, 2003), and detection of attempts to "fake good" (Banse et al., 2001). The IAT has also been modified to measure implicit association with NSSI. This behavioral task is similar to the d/s-IAT, with the major difference being that the Self-Injury Implicit Association Test (SI-IAT; Nock & Banaji, 2007a) uses words and images as stimuli, rather than solely using words. The SI-IAT presents participants with a series of images that are either related to self-injury (i.e., pictures of skin that has been cut) or neutral (i.e., pictures of uncut skin) and asks participants to classify these concepts as "cutting" or "no cutting." Participants are then presented with words that are self-relevant (e.g., *I, Mine*) or other-relevant (e.g., *They, Them*) and directed to classify these words as quickly as possible in groups representing "me" or "not me."

The SI-IAT has been shown to differentiate between individuals with and without NSSI history (Dickstein et al., 2015; Nock & Banaji, 2007b), and to predict subsequent engagement in NSSI during a hospital stay in an adolescent inpatient sample (Cha et al., 2016). In a school-based community sample of adolescents, those with lifetime NSSI exhibited stronger self-identification with NSSI than those with no NSSI history, and SI-IAT scores uniquely and prospectively predicted NSSI engagement over the subsequent year (Glenn et al., 2016). The empirical evidence thus far indicates that implicit tasks measuring NSSI may offer important information that extends beyond self-report. However, limitations of these studies include sample size/base rates (relatively smaller clinical samples; large samples of adolescents with lower base rates of lifetime NSSI), assessing only lifetime NSSI, and limited prospective analysis of future behavior. Focusing on individuals with past-year NSSI engagement and their prospective NSSI behavior will provide a clearer picture of how NSSI behavior at one time point may associate with the behavior at another time point, and whether implicit or explicit measurement of NSSI better predicts future NSSI.

Rationale and hypotheses

Identifying whether explicit (self-reported) NSSI behavior or implicit identification with NSSI are more strongly related to concurrent and future NSSI is important, especially given the under-reported nature of NSSI. Establishing solid assessment of NSSI that may help predict future NSSI is also beneficial since continued and more severe NSSI can ultimately increase risk of future suicidal thoughts or behaviors (Ribeiro et al., 2016; Whitlock et al., 2003). Therefore, fully understanding how best to assess NSSI and how implicit association with NSSI may relate to its severity is of vital clinical importance. One goal of the present study was to examine the association between implicit identification with NSSI, as measured by the SI-IAT, and NSSI frequency in a sample of young adults with recent NSSI. Another goal was to examine whether SI-IAT scores at baseline would be a better predictor of future NSSI behavior than self-reported likelihood of future NSSI behavior at 6-month follow-up. It was hypothesized that (1) SI-IAT scores at baseline would be significantly and positively associated with NSSI frequency in the past year (also assessed at baseline), and (2) baseline

SI-IAT scores would be significantly and positively associated with NSSI frequency at 6-month follow-up, and they would be stronger predictors than self-reported likelihood of future NSSI.

METHOD

Participants

Data were collected from 421 young adults; of those, 324 completed Time 2 data collections (retention rate = 77%). Inclusion criteria for the study included being between 18 and 25 years old, reporting any NSSI in the past 12 months at the baseline assessment, and fluency in English. The majority of the sample identified as female (82.6%, $n = 348$), 11.8% identified as male, and 5.4% identified as other. The mean age of the sample was 18.92 (SD=1.38); the majority were Caucasian (87.2%) and heterosexual (63.4%). The remaining participants identified as Black/African American (2.6%), Hispanic (1.7%), Asian/Pacific Islander (2.1%), multi-ethnic (1.0%), and 0.5% identified it as “other.” The majority of the sample were 1st-year college students (60.1%). The remaining were 2nd-year students (28.7%), 3rd-year students (9.3%), 4th-year students (1.2%), and-5th year students (0.2%). Most participants (62.2%) were not currently in treatment. At baseline, the past-year NSSI mean frequency was 9.43 ($SD = 16.56$), the median was 3, and the range was 1–94. Mean number of NSSI methods at baseline was 3.77 ($SD = 1.93$), ranging from 1 to 9, and cutting was endorsed by 81.7% of the sample. Of the 324 participants that completed the 6-month follow-up, 44.8% ($n = 189$) reported NSSI during the follow-up, with a NSSI frequency range of 1–50, mean of 4.21 ($SD = 8.7$), and a median of 1. Comparisons were made between participants who completed both time points and those who only completed T1. There were no significant differences found for mean age, gender, ethnicity, sexual orientation, year in school, or being currently in treatment (Table 1). These groups were also examined for differences in baseline SI-IAT scores, past-year NSSI frequency at baseline, and lifetime NSSI frequency at baseline. Only lifetime NSSI frequency was significantly different, with participants completing T1 only reporting higher lifetime frequency of NSSI than those who completed both time points ($M_{T1only} = 111.24$, SD = 197.5; $M_{both} = 62.07$, SD = 121.16; $F(1, 363) = 5.87$, $p = 0.02$). Past-year NSSI frequency did not differ.

