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A Shortened Version of the Suicide Cognitions Scale for Identifying Chronic Pain Patients at Risk for Suicide

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Abstract

Objective: Research in psychiatric outpatient and inpatient populations supports the utility of the Suicide Cognitions Scale (SCS) as an indicator of current and future risk for suicidal thoughts and behaviors. Designed to assess suicide-specific thoughts and beliefs, the SCS has yet to be evaluated among chronic pain patients, a group with elevated risk for suicide. The purpose of the present study was to develop and test a shortened version of the SCS (the SCS-S).

Study Design: A total of 228 chronic pain patients completed a battery of self-report surveys before or after a scheduled appointment.

Setting: Three outpatient medical clinics (pain medicine, orofacial pain, and clinical health psychology).

Methods: Confirmatory factor analysis, multivariate regression, and graded item response theory model analyses.

Results: Results of the CFAs suggested that a 3-factor solution was optimal. A shortened 9-item scale was identified based on the results of graded item response theory model analyses. Correlation and multivariate analyses supported the construct and incremental validity of the SCS-S.

Conclusions: Results support the reliability and validity of the SCS-S among chronic pain patients, and suggest the scale may be a useful method for identifying high-risk patients in medical settings.

Key Words: suicide, chronic pain, screening, military

INTRODUCTION

The notion of chronic vulnerability for suicidal thoughts and behaviors as a distinct dimension of suicide risk is a core tenet of the fluid vulnerability theory of suicide. Specifically, the fluid vulnerability theory conceptualizes suicide risk on 2 dimensions: baseline and acute. Baseline risk entails the persistent dimension of risk that remains reasonably constant over time, whereas acute risk entails the fluctuations in risk that often occur in response to life stressors as well as moment-to-moment change in various transient or state-dependent risk factors (eg, mood). The temporal process of suicide risk is therefore best conceptualized as the ebb and flow of risk factors around a relatively fixed “set point.” These fluid dynamics provide a unique challenge for identifying and intervening with patients: if assessed during a period of relative “calm,” a high-risk individual...
might be missed. Indeed, research suggests that the majority of individuals who die by suicide screened negative for suicidal thoughts or intent prior to their deaths across a wide range of medical settings. Newer methods that assess the baseline (or chronic) dimension of risk instead of the acute (or dynamic) dimension of risk may therefore prove to be a useful strategy for identifying higher risk patients who might otherwise be missed by traditional screening and assessment methods.

According to the fluid vulnerability theory, an important component of baseline risk is the individual’s sense of self. In particular, negative and self-deprecatory identity-based perceptions such as perceived burdensomeness, self-hatred, and trait hopelessness serve as long-term vulnerabilities to suicide risk. Individuals who endorse such perceptions are therefore hypothesized to be at increased risk for future suicidal crises and behaviors, even if they deny recent emotional distress and/or other time-limited risk factors for suicide (eg, situational hopelessness, relationship problems). This hypothesis has gained preliminary support in two samples of military personnel receiving outpatient mental health treatment, in which researchers found that the 18-item scale designed to assess self-perceptions consistent with the chronic dimension of suicide risk, the Suicide Cognitions Scale (SCS), predicted concurrent and future suicidal thoughts and behaviors beyond the effects of other risk factors. Results suggested the SCS had two latent factors, which were named Unlovability (ie, perceptions that one is a burden on others, is unworthy of love and respect, and deserves to be punished) and Unbearability (ie, perceptions that one is incapable of tolerating one’s emotional pain). Consistent with the hypotheses of the fluid vulnerability theory, both SCS subscales differentiated between patients with a history of suicide attempts and those with a history of suicidal thoughts only, and predicted future suicide attempts better than current suicide ideation. Subsequent research among psychiatric inpatients suggests the SCS may actually have 3 latent factors as opposed to 2: Unlovability, Unbearability, and Unsolvability (ie, perceptions that one is hopelessly incapable of solving one’s problems, and that suicide is the only solution). Each of the 3 factors was significantly better predictors of suicide ideation than depression and hopelessness, with the Unsolvability and Unlovability factors being the relative best predictors. In sum, the self-deprecatory perceptions assessed by the SCS appear to be better indicators of current and future suicide risk than traditional constructs that are hypothesized to be more state-dependent (eg, depression, hopelessness).

