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Self-Stigma Toward Nonsuicidal Self-Injury: An Examination of Implicit and Explicit Attitudes

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Objective: Evidence suggests that individuals without a history of nonsuicidal self-injury (NSSI) are likely to view NSSI as a stigmatized behavior. However, there is limited evidence evaluating the presence of self-stigma among individuals who have engaged in NSSI.
Methods: We recruited a university sample (n = 351) and employed implicit and explicit measures to examine the degree of stigmatization toward those with NSSI scarring, as compared to nonintentional disfigurement (i.e., accidental scarring) and to tattoos (i.e., a culturally sanctioned form of intentional tissue alteration). We examined the extent to which bias is related to indicators of NSSI severity among those with a history of NSSI.
Results: We provide evidence that negative biases toward NSSI may represent the effects of self-stigma. However, findings suggest that biases were generally attenuated among participants with a history of NSSI as compared to those without. Participants who had lower levels of NSSI explicit bias were more likely to have a history of more severe engagement in NSSI; however, no significant relationships were found between implicit bias and NSSI severity indicators.
Conclusions: We present a theoretical rationale for attenuated biases among individuals with a history of NSSI and discuss implications of this research for NSSI recovery.

Nonsuicidal self-injury (NSSI) refers to the intentional damage of one's body tissue (e.g., self-cutting and burning) without associated suicidal intent (Nock, 2010). NSSI is a highly prevalent behavior among college students; a recent meta-analysis suggests that the pooled

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lifetime prevalence of NSSI is approximately 20% in this population (Swannell, Martin, Page, Hasking, & St. John, 2014; Whitlock, Eckenrode, & Silverman, 2006), with 12-month engagement rates varying widely, up to 14% (Kuentzel, Arble, Boutros, Chugani, & Barnett, 2012; Serras, Saules, Cranford, & Eisenberg, 2010; Wilcox et al., 2012). Engagement in NSSI is strongly associated with a wide range of both internalizing and externalizing psychiatric disorders (Nitkowski & Petermann, 2011). Given its high prevalence, as well as increasing evidence suggesting that NSSI is associated with both clinical and functional impairment, the most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition* (DSM-5) incorporated nonsuicidal self-injury disorder (NSSI-D) as a condition requiring further study (American Psychiatric Association, 2013).

There is extensive evidence of *public stigma* toward mental illness. That is, society or the public in general is more likely to hold negative beliefs toward individuals with mental illness as compared to physical illness (Pettit & Monteith, 2011; Teachman, Wilson, & Komarovskaya, 2006). Indeed, although NSSI is still a condition requiring further study, there is evidence suggesting that NSSI is a stigmatized behavior (Burke, Piccirillo, Moore-Berg, Alloy, & Heimberg, 2019; Law, Rostill-Brookes, & Goodman, 2009; Lloyd, Blazely, & Phillips, 2018). For example, our recent work demonstrated evidence of stigmatization toward those who have engaged in NSSI and have physical manifestations of such behavior (Burke et al., 2019). In this previous study, we examined implicit and explicit attitudes toward NSSI scarring and compared attitudes toward NSSI to attitudes toward nonintentional scarring (i.e., scarring from an accident), as well as self-determined manifestations of physical disfigurement (i.e., tattoos). We found evidence of strong negative implicit and explicit biases toward NSSI (Burke et al., 2019). Using the implicit association test (IAT; Greenwald, Mcghee, & Schwartz, 1998), we found that participants were more likely to classify NSSI scarring as bad and rejection-worthy as compared to scarring from accidents or tattoos. We also found that participants were more likely to classify NSSI as bad, rejection-worthy, and dangerous rather than good, acceptance-worthy, and safe on a single-category IAT (Karpinski & Steinman, 2006). Further, results from explicit measures mirrored those from implicit measures and revealed that participants exhibited a negative bias toward people with NSSI scarring as compared to those with tattoos or nonintentional disfigurement. Additionally, participants endorsed that they were less likely to accept individuals with a history of NSSI as a friend, roommate, classmate, or sexual–romantic partner compared to those with tattoos or nonintentional disfigurement (Burke et al., 2019).

Notably, our recent findings are in line with other research that measured public stigma toward NSSI and demonstrated evidence of negative biases toward NSSI (Law et al., 2009; Lloyd et al., 2018). For example, Lloyd et al. (2018) found that when participants perceived more individual responsibility for those with a history of NSSI, participants were more likely to report angry feelings toward individuals with a history of NSSI and less likely to endorse a desire to help those individuals. Additionally, these participants exhibited lower levels of sympathy toward individuals who disclosed a history of NSSI and were more likely to view NSSI behaviors as manipulative (Lloyd et al., 2018). Similarly, Law et al. (2009) demonstrated that among the health care students they studied, medical students were the most likely to view NSSI negatively and as a manipulative behavior, as compared to psychology or social work students (Law et al., 2009).

These findings provide evidence that those with a history of NSSI are likely to face significant social adversity from both peers and health care students. However, there are clear gaps in our understanding of the presence of *self-stigma* toward NSSI. For example, to what extent do individuals with a history of NSSI hold a negative bias toward others with a history of NSSI? Do these individuals hold similarly negative attitudes toward NSSI as

people without a history of NSSI? Or have their attitudes toward NSSI behavior been moderated by greater familiarity with self-injurious behavior, by identification with the self-injuring community, or by the reinforcing properties of self-injury? Still too is the possibility that individuals with a more native positive attitude toward NSSI are most likely to engage in the behavior.

These questions have only partially been answered in regards to NSSI; however, there is answered in regard to NSSI, there is prior research to suggest that individuals with a history of mental illness do, in fact, demonstrate self-stigma. Teachman et al. (2006) compared implicit and explicit biases toward psychiatric illness and physical illness between individuals with and without psychiatric disorders. They hypothesized that those with psychiatric disorders may be protected partially from self-stigma as these individuals may have more knowledge of or contact with others who experience mental illness, as well as an incentive toward positive bias of one's in-group. However, results from both implicit and explicit measures suggested that psychiatric disorder was stigmatized far greater than physical illness overall, and there was no evidence of a positive in-group bias for those with a psychiatric disorder (Teachman et al., 2006).