Procedure

Participants were recruited from an online screening survey administered at two different public universities: one in the south central and one in the midwestern region of the United States. Individuals with self-reported NSSI in the past 12 months were contacted and offered the opportunity to participate in the longitudinal study. The study received approval from the Institutional Review Boards at both universities. Participants completed informed consent paperwork and were screened with a wrap-around risk assessment based on the University of Washington Risk Assessment Protocol (UWRAP; Linehan et al., 2012) to assess distress and suicide risk. If a participant reached the predetermined threshold of risk, additional assessment of imminent risk for suicide and referral protocols were initiated. Five baseline participants and two at 6-month follow-up needed assessment for imminent risk. After pre-assessment risk was assessed, participants completed a series of self-report and behavioral tasks on a laptop computer in the research laboratory that typically took 30–

45 min to complete. After task completion and the subsequent post-assessment UWRAP evaluation, the participant was paid $20 each time for their participation. Participants were debriefed about the study and given student mental health and community-based resources. Participants were contacted six months after the baseline assessment and given the opportunity to participate in the study again. At the 6-month follow-up, participants completed the same research protocol, except NSSI behavior in the past 6 months was assessed instead of lifetime and past-year history.

Measures

Demographics—Demographics were assessed in a questionnaire with open-ended questions asking the participants' age, gender, sexual orientation, ethnicity, year in school, and if they were currently in treatment.

Implicit Association Test: Self-Injury—The Self-Injury Implicit Association Test is a computerized test that measures participants' implicit associations based on their reaction time or latency in categorizing stimuli (Nock & Banaji, 2007a). The IAT is administered via computer. Participants read instructions that indicate stimuli will appear in the middle of the screen and should be sorted into their corresponding categories as fast as possible. The "e" key is pressed for stimuli belonging to the category on the left, or the "i" key for the category on the right. The tests occur over two blocks: the first trial block consists of participants sorting words pertaining to "me" (e.g., *I*, *Mine*) and "other" (e.g., *They*, *Them*); essentially, "me" and "not me" categories. Correct classification of stimuli results in presentation of the next stimuli, and a red "X," which remains in the middle of the screen until the correct key is pressed follows incorrect pairings. The SI-IAT assesses implicit association with self-injury stimuli (images) that depict cutting. The first block pairs "cutting" and "me" stimuli, and "no cutting" and "not me" stimuli together. The second block of trials presents opposite responses, with pairing of "cutting" and "not me" and "no cutting" and "me." The participant sorts all words for each block, with each block containing two trials for a total of four trials. Upon task completion, the response latencies from both blocks are recorded and algorithmically scored prescribing to Greenwald et al. (2003). The subsequent score indicates the relative strength of association between self-injury and oneself, referred to as the participants' *d*-score. To calculate the *d*-score, the average response latency of the "cutting" and "me" block is subtracted from the average latency of "cutting" and "not me" block and is divided by the standard deviation from responses across all trials. A positive *d*-score occurs when participants respond comparatively faster when self-injury and oneself are paired. A negative *d*-score is the converse, a weaker association when oneself is paired with self-injury. All participants completed both condition blocks, and the order of administration was randomized. A meta-analysis of IAT predictive validity (Greenwald et al., 2009) found that it significantly exceeded predictive validity of self-report measures, but only in domains regarding high social sensitivity, such as self-harm behavior. Test–retest reliability of IAT measures was reported to have a median value of $r = 0.56$ across nine available reports (Nosek et al., 2007). In the current sample, the 6-month test–retest reliability of the SI-IAT was good, $r = 0.46$, $p < 0.001$.

