Moving Beyond Self-Report: Implicit Associations about Death/Life Prospectively Predict Suicidal Behavior among Veterans

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Reliance on self-report limits clinicians' ability to accurately predict suicidal behavior. In this study the predictive validity of an objective measure, the death/suicide Implicit Association Test (d/sIAT), was tested among psychiatrically hospitalized veterans. Following acute stabilization, 176 participants completed the d/sIAT and traditional suicide risk assessments. Participants had similar d/sIAT scores regardless of whether they had recently attempted suicide. However, d/sIAT scores significantly predicted suicide attempts during the 6-month follow-up above and beyond other known risk factors for suicidal behavior (OR = 1.89; 95% CI: 1.15–3.12; based on 1SD increase). The d/sIAT may augment the accuracy of suicide risk assessment.

Accurately assessing suicide risk is extremely difficult. Current suicide risk screening and assessment methods rely almost entirely on patient self-report of suicidal thoughts and intentions, which is problematic for a number of reasons. Suicidal individuals are often motivated to minimize the report of their actual suicidal ideation or intentions to avoid psychiatric hospitalization or facilitate discharge from

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such settings (Nock & Banaji, 2007). People also often have limited insight into their thoughts and feelings, which can impact their ability to accurately report suicidal ideation and intentions (Wilson, 2009). Furthermore, many patients experience transient suicidal thoughts and intentions that may be absent during a clinical interview, but then rapidly resurface under stress (Nock, Prinstein, & Sterba, 2009). In a prospective study of psychiatric inpatients, Busch, Fawcett, and Jacobs (2003) found that 78% of individuals who died by suicide as an inpatient or immediately following discharge had denied suicide ideation or intent in their last communication. Similarly, 73% of Veterans Health Administration (VHA) patients who died by suicide did not report suicide ideation when assessed within a week of their death (Smith et al., 2013). Indeed, many studies have found the highest risk of death by suicide occurs immediately following inpatient discharge (e.g., Hunt et al., 2009; Valenstein et al., 2009), presumably after patients deny suicidal intent (Nock & Banaji, 2007) .

Even among patients who accurately report current suicidal ideation and intentions, determining which of these individuals will go on to engage in suicidal behavior remains extremely challenging (Fowler, 2012; Silverman & Berman, 2014). Despite decades of research, no method of suicide risk assessment currently has the capacity to adequately predict who will engage in suicidal behavior (Fowler, 2012; Franklin et al., 2016). To overcome these limitations, more work is needed to identify behavioral markers of suicide risk and recovery. The development and validation of objective measures to assess implicit cognitions and processes specific to suicide is an emerging line of research that holds great promise. A nascent literature suggests that assessing patients' implicit associations regarding death and life using performance-based, reaction-time tasks may circumvent some of the limitations of self-report measures by providing a more objective assessment of suicide risk. Specifically,

Nock et al. (2010) have developed a suicide-related version of the Implicit Association Test (IAT; Greenwald, McGhee, & Schwarts, 1998) that assesses individuals' unconscious associations between themselves and life and death, the "death/suicide IAT" (d/sIAT). Several studies have demonstrated a relation between d/sIAT scores and concurrent or past suicidal thoughts, intentions, and behaviors (Harrison, Stritzke, Fay, Ellison, & Hudaib, 2014; Nock et al., 2010; Randall, Rowe, Dong, Nock, & Colman, 2013). Similarly, Ellis, Rufino, and Green (2016) found that d/sIAT scores upon admission to a psychiatric inpatient unit predict suicide ideation at discharge. Moreover, two studies focused on psychiatric emergency room patients have demonstrated the incremental predictive validity of the d/sIAT for predicting self-harm (Nock et al., 2010; Randall et al., 2013). Nock and colleagues found that positive associations between self and death among participants with a history of a suicide attempt were associated with a sixfold increase in the risk of a suicide attempt during a 6-month follow-up, even after controlling for other primary predictors of suicide risk, including presence of a current depressive disorder, a history of multiple suicide attempts, severity of suicide ideation, and clinician and patient prediction. This effect of d/sIAT scores incrementally predicting self-harm behavior was replicated by Randall et al. (2013); however, nonsuicidal self-injury was not differentiated from suicidal self-injury in that study. Despite these promising findings, no other studies have evaluated the prospective predictive validity of the d/sIAT for suicide attempts or deaths. Researchers still need to evaluate the generalizability of these findings to other patient populations at risk for suicide (e.g., veterans) and in care settings besides emergency departments.

