Journal of Psychiatric Research 191 (2025) 155–161

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/jpsychires

Clinical utility of the brief suicide cognitions scale with high-risk inpatient, outpatient, and emergency department clinical samples

M. David Rudd [a,*], Gretchen J. Diefenbach [b,c], David F. Tolin [b,c], Andrea Pérez-Muñoz [a], Taylor Flowers [a], Burak Tuna [a], Vivian L. Gleason [a], Jacob Tempchin [a], Craig J. Bryan [d]

[a] The University of Memphis, Department of Psychology, Memphis, TN, USA
[b] Anxiety Disorders Center, Institute of Living, Hartford, CT, USA
[c] Yale University School of Medicine, USA
[d] Department of Psychiatry & Behavioral Health, The Ohio State University College of Medicine, USA

ARTICLE INFO

Keywords:
Suicide
Suicide cognitions
Suicide attempt
Clinical utility
Treatment tailoring

ABSTRACT

The current study explored the clinical utility of the Brief Suicide Cognitions Scale (B-SCS) in multiple samples, including a normative sample and three clinical samples with varying degrees of suicide risk. Derived cutting scores were identical across an inpatient randomized clinical trial (RCT) sample, an emergency department (ED) sample, and an inpatient consecutive admission sample, with B-SCS scores at intake correctly predicting 96 % and 94 % of suicide attempts over six-month follow-up periods in the RCT and ED samples, respectively. Additionally, the B-SCS intake scores in the RCT sample predicted differences in high and low suicide ideation groups over the six-month follow-up period, with those below the B-SCS intake cutoff score reporting suicidal ideation scores within normal limits throughout the entirety of post-discharge follow-up. Current results support the recommendation that evaluation of the clinical utility of instruments identifying suicide risk require variable criteria depending on the specific clinical context and related clinical decision-making. With respect to post-discharge monitoring and related treatment tailoring for inpatient and ED clinical environments, instruments with strong sensitivity and high negative predictive value (NPV) estimates are of particular importance given the need to accurately recognize both the resolution of an acute episode of suicide risk and identify those vulnerable for future episodes. In the current study, the B-SCS had sensitivity estimates of .96 and .94 and NPV estimates of .97 and .93. in these clinical settings. Implications for day-to-day practice, the need for future research, and study limitations are discussed.

1. Introduction

Assessing suicide risk remains one of the most significant challenges practicing clinicians routinely face. Traditional approaches typically consider a broad range of risk factors, warning signs, and related variables to detect risk and inform subsequent clinical decision-making (Ryan and Oquendo, 2020). Despite reasonable consensus regarding identifiable risk factors across clinical guidelines published by a range of leading professional associations and scientific organizations and The Joint Commission's (TJC) recent mandate that accredited institutions use "validated scales to assess the risk of suicide" (TJC, 2019), limited progress has been made in advancing clinicians' ability to accurately identify elevated risk. An area that is particularly challenging is anticipating the expected ebb and flow of suicide risk over time, including changes in suicide risk post-treatment or following significant clinical decisions such as discharge from an inpatient facility or emergency department (Riblett et al., 2023).

Traditional methods of assessing risk are now recognized as far less effective in predicting suicidal behavior than previously believed. A meta-analysis of 365 studies conducted over the previous five decades concluded that "traditional risk factors are poor predictors of suicide thoughts and behaviors", including common predictive factors for future suicide attempts such as prior non-suicidal self-injury (NSSI), prior suicide attempts, prior hospitalization, Axis II diagnoses, and commonly used screening tools (Franklin et al., 2017). Simpson et al. (2021) reviewed the significant limitations of traditional approaches that focus predominantly on suicidal thinking, plans, and suicidal intent, and called for new tools and perspectives given the remarkably poor

* Corresponding author.Department of Psychology 400 Fogelman Drive Memphis, TN, 38103, USA
E-mail address: mdrudd@memphis.edu (M.D. Rudd).

https://doi.org/10.1016/j.jpsychires.2025.09.034
Received 18 May 2025; Received in revised form 21 September 2025; Accepted 23 September 2025
Available online 24 September 2025

predictive values for widely used assessment tools like the Columbia Suicide Severity Rating Scale (C-SSRS; Posner et al., 2011).

The need to identify new approaches to understanding and detecting suicide risk is coupled with a need to reconceptualize how we define and evaluate the clinical utility of assessment instruments and how they relate to underlying theories of suicide risk. As Ryan and Oquendo (2020) appropriately noted, detecting elevated suicide risk in clinical assessment is not the same as "prediction." Rather, it involves recognizing time-limited periods of heightened risk and responding appropriately (Bryan and Rudd, 2016). The clinical utility of a suicide risk assessment measure or tool is not simply a function of overall diagnostic (or classification) efficiency and related psychometrics. Instruments with clinical utility offer meaningful information that helps the clinician identify and understand potentially unique elements of individual vulnerability to episodes of suicidality, the onset or resolution of discrete episodes of acute risk, vulnerability for enduring or chronic risk, the potential for future suicidal behaviors, and individual response to targeted interventions or treatment believed to reduce risk.