Self-Injurious Thoughts and Behaviors Interview—short form—The Self-Injurious Thoughts and Behaviors Interview (SITBI)—short form is a 72-item self-report questionnaire about past occurrences and characteristics of suicidal ideation, gestures, plans, and attempts (Nock et al., 2007). Items included in the current study assessed NSSI past-year engagement and frequency. Additionally, an item that asks participants to rate their future likelihood of engaging in NSSI on a scale of 0 (low/little) to 4 (very much) was used as the explicit measure of future NSSI. At 6-month follow-up, items assessing NSSI engagement and frequency during the time since baseline were used. The SITBI has strong interrater reliability ($average_K$ = .99, r = 1.0) and test–retest reliability ($average_K$ = .70, intraclass correlation coefficient = .44) over a 6-month period. Concurrent validity for the SITBI was shown via strong agreement between the SITBI and other measures of suicidal ideation ($average_K$ = .54), suicide attempts ($average_K$ = .65), and NSSI ($average_K$ = .87) (Nock et al., 2007). In the current sample, 6-month test–retest reliability was calculated for past-month NSSI (r = 0.41, p < 0.001), past-week NSSI (r = 0.37, p < 0.001), and future likelihood of engaging in NSSI ratings (r = 0.61, p < 0.001).

RESULTS

Data management

Descriptive statistics including demographic information (gender, age, race/ethnicity, sexual orientation), and the means and standard deviations for the primary outcome variables (SI-IAT *d*-score, NSSI frequency) were calculated. For the past-year NSSI frequency variable, values that were three or more standard deviations above the means were replaced with the next highest value, winsorizing the data to manage outliers. Additionally, *t* tests and chi-square analyses were performed to determine whether or not the separate university samples were significantly different at baseline on any demographic or self-harm–related variables. See Table 2 for descriptive statistics and correlations between the main study variables.

Demographics statistics—Chi-square and *t* test analyses were conducted to determine whether participants varied across university samples based on measures of gender, race, age, and school year prior to testing study hypothesis. Chi-square analyses found proportions of year in school and gender to be similar across university samples, $\chi^2(4) = 2.69$, $p = 0.61$, and $\chi^2(5) = 5.104$, $p = 0.40$, respectively. The south-central university sample had significantly greater proportions of individuals identifying as bisexual and gay/lesbian and fewer individuals identifying as heterosexual than the midwestern university, $\chi^2(5) = 14.20$, $p = 0.014$. The south-central university also had greater diversity regarding race/ethnicity than the midwestern university (greater proportions of all non-Hispanic White minorities), $\chi^2(5) = 13.87$, $p = 0.016$. The samples did not differ on mean age, $t(417) = 0.78$, $p = 0.43$.

Hypothesis testing—To test the hypothesis that SI-IAT baseline scores would be significantly associated with past-year NSSI frequency, a linear regression analysis was used. Baseline scores of the SI-IAT were entered as the independent variable and past-year NSSI frequency as the dependent variable. The overall model was significant, $F(1,399)$

=10.93, $p < 0.01$, and $R^2 = .03$, and baseline SI-IAT scores significantly predicted past-year NSSI frequency ($\beta = 0.16$, $t = 3.31$, $p < 0.01$). Greater implicit identification with NSSI at baseline was associated with greater past-year NSSI frequency reported at baseline.