The purpose of the current research was to test the validity of the d/sIAT as a marker of suicide risk among veterans admitted to a psychiatric inpatient unit. Following the design of Nock et al. (2010), the primary objectives of this study were to determine if the d/sIAT could (1) be used

to detect recent suicide attempt status in a sample of veterans admitted to an inpatient psychiatric unit due to imminent suicide risk, and (2) prospectively predict suicide attempts during a 6-month follow-up above and beyond other known risk factors. We hypothesized that higher scores on the d/sIAT (stronger association between self and death/weaker associations between self and life) would be associated with: (1) significantly greater odds of having made a suicide attempt in the week prior to admission and (2) significantly greater odds of making a suicide attempt in the next 6 months, above and beyond the influence of other known risk factors for suicidal behavior (i.e., demographic factors, diagnosis, history of multiple suicide attempts, severity of suicide ideation, and clinician and patient prediction).

METHOD

Design

Eligible patients included all veterans between the ages of 18 and 89 years old who were currently hospitalized due to suicide risk (as documented in admission notes) in a VHA psychiatric inpatient unit at an urban Veterans Affairs Medical Center. Veterans were excluded from study participation if they were unable to provide informed consent and complete study measures (e.g., due to extreme distress, mania, sedation, cognitive deficits, etc. based on the charge nurse's and experimenter's evaluation). The single-arm, longitudinal study consisted of a baseline assessment while the participants were hospitalized and a follow-up assessment/ medical record review 6 months later.

Participants

We enrolled 176 veterans in this study. One participant was excluded after revealing information during his baseline session that met exclusion criteria. Two additional participants were excluded from d/sIAT analyses; one due to slow and random responses on the d/sIAT and one due to loss of data during a technical malfunction. Baseline analyses for the first hypothesis therefore included 173 participants. An additional nine participants were lost to follow-up and one participant declined to provide a prediction of his/her likelihood of attempting suicide within the next 6 months. This left 163 participants in the follow-up sample. There were no significant differences between the 12 eligible participants who were not included in the follow-up sample and participants who completed the study (results available upon request). The majority of participants were White males with a median age of 50 years (range = 21–88; Table 1). Over two-thirds of participants had a history of one or more suicide attempts.

Measurement

We used the same measures as Nock et al. (2010). In addition to the measures described here, at the end of the baseline assessment session study participants completed several self-report measures for use in exploratory research.

Implicit Associations of Self with Death/ Life. The Death/Suicide Implicit Association Test (d/sIAT) was used to assess the relative strength of the respondent's tendency to associate death or life with themselves. The d/sIAT achieves this by measuring participants' reaction times on a computerized semantic categorization task. Participants classify stimuli representing the constructs of "death" (i.e., suicide, die, funeral, lifeless, deceased) and "life" (i.e., alive, live, thrive, survive, breathing), and the attributes "me" (i.e., myself, my, mine, I, self) and "not me" (i.e., them, they, theirs, their, other). On critical trials of the d/ sIAT, pairs of constructs and attributes appear in each upper corner of the screen. Stimuli appear in the lower center of the screen and respondents categorize the words to the right or left depending on the construct/attribute pairs in the top corners of the screen. Faster responses on the

TABLE 1
Baseline Sample's Characteristics and Primary Predictors of Suicide Attempts