In contrast to assessing the presence or absence of suicidal thinking, associated plans, and elements of suicidal ideation typical of screening tools, the original long-form Suicide Cognitions Scale (SCS; Rudd et al., 2008), a revised version (SCS-R; Bryan et al., 2020; Bryan et al., 2014), and a brief-form modification (i.e., B-SCS; Rudd and Bryan, 2021) all represent potentially meaningful additions to a clinician's suicide risk assessment framework. All iterations of the SCS assess suicide cognitions related to motivation(s) to die without asking specifically about the nature of suicidal thinking. The various iterations of the SCS build on previous efforts to understand both acute and enduring vulnerability to suicide and suicidal behaviors as a function of individual characteristics, including enduring belief systems like trait hopelessness (Abramson et al., 1989; Brown et al., 2000), perceived burdensomeness, and acquired capability to die (Joiner et al., 2005; Joiner, 2005). The idea of chronic or enduring suicide risk aligns closely with Wenzel et al.'s (2009) discussion of the importance of belief systems or "schemas" in understanding fluctuations and variability of suicide risk over time. This concept also parallels Rudd's (2006) idea of enduring vulnerability or "residual and chronic" suicide risk following the resolution of an acute suicidal episode fueled by identity-related suicide cognitions of unlovability (belief that one is unlovable), unbearability (belief that one's emotional pain is unbearable), and unsolvability (belief that one's problems are unsolvable) (Bryan et al., 2017; Ellis and Ruffino, 2015).

Several studies have demonstrated the clinical utility of the original and modified versions of the SCS for both recognizing and responding to elevated suicide risk over time and across a range of clinical settings (Bryan et al., 2014, 2017; Ellis and Ruffino, 2015), with item responses being strongly influenced by a general latent factor (Bryan et al., 2020). Similarly, previous work suggests the underlying latent factor of the original SCS is captured by the unidimensional structure of the B-SCS (Rudd and Bryan, 2021). There is converging and compelling evidence to support the validity of the original long-form SCS and brief-form modifications, with scores from these measures demonstrated to differentiate those with a history of suicide attempts from those only experiencing suicidal ideation and to meaningfully predict future suicide attempts after controlling for suicidal thinking in the clinical samples studied (Bryan et al., 2014; Rudd and Bryan, 2021). These initial findings suggest the original SCS and B-SCS items assess aspects of suicide risk that are distinct from traditional perspectives focused on suicide-specific constructs and content such as suicidal thinking, plans, and suicide intent.

The current study sought to build on the growing foundation for the clinical utility of the SCS by examining clinically significant change (CSC) and identifying related threshold values or cutting scores for the B-SCS, in accordance with recommendations by Jacobson and Truax (1991). To differentiate "functional and dysfunctional" B-SCS scores as they described, we used a normative general population sample (with participants excluded for acute suicidal crisis) and three different clinical samples, all with varying degrees of suicide risk. Following the approach of Jacobson and Truax (1991), a measure of CSC was used to determine if a B-SCS score is more likely to fall within the normative or clinical range, establishing a cutting score for B-SCS values indicating elevated suicide risk. Recent work with the SCS-R (Bryan and Rudd, 2016) found that measurement of CSC is particularly effective at establishing threshold values to gauge meaningful change in suicide risk pre- and post-treatment, along with identifying threshold values (i.e., cutting scores) that can be used to anticipate acute episodes and chronic suicide risk, with scores having important implications for subsequent clinical decision-making and quality of care for individuals at high-risk for suicide. Coupled with the recent SCS-R findings, this extension to the B-SCS is, to our awareness, the first time this approach has been used with a scale targeting suicide risk.

2. Methods

Participants included four diverse samples representing a broad range of suicide risk:

1) A normative, non-clinical sample of undergraduate students (N = 236) participating in research as a requirement for an introductory psychology course.
2) An inpatient sample (N = 200) admitted and treated specifically for elevated suicide risk as part of a randomized clinical trial (RCT; Diefenbach et al., 2020).
3) A clinical sample of consecutive inpatient admissions to a psychiatric unit (not all indicating elevated suicide risk) in a major tertiary care medical center (N = 160). Admissions occurred over an 18-month period.
4) A clinical sample of emergency department (ED) patients presenting to an emergency department in a tertiary care medical center (N = 156), including individuals who made a suicide attempt (n = 53) and individuals presenting with suicidal ideation (n = 41). Not all presentations resulted in subsequent inpatient admission.

The four studies were conducted over a period of several years and across different institutions and did not occur simultaneously. All were reviewed and approved by the appropriate institutional review board, and all participants reviewed and signed appropriate informed consent documents. Each sample is described in more detail below. Cases with missing data were excluded from all clinical samples prior to analysis. There were no exclusion criteria for the normative undergraduate sample, aside from evidence of an acute crisis warranting emergency evaluation and intervention at the time the study was completed (i.e., individual distress during the study). No students, however, were excluded for this reason. General exclusion criteria for the three clinical samples included: (a) active psychosis, (b) cognitive impairment that prevented participation (e.g., dementia, delirium, diminished intellectual functioning), and (c) impairment in reading and comprehension that resulted in an inability to read, understand, and complete study instruments, as well as the informed consent documents (e.g., severe learning disorders, non-English speaking). As detailed below, there were some differences in exclusion criteria for the inpatient randomized clinical trial sample. See Table 1 below for a summary of demographic details across all samples.