To test the hypothesis that baseline SI-IAT scores would predict NSSI frequency at a 6-month follow-up, and that it would be a stronger predictor of self-reported future likelihood of NSSI, another linear regression was used. After controlling for baseline NSSI past-year frequency, baseline SI-IAT scores and self-reported future likelihood ratings were entered as the independent variables and NSSI frequency at 6-month follow-up as the dependent variable. Baseline past-year NSSI frequency scores contributed 3.5% of the variance, and when baseline SI-IAT scores and future likelihood ratings were entered, the overall regression model was still statistically significant, $F(3,356) = 8.33$, $p < 0.001$), adding 4.3% of variance for a total $R^2 = .08$. Baseline SI-IAT scores did not significantly predict NSSI frequency at 6-month follow-up ($\beta = -0.02$, $t = -0.43$, $p = 0.67$), but self-reported likelihood was a significant predictor ($\beta = 0.22$, $t = 4.07$, $p < 0.001$).

DISCUSSION

The goal of the current study was to examine how explicit and implicit identification with NSSI associates with concurrent and future NSSI in a sample of young adults who had all recently engaged in NSSI. It was expected that baseline implicit SI-IAT scores would significantly predict past-year NSSI frequency in this sample and that implicit association with NSSI would be a stronger predictor of NSSI frequency than self-reported future likelihood of engaging in NSSI prospectively. Hypotheses were partially supported as baseline implicit NSSI association was significantly related to past-year NSSI frequency; however, self-reported likelihood of future NSSI was a stronger predictor of future NSSI frequency.

Implicit association/identification with NSSI does appear to associate with recent NSSI engagement, with stronger identification corresponding to greater NSSI frequency in the past year. As prior research suggests, these results are in line with the idea that individuals with recent NSSI show strong implicit identification with cutting versus non-cutting (Dickstein et al., 2015). These results also concur with a previous study in which implicit association with NSSI and NSSI behavior was assessed across three time points in a school-based sample of adolescents (Glenn et al., 2016). In their sample, SI-IAT scores were weakly, but positively and significantly, correlated with past-year NSSI frequency. The results of the current study were likely more robust due to its utilization of an exclusive sample of young adults with recent NSSI compared to a community sample of adolescents with much greater variability in NSSI prevalence and severity. Glenn et al. (2016) also found implicit associations for NSSI to be stronger when NSSI was more frequent and recent, which also corresponds with the results from the current study. Both studies lend support to the self-identification hypothesis of NSSI (Nock & Banaji, 2007a), which states that individuals develop associations between themselves and NSSI over time, which leads them to continue to choose NSSI rather than other coping skills. Self-identification with NSSI seems to be established soon after onset of NSSI behavior, and the more NSSI is engaged in over time, the stronger the self-identification with NSSI (Glenn et al., 2016).

The converse of this could also be true; as one engages less frequently in NSSI, then one may begin to associate oneself less with NSSI as the behavior diminishes over time. Glenn et al. (2016) provided evidence that this inverse relationship also occurs; their results found implicit associations with NSSI weakened as NSSI frequency decreased.

Contrary to expectations, implicit association with NSSI was not found to prospectively predict NSSI frequency at a 6-month follow-up. This is inconsistent with prior studies that did find significant relationships (Cha et al., 2016; Glenn et al., 2016). SI-IAT scores at baseline were associated with greater likelihood of NSSI engagement at future time points in a community sample of adolescents (Glenn et al., 2016), and SI-IAT scores predicted engagement in cutting in a discrete time period (during duration of hospitalization) in adolescent inpatients (Cha et al., 2016). The current study differs from prior ones in that it examined implicit ratings and self-reported ratings of future NSSI in the same model, which may partially explain the divergent results. Self-reported ratings of future NSSI were strongly predictive of future NSSI and may have overruled the implicit measurements. The prospective results from the current study add to the growing body of research that highlights how strong self-identification with NSSI may be an important factor that helps identify which individuals will persist with NSSI over time. More research is needed to evaluate how strong this association may be in prospective relationships for varying periods of time.