Characteristic	Participants with recent attempt (n = 44) Mean (SD) and Median (range) or n (%)	Participants without recent attempt (n = 129) Mean (SD) and Median (range) or n (%)	Test statistic Chi-square or t value	Effect size Cohen's d or Cramer's v	p Value Chi-square or t test
Age	49.0 (12.3) 52 (21, 67)	45.6 (14.4) 48 (22, 88)	1.4	0.24	0.17
Male	41 (93%)	121 (94%)	n/a	<0.0001*	>0.99*
Race/ethnicity			n/a	0.09*	0.25*
Caucasian	25 (57%)	89 (69%)			
African American	9 (20%)	21 (16%)			
Latino/Latina	7 (16%)	8 (6%)			
Multiple	2 (5%)	9 (7%)			
Other	1 (2%)	2 (2%)			
Marital status			3.2	0.13	0.34
Never married	14 (32%)	36 (28%)			
Partnered or married	6 (14%)	35 (27%)			
Separated	5 (11%)	12 (9%)			
Divorced/widowed	19 (43%)	44 (36%)			
Diagnosis					
Depressive disorder	34 (77%)	102 (79%)	0.06	0.02	0.80
Anxiety disorder	24 (55%)	83 (64%)	1.3	0.09	0.25
Alcohol-use disorder	25 (57%)	57 (44%)	2.1	0.11	0.15
Substance-use disorder	27 (61%)	50 (39%)	6.8	0.20	0.009
Psychotic disorder	7 (16%)	12 (9%)	n/a	0.09*	0.26*
Other disorder	5 (11%)	18 (14%)	0.19	0.03	0.66
Past suicide attempts			10.5	0.25	0.005
No attempt	9 (20%)	47 (36%)			
One attempt	7 (16%)	36 (28%)			
Multiple attempts	28 (64%)	46 (36%)			
BSS scores (n = 172)	15.7 (10.4) 18 (0, 31)	13.1 (8.9) 14 (0, 36)	1.6	0.28	0.12
d/sIAT scores	−0.44 (0.44)	−0.48 (0.39)	0.60	0.10	0.55

Note. BSS, Beck Scale for Suicide Ideation; "Past Suicide Attempts" do not include "Recent Attempts" prior to hospital admission.
*$r_{equivalent}$ (Rosenthal & Rubin, 2003) and Fisher's exact test.

"death"/"me" blocks relative to the "life"/ "me" blocks have been associated with increased suicide risk (Nock et al., 2010). We utilized the same code and presentation program (Inquisit 3.0, Millisecond Software, Seattle, WA, 2012) as Nock et al. (2010). The d/sIAT was presented on a laptop computer with a 15.6 inch screen.

Participant Demographic and Psychiatric Factors. VHA electronic medical records were reviewed to collect demographic and psychiatric risk factors for suicide attempts. This included age, sex, race, and mental health diagnoses listed in discharge reports.

History of Suicidal Behavior. The Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007), a structured clinical interview, was used to assess past and current suicide ideation, plans, and attempts. The SITBI defines *suicide* as "an actual attempt to kill yourself in which you had at least some intent to die." The SITBI has good reliability and validity (Nock et al. 2010). Study staff administered the SITBI during the baseline assessment. Suicide attempt status prior to the baseline assessment (i.e., whether the participant attempted suicide in the week prior to admission) was determined by self-report on the SITBI.

Severity of Current Suicide Ideation. The Beck Scale for Suicide Ideation (BSS; Beck & Steer, 1991) was used to measure the severity of suicide ideation during the week prior to the baseline assessment. The BSS has 21 self-report items each consisting of three statements in order of increasing severity (0 = *least severe* to 2 = *most severe*). Respondents select the statement that best describes their feelings. Only items 1 through 19 are used to calculate the total scale score. The scale has high concurrent validity (comparing patient and psychiatrist ratings: .90, $p < .001$) and internal consistency (α = .93; Beck, Steer, & Ranieri, 1993).