Normative Sample. The student sample (N = 236) included individuals self-identifying as female (n = 195, 83 %) and male (n = 41, 17 %) participating in research for extra credit for an introductory psychology course. Ages ranged from 18 to 33 years old (M = 19). There was moderate self-identified racial/ethnic diversity in the sample, with 34 Black/African-American participants (10 %), 29 Hispanic/Latino (8 %), 31 Asian (9 %), 1 Native American (.3 %), 1 East Indian (.3 %), 247 White/Non-Hispanic (71 %), and 6 participants designated as "other" (1.4 %). With respect to marital status, the overwhelming majority were single and had never been married (n = 345, 99 %), with only 4 (1 %)

Table 1
Demographic comparisons across samples.

	Normative Sample (N = 236)	Inpatient RCT (N = 200)	Inpatient Consecutive Admission (N = 160)	Emergency Department (N = 156)
Age Range (mean)	18-33 (19)	18-65 (33)	18-81 (40)	18-58 (38)
Male	195 (83 %)	83 (41.5 %)	47 (29 %)	113 (72.4 %)
Female (%)	41 (17 %)	117 (58.5 %)	113 (71 %)	43 (27.6 %)
Assigned at Birth/ Identifying				
Relationship Status	234 (99 %)	157 (78.5 %)	100 (62.5 %)	133 (85.3 %)
	2 (1 %)		60 (37.5 %)	23 (14.7 %)
Single (never married/ divorced/ separated)		34(17 %)		
Married/Living Together				
History of Mental Health Care	40 (11 %)	200 (100 %)	160 (100 %)	156 (100 %)
History of Suicide Attempt	31 (9 %)	200 (100 %)	87 (54 %)	51 (33 %)

reporting being married.

Although clinical diagnostic assessments were not completed on the student sample, participants completed additional demographic and personal history questions, including involvement with previous mental health care. Additionally, the B-SCS and the full Beck Scale for Suicidal Ideation (Beck et al., 1979) were administered, and item 20 on the scale allowed us to identify those with a previous history of suicide attempts. As would be expected with a non-clinical student sample, a relatively small number (n = 40, 11 %) reported a previous history of mental health care (either inpatient or outpatient), and a similarly small number (n = 31, 9 %) reported a previous history of at least one suicide attempt, providing limited variability in the sample and an opportunity for clinical comparisons and identification of meaningful cutting scores for the B-SCS.

Inpatient Randomized Clinical Trial Sample. Participants were recruited from inpatient units of a private psychiatric hospital located in the northeastern United States from January 2020 through February 2023. The current study represents a secondary analysis using data from a randomized clinical trial testing a modified inpatient adaptation of Brief Cognitive Behavioral Therapy for Suicide Prevention (BCBT-I; see Diefenbach et al., 2020 for complete sample description). Inclusion criteria included individuals between the ages of 18–65 years old and either 1) suicide attempt within a week of admission or 2) suicide ideation with a plan on admission, as well as a suicide attempt within two years. All participants reported a lifetime history of suicide attempts. Exclusion criteria included the following: current mania, lifetime schizophrenia or schizoaffective disorder, intellectual disability, organic brain disease, electroconvulsive therapy (ECT) included in the inpatient treatment plan, expected length of stay less than four business days, unwillingness or inability to follow study procedures, lack of proficiency in English, or any other medical or psychiatric condition that would preclude informed consent or ability to participate in the study.

Study eligible participants (N = 213) were randomly assigned via a computer-generated stratified block (on current Substance Use Disorder diagnosis) randomization schedule to either BCBT-I or treatment as usual (TAU). Data were excluded for participants starting ECT (n = 5) or for failing to complete at least one BCBT-I treatment session (n = 8), resulting in a final sample size of 200 (BCBT-I; n = 94; TAU n = 106). Participants completed study assessment protocols at intake, discharge, and monthly follow-ups for six months.

Inpatient Consecutive Admission Sample. This sample included 160 consecutive admissions to an inpatient psychiatric unit, including individuals self-identifying as female (n = 113, 71 %) and male (n = 47, 29 %). Ages ranged from 18 to 81 years old (M = 40). As with the student sample, self-identified racial/ethnic diversity was moderate with 16 Black/African-American participants (10 %), 3 Native American (2 %), 17 Hispanic/Latino (11 %), 122 White/Non-Hispanic participants (76 %) and two participants indicating ethnicity as "other" (1 %). In terms of marital status, 38 were single and never married (24 %), 60 married (38 %), 18 separated (11 %), 34 divorced (21 %), and 10 widowed (6 %).