Despite these promising findings, additional research on the SCS across a diversity of populations and settings is needed. In particular, studies that examine the feasibility of reducing the scale’s length are needed in order to enhance the practicality of using the SCS within clinical and medical settings. Examination of the SCS among chronic pain patients provides a unique opportunity to evaluate the scale’s properties for several reasons. First, chronic pain is an established risk factor for suicide ideation, attempts, and death. Among individuals with chronic pain, estimated prevalence rates across studies range from 17% to 66%. Although the mechanisms by which some chronic pain patients develop suicide ideation and subsequently transition to suicide attempts remain unclear, comorbid depression has been identified as an especially important risk factor.

Second, recent research has pointed to the incremental validity of certain self-perceptions and cognitions, especially perceived burdensomeness, as indicators of suicide ideation among chronic pain patients. These findings converge with a considerable body of research in nonpain populations. According to Van Orden et al., perceived burdensomeness entails self-hatred (ie, shame, low self-esteem) combined with the perception that one’s death is worth more to others than one’s life (ie, liability). Perceived burdensomeness may function in unique ways among individuals with chronic pain, who may have physical and/or functional limitations that require them to depend on family members and caretakers to a greater degree than individuals without such limitations. Over time, this self-perceived burden that is relatively common among chronic pain patients could lead to the emergence of emotional distress, resignation and defeat, negative self-regard, and the erosion of relationships with supportive others. Chronic pain patients are therefore characterized by a range of cognitions, beliefs, and behaviors that can increase vulnerability to suicidal thoughts and behaviors.

The primary aims of the present study were to develop a shortened version of the SCS (SCS-S) and to evaluate its psychometric properties in a clinical sample of chronic pain patients. We specifically sought to answer the following questions:

1. What is the best fitting factor solution for the SCS?
2. Which items should be included in a shortened SCS scale?
3. How does a shortened SCS scale perform with respect to reliability (ie, internal consistency) and validity (ie, convergent, divergent, and incremental)?

METHODS
Participants and Procedures
Participants included 228 patients (56.1% male, 39.5% female, 4.4% unknown) receiving outpatient treatment for pain-related conditions at 3 clinics (pain medicine, orofacial pain, and clinical health psychology) located at a large military medical center in the southern United States. The majority (64.5%) of participants were active duty military (92.1% Army, 7.2% Air Force, and 0.7% Navy); the remainder were military retirees and/or family members. Current marital status was 68% married, 6.6% dating or engaged, 12.7% separated or divorced, and 0.9% widowed. Approximately half of participants’ pain conditions were secondary to an injury (24.1% work-related, 19.2% not work-related); the other half were related to a medical condition or other cause. The length of time since pain onset was less than 5 years for 60.3% of participants.

Participants were invited to complete a self-report survey before or after routine clinic visits. Surveys were administered anonymously via a computer kiosk located in clinic waiting rooms, or via paper survey packet, if preferred. Inclusion criteria included being a Department of Defense beneficiary (ie, active duty, retiree, or dependent) at least 18 years of age who was receiving treatment for pain of any etiology with a duration of at least 4 months. In order to maximize the representativeness and generalizability of the sample, there were no exclusion criteria. The study was reviewed and approved by the Wilford Hall Medical Center’s Institutional Review Board.