Clinician and Participant Predictions. Each participant's primary psychiatrist answered the following question: "Based on your clinical judgment and all that you know of this patient, if untreated what is the likelihood that this patient will make a suicide attempt in the next 6 months?" Psychiatrists responded using an 11-point Likert-type scale with 0 being *no likelihood* and 10 being *very high likelihood* (c.f., Nock et al., 2010). An item on the SITBI was used to ascertain each participant's own prediction of the likelihood they would attempt suicide during the follow-up period. Participants were asked, "On the scale of 0–4, what do you think the likelihood is that you will make a suicide attempt in the future?" The Likert-type scale ranged from 0 (*low/little*) to 4 (*very much/severe*).

Suicide Attempts During the 6-Month Follow-Up. Participants were contacted 6 months after their baseline assessment session and re-administered the SITBI. Follow-up suicide attempt status (i.e., whether the participant had attempted suicide during the follow-up period, including participants who died by suicide) was determined by a combination of self-report on the SITBI and medical record review (c.f., Nock et al., 2010). Approximately 55% of participants took part in the follow-up SITBI. Medical records were considered to be "positive" for a suicide attempt if a new suicide attempt occurring during the follow-up period was documented in the chart. If the medical record included documentation of a suicide risk assessment occurring at least 5 months after the baseline assessment session and suicide attempts were denied, the medical record was coded as "negative" for a suicide attempt. If a veteran was in VA residential care (e.g., domiciliary, substance abuse treatment program) that included regular clinical contact, and there was no documentation of suicidal behavior, the medical record was coded as "negative" for suicide attempt. If the medical record did not include documentation of a suicide attempt or assessment of suicide risk and the veteran had not been in residential care, the medical record was coded as "missing" suicide attempt data. When either the SITBI or sufficient chart data were missing, the other

was used to determine the follow-up attempt status. Using this method, we were still unable to determine the follow-up suicide attempt status for nine participants. If the participant's self-report and chart data conflicted, the discrepancy was clarified. The first and second authors reviewed and discussed any instances of questionable suicidal behavior (e.g., attempt vs. preparatory behavior) and classified it based on the SITBI and the Self Directed Violence Classification System (Brenner et al., 2011).

Procedure

Clinicians on the inpatient psychiatric unit notified potentially eligible patients about the study and referred interested patients to study staff. Study staff reviewed the patients' medical records and discussed their capacity to participate in the research with the referring provider and charge nurse. When the treatment providers believed that the patient was emotionally stable enough to participate in the baseline assessment, study staff met with the patient, discussed the details of the study with them, assessed their capacity to provide informed consent, and—if appropriate—the patient enrolled in the study. Participants were enrolled in the study as soon as possible following hospital admission. The baseline assessment session lasted approximately 1 hour, and participants were compensated $25. Participants began by completing the d/sIAT, followed by the SITBI and BSS. All participants were reminded that they would be called on the telephone in approximately 6 months to complete the follow-up SITBI. Participants did not receive additional compensation for completing the follow-up assessment.

Analyses

Demographic and clinical characteristics are reported as means and SDs, medians and ranges, and counts and percents, as appropriate. IAT D scores were calculated using the improved algorithm as described by Greenwald, Nosek, and Banaji (2003) with the following "approximately equivalent alternatives" added: (1) delete trials with latencies below 400 milliseconds and (2) for errors, do not add time to error latencies given that the program requires a correct response after an error. A hierarchical logistic regression analysis was used to test the hypothesis that higher IAT scores would be associated with significantly greater odds of having made a suicide attempt within the week prior to admission. In order to determine which variables to include in the final regression model as potential confounders, we identified variables significantly related to suicide attempt status, independent of IAT scores ($p < .05$). The variables considered were age, race/ethnicity, marital status, diagnosis, history of suicide attempts, and severity of suicide ideation. The potential confounders identified were entered in the first step of the logistic regression, and the IAT scores were entered in the second step.