Specific to NSSI, there is accumulating evidence that individuals with scarring report feeling shame and embarrassment about their scarring (Bachtelle & Pepper, 2015; Burke, Olino, & Alloy, 2017; Lewis & Mehrabkhani, 2016), providing complementary evidence of self-stigma. Additionally, people who engage in NSSI may be hesitant to disclose a history of NSSI due to a perceived likelihood of a negative reaction (Berger, Hasking, & Martin, 2013), such as being labeled as attention seeking (Fortune, Sinclair, & Hawton, 2008; Klineberg, Kelly, Stansfeld, & Bhui, 2013). These feelings of shame and embarrassment either may be influenced by self-stigma toward NSSI or may lead to such negative attitudes.

However, unlike other psychiatric disorders (e.g., depression or anxiety), there is evidence to suggest that engaging in NSSI is unique in that it can be reinforcing through the reduction of aversive affect (negative reinforcement) and through the introduction of positive affect (positive reinforcement) among those who engage in the behavior (Klonsky, 2009). Thus, it is possible that the reinforcing effects of NSSI behavior actually may attenuate self-stigma. Additionally, previous research using an implicit measure that evaluates affective associations, known as the affect misattribution procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005), has demonstrated that people with a history of NSSI perceive NSSI stimuli to be less aversive than those without a history of NSSI (Franklin, Lee, Puzia, & Prinstein, 2014). Thus, it is possible that reduced aversion toward NSSI may contribute to an attenuation of self-stigma, such that individuals with a history of NSSI may demonstrate a positive implicit in-group bias. Additionally, individuals may engage in NSSI to regulate distressing emotions, which also may contribute to a positive in-group bias due to the positive (or reinforcing) associations with this behavior. Furthermore, previous studies using the AMP have demonstrated that lower aversion to NSSI stimuli is predictive of future NSSI behaviors (Franklin, Puzia, Lee, & Prinstein, 2014). Thus, we aim to extend this research by examining whether implicit and explicit attitudes toward NSSI are associated with NSSI indicators, such as frequency, intensity, and severity of NSSI behavior.

Current Study

In our previous study (Burke et al., 2019), we measured implicit and explicit stigma toward NSSI among those without a history of the behavior and compared NSSI stigmatization to the stigmatization of other forms of physical disfigurement (i.e., tattoos and nonintentional scarring). In the current study, we extend these findings by measuring implicit and explicit attitudes toward NSSI among young adults with a lifetime history of NSSI (NSSI+) and by comparing these attitudes with those from young adults without a history of NSSI (NSSI−). When measuring

stigma, it is critical to include both implicit and explicit measures, given the different types of attitudes these measures assess. That is, implicit measures tap into automatic and unconscious processing (i.e., implicit attitudes), whereas explicit measures capture attitudes through introspection (i.e., explicit attitudes) (Gawronski & Bodenhausen, 2006). Further, explicit attitudes often fall victim to social desirability effects, which are particularly strong when measuring stigma (Gawronski & Bodenhausen, 2006; Teachman et al., 2006). Thus, the use of both implicit and explicit measures is necessary to provide complementary evidence when evaluating the presence of stigma toward a given construct.

Consistent with previous literature (Teachman et al., 2006), we hypothesized that both NSSI+ and NSSI– groups would demonstrate negative biases toward NSSI. However, because NSSI behaviors are used to regulate distressing emotions (Klonsky, 2009) and researchers have demonstrated group differences in aversion toward NSSI stimuli (Franklin, Lee, et al., 2014), we predicted that negative biases would be attenuated among NSSI+ individuals as compared to NSSI– individuals. That is, we expected that NSSI+ individuals still would demonstrate negative biases toward NSSI, but that these biases would be less negative than those exhibited by NSSI– individuals.

In a series of exploratory analyses, we also examined the relationship between implicit and explicit attitudes toward NSSI and measures of NSSI severity (e.g., frequency, number of NSSI methods, and NSSI method of cutting) and recency (i.e., past year engagement) among the NSSI+ individuals, to determine whether individuals with more severe and recent histories of NSSI demonstrate differences in levels of self-stigma.

METHODS

Participants

Participants in the current study were enrolled through a previous study. The sample and recruitment methods will be described here briefly, and further details can be found elsewhere (Burke et al., 2019). This sample consisted of 368 undergraduate students enrolled in psychology classes at a large, urban university. Participants were included in this study if they completed an initial online battery of measures, met criteria for study eligibility (i.e., were over 18 and spoke English fluently), and completed the in-person session. A total of 16 participants were excluded due to not completing the in-person session, and one participant was excluded due to not understanding the definition of NSSI. Thus, a total of 351 participants were included in the current study. A total of 236 participants did not have a history of NSSI. To be included in the NSSI+ group (n = 115), participants had to endorse engaging in at least one lifetime act of NSSI (e.g., self-cutting and burning). Participants mostly were female (n = 286; 81.5%), and the mean age of the sample was 20 years (SD = 3.62). Participants identified as White (61.5%), Black (12%), East Asian (9.1%), South Asian (6.3%), biracial (6.8%), and other (4.3%). A minority (6.6%) identified as Hispanic or Latino. A total of 82.3% identified as heterosexual; 3.1% as lesbian, gay, or homosexual; 9.7% as bisexual; 3.4% as questioning; and 1.4% preferred not to use a label to describe their sexual orientation. Further descriptives on NSSI characteristics are presented below.

Measures

All measures in this study were the same as those used in the previous study; thus, a brief description of study measures will be included here. Further details, especially regarding the implicit association measures, can be found in Burke et al. (2019).

Implicit Measures. We employed the IAT and the single-category IAT (SC-IAT) in order to assess implicit attitudes toward NSSI. All implicit items were administered in a random, counterbalanced order.