Participants in this clinical sample were administered a brief demographic interview with a trained nurse to obtain background information (ethnicity, education level, marital status, number of previous psychiatric hospitalizations, if any, and number of previous suicide attempts, if any). Suicide attempt status and Axis I clinical diagnosis(es) were determined by reviewing the admission note in the medical record. Fifty-eight participants (36 %) did not receive an Axis I diagnosis in the chart, with some receiving a deferred diagnosis and others receiving a primary diagnosis on Axis II. After completion of the history and chart review, participants completed all self-report measures in random order. The length of stay for the clinical sample ranged from 1 to 21 days (M = 4.8 days). The most common primary Axis I diagnosis was a depressive disorder (i.e., major depressive disorder with both single and recurrent episodes and depressive disorder not otherwise specified), with 60 subjects (38 %) diagnosed with a depressive disorder, followed by substance use disorder (n = 18, 11 %; including alcohol, cannabis, opioids, and polysubstance abuse), bipolar disorder (n = 9, 6 %) and adjustment disorder (n = 5, 3 %). The most frequent Axis II diagnosis was borderline personality disorder, with 19 participants (12 %) receiving this diagnosis.

A total of 100 participants (63 %) were admitted for a suicidal crisis and 68 (43 %) reported multiple admissions over their lifetime, ranging from 1 to 25 (M = 2). Ninety participants (56 %) reported that it was their first admission for suicidality. A total of 87 participants (54 %) reported a prior history of suicide attempts regardless of the status of the current admission, ranging from 1 to 20 (M = 2.5) previous suicide attempts, providing an opportunity to compare participants solely with ideation, participants with a single attempt, and participants with multiple attempts. As mentioned above, suicide attempt status at the time of admission was determined by clinical chart review, with the admitting psychiatrist indicating suicide intent and categorizing the behavior as a suicide attempt.

Emergency Department Sample. This clinical sample included a total of 156 participants presenting to an emergency department at a tertiary-care medical center during an acute episode of suicidality, including 51 making suicide attempts and 43 experiencing suicidal thoughts. A significant majority of the sample (N = 77, 81.9 %) reported previous episodes of suicidality. The mean age was 38 years (SD = 10.5; range = 18–58), with individuals self-identifying as female (n = 113) and male (n = 43). Self-identified racial/ethnic diversity was moderate, with 58 reporting as White (61.7 %), 22 Black (23.4 %), 12 Hispanic (12.8 %), and 2 Native American (2.1 %). With respect to marital status, 32 reported being single/never married (34 %), 23 married (24.5 %), 19 divorced (20.2 %), 7 separated (7.4 %), 9 cohabitating (9.6 %), and 4 widowed (4.3 %). Although additional measures were not collected, participants agreed to a six-month follow-up phone call to assess the presence of any subsequent suicide attempts (i.e., suicide attempt Time 2), allowing an opportunity to address the predictive value of the B-SCS items. A total of 16 suicide attempts were reported at T2 (17 % of the original sample).

2.1. Measures

The Brief Suicide Cognitions Scale (B-SCS; Rudd and Bryan, 2021) was administered across all four samples. The B-SCS includes both a 5-item and 6-item self-report version designed to measure suicide-specific cognitions (unsolvability, unlovability, and unbearability) consistent with the suicide mode (Rudd, 2006). The

suicide-specific cognitions targeted by the B-SCS address core beliefs revolving around both identity (unlovability; "I'm completely unworthy of love") and agency (unbearability; "I can't imagine anyone being able to withstand this kind of pain"; unsolvability; "nothing can help solve my problems"). Both the 5-item and 6-item versions have comparable psychometric outcomes and perform similarly across a range of clinical settings (Rudd and Bryan, 2021). The advantage of the 5-item version is that no scale items mention the word "suicide", with the one item mentioning the word suicide removed in the 5-item version. The 5-item version was evaluated across all samples for the current study.

The items are measured on a 5-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Total scores range from 5 to 25, with lower scores indicating lower risk and higher scores indicating higher risk and the presence of suicide cognitions. The B-SCS has demonstrated strong reliability, validity, and both positive and negative predictive value in previous studies utilizing both clinical and non-clinical samples.

In addition to B-SCS scores, all four samples provided additional data on history of suicide attempts, suicide attempts over six-month follow-up (for the inpatient RCT and the ED sample), suicide attempt status at initial evaluation, and lifetime suicide attempt status.

2.2. Analytic approach and plan

We calculated CSC using the methods recommended by Jacobson and Truax (1991), with values indicating appropriate cutting scores for differentiating "functional versus dysfunctional" B-SCS scores. When the distributions of scale scores between groups with and without a condition of interest overlap, Jacobson and Truax recommend defining CSC as the midpoint between the mean scores of the two groups. In this analysis, all three clinical samples served as the group with the condition of interest (i.e., suicidal ideation and/or behaviors within the past month) and the normative student sample (in which participants in acute suicidal crisis were excluded) served as the comparison, normative group without the condition of interest.