A hierarchical logistic regression analysis using forward stepwise entry into three blocks was used to test the hypothesis that higher scores on the suicide IAT would be associated with significantly greater odds of making a suicide attempt in the next 6 months, above and beyond the influence of other known risk factors for suicidal behavior. Similar to Nock et al.'s (2010) analyses, block one consisted of potential predictors associated with follow-up attempt ($p < .05$). The variables assessed included age, race/ethnicity, marital status, diagnosis, history of suicide attempts, and severity of suicide ideation. Psychiatrist and participant predictions were entered in block two, and IAT scores were entered in the third block. In order to increase the generalizability of the findings to all veterans admitted to inpatient care due to suicide risk, we chose to include veterans both with and without a history of suicide, whereas past research has focused on the incremental predictive validity of the d/sIAT among participants with a history of one or more lifetime suicide attempts (Nock et al. 2010).

RESULTS

Baseline Results

Participants who attempted suicide in the week prior to admission did not differ from participants who had not attempted suicide in the week prior to admission on age, sex, or race. Both groups had similar BSS scores and diagnoses (Table 1), with the exception that participants who attempted suicide in the week prior to admission were more likely to have a substance-use disorder and a history of multiple previous suicide attempts (excluding attempts in the week prior to admission). Participants had similar d/sIAT scores regardless of whether they had attempted suicide in the week prior to admission. A hierarchical logistic regression accounting for substance-use disorders and previous suicide attempts failed to support the first hypothesis that participants with higher d/sIAT scores (i.e., stronger implicit associations between self and death and weaker implicit associations between self and life) would have significantly greater odds of having made a suicide attempt in the week prior to admission (Table 2).

Follow-Up Results

Twenty-seven participants attempted suicide at least once within 6 months of the baseline assessment. The primary factors traditionally used in suicide risk assessment were analyzed for differences between the group of participants who attempted suicide during the follow-up period and those who did not (Table 3). There were no significant differences in demographic or psychiatric variables between groups, with the exception of age. Participants who attempted suicide during the follow-up tended to be younger than participants who did not attempt suicide during the follow-up. Mental health diagnoses and history of previous suicide attempts were similar across groups. Participants and clinicians predicted a significantly higher likelihood of suicide among participants who went on to attempt suicide during the follow-up period. These participants also had significantly higher scores on the d/sIAT than participants who did not attempt suicide during the follow-up period.

A hierarchical logistic regression was used to test the incremental predictive validity of the d/sIAT to predict suicide attempts even after accounting for the principal suicide risk factors that were significantly related to suicide attempt status at follow-up (Table 4). In support of the second hypothesis, d/sIAT scores significantly predicted suicide attempts during the follow-up period above and beyond age, patient predictions, and clinician predictions, with a one standard deviation increase in d/sIAT score associated with an 89% increase in the likelihood of a suicide attempt during the next 6 months.

DISCUSSION

This study provides additional support for the incremental predictive validity of the d/sIAT. Our findings not only replicate those of Nock et al. (2010), but also extend the findings to a sample of veterans in a psychiatric inpatient setting. Specifically, in our sample, d/sIAT scores explained an additional 4.6% of the variance in suicide attempts during the 6-month follow-up period, after accounting for principal suicide risk factors significantly associated with these attempts. Veterans with higher d/sIAT scores (stronger associations between self and death compared with associations between self and life) were almost twice as likely to attempt suicide during the 6-month follow-up period. Moreover, these analyses included both participants with and without a history of a suicide attempt, whereas past research has focused on the incremental predictive validity of the d/sIAT only among participants with a history of one or more suicide attempts (Nock et al. 2010). It is also notable that d/sIAT scores predicted future suicide attempts when many of the "best" self-reported indicators of suicide risk failed to do so (i.e., history of suicide attempt, severity of suicide ideation). Given the somewhat

TABLE 2
Test of Hypothesis One: d/sIAT Scores and Recent Suicide Attempts

HLR step and variable(s)	b (SE)	OR (95% CI)	R^2_L	Incremental R^2_L	Likelihood ratio test	p Value
Step 1			0.077	0.077	15.09	0.002
Substance-use disorder	0.79 (0.37)	2.21 (1.07, 4.56)				
Prior attempts						
No prior attempts	Reference					
One prior attempt	−0.39 (0.32)	0.92 (0.31, 2.75)				
Multiple prior attempts	0.70 (0.25)	2.75 (1.15, 6.57)				
Step 2			0.080	0.003	0.51	0.48
IAT D score	0.32 (0.45)	1.14 (0.80, 1.62)[a]				

