Using Implicit and Explicit Measures to Predict Nonsuicidal Self-Injury Among Adolescent Inpatients

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Objective: To examine the use of implicit and explicit measures to predict adolescent nonsuicidal self-injury (NSSI) before, during, and after inpatient hospitalization.

Method: Participants were 123 adolescent psychiatric inpatients who completed measures at hospital admission and discharge. The implicit measure (Self-Injury Implicit Association Test [SI-IAT]) and one of the explicit measures pertained to the NSSI method of cutting. Patients were interviewed at multiple time points at which they reported whether they had engaged in NSSI before their hospital stay, during their hospital stay, and within 3 months after discharge.

Results: At baseline, SI-IAT scores differentiated past-year self-injurers and noninjurers ($t_{121} = 4.02$, $p < .001$, $d = 0.73$). These SI-IAT effects were stronger among patients who engaged in cutting (versus noncutting NSSI methods). Controlling for NSSI history and prospective risk factors, SI-IAT scores predicted patients' subsequent cutting behavior during their hospital stay (odds ratio (OR) $= 8.19$, CI $= 1.56$–42.98, $p < .05$). Patients' explicit self-report uniquely predicted hospital-based and postdischarge cutting, even after controlling for SI-IAT scores (ORs $= 1.82$–2.34, CIs $= 1.25$–3.87, p values $<.01$). Exploratory analyses revealed that in specific cases in which patients explicitly reported low likelihood of NSSI, SI-IAT scores still predicted hospital-based cutting.

Conclusion: The SI-IAT is an implicit measure that is outcome-specific, a short-term predictor above and beyond NSSI history, and potentially helpful in cases in which patients at risk for NSSI explicitly report that they would not do so in the future. Ultimately, both implicit and explicit measures can help to predict future incidents of cutting among adolescent inpatients.

Key words: self-injury, risk factor, prediction, IAT, self-report

Nonsuicidal self-injury (NSSI), defined as direct and deliberate destruction of bodily tissue in the absence of intent to die, is a serious health problem. In addition to causing immediate physical harm, NSSI increases the likelihood of making a suicide attempt.[1-3] Youth and those with mental disorders are at especially high risk of NSSI, with up to 82% of psychiatrically hospitalized adolescents reporting past-year engagement in this behavior.[4] Despite these high prevalence estimates, there are no empirically based practices for assessing NSSI risk in hospital settings. This is concerning in light of contagion effects observed in adolescent treatment centers[5] and adolescents' propensity to learn NSSI behavior from each other.[6] Risk assessments that identify which individuals are likely to hurt themselves, either during or after hospitalization, may help to inform milieu management and treatment decisions.

Risk assessments can be either explicit or implicit in nature. Explicit measures capture psychological processes that respondents can consciously observe and report. For example, one could directly ask a patient about their NSSI risk (e.g., "What is the likelihood that you will hurt yourself without wanting to die in the future?"). This is a pragmatic assessment technique, but its predictive validity has rarely been tested. Related work on self-injurious (suicidal or nonsuicidal) adolescents[7] and suicidal patients[8-10] report that explicit self-report may be unreliable, or at least not

incrementally helpful. More focused on NSSI, one prior study involving college students revealed that self-reported future NSSI risk predicted NSSI frequency one year later, but not above and beyond NSSI history.[11] It remains unknown whether explicit self-report of NSSI risk is incrementally predictive in a clinical sample.

In contrast to explicit measures, implicit measures use respondents' automatic, observable response patterns to infer NSSI risk. The respondent may be unaware of the psychological processes captured by implicit measures, such that their responses are less susceptible to conscious control.[12] For example, the Self-Injury Implicit Association Test (SI-IAT)[13] is a computer task that measures respondents' reaction times to distinct word pairs on the computer screen (i.e., "Cutting–Me," "Cutting–Not Me"). By doing this, the SI-IAT evaluates the strength of the mental association a self-injurer holds between NSSI (i.e., cutting) and themselves (i.e., me). According to the Implicit Identification Hypothesis,[14] individuals' strong automatic association between NSSI and their self-concept (i.e., Cutting–Me) can guide their decision to select NSSI as a preferred coping strategy. Implicit identification with NSSI is therefore considered a proximal or short-term risk factor. Although this "short-term" status conceptually sets it apart from distal risk factors (e.g., childhood sexual abuse), the concrete time frame within which implicit identification with NSSI relates to subsequent behaviors remains unknown.

Despite its theoretical conceptualization, implicit identification with NSSI has yet to be tested within a time frame shorter than 6 months. Cross-sectional work using the SI-IAT reveals that adolescent self-injurers have stronger implicit identification with NSSI compared to noninjurers,[13] and that self-injurers have stronger implicit identification with NSSI compared to suicide attempters and healthy adolescents.[15] Both 6- and 12-month prospective studies, limited to community-based samples, have shown that implicit identification with NSSI did not predict future NSSI frequency, remission, or recurrence.[11,16] Instead, robust predictors pertained to history of NSSI, specifically the frequency of prior episodes and number of NSSI methods. It still remains unknown whether implicit identification with NSSI is a poor predictor altogether, or whether it simply does not predict 6- or 12-month NSSI. This is an important consideration for a behavior such as NSSI, which tends to have a relatively short-lived course[17] and can be readily replaced by other behaviors within a matter of weeks.[18] An adolescent who strongly identifies with NSSI at 3 years of age, for example, may no longer identify as a self-injurer 5 years or even 1 year later.