The calculated cutting score values were 8.8 for the ED sample, 9.1 for the inpatient RCT sample, and 9.3 for the inpatient consecutive admission sample. With rounding to the nearest B-SCS scale value, calculated cutting scores were identical across all three clinical samples, with an identified B-SCS threshold value of $\leq$9 as within the normative range and those above consistent with elevated suicide risk. To assess the validity of this CSC value, we compared follow-up suicide attempt rates between patients in the ED sample and the inpatient RCT sample who fell above and below the threshold value. In both studies, follow-up suicide attempts were assessed as a binary outcome (yes or no). The inpatient consecutive admission sample included suicide attempt status at admission and lifetime history of suicide attempts, allowing us to compare the B-SCS threshold value in terms of those with and without a recent attempt, along with those with and without a lifetime history of suicide attempts. The inpatient RCT sample also included multiple assessments of suicide ideation over a six-month follow-up period, enabling the comparison of suicide ideation for those falling above and below the B-SCS cutting score value post-discharge over the entire follow-up period.

Given the very limited number of cases with missing data and that missingness was consistent with the core assumptions of MCAR (missing completely at random), case-wise exclusion was utilized with no meaningful reduction in available samples. The data were analyzed using IBM SPSS Statistics (Version 30), with the assumptions for the subsequent chi-square comparisons and related odds ratios being categorical data, independent observations, and adequate sample sizes.

3. Results

3.1. Clinically significant change and cutting-score values in B-SCS scores

In accordance with Jacobson and Truax (1991), we calculated clinically significant change (CSC) as the midpoint between the mean normative sample ($M = 6.31$, $SD = 2.85$) and each of the three clinical samples, including the inpatient RCT randomized clinical trial sample (M = 15.03, SD = 5.74), the inpatient consecutive admission sample ($M = 14.67$, $SD = 5.03$), and the ED sample ($M = 13.42$, $SD = 5.27$). The B-SCS cutting-score value was estimated at $\leq$ 9 across all three clinical samples, with those scoring above the cutoff indicating elevated risk.

3.2. Validity of B-SCS cutting score: suicide attempt risk over six-month follow-up

For the inpatient RCT sample ($N = 192$), the number of suicide attempts reported during the six-month follow-up differed significantly between patients scoring below and above the B-SCS threshold value at baseline ($X^2 = 5.90$, $p = .01$; $OR = 5.26$, 95 % CI [1.20, 23.03]), with 46 of 48 suicide attempts (96 %) reported over the six-month follow-up period correctly classified as having elevated suicide risk based on the B-SCS cutting score. In the ED sample ($N = 156$), 15 of the 16 suicide attempts (94 %) reported during the six-month follow-up period were correctly classified as having elevated suicide risk using the B-SCS cutting score ($X^2 = 2.84$, $p = .03$; $OR = 5.00$, 95 % CI [.64, 39.2]). Finally, 116 of the 132 suicide attempts at admission (88 %) for the inpatient consecutive admission sample were correctly classified as having elevated risk using the cutting score ($X^2 = 4.10$, $p = .04$; $OR = 2.512$, 95 % CI [1.01, 6.27]).

As mentioned above, suicide ideation was assessed at each follow-up point for the inpatient RCT sample. There were significant differences in suicide ideation between those scoring above and below the B-SCS threshold value at intake over the entirety of the six-month follow-up period ($F(1) = 10.31$, $p = .002$, $\eta p^2 = .15$), with those scoring below the threshold, on average, not experiencing clinically elevated levels of suicidal ideation as measured by the Adult Suicidal Ideation Questionnaire (Reynolds, 1991) throughout follow-up (see Fig. 1), with a large effect size.

The availability of six-month follow-up for the ED sample and the inpatient RCT sample allowed for calculation of sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) estimates. In the ED sample, sensitivity was .94, specificity .25, PPV .13, and NPV .97. The B-SCS demonstrated strong sensitivity, correctly identifying 15 of 16 individuals who made a suicide attempt during

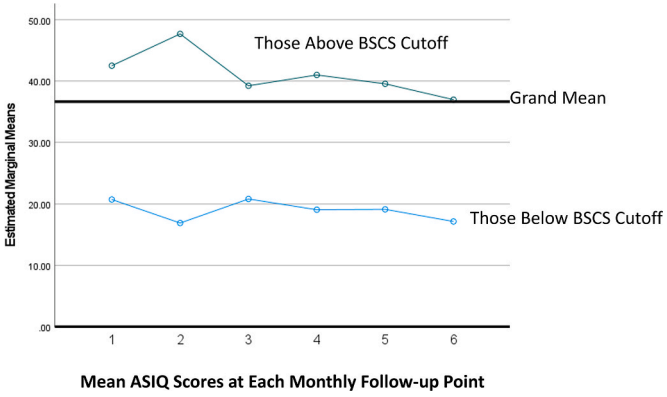

Fig. 1. Mean ASIQ Scores for those above and below BSCS cutoff.

follow-up, and its high NPV indicated that 97 % of those classified as low risk did not attempt suicide. Similarly, in the inpatient RCT sample, sensitivity was .96, specificity .19, PPV .28, and NPV .93. The B-SCS accurately identified 46 of 48 suicide attempts, and 93 % of those scoring below the cutoff did not attempt suicide during the follow-up period.