As mentioned, self-reported future likelihood of NSSI was predictive of the frequency of future NSSI and it was a stronger predictor of future NSSI than the SI-IAT. An explicit, conscious acknowledgment that one expects to continue self-injuring appears to be a good indicator that an individual will in fact continue to engage in NSSI. This outward acknowledgment also appears to associate with more frequent NSSI. Perhaps these individuals are aware of their usage of NSSI and its effectiveness in achieving desired functions and are fairly accurate reporters. The higher individuals rated their own likelihood of future engagement, the more likely and more often they were to engage. In the current study, of the individuals whom endorsed a higher likelihood of future engagement (3 or 4 on a 0–4 scale), more than 70% did engage in future NSSI. The percentage of future engagement declined steadily as self-reported likelihood decreased or was rated at 0. For example, only 20% of individuals who rated their future NSSI likelihood as 0 engaged in NSSI during the follow-up. This finding augments previous studies which found that greater NSSI severity was associated with more engagement in NSSI and other risk behaviors in the future (Brausch & Boone, 2015). If an individual has not been recently engaging in NSSI, then the desire to engage in NSSI might appear as a less useful behavior to mitigate negative emotions that might have driven the behavior previously. On the other hand, if one actively engages in NSSI and finds it useful, then one could likely foresee utilizing this behavior in the future due to its previously perceived effectiveness.

In one of the few prior studies to examine implicit and explicit assessment of NSSI and its relationship to future NSSI, Cha et al. (2016) used the SI-IAT with adolescent inpatients and an explicit measurement of future cutting. Ratings from the SI-IAT predicted cutting during hospitalization, even when explicit ratings for NSSI were low. By contrast, explicit scores predicted cutting post-discharge above and beyond SI-IAT scores, and the implicit

assessment was not predictive of post-discharge cutting. With mixed findings regarding the usefulness of explicit versus implicit measurement of NSSI and its predictive ability for differing periods of time, it may be that the SI-IAT is more helpful in certain settings, such as during hospitalization. Individuals in the study by Cha et al. (2016) were likely in a state of great distress or crisis and may have experienced the SI-IAT differently than participants in the current study, all with recent NSSI but without the stress of an inpatient setting. The results of the current study indicate that self-reported likelihood of future NSSI may be a better indicator of actual future NSSI for individuals who are not in crisis.

It is important for both clinicians and researchers alike to understand that implicit bias toward self-injury seems to associate with greater recent NSSI frequency. The previously mentioned stigma and frequent non-disclosure of NSSI endorsement among this age-group are problematic for mental health providers and researchers. If NSSI behavior is not disclosed and treated, it could increase in severity if it is perceived as effective for coping needs (Brausch & Muehlenkamp, 2018), as well as increasing risk of suicidal behaviors (Ribeiro et al., 2016). The SI-IAT was significantly associated with past-year NSSI frequency in this sample and hypothetically could be a supplemental option for researchers and clinicians to gain potential insight into individuals' recent NSSI engagement and its severity without relying expressly on self-report. However, further research is needed to determine whether the SI-IAT is able to accurately predict future NSSI behavior in a diverse sample of participants, or should not be utilized to try and predict such a complicated human behavior. These findings imply that researchers and clinicians may be wise to continue to rely primarily on self-report measures of NSSI engagement until further research ascertains if implicit NSSI measures could supplement self-report measures. Individuals may feel more comfortable answering questions about their future plans for engaging in NSSI electronically, compared to verbally. Further research could assess participants' preferences comparing computerized NSSI assessment and a clinician's verbal assessment. Researchers could also track implicit bias in groups of individuals who have never engaged in NSSI, previously engaged in NSSI, and currently engage in NSSI to see whether the identification with oneself and self-harm stays strong, or changes over time. This is an important step for implicit measures of self-harm if researchers continue to integrate implicit measures into clinical psychological research. The tests need to be accurate and reliable at identifying individuals who engage in self-harm behavior.