Implicit Association Test. Participants completed four IATs (good–bad NSSI–tattoo IAT; accept–reject NSSI–tattoo IAT; good–

bad NSSI–nonintentional disfigurement IAT; accept–reject NSSI–nonintentional disfigurement IAT) (modeled after Greenwald, Mcghee, & Schwartz, 1998) in order to compare NSSI implicit attitudes to tattoo and nonintentional disfigurement implicit attitudes. In each IAT, participants were asked to quickly categorize concept (i.e., NSSI, nonintentional disfigurement, and tattoos) and attribute (i.e., accept–reject or good–bad) descriptors (see Appendix A for complete list of concepts and attributes used in this study and in the previous study). All IATs followed the same procedure. The IAT task consisted of five blocks of trials. There were three practice blocks of 24 trials each, in which participants were asked to categorize only concepts or only attributes. There were also two critical blocks of 48 trials each, in which participants were asked to categorize both attributes and concepts. Using the example of good–bad NSSI–tattoo, during one block of the critical trials, the NSSI concepts were paired with good attributes and the tattoo concepts were paired with bad attributes. During the other critical trial, the concept and attribute pairings were switched—NSSI concepts were paired with bad attributes, and the tattoo concepts were paired with good attributes. Participants had as much time as needed to respond to each trial. Reliability for the IATs was: accept–reject NSSI–nonintentional disfigurement IAT (split-half $\alpha = .49$), accept–reject NSSI–tattoo IAT (split-half $\alpha = .28$), good–bad NSSI–nonintentional disfigurement IAT (split-half $\alpha = .61$), and good–bad NSSI–tattoo IAT (split-half $\alpha = .57$).

Single-Category Implicit Association Test. Participants completed three SC-IATs (modeled after Karpinski & Steinman, 2006). We employed SC-IATs in addition to the traditional IATs in order to examine the *absolute strength* of implicit attitudes toward NSSI, without comparing NSSI attitudes to another concept category (e.g., tattoos or scarring from nonintentional incidents). IATs and SC-IATs thus provide distinct, yet complementary information regarding implicit associations. Participants categorized concept (i.e., NSSI) and attribute words (i.e., good–bad, safe–dangerous, and accept–reject) for each SC-IAT. Each SC-IAT consisted of three blocks of trials. Participants completed one practice block of 30 trials, in which they were asked to categorize attributes only. They then completed two critical blocks of 96 trials each, in which they were asked to categorize NSSI concepts and attributes by first pairing NSSI concepts with safe–good–accept attributes (block 1) and then with dangerous–bad–reject attributes (block 2). Participants had a total of 1,500 ms to respond to each trial, and they received response feedback based on the accuracy of their categorization. Participants who responded too slowly also received feedback to answer more quickly on the following trial. Reliability for the SC-IATs was: good–bad SC-IAT (split-half $\alpha = .36$), accept–reject SC-IAT (split-half $\alpha = .35$), and safe–dangerous SC-IAT (split-half $\alpha = .59$).

All implicit measures were administered via computer using E-Prime software (Psychological Software Tools Incorporated, 2016).

Explicit Self-report Measures

Deliberate Self-Harm Inventory (DSHI). The DSHI (Gratz, 2001) is a self-report measure of self-injury and assesses the frequency, duration, and forms of nonsuicidal self-injurious behaviors (e.g., cutting, carving, burning, biting, and head-banging). The DSHI uses the prompt, "Have you ever intentionally (i.e., on purpose) _____?" If a participant endorses the self-injurious behavior, they are asked follow-up questions, including age at onset, frequency, recency, years of engagement, and if the behavior ever resulted in a hospitalization or required medical treatment. The DSHI has been tested in a university-student sample and demonstrates good psychometric properties (Fliege et al., 2006; Gratz, 2001). This measure was used to assess history of engagement in NSSI and to differentiate those with and without a history of NSSI.

Behavioral Intention Questionnaires. The Behavioral Intention Questionnaires (BIQs) were designed to measure

explicit behavioral intentions. The BIQs used items similar to previous literature assessing stigma (Corrigan, Markowitz, Watson, Rowan, & Kubiak, 2003; Link et al., 1987; Triandis, 1977) and implicit attitudes (Bonar et al., 2012; White, Hogg, & Terry, 2002). BIQs were created for this study to assess behavioral intentions (including discrimination) toward individuals with scarring from NSSI, those with visible tattoos, and individuals with scarring from nonintentional accidents. A sample item is "Would you want to become friends with X?" where X represents a same-age peer who has engaged in NSSI in the past, has visible tattooing, or has visible scars from a car accident. Individuals responded using a Likert scale ranging from 1 (*Very unlikely*) to 7 (*Very likely*), and higher scores indicated a greater likelihood that the participant would engage in social interaction with the same-age peer.

In line with Burke et al. (2019), we used two subscales derived from BIQ items: a subscale assessing sexual–romantic relationship intentions and a subscale assessing nonsexual–nonromantic relationship intentions. Reliability for the three BIQs and their subscales was: NSSI (sexual–romantic $\alpha = .97$, nonsexual–nonromantic $\alpha = .95$), tattoos (sexual–romantic $\alpha = .97$, nonsexual–nonromantic $\alpha = .95$), and nonintentional disfigurement (sexual–romantic $\alpha = .98$, nonsexual–nonromantic $\alpha = .95$).

Semantic Differential Scale. The Semantic Differential Scale (SDS) is another explicit measure that has been used to evaluate explicit (i.e., self-reported) ratings of various concepts (see Greenwald et al., 1998). SDS measures were developed using semantic differential methodology described in previous literature (Maguire, 1973; Osgood, Suci, & Tannenbaum, 1957; Schibeci, 1982) and used a bipolar scale to assess the extent to which individuals endorse qualities taken from the attribute trials of the IAT, including good–bad, safe–dangerous, and accepted–rejected. Participants first were provided with a description of a person with each characteristic (i.e., NSSI, tattoos, or nonintentional disfigurement) and then asked to rate each group on the three pairs of attributes. Ratings were recoded from −3 to +3 into scores ranging from 1 to 7, with higher scores representing more negative attributes. A mean score of 3.5 was used to represent neutral ratings toward the group. Reliability for the SDS measures was: NSSI ($\alpha = .75$), tattoos ($\alpha = .77$), and nonintentional disfigurement ($\alpha = .69$).