4. Discussion

In contrast to traditional screening instruments, the B-SCS has a potentially unique role in both recognizing and responding to elevated suicide risk across a range of clinical settings by assessing suicide cognitions related to motivation to die around suicidal beliefs of unlovability, unbearability, and unsolvability rather than specific suicidal thoughts, plans, and intent. As Riblett et al. (2023) noted, no single traditional measure has demonstrated the necessary positive and negative likelihood ratios for effective clinical use. Similarly, Seyedsalehi & Fazel (2024) recently the importance of evaluating clinical utility across different clinical contexts requires flexibility in the interpretation of positive and negative predictive values, with variable tolerance for high false positive rates given clinical acuity and related consequences. As originally conceptualized, suicide cognitions as measured by the B-SCS are hypothesized to be a critical component of the suicidal mode (Rudd, 2006). The suicidal mode is hypothesized to fluctuate between active and inactive states, depending on individual activation thresholds. Once the suicidal mode is activated, suicide cognitions emerge as part of a discrete process that elevates suicide risk for time-limited periods. Evidence has accumulated supporting this approach to suicide risk as a discrete process rather than a continuous one (Bryan et al., 2020; Rufino et al., 2018).

In the current study, the use of the CSC strategy allowed us to identify B-SCS cutting scores differentiating high versus low risk and consistent with identifying a threshold value for an active suicidal mode and a discrete period of elevated suicide risk. Identified cutting scores with both the RCT and the emergency department clinical samples resulted in accurate classification of 96 % and 94 % of suicide attempts over the six-month follow-up period, respectively, with those scoring above the cutting score at five times higher risk of making a suicide attempt in contrast to those scoring below the threshold value. In these particular clinical contexts, it is arguable that sensitivity and negative predictive value are of particular importance and, given the nature of clinical decision-making, may counterbalance poor specificity and positive predictive value estimates.

Current results indicate that both sensitivity and negative predictive value estimates for the B-SCS were quite good, although specificity and positive predictive value estimates were poor. In addition, results from the RCT sample illustrate the clinical utility of the B-SCS in relationship to other clinical measures like suicidal thinking, with those scoring below the cutting score reporting, on average, non-clinical levels of suicidal ideation throughout the entirety of the follow-up period and those scoring above experiencing clinically significant ideation over the same period. These findings suggest that there may be value in using a constellation of measures—such as the B-SCS, suicidal ideation, and suicidal behavior—in combination to assess treatment response or track post-discharge risk, making the B-SCS most useful as part of a broader clinical risk assessment rather than as a standalone predictive tool.

The ability to identify those at elevated enduring or chronic risk for future suicidal behavior (i.e., in this case, suicide attempts) at discharge from an inpatient facility or emergency department when traditional measures of suicidal thinking, plans and intent have resolved or are within normal limits is potentially critical. As Berman (2018) reported, over 70 % of those dying by suicide within a week of evaluation in a healthcare setting denied suicidal thinking at the time of evaluation. With current B-SCS results mirroring those with the SCS-R (Bryan and Rudd, 2016), the use of the B-SCS cutting score would allow the clinician to anticipate the need for additional suicide prevention care following discharge, targeting enduring vulnerability or chronic suicide risk in particular. This is consistent with the idea of treatment tailoring (Almirall et al., 2014). Clinical information that facilitates treatment tailoring offers individual insights that can inform subsequent treatment decisions with individuals at high-risk. Similarly, current results suggest the B-SCS may have particular utility in assessing post-treatment response, likely in addition to traditional measures of suicidal thinking, plans, and intent, and related symptom measures, consistent with the characteristic features of an active suicidal mode (i.e., suicidal thoughts, suicide cognitions, associated symptoms, and behaviors).

Rather than focusing efforts on the use of a single screening tool, effectively recognizing and responding to suicide risk may require a more comprehensive approach. This would involve clearly connecting underlying theories of risk to specific assessment and monitoring tools, and strategically using a combination of measures. Given the natural variability across different clinical scenarios with varying probabilities of suicide risk, it is essential to tailor the risk assessment process to the specific context and clinical purpose. This approach should weigh the clinical utility of assessment tools while considering factors such as variable sensitivity, specificity, and negative and positive predictive value estimates in accordance with the identified clinical question.

The current study is not without significant limitations. The normative sample did not represent the general population and offered a restricted age range of participants. More representative samples are needed for normative comparisons and calculation of B-SCS cutting scores in future research. Additionally, the normative sample appeared to potentially be overrepresented with respect to both a past history of mental health care (11 %) and prior suicide attempts (9 %), an issue that needs careful scrutiny in subsequent normative comparisons. Although the clinical samples offer a range of suicide risk; they are small, demonstrate demographic imbalance, are naturally limited in the representativeness of risk and related clinical diagnoses, a problem compounded by a brief follow-up window of six months for the current study, the use of self-report measures, and the retrospective nature of chart reviews. Ideally future studies would allow for longer follow-up windows (i.e., 12–24 months) to address the critical issue of enduring or chronic suicide risk. There is also a need for clinical samples across the full spectrum of clinical assessment and treatment environments, including additional outpatient, emergency department, partial hospital, and intensive outpatient settings. Similarly, there is a need for future samples to address potential clinical confounds such as comorbid diagnoses, particularly given our exclusion of those struggling with psychosis, and variable treatment histories in an effort to improve internal validity. The small and non-representative samples require caution in interpretation, clinical application, and generalizability across various clinical contexts. Similarly, longer follow-up windows would allow for more accurate estimates of predictive values of identified cutting scores.