Odds ratio (OR) based on a 0.40 unit increase in d/sIAT score (about 1 standard deviation).

modest increase in suicide risk accounted for by d/sIAT scores, it is unlikely that the d/sIAT will eliminate the need for traditional self-report assessment techniques. Rather, the most promising use of the d/sIAT may be as one component of a larger suicide risk assessment battery (Randall et al., 2013). Nevertheless, these findings together with those of Nock and colleagues provide a compelling justification for future research examining how the d/sIAT may be used clinically to enhance suicide risk assessment.

Given that the d/sIAT predicted suicide attempts, it is interesting that d/sIAT scores were similar among participants regardless of whether they had attempted suicide within the week prior to admission. This null finding is inconsistent with Nock et al. (2010) results, which demonstrated higher d/sIAT scores among participants who attempted prior to admission. The discrepant level of variability in suicide risk between the two samples may explain the inconsistent findings. Nock and colleagues compared participants with recent attempts to other psychiatrically distressed participants presenting for emergency care. Some of these participants were not seeking care due to concerns of suicide. Additionally, unlike some of Nock and colleagues' participants who presented for emergency care due to suicide risk, but were not admitted, all of the participants in the current study were

believed to be at high enough risk to warrant admission. The resulting sample had a very high prevalence of past suicide attempts (68%). This may have limited variability in underlying suicide risk and reduced the variability accounted for by recent suicide attempts. Indeed, lifetime history of suicide attempts did not predict attempts during the 6-month follow-up.

The Cognitive Model of Suicidal Behavior (CMSB) may offer another potential explanation as to why attempts just prior to admission were not associated with higher d/sIAT scores. The theory holds that dormant schema, or maladaptive cognition and biased information processing, need to be activated by stress in order to influence cognition and imminent suicide risk (Wenzel & Beck, 2008). Nock et al. (2010) participants were assessed in emergency rooms—presumably near the height of a suicidal crisis when maladaptive self-associations with death may have been most fully activated. In the current sample, activation related to stressors precipitating hospitalization might have dissipated somewhat by the time participants were assessed several days (median = 3 days) after admission, leading to similar d/sIAT scores regardless of attempts prior to admission. The potential for decreased activation of maladaptive cognition following psychiatric hospitalization is supported by Russ, Kashdan, Pollack, and Bajmakovic-Kacilas' (1999)

TABLE 3
Follow-Up Sample's Characteristics and Primary Predictors of Suicide Attempts

Characteristics and primary predictors of suicide attempts	Those with a follow-up attempt ($n = 27$) Mean (SD) and Median (range) or n (%)	Those without a follow-up attempt ($n = 136$) Mean (SD) and Median (range) or n (%)	Test statistic Chi-square or t value	Effect size Cohen's d or Cramer's v	p Value Chi-square or t test
Age	42.0 (13.2) 39 (21, 65)	47.9 (13.7) 51.5 (24, 88)	2.0	0.43	0.04
Male	25 (93%)	128 (94%)	n/a	0.03*	0.67*
Race/ethnicity			n/a	0.02*	0.79*
Caucasian	20 (74%)	87 (64%)			
African American	3 (11%)	25 (18%)			
Hispanic	3 (11%)	11 (8%)			
Multiple	1 (4%)	10 (7%)			
Other	0 (0%)	3 (2%)			
Disorder					
Depressive	24 (89%)	103 (76%)	2.3	0.12	0.13
Anxiety	18 (67%)	81 (60%)	0.48	0.05	0.49
Alcohol use	14 (52%)	63 (46%)	0.28	0.04	0.60
Substance use	13 (48%)	58 (43%)	0.28	0.04	0.60
Psychotic	4 (15%)	15 (11%)	n/a	0.05*	0.52*
Other	3 (11%)	19 (14%)	n/a	<0.0001*	>0.99*
Past attempts			3.8	0.15	0.15
No attempt	4 (15%)	39 (29%)			
One attempt	6 (22%)	38 (28%)			
Multiple attempts	17 (63%)	59 (43%)			
BSS score	16.5 (9.5) 19 (0, 31)	13.2 (9.2) 14.5 (0, 36)	1.7	0.35	0.10
($n = 26$ in attempt group)					
Patient prediction	2.0 (1.4)	1.1 (1.3)	3.2	0.68	0.002
Clinician prediction	8.1 (2.1)	6.2 (2.4)	3.9	0.82	0.0002
d/sIAT score	−0.29 (0.41)	−0.50 (0.39)	2.5	0.53	0.01