Procedure

Participants were recruited for this study after completing an online battery of self-report questionnaires (Burke et al., 2019). Participants who were over 18 years old and who indicated that they spoke English fluently received an invitation email. They completed the IAT and SC-IAT tasks, as well as several self-report measures, including measures assessing explicit attitudes toward NSSI, tattoos, and nonintentional disfigurement in the laboratory. All study measures were administered via a computer in the study laboratory, and the total time to complete the study was approximately 2 hr. Participants received compensation in the form of course credit.

Data Analytic Plan

We conducted two *post hoc* sensitivity analyses to determine whether there was sufficient power for the analyses described here using the sample of individuals with a history of NSSI. Results from the first sensitivity analysis ($\beta = .95$, $p = .05$, two-tailed) revealed that a sample of 112 individuals with NSSI would be powered sufficiently to detect a minimum effect size of $d = .34$. Additionally, results from the second sensitivity analysis ($\beta = .95$, $p = .05$, two-tailed) revealed that a sample of 112 individuals with a history of NSSI and a sample of 236 individuals without a history of NSSI would be powered sufficiently to detect a minimum effect size of $d = .41$. Standardized D scores were calculated for both the IAT and SC-IAT and are reported here as the mean D score (M_D) (Greenwald, Nosek, & Banaji, 2001; Karpinski & Steinman, 2006). We conducted one-

sample *t* tests for each IAT–SC-IAT to examine NSSI+ implicit attitudes and independent-samples *t* tests to compare NSSI+ to NSSI– implicit attitudes. A Bonferroni correction to adjust for multiple comparisons was used.

We conducted a repeated-measures analysis of variance (ANOVA) to compare participants' scores on the explicit measures (i.e., SDS and BIQs) across conditions and examined pairwise comparisons between NSSI and tattoo or nonintentional disfigurement conditions using a Bonferroni correction to adjust for multiple comparisons.

RESULTS

Descriptives

Among participants endorsing a history of NSSI (n = 115), the average age of onset was 13.2 years (SD = 3.59). Participants reported a wide range of lifetime frequency of NSSI: 1 act (n = 10; 8.7%), 2-5 acts (n = 38; 33.0%), 6-20 acts (n = 32; 27.8%), 20-50 acts (n = 17; 14.8%), and 50+ acts (n = 18; 15.7%). Approximately 40.9% of the sample (n = 47) endorsed engaging in NSSI over the past one year. About half of the sample (n = 54; 47%) reported bearing at least one scar secondary to engaging in NSSI. Participants endorsed engaging in an average of two methods of NSSI (SD = 1.43). NSSI methods endorsed included self-cutting (n = 70; 60.9%), severely scratching self (n = 33; 28.7%), preventing wounds from healing (n = 19; 16.5%), sticking sharp objects into skin (n = 16; 13.9%), burning self with a cigarette (n = 12; 10.4%), burning self with a lighter or a match (n = 12; 10.4%), carving words into skin (n = 12; 10.4%), carving pictures, designs, or other marks into skin (n = 11; 9.6%), punching self (n = 10; 8.7%), banged head (n = 8; 7.0%), biting self (n = 6; 5.2%), rubbing sandpaper on self (n = 3; 2.6%), rubbing glass into skin (n = 2; 1.7%), and others (n = 17; 14.8%).

Implicit Association Tests

Accept–Reject NSSI–nonintentional disfigurement IAT. Participants (n = 11) with error scores greater than 40% were excluded from the accept–reject NSSI–nonintentional disfigurement IAT analyses. One-sample *t*-test analyses of the accept–reject NSSI–nonintentional disfigurement IAT scores revealed that NSSI+ participants showed an overall rejection of NSSI scarring and acceptance of nonintentional disfigurement (M_D = 0.74, SD = 0.42, 95% CI [0.66, 0.83]), $t(100) = 17.58$, $p < .001$, $|d| = 1.76$.

Comparison of the accept–reject NSSI–nonintentional disfigurement IAT scores for the NSSI+ (M = 0.74, SD = 0.42) and NSSI– (M = 0.91, SD = 0.45) participant groups revealed that NSSI– participants had greater rejection of NSSI scarring and greater acceptance of nonintentional disfigurement than the NSSI+ participants, (M_D = 0.17, SE_D = 0.05, 95% CI [0.07, 0.28]), $t(304) = 3.18$, $p = .002$, $|d| = 0.39$.

Accept–Reject NSSI–tattoo IAT. There were three participants excluded from the accept–reject NSSI–tattoo IAT analyses for high error scores. One-sample *t*-test analyses of the accept–reject NSSI–tattoo IAT scores revealed that NSSI+ participants showed an overall rejection of NSSI scarring and acceptance of tattoos (M_D = 1.00, SD = 0.45, 95% CI [0.91, 1.08]), $t(106) = 23.13$, $p < .001$, $|d| = 2.22$.

Comparison of the accept–reject NSSI–tattoo IAT scores for the NSSI+ (M = 1.00, SD = 0.45) and NSSI– (M = 1.09, SD = 0.46) participant groups revealed that NSSI– participants had a marginally greater rejection of NSSI scarring and marginally greater acceptance of tattoos than the NSSI+ participants (M_D = 0.09, SE_D = 0.05, 95% CI [−0.01, 0.20]), $t(321) = 1.74$, $p = .083$, $|d| = 0.20$.

Good–Bad NSSI–nonintentional disfigurement IAT. No participants were excluded from the good–bad NSSI–nonintentional disfigurement IAT analyses, as all participants had error scores less than 40%. One-sample *t*-test analyses of the good–bad NSSI–

nonintentional disfigurement IAT scores revealed that NSSI+ participants demonstrated greater associations between NSSI scarring and bad and between nonintentional disfigurement and good attributes (M_D = 0.27, SD = 0.40, 95% CI [0.19, 0.35]), $t(111) = 7.05$, $p < .001$, $|d| = 0.68$.

Comparison of the good–bad NSSI–nonintentional disfigurement IAT scores for the NSSI+ (M = 0.27, SD = .40) and NSSI– (M = 0.38, SD = .37) participant groups revealed that NSSI– participants had greater rejection of NSSI scarring and greater acceptance of nonintentional disfigurement than the NSSI+ participants, (M_D = 0.11, SE_D = 0.04, 95% CI [0.02, 0.20]), $t(333) = 2.50$, $p = .013$, $|d| = 0.29$.