Given the identified limitations, it is most appropriate to interpret the current study as initial evidence supporting the need for flexible interpretation of classification indices for suicide risk measures (i.e., sensitivity, specificity, NPV, PPV) given the particular clinical demands and related nuance, consistent with the arguments of Riblett et al. (2023) and Seyedsalehi and Fazel (2024). As Seyedsalehi and Fazel (2024) appropriately note, there are not optimal threshold values and cutting scores that apply across all clinical practice settings, with variable costs and benefits of true positives, false positives, and false negatives depending on the specific clinical context. For example, in an emergency department considering the need for possible hospitalization, available support from family and friends, coupled with accessible outpatient care, with higher thresholds for admission if the individual has accessible support and outpatient care. Also consistent with the argument of Seyedsalehi and Fazel (2024), current results highlight the need to be flexible in the clinical application of suicide risk measures like the B-SCS. In particular, combining tools like the B-SCS with other validated measures like the Columbia Suicide Severity Rating Scale (C-SSRS) (Posner, 2007) to capture different aspects and dimensions of

suicide risk is critical for an accurate understanding of suicide risk that informs both immediate clinical decisions, along with ongoing treatment.

The B-SCS is a brief measure that can help inform clinical decision making in identifying individuals at elevated suicide risk across diverse clinical populations. Of particular importance, though, the information provided by the B-SCS complements information gathered by more traditional tools like the C-SSRS and can help generate a more comprehensive understanding of suicide risk across the full spectrum, one that informs both immediate clinical decisions regarding acute risk and safety, coupled with longer term treatment decisions and directions for those at chronic risk.

CRediT authorship contribution statement

M. David Rudd: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Gretchen J. Diefenbach:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **David F. Tolin:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Andrea Pérez-Muñoz:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Taylor Flowers:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Burak Tuna:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Vivian L. Gleason:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Jacob Tempchin:** Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Craig J. Bryan:** Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization.

Funding sources

The inpatient RCTE study was supported by Grant # STR-0-038-18 from the American Foundation for Suicide Prevention (PI: Tolin).

No additional funding was utilized for the other clinical samples.

Declaration of competing interest

Conflict of Interest Disclosure: Dr. Rudd reported receiving royalties from American Psychological Association, Guilford, and Springer publications, and owning Oui Therapeutics stock, and funding from the Department of Defense (DoD). Dr. Diefenbach reported receiving grant funding, material support, and consultant fees from Oui Therapeutics. Dr. Tolin reported receiving grant funding, material support, and consultant fees from Oui Therapeutics; consultant fees from Mindyra LLC; and royalties from Psychwire, Guilford Press, Oxford University Press, Cambridge University Press, John Wiley and Sons, Springer Publications, and New Harbinger Publications. Dr. Bryan reported grant funding from NIH, DoD, royalties from APA, Guilford, and consulting fees from Oui Therapeutics. All others have no known conflicts of interest to disclose.

Acknowledgments

The authors wish to thank Jessica Bimstein, Sarah Collett, Kate Everhardt, and Tyler Rice for serving as research assistants; and Dr. Hannah Levy, Dr. Kayla Lord, Dr. Emily O'Bryan, Dr. Kimberly Sain, Dr. Jessica Stubbing, and Dr. Blaise Worden for serving as study therapists and/or independent evaluators in the inpatient RCT study.

References

Abramson, L.Y., Metalsky, G.I., Alloy, L.B., 1989. Hopelessness depression: a theory based subtype depression. Psychol. Rev. 96, 358–372. https://doi.org/10.1037/0033-295X.96.2.358.

Beck, A.T., Kovacs, M., Weissman, A., 1979. Assessment of suicidal intention: the Scale for Suicide Ideation. J. Consult. Clin. Psychol. 47 (2), 343–352. https://doi.org/10.1037//0022-006x.47.2.343. PMID: 469082.

Berman, A.L., 2018. Risk factors proximate to suicide and suicide risk assessment in the context of denied suicide ideation. Suicide Life-Threatening Behav. 48 (3), 340–352. https://doi.org/10.1111/sltb.12351.

Brown, G.K., Beck, A.T., Steer, R.A., Grisham, J.R., 2000. Risk factors for suicide in psychiatric outpatients. A 20-year prospective study. J. Consult. Clin. Psychol. 68, 371–377.

Bryan, C.J., Rudd, M.D., 2016. The ebb and flow of the wish to live and wish to die as an indicator of emerging suicidal behavior and treatment efficacy among suicidal military personnel. J. Affect. Disord. 202, 58–66.

Bryan, C.J., Rozek, D.C., Khazem, L.R., 2020. Prospective validity of the Suicide Cognitions Scale among acutely suicidal military personnel seeking unscheduled psychiatric intervention. Crisis J. Crisis Interv. Suicide Prev. 41, 407–411. https://doi.org/10.1027/0227-5910/a000639.