Note. BSS, Beck Scale for Suicide Ideation.
*$r_{\text{equivalent}}$ (Rosenthal & Rubin, 2003) and Fisher's exact test.

TABLE 4
Test of Hypothesis Two: d/sIAT Scores Predict Suicide Attempts

HLR step and variable(s)	b (SE)	OR (95% CI)	R_L^2	Incremental R_L^2	Likelihood ratio test	p Value
Step 1			0.028	0.028	4.09	0.04
Age	−0.03 (0.02)	0.97 (0.94, 0.99)				
Step 2			0.178	0.150	22.05	<0.0001
Patient prediction	0.46 (0.17)	1.58 (1.13, 2.19)				
Clinician prediction	0.35 (0.12)	1.42 (1.13, 1.79)				
Step 3			0.224	0.046	6.66	0.01
IAT D score	1.59 (0.64)	1.89 (1.15, 3.12)[a]				

Odds ratio (OR) based on a 0.40 unit increase in d/sIAT score (about 1 standard deviation).

finding that individuals hospitalized due to risk of suicide experienced a significant decrease in suicide ideation within 24 hours of admission (Russ et al., 1999). Moreover, patients who attempted suicide prior to admission were more likely to report being free of suicide ideation than participants who had not attempted just prior to admission. However, it is important to note that these findings are limited by reliance on participants' self-report and that the CMSB needs more prospective empirical evaluation.

Future research should examine the impact of acute affect on d/sIAT scores among participants with and without elevated suicide risk. Additionally, researchers should continue to assess the psychometric properties of the d/sIAT in samples with greater variability in suicide risk. Evaluation of test–retest reliability and identification of variables that confound task performance will assist in determining appropriate uses of the measure. Researchers should also evaluate the d/sIAT's capacity to serve as a marker of short-term suicide risk (i.e., to predict attempts within hours or days rather than months). If research demonstrates the reliability and validity of the d/sIAT, then investigators should evaluate the impact its use has on clinical decision making.

Limitations

Results may not generalize to non-veteran samples or individuals at lower risk

of suicide. Participants' acute affect was not assessed so it is unknown how this may have influenced their responding. Some suicide attempts may have gone undetected. The follow-up was based on self-report and medical record review, which is also largely composed of self-report. Informed consent and discussion that confidentiality would only be broken if participants were at imminent risk of suicide should have increased participants' willingness to disclose attempts. Additionally, VA providers' utilization of standardized documentation of suicidal behavior likely enhanced the quality of the information gathered in the medical record review.

CONCLUSION

The d/sIAT has now demonstrated incremental predictive validity for suicide attempts during a 6-month period in two separate research studies, each targeting a unique patient population. Findings from the current study show that self-associations with life and death assessed by the d/sIAT may still serve as a behavioral marker of suicide risk, even when the task is used outside of an emergency room. Overall, the d/sIAT may be a promising measure for augmenting suicide risk, assessment in the future and gaining a better understanding of suicidal crises, but more work needs to be done to understand its psychometric properties and to determine how it can be used clinically to inform treatment decisions.

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