Good–Bad NSSI–tattoo IAT. No participants were excluded from the good–bad NSSI–tattoo IAT analyses, as all participants had error scores less than 40%. One-sample t-test analyses of the good–bad NSSI–tattoo IAT scores revealed that NSSI+ participants demonstrated greater associations between NSSI scarring and bad and between tattoos and good attributes (M_D = 0.58, SD = 0.35, 95% CI [0.52, 0.65]), $t(111) = 17.52$, $p < .001$, $|d| = 1.66$.

Comparison of the good–bad NSSI–tattoo IAT scores for the NSSI+ (M_D = 0.58, SD = .35) and NSSI– (M = 0.60, SD = .34) participant groups revealed no difference in scores between NSSI– participants and NSSI+ participants (M_D = 0.02, SE_D = .04, 95% CI [−0.05, .10]), $t(337) = 0.50$, $p = .618$, $|d| = 0.06$. Both groups of participants were equally more likely to associate NSSI scarring with bad and tattoos with good attributes.

Good–Bad SC-IAT. There were five participants excluded from the good–bad SC-IAT analyses because of error scores greater than 20%. One-sample t-test analyses of the good–bad SC-IAT scores revealed that NSSI+ participants were more likely to associate NSSI scarring with bad than good attributes (M_D = −0.42, SD = 0.33, 95% CI [−0.48, −0.36]), $t(101) = -13.05$, $p < .001$, $|d| = 1.27$.

Comparison of the good–bad SC-IAT scores for the NSSI+ (M = −0.42, SD = 0.33) and NSSI– (M = −0.49, SD = 0.32) participant groups revealed that NSSI– participants had marginally stronger associations between NSSI scarring and bad attributes than the NSSI+ participants, (M_D = −0.07, SE_D = 0.04, 95% CI [−0.15, 0.004]), $t(305) = -1.88$, $p = .062$, $|d| = 0.22$.

Accept–Reject SC-IAT. There were five participants excluded from the accept–reject SC-IAT analyses because of high error scores. One-sample t-test analyses of the accept–reject SC-IAT scores revealed that NSSI+ participants were more likely to associate NSSI scarring with rejection than acceptance (M_D = −0.24, SD = 0.32, 95% CI [−0.30, −0.18]), $t(102) = -7.66$, $p < .001$, $|d| = 0.75$.

Comparison of the accept–reject SC-IAT scores for the NSSI+ (M = −0.24, SD = 0.32) and NSSI– (M = −0.39, SD = .33) participant groups revealed that NSSI– participants had stronger associations between NSSI scarring and rejection than the NSSI+ participants, (M_D = −0.15, SE_D = 0.04, 95% CI [−0.22, −0.07]), $t(305) = -3.77$, $p < .001$, $|d| = 0.46$.

Safe–Dangerous SC-IAT. There were ten participants excluded from the safe–dangerous SC-IAT analyses because of high error scores. One-sample t-test analyses of the safe–dangerous SC-IAT scores revealed that NSSI+ participants were more likely to associate NSSI scarring with danger than safety attributes (M_D = −0.36, SD = 0.35, 95% CI [−0.43, −0.29]), $t(95) = -9.98$, $p < .001$, $|d| = 1.03$.

Comparison of the safe–dangerous SC-IAT scores for the NSSI+ (M = −0.36, SD = .35) and NSSI– (M_D = −0.43, SD = .37) participant groups revealed no difference in scores between NSSI– and NSSI+ participants, (M_D = −0.07, SE_D = 0.05, 95% CI [−0.16, 0.02]), $t(280) = -1.50$, $p = .135$, $|d| = 0.19$. Both groups of participants were equally more likely to associate NSSI scarring with danger than safety.

Explicit Measures

Semantic Differential Scale. A repeated-measures ANOVA with a

Greenhouse–Geisser correction demonstrated that total SDS scores differed across the three comparison conditions [$F(1.73, 845.30) = 73.91$, $p < .001$, $\eta^2 = 0.40$]. *Post hoc* tests revealed that participants responded significantly differently on the NSSI SDS compared to the tattoo SDS ($M_D = 3.83$, $SD = 0.49$, 95% CI [2.64, 5.03]), $p < .001$, $|d| = 0.97$. Similarly, results suggested a significant difference between NSSI SDS scores and nonintentional disfigurement SDS scores ($M_D = 4.79$, $SD = 0.38$, 95% CI [3.86, 5.72]), $p < .001$, $|d| = 1.21$. These results indicate that NSSI+ participants assigned more negative ratings to NSSI as compared to the ratings they assigned to tattoos or nonintentional disfigurement. Furthermore, those with a history of NSSI provided less negative ratings on the NSSI SDS than those without a history of NSSI ($M_D = 1.23$, $SD = 0.45$, 95% CI [0.34, 2.11]), $t(342) = 2.73$, $p = .007$, $|d| = 0.31$.

Behavioral Intention Questionnaires. A repeated-measures ANOVA with a Greenhouse–Geisser correction demonstrated that BIQ scores for nonsexual–nonromantic interactions differed across comparison conditions [$F(1.56, 2{,}813.42) = 21.92$, $p < .001$, $\eta^2 = 0.16$]. *Post hoc* tests revealed that there was a significant difference between nonsexual–nonromantic NSSI BIQ scores and nonsexual–nonromantic tattoo BIQ scores ($M_D = -8.25$, $SD = 1.47$, 95% CI [−11.82, −4.67]), $p < .001$, $|d| = 0.50$, as well as a significant difference between nonsexual–nonromantic NSSI BIQ scores and nonsexual–nonromantic nonintentional disfigurement BIQ scores ($M_D = -6.69$, $SD = 1.51$, 95% CI [−10.36, −3.03]), $p < .001$, $|d| = 0.40$. These results indicate that NSSI+ participants were less willing to engage in a nonsexual–nonromantic interaction with an individual who had a history of NSSI as compared to individuals with tattoos or scarring from nonintentional disfigurement. Notably, NSSI+ participants' ratings of willingness to engage in a nonsexual–nonromantic interaction with an individual with a history of NSSI were significantly greater than NSSI− participants' willingness to do so ($M_D = -8.43$, $SD = 2.08$, 95% CI [−12.52, −4.35]), $t(349) = -4.06$, $p < .001$, $|d| = 0.46$.