Limitations

There are limitations of this study that should be mentioned. The sample consists of primarily White, female, heterosexual, college students and might not be entirely representative of the population of people who engage in NSSI behavior. Future research could begin to diversify the gap of gender, racial, and ethnic demography. Although NSSI frequency has been previously shown to be strong a predictor of future NSSI and suicidal ideation and behavior, there are many explanations on why individuals persist in NSSI engagement. The implicit association between oneself and self-harm is unlikely to be the sole contributor to the promotion or cessation of NSSI behavior. It is potentially one piece to a much larger puzzle and should be viewed in larger, more holistic context. The SI-IAT only shows stimuli related to cutting, and a relatively small portion of the participants

(14%) endorsed cutting as their *only* NSSI method. Overall, 12.65% of the sample did not endorse cutting as *any* of their methods utilized; therefore, the stimuli could be less salient to these individuals and minimize their *d*-scores. This study used a 6-month follow-up to examine NSSI behavior temporally, but different time frames are needed to study the fluid relationship between implicit association and actual NSSI behavior.

Conclusion

Overall, this study examined how explicit and implicit measurement of NSSI associates with actual NSSI behavior in young adults with recent NSSI behavior. The results show the importance of continuing to examine both the explicit and implicit features and functions of NSSI longitudinally in young adults. Earlier identification of individuals who currently engage, or are at risk of NSSI behavior, is of vast clinical importance due to these individuals' elevated risk of future suicidal ideation and behavior. Although the implicit measure at baseline was associated with higher past-year NSSI frequency, it was not significantly associated with future NSSI behavior and the self-reported predictions were much more strongly related. Although previous studies have been able to utilize the SI-IAT to predict subsequent NSSI engagement, to our knowledge, none have compared implicit measures with self-reported likelihood of future NSSI engagement. The limitations and utility of implicit measures and tests need to be properly defined if they will continue to be used in clinical psychological research. This study adds new insight to the growing literature regarding the predictive and clinical utility of implicit and explicit measures in self-harm research. The SI-IAT has limitations in regard to clinical practice, but could be utilized to supplement self-report measures in research settings for individuals that either currently engage in NSSI, or have engaged in NSSI recently. SI-IAT scores may not be a reliable indicator for those who have lifetime engagement, compared to those with recent NSSI. There is still much unknown about the onset of NSSI and its subsequent promotion and inhibition, and further research is needed to fully understand why NSSI continues to be such a strong predictor of future NSSI behavior, and suicidal ideation and behavior.

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TABLE 1

Demographics for participants and differences between those who completed only Time 1 versus both time points

Characteristic	Time 1 (n = 421) M/%	Time 2 (n = 324) M/%	F/χ^2
Age	18.92	18.98	2.63
Gender			
Female	82.7	82.1	0.40
Male	11.9	12.0	
Transgender, M- to- F	1.7	1.9	
Not sure	1.0	0.9	
Prefer not to answer	0.7	0.9	
Other	0.2	0.3	
Race/ethnicity			
White/Caucasian	87.2	88.3	5.62
Black/African American	2.6	2.5	
Hispanic/Latinx	1.7	1.2	
Asian/Pacific Islander	2.1	1.9	
Multi-ethnic	1.0	0.9	
Other	0.5	0.6	
Sexual orientation			
Heterosexual/straight	63.4	65.1	2.51
Bisexual	22.3	20.7	
Homosexual/lesbian/gay	4.3	4.0	
Not sure	3.6	3.7	
Prefer not to answer	0.2	0.3	
Other[a]	5.7	5.9	
School year			
1st year	60.1	58.6	1.50
2nd year	28.7	29.9	
3rd year	9.3	9.6	
4th year	1.2	1.2	
5th year	0.2	0.3	
Currently in treatment			
No	62.2	64.2	0.68
Yes	35.9	34.6	

[a](asexual, demisexual, pansexual, queer).

TABLE 2

Descriptive statistics and correlations between study variables

Variable	*M*	SD	1	2	3	4
NSSI Frequency T1	9.22	16.34	—			
Likelihood of future NSSI T1	2.29	1.34	.293**	—		
SI-IAT T1	0.81	0.53	.157**	.242**	—	
NSSI frequency T2	4.23	8.70	.146**	.247**	.016	—

Note: SI-IAT is the *d*-score from the Self-Injury Implicit Association Task. All NSSI variables are from the Self-Injurious Thoughts and Behaviors Interview (SITBI). All correlations are Pearson.

** p < .01