One of the greatest challenges with testing short-term prediction models is achieving a high enough base rate of the outcome. The shorter the prospective time frame, the fewer individuals will have engaged in NSSI at follow-up. A high-risk group (i.e., individuals more likely to reengage in NSSI in the future) represents an optimal sample for short-term prediction and would be more likely to produce more promising statistical power at follow-up time points. Short-term prediction models of NSSI would ideally be assessed in a clinical population, which reveals higher rates of NSSI.[4] Higher follow-up rates of NSSI may also be achieved with younger samples. Prior longitudinal SI-IAT studies have assessed young adults (means = 19.1–24.4 years),[11,16] who are more likely to stop (versus start or continue) engaging in NSSI and thereby leave fewer subsequent NSSI episodes to predict.[17]

The present study tested the short-term predictive validity of implicit and explicit measures of NSSI risk. In doing so, we addressed the aforementioned gaps in the current literature and assessed predictive validity in a way that is closer to what happens in actual clinical practice. More specifically, we examined whether implicit and explicit measures can predict the occurrence of NSSI over the course of hospitalization (i.e., 14.5 days on average), and within 3 months of hospital discharge. These are referred to as "hospital-based NSSI" and "post-discharge NSSI," respectively. We tested 2 specific hypotheses. First, we hypothesized that patients' SI-IAT scores would be associated with their history of NSSI such that they would distinguish self-injurers and noninjurers at baseline. Second, we hypothesized that SI-IAT scores would improve 2-week and 3-month prediction of NSSI above and beyond NSSI history. We similarly tested the predictive validity of explicit self-report as a measure of NSSI risk—a highly pragmatic but understudied prediction tool.

As a final feature of this study, we explored change in implicit identification with NSSI over the course of inpatient stabilization by administering the SI-IAT at admission and at discharge. It remains unknown whether such change is possible, or whether it predicts subsequent NSSI behavior (i.e., after patients leave the hospital). Prior work has shown that IAT scores related to depression or anxiety change across the course of treatment and relate to symptom reduction.[19-21] These findings would highlight the malleability of implicit associations and their subsequent connection to clinical change. As a comparison, explicit self-report measures from admission and discharge were examined as well.

METHOD

Study Sample

We approached 249 adolescents who had recently been admitted to a psychiatric inpatient unit, of whom 137 provided parental consent and child assent (response rate = 55.0%). Among this sample, 123 patients provided data relevant to our hypotheses (i.e., completed both the SI-IAT and explicit self-report measures). Exclusion criteria included the presence of any factor that impaired an individual's ability to comprehend and to effectively participate in the study, including an inability to speak or write English fluently, the presence of gross cognitive impairment, or the presence of extremely agitated or violent behavior. Fourteen patients were excluded because of behavioral, medical, or cognitive limitations to providing reliable self-report responses (n = 8), invalid SI-IAT data at baseline (n = 4), and decision to withdraw from the study (n = 2). The final sample consisted of 123 adolescents ranging from 10 to 17 years (mean = 14.8 years, SD = 1.5 years), predominantly female (71.5%), and white (87.0% white, 4.9% Hispanic, 2.4% African American, 1.6% Asian, 4.1% other), with complex diagnostic presentations (1–5 psychiatric diagnoses at admission, mean = 2.0, SD = 0.9). More than half of the final sample reported past-year history of NSSI (n = 68, 55.3%). A total of 115 participants completed the follow-up assessment at discharge (response rate = 93.5%), and 100 completed the 3-month follow-up assessment (response rate = 81.3%). The average duration between admission and discharge assessments was approximately 2 weeks (mean = 15.2 days, SD = 21.4 days).

Measures

Self-Injurious Thoughts and Behaviors Interview. Adolescents' engagement in NSSI was assessed using the Self-Injurious Thoughts and Behaviors Interview (SITBI),[22] which is a structured interview about engagement in self-injurious thoughts and behaviors including NSSI. The SITBI was used to assess history of NSSI at admission, hospital-based NSSI, post-discharge NSSI, and adolescents' self-reported future likelihood of NSSI. NSSI was captured through questions about whether an adolescent had engaged in NSSI during the respective time frames, how frequently he or she engaged in NSSI, and what types of methods he or she used. The SITBI also assessed future likelihood of NSSI, described below in greater detail.

Self-Injury Implicit Association Test. We used Self-Injury Implicit Association Test (SI-IAT)[13] scores to caputure our primary predictor, namely, implicit associations about NSSI. The SI-IAT is a brief reaction time test during which patients sort images and words into concept categories (Cutting, Not Cutting) and attribute categories (Me, Not Me) by pressing either a left or right key on a computer keyboard. A total of 40 presented category pairs of Cutting/Me on one side and Not Cutting/Not Me on the other side. In addition, 40 trials presented reversed category pairs of Cutting/Not Me on one side and Not Cutting/Me on the other side. The SI-IAT compares the speed at which a person classifies stimuli when the paired