A second repeated-measures ANOVA demonstrated that BIQ score for sexual–romantic interactions also differed across comparison conditions [$F(1.67, 108.72) = 19.91$, $p < .001$, $\eta^2 = 0.15$]. *Post hoc* tests using a Bonferroni correction revealed that there was a significant difference between sexual–romantic NSSI BIQ scores and sexual–romantic tattoo BIQ scores ($M_D = -1.24$, $SD = 0.31$, 95% CI [−1.98, −0.50], $p < .001$, $|d| = 0.34$, as well as a significant difference between sexual–romantic NSSI BIQ scores and sexual–romantic nonintentional disfigurement BIQ scores ($M_D = -1.73$, $SD = 0.32$, 95% CI [−2.50, −0.95]), $p < .001$, $|d| = 0.46$. These results indicate that NSSI+ participants were less willing to engage in a sexual–romantic interaction with an individual who had a history of NSSI as compared to individuals with tattoos or scarring from nonintentional disfigurement; however, they were significantly more willing than NSSI− participants to engage in a sexual–romantic interaction with an NSSI+ individual, ($M_D = -1.35$, $SD = 0.41$, 95% CI [−2.15, −0.55]), $t(349) = -3.32$, $p = .001$, $|d| = 0.37$.

Correlations between bias scores and history of NSSI severity. In a series of exploratory analyses, SC-IAT scores were summed together to create a total implicit score. Implicit scores were not associated significantly with NSSI severity indicators. SDS and BIQ scores were summed together to create a total explicit score. The total explicit score was significantly negatively related to frequency of NSSI, presence of NSSI scarring, and number of NSSI methods used, such that individuals with a history of greater NSSI severity exhibited less negative explicit biases (Table 1). Neither NSSI recency nor the NSSI method of cutting were associated with the total explicit score. Furthermore, there were no significant associations between NSSI severity characteristics and implicit ratings. Finally, correlations between implicit and explicit measures were examined and there were few statistically significant relationships (Table 2).

TABLE 1
Correlations Between Implicit and Explicit Measures, and NSSI Severity Indices

	SC-IAT Tot	Explicit Tot	Lifetime NSSI Freq	NSSI Num Methods	NSSI Scarring	NSSI Recency	Self-cutting
SC-IAT Tot							
Explicit Tot	−.124						
Lifetime NSSI Freq	.128	−.366**					
NSSI Num Methods	.018	−.188*	.680**				
NSSI Scarring	−.030	−.265	.468**	.325**			
NSSI Recency	.041	−.076	.588**	.430**	.281		
Self-cutting	.191	−.106	.415**	.405**	.326**	.05	

*N*s range from 103 to 115.

Explicit Tot = combined score of explicit measures (BIQ and SDS); Lifetime NSSI Freq = NSSI lifetime frequency; NSSI Num Methods = number of NSSI methods employed; NSSI Recency = engaged in NSSI over the prior 1 year; SC-IAT Tot = combined score of three SC-IATs.

*$p < .05$

**$p < .001$.

DISCUSSION

Previous empirical literature has demonstrated the presence of public stigma toward NSSI (Burke et al., 2019; Law et al., 2009; Lloyd et al., 2018), and this study provides evidence of self-stigma toward NSSI. Although previous research has suggested that individuals with psychiatric disorders do not demonstrate a positive in-group bias (Teachman et al., 2006), there is evidence demonstrating a reduced aversion to NSSI stimuli (Franklin, Lee, et al., 2014). Furthermore, the reinforcing nature of NSSI as an emotion regulation strategy (Klonsky, 2009) suggests the potential for attenuation of self-stigma. This study utilized implicit and explicit measures to evaluate the level of self-stigma toward NSSI scarring. Implicit and explicit attitudes were compared across NSSI+ and NSSI− individuals. NSSI+ and NSSI− individuals both were more likely to associate NSSI behavior with negative attributes—as compared to positive attributes—in both implicit and explicit tests. However, the ratings made by NSSI+ individuals were less negative than ratings made by NSSI− individuals, suggesting that, across most implicit and explicit measures, NSSI history appeared to be associated with less negative attitudes toward NSSI. Interestingly, participants who had lower levels of explicit bias were more likely to have a history of more severe engagement in NSSI (i.e., greater frequency, number of NSSI methods, and scarring secondary to NSSI). However, there was no significant relationship between implicit bias and NSSI severity indicators.

These results were consistent with previous evidence suggesting that NSSI is a stigmatized behavior (Burke et al., 2019; Law et al., 2009; Lloyd et al., 2018) and with studies demonstrating the presence of self-stigma among those with psychiatric disorders (Teachman et al., 2006). Teachman et al. (2006) found that participants were more likely to endorse stigmatizing beliefs about psychiatric disorder as compared to physical illness regardless of the participants' health status. These results are somewhat consistent with findings demonstrated here that suggest that NSSI+ individuals do rate NSSI behaviors more negatively than scarring from non-intentional disfigurement or tattoos. However, results here suggest that although NSSI+ participants still rate NSSI negatively, they tend to rate NSSI less negatively than NSSI− participants, suggesting the presence