Bryan, C.J., Rudd, M.D., Wertenberger, E., Etienne, N., Say-Sannerud, B.N., Morrow, C. E., et al., 2014. Improving detection and prediction of suicidal behavior among military personnel by measuring suicidal beliefs: an evaluation of the Suicide Cognitions Scale. J. Affect. Disord. 159, 15–22. https://doi.org/10.1016/j.jad.2014..02.021.

Bryan, C.J., Kanzler, K.E., Grieser, E., Martinez, A., Allison, S., McGreary, D., 2017. A shortened version of the Suicide Cognitions Scale for identifying chronic pain patients at risk for suicide. Pain Pract. 17, 371–381. https://doi.org/10.1111/papr.12464.

Diefenbach, G.J., Rudd, M.D., Merling, L.F., Davies, C., Katz, B.W., Tolin, D.F., 2020. Brief cognitive behavioral therapy for suicidal inpatients. Cognit. Behav. Pract. 28 (2), 228–240. https://doi.org/10.1016/j.cbpra.2020.09.010.

Ellis, T.E., Ruffino, K.A., 2015. A psychometric study of the Suicide Cognitions Scale with psychiatric inpatients. Psychol. Assess. 27, 82–89. https://doi.org/10.1037/pas0000028.

Franklin, J.C., Riberio, J.D., Fox, K.R., Bentley, K.H., Kleiman, E.M., Huang, X., Musacchio, K.M., Jaroszewski, A.C., Chang, B.P., Nock, M.K., 2017. Risk factors for suicidal thoughts and behaviors: a meta-analysis of 50 years of research. Psychol. Bull. 143 (2), 187–232. https://doi.org/10.1037/bul0000084.

Jacobson, N.S., Truax, P., 1991. Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. J. Consult Clin. Psychol. 59 (1), 12–19. https://doi.org/10.1037//0022-006x.59.1.12.

Joiner, T.E., 2005. Why People Die by Suicide. Harvard University Press, Boston.

Joiner, T.E., Conwell, Y., Fitzpatrick, K.K., Witte, T.K., Schmidt, N.B., Berlim, M.T., et al., 2005. Four studies on how past and current suicidality relate even when "everything but the kitchen sink" is covaried. J. Abnorm. Psychol. 114, 291–303. https://doi.org/10.1037/0021-843X.114.2.291.

Posner, K., 2007. *Columbia-Suicide Severity Rating Scale (C-SSRS)* [Database record]. APA PsycTests. https://doi.org/10.1037/t52667-000.

Posner, K., Brown, G.K., Stanley, B., et al., 2011. The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. Am. J. Psychiatr. 168 (12), 1266–1277. https://doi.org/10.1176/appi.ajp.2011.10111704.

Reynolds, W.M., 1991. Psychometric characteristics of the Adult Suicidal Ideation Questionnaire in college students. J. Pers. Assess. 56 (2), 289–307. https://doi.org/10.1207/s15327752jpa5602_9.

Riblett, N.B., Matsunaga, S., Shiner, B., Schnurr, P.P., Watts, B.V., 2023. Are suicide risk scales sensitive to change? A scoping review. J. Psychiatr. Res. 161, 170–178.

Rudd, M.D., 2006. Fluid vulnerability theory: a cognitive approach to understanding the process of acute and chronic risk. In: Ellis, T.E. (Ed.), Cognition and Suicide: Theory, Research, and Therapy. American Psychological Association, Washington, DC, pp. 355–368. https://doi.org/10.1037/11377-016.

Rudd, M.D., Bryan, C.J., 2021. The brief suicide cognitions Scale: Development and clinical application. Front. Psychiatr. 12, 737393. https://doi.org/10.3389/fpsyt.2021.737393.

Rudd, M.D., Schmitz, B., Joiner, T., McClenen, R., Claassen, C., 2008. The Suicide Cognitions Scale: Rethinking Hopelessness and Suicide Risk. Unpublished manuscript.

Rufino, K.A., Marcus, D.K., Ellis, T.E., Boccaccini, M.T., 2018. Further evidence that suicide risk is categorical: A taxometric analysis of data from an inpatient sample. Psychological Assessment 30 (11), 1541–1547. https://doi.org/10.1037/pas0000613.

Ryan, E.P., Oquendo, M.A., 2020. Suicide risk assessment and prevention: challenges and opportunities. Focus: J. Lifelong. Learning. Psychiatry 18 (2), 88–99. https://doi.org/10.1176/appi.focus.20200011.

Seyedsalehi, A., Fazel, S., 2024. Suicide risk assessment tools and prediction models: new evidence, methodological innovations, and outdated criticisms. BMJ Mental Health 27, 1–3. https://doi.org/10.1136/bmjment-2024-300990.
Simpson, S.A., Goans, C., Loh, R., Ryall, K., Middleton, M.C.A., Dalton, A., 2021. Suicidal ideation is insensitive to suicide risk after emergency department discharge: performance characteristics of the Columbia-Suicide Severity Rating Scale Screener. Acad. Emerg. Med. 28 (6), 621–629. https://doi.org/10.1111/acem.14198.
Wenzel, A., Brown, G.K., Beck, A.T., 2009. Cognitive Therapy for Suicidal Patients: Scientific and Clinical Applications. American Psychological Association, Washington, DC. https://doi.org/10.1037/11862-000.