TABLE 2
Correlations Between Implicit and Explicit Measures

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. ar_acc_IAT												
2. gb_acc_IAT	.317											
3. ar_tatt_IAT	.396	.166										
4. gb_tatt_IAT	.238*	.392	.164									
5. ar_SC-IAT	−.142	−.187	−.021	−.348								
6. gb_SC-IAT	−.174	−.117	−.183	−.084	.343							
7. sd_SC-IAT	−.037	−.175	−.064	−.027	.366	.389						
8. gb_SDS	.044	.066	−.052	−.069	−.035	−.035	.036					
9. sd_SDS	.000	.215*	.022	.101	−.074	−.098	−.153	.581				
10. ar_SDS	.135	−.032	.098	−.135	.201*	−.014	.044	.381	.419			
11. nonrom_BIQ	−.099	−.305	−.021	.003	.062	.069	.221*	−.453	−.471	−.25		

ar_acc_IAT = accept–reject, accidental-nonsuicidal self-injury (NSSI) traditional implicit association task (IAT); ar_SC-IAT = accept–reject single-category IAT (SC-IAT); ar_SDS = accept–reject SDS; ar_tatt_IAT = accept–reject, tattoo–NSSI traditional IAT; gb_acc_IAT = good–bad, accidental-NSSI traditional IAT; gb_SC-IAT = good–bad single-category IAT; gb_SDS = good–bad Semantic Differential Scale (SDS); gb_tatt_IAT = good–bad, tattoo–NSSI traditional IAT; nonrom_BIQ = nonromantic–nonsexual Behavioral Intentions Questionnaires (BIQ); rom_BIQ = romantic-sexual BIQ items; sd_SC-IAT = safe–dangerous single-category IAT; sd_SDS = safe–dangerous SDS.

*$p < .05$

of a positive in-group effect. It is important to note that a positive in-group bias merely refers to an attenuation of the negative implicit and explicit bias toward NSSI. This in-group bias could be the result of the reinforcing effects of NSSI behavior as a largely effective, albeit health-compromising, method of emotion regulation (Klonsky, 2009). It also is consistent with previous research demonstrating reduced aversion toward NSSI stimuli among NSSI+ individuals (Franklin, Lee, et al., 2014).

Additionally, results from the analyses using explicit measures echoed findings from the implicit tasks. On the whole, NSSI+ participants tended to endorse more negative attitudes toward NSSI and were less likely to report being open to establishing interpersonal relationships with individuals who had a history of NSSI. There was evidence of an in-group bias on some explicit measures, such that NSSI+ participants rated NSSI less negatively than did NSSI− participants. However, for other explicit measures (e.g., preference for initiating a sexual–romantic relationship with someone with tattoos), there were no significant differences between participant ratings based on NSSI status. These results are in line with both study hypotheses and previous literature, demonstrating that NSSI+ individuals exhibit self-stigma, although this negative bias is less than the negative bias seen in NSSI− individuals on some measures.

Interestingly, there were mixed findings when evaluating the relationship between implicit attitudes, explicit attitudes, and indicators of NSSI severity among those with a history of the behavior. Explicit scores were significantly associated with NSSI frequency, presence of scarring, and number of NSSI methods used, such that individuals with a history of greater NSSI severity exhibited less negative explicit bias than individuals with a less severe history of NSSI. It is likely that those who find NSSI particularly effective in up-regulating positive emotions and down-regulating negative emotions (Kranzler et al., 2018) are most likely to engage in these behaviors frequently and with greater severity. That NSSI may be particularly reinforcing for these individuals may account for the positive correlation between NSSI severity and relatively more positive explicit attitudes toward NSSI. It is also possible that participants who engage in this behavior more frequently may be rating the behavior more positively in order to avoid the experience of cognitive dissonance, often experienced as aversive (Elliot & Devine, 1994). If greater NSSI severity is associated with greater positive explicit attitudes toward NSSI due to the reinforcing nature of NSSI, we would expect that we would see similar associations between NSSI severity and implicit attitudes toward NSSI. However, there were no statistically significant associations between NSSI severity indicators and implicit scores. Given that we do not see consistency between implicit and explicit findings, this may provide evidence for our cognitive dissonance hypothesis. Interpretation aside, it is useful to consider whether this explicit positive in-group bias is protective for individuals with a history of NSSI (i.e., reflecting cognitive dissonance). Additionally, the explicit positive in-group bias could serve as a risk factor for future engagement in self-injury. Indeed, it is possible that individuals with a more native positive attitude toward NSSI are most likely to both initiate and maintain engagement in the behavior. However, from a method perspective, this pattern of results is in line with the results from a meta-analytic review of racial and ethnic implicit and explicit measures demonstrating minimal association between implicit and explicit measures (Oswald, Mitchell, Blanton, Jacard, & Tetlock, 2013). Perhaps even more notably, this review also did not provide any evidence to suggest that implicit scores predict discriminatory behavior (Oswald, Mitchell, Blanton, Jacard, & Tetlock, 2013), underscoring the need for research critically examining the utility of IAT measures for applied interventions.

This study adds to the small, but growing, literature examining implicit and explicit attitudes toward NSSI scarring among individuals with and without a history of NSSI.

Our study exhibits important strengths in that it used a mixed-methods approach to evaluate the presence of implicit and explicit bias toward NSSI. The use of both the traditional and the single-category IAT measures allowed for the examination of implicit attitudes in comparison with other concept categories (i.e., nonintentional disfigurement and tattoos; through the use of the IAT), in addition to absolute measures of bias (e.g., through the use of the SC-IAT). Using nonintentional disfigurement as a comparison condition allowed us to replicate previous stigma research, which often has compared psychiatric illness to physical illness (e.g., Teachman et al., 2006). Using tattoos as an additional comparison condition allowed us to compare NSSI to a form of intentional disfigurement that is considered more culturally accepted.

Furthermore, the combination of more traditional explicit measures of bias (i.e., Semantic Differential Scale) with more novel measures of explicit bias (e.g., Behavioral Intentions Questionnaires) allowed us to collect a wider range of information on participant attitudes toward NSSI scarring and the comparison categories of disfigurement. As a growing body of literature supports that interpersonal difficulties may not only lead to or be associated with NSSI (Santangelo et al., 2017; Turner, Cobb, Gratz, & Chapman, 2016), but also that NSSI may negatively impact interpersonal relationships (Burke, Hamilton, Abramson, & Alloy, 2015; Miller et al., 2018), the inclusion of the BIQs measuring desire to initiate and maintain interpersonal relationships with NSSI+ individuals provides useful information regarding the interpersonal implications of stigma toward NSSI.

There is considerable evidence highlighting the negative outcomes associated with stigma, especially stigma tied to psychiatric distress (i.e., NSSI). These outcomes can include general negative psychosocial outcomes, such as decreased economic productivity (Heatherton, Kleck, Hebl, & Hull, 2000; Link, Struening, Rahav, Phelan, & Nuttbrock, 1997), as well as negative outcomes related to NSSI more specifically, such as increases in symptomatology, such as depression (e.g., Stier & Hinshaw, 2007), or increases in negative self-concept, such as reductions in self-esteem or increases in shame (Garisch & Wilson, 2015; Lundh, Wångby-Lundh, & Bjärehed, 2011). Thus, there is a clear public health imperative to reduce stigma toward NSSI by targeting both general public attitudes toward NSSI, as well as ameliorating the effects of self-stigma that have been demonstrated here.

Strategies for reducing stigma toward NSSI among the general population are multifaceted and can include psychoeducational approaches implemented in school settings. Educational programs that allow for some amount of social contact with the stigmatized individuals may be especially beneficial at reducing social stigma (Pinfold et al., 2003; Schulze, Richter-Werling, Matschinger, & Angermeyer, 2003). Interventions that provide nonjudgmental information regarding reasons for engaging in NSSI, or risk factors for the behavior, may assist in reshaping negative attitudes toward NSSI, especially the perception that NSSI is inherently a socially manipulative behavior. However, specific strategies also can be implemented to help individuals who engage in NSSI. If effective, these strategies can assist with increasing help-seeking behavior and mitigating self-stigma among those with a history of NSSI.

Furthermore, findings from previous research demonstrate that self-stigma reduces disclosure, thus increasing barriers to receiving help (Corrigan & Fong, 2014; Rowe et al., 2014). Moreover, given the negative attitudes toward NSSI among peers, teachers, and even medical professionals (Berger et al., 2013), there are clear reasons why individuals who engage in NSSI may choose not to disclose and reach out for help (Fortune et al., 2008; Klineberg et al., 2013). Thus, from a public health standpoint, methods that utilize social media, the Internet, or that promote ways for individuals to disclose self-injury anonymously and receive help (e.g., Self-Injury Outreach and Support, University of Guelph & McGill University, 2019) may be the most

efficacious for individuals who self-injure (Rowe et al., 2014). On an individual level, it is important for mental health providers to acknowledge and demonstrate understanding of the negative stigma that NSSI+ individuals face. Although disclosure can help to reduce stigma (as discussed by Corrigan & Matthews, 2003), it is important that disclosure occurs in a supportive environment so as to not increase negative outcomes associated with stigma (Hasking, Rees, Martin, & Quigley, 2015; Lloyd et al., 2018). Finally, there is evidence to suggest that mental health providers also may exhibit negative bias toward individuals with psychological disorders (e.g., Berger et al., 2013; Nordt, Rössler, & Lauber, 2006). Thus, clinicians working with NSSI individuals should be careful to identify and resolve negative biases that may affect their work with such individuals.

However, this study is not without clear limitations. For example, we used relatively novel explicit measures to assess attitudes toward NSSI. Although the SDS and BIQs were designed to increase face validity and similar tasks have been used in the literature (e.g., Bonar et al., 2012; Greenwald et al., 1998), they have not been psychometrically tested, and thus, future studies are needed to ensure that these measures assess explicit bias and attitudes toward NSSI in a reliable and systematic way. Second, our study used an undergraduate sample, which may limit generalizability. Future work is needed to evaluate the presence of stigmatization toward NSSI in both younger and older samples and in clinical samples. However, it is important to note that a significant proportion of undergraduates endorse a history of NSSI (Swannell et al., 2014), and college campuses can offer a unique setting for antistigma efforts (Lewis et al., 2019). Third, our NSSI subsample varied significantly in severity and recency of NSSI. For example, some individuals endorsed a chronic history of engagement in NSSI, whereas others only had engaged in NSSI once during their lifetime. It may be useful for future researchers who are aiming to design an intervention to target stigma surrounding NSSI in specific populations to replicate these findings with a more clinically homogenous sample. Finally, we did not account for any scarring from nonintentional accidents or tattoos that the participants may have had. That is, although we accounted for NSSI status, if a study participant had tattoos or nonintentional disfigurement, this may systematically have influenced the level and direction of their attitudes. In the future, it may be useful to examine status of nonintentional disfigurement or tattoos in order to rule out any systematic effects of these types of scarring on implicit or explicit bias scores.

Overall, this study adds to the previous literature demonstrating the presence of negative implicit and explicit stigma toward NSSI behavior, both among individuals with and without a history of NSSI. Furthermore, our exploratory analyses revealed that among those with a history of NSSI, lowered explicit bias toward NSSI is associated with a history of greater NSSI severity, necessitating further research to determine the nature and implications of this negative association. Results highlight the need for public health and clinical interventions for reducing NSSI stigma and helping individuals who engage in NSSI with identifying and addressing the self-stigma that may contribute in part to the negative sequelae of NSSI.

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APPENDIX A

TABLE A1
Complete list of words for the IAT and SC-IAT attribute categories as published in Burke et al. (2019)

NSSI	Tattoo	Non-intentional disfigurement
Cutting	Tatoo	Injured
Self-harm	Branded	Wounded
Self-injury	Body modification	Hurt
Non-suicidal self-injury	Marked	Marked
Self-mutilation	Inked	Discoloration
Self-burning	Tat	Birthmark

Good vs. Bad		Accept vs. Reject		Safe vs. Dangerous	
Kind	Untrustworthy	Loved	Forgotten	Sheltered	Threatening
Considerate	Evil	Welcomed	Alienated	Secure	Alarming
Caring	Selfish	Admired	Deserted	Shielded	Jeopardous
Just	Manipulative	Included	Shunned	Innocent	Risky
Moral	Dishonest	Respected	Disliked	Naïve	Hazardous
Generous	Cruel	Accepted	Outcast	Guarded	Unreliable
Loving	Gross	Valued	Pushed out	Gentle	Terrible
Trustworthy	Deceptive	Treasured	Denied	Harmless	Aggressive
Honest	Immodest	Integrated	Isolated	Peace	Hostile
Pure	Hate	Incorporated	Rejected	Trust	High-risk

Complete list of words for the IAT and SC-IAT attribute categories as published in Burke et al. (2019).