Materials
Suicide Cognitions Scale. The SCS7 is an 18-item self-report scale designed to assess cognitions and beliefs that are commonly expressed by suicidal individuals (eg, “The world would be better off without me”; “I can’t tolerate being this upset any longer”). Items are scored on a 5-point scale ranging from 1 (disagree strongly) to 5 (agree strongly). Previous research has supported a 2-factor7 as well as a 3-factor8 latent structure. The scale’s reliability, concurrent validity, and predictive validity have been supported in outpatient as well as inpatient psychiatric samples.7,8

Beck Scale for Suicide Ideation (BSSI). The BSSI24 is a 19-item self-report scale designed to assess the intensity of thoughts, attitudes, and behaviors associated with the desire for suicide. Items are scored on a 3-point scale, with higher scores indicating more severe suicide ideation. The BSSI can be administered with respect to 2 different time frames: current (ie, past week) and worst point (ie, most severe episode during the specified time frame of interest). In the present study, both methods were administered in order to assess the severity of current as well as past suicide risk. For the worst-point assessment, participants were directed to consider the period of time since the onset of their chronic pain during which they possessed the most intense or severe desire to attempt suicide, and to complete the scale according to that worst point. Research has shown that both methods of assessment are reliable and valid, although the worst-point assessment has been shown to be a relatively stronger predictor of current and future risk for suicidal behavior.25 In addition to its 19 core items, the BSSI also includes 2 additional items that ask about past suicide attempts (none, one, or multiple attempts) as well as the level of suicidal intent during the most recent attempt (none, mild, or moderate to severe).

Beck Depression Inventory, Second Edition (BDI-II). The BDI-II26 is a 21-item self-report scale that assesses depression symptom severity. Items are summed to provide a metric of overall depression severity. The BDI-II is a widely used measure of depression with well-established reliability and validity.

Post-Traumatic Stress Disorder Checklist (PCL). The PCL27 is a 17-item self-report scale that assesses posttraumatic stress disorder (PTSD) symptom severity. Items correspond to the Diagnostic and Statistical Manual of Mental Disorders (4th edition, text revision)28 diagnostic criteria for PTSD, and are summed to provide a metric of overall symptom severity. The PCL is a widely used measure of PTSD symptoms with well-established reliability and validity.

Pain Catastrophizing Scale (PCS). The PCS29 is a 13-item self-report scale that assesses rumination about pain, magnification of pain-related problems, and perceived helplessness over one’s pain. The scale is a reliable and valid predictor of pain-related outcomes, including
pain severity and recovery following surgical or medical procedures.

**Chronic Pain Acceptance Questionnaire (CPAQ).** The CPAQ\(^\text{30}\) is a 34-item self-report scale that assesses acceptance of one’s pain along 2 dimensions: activity engagement (ie, pursuit of life activities regardless of pain) and pain willingness (ie, recognition that avoidance and control are unhelpful strategies for adapting to pain). Scale scores are associated with a range of pain-related outcomes, including functional limitations, disability, depression, and anxiety.

**West Haven–Yale Multidimensional Pain Inventory, Version 2 (MPI).** The MPI\(^\text{31}\) is a 52-item self-report scale that assesses 12 different dimensions of pain experience. For the present study, only the pain severity scale and the 3 scales related to caretaker/significant other relationships were included: punishing responses, which assess perceptions that the caretaker is angry or frustrated with the respondent; solicitous responses, which assess perceptions that the caretaker provides support; and distracting responses, which assess perceptions that the caretaker engages in activities to help redirect the respondent’s focus away from his or her pain.

**Oswestry Disability Index (ODI).** The ODI\(^\text{32}\) is a 10-item self-report scale that assesses perceived disability and functional impairment across a range of daily activities, with higher scores indicating greater perceived disability. The ODI has been validated across a wide range of populations as a reliable and useful indicator of overall disability and represents the gold standard of self-report disability measures.

### Data Analytic Approach

Confirmatory factor analysis (CFA) with robust weighted least-squares estimation was used in the Mplus 6.12 software (Muthen & Muthen, 1998–2001) to examine the latent structure of the SCS. Three separate models were compared: a 1-factor solution in which all items loaded onto a global factor; a 2-factor solution identified by Bryan et al.\(^7\); and a 3-factor solution identified by Ellis & Rufino.\(^8\) Good model fit was determined using the following criteria: nonsignificant chi-square, root mean square error of approximation (RMSEA) < 0.05, comparative fit index (CFI) > 0.95, Tucker-Lewis Index (TLI) > 0.95, and weighted root mean square residual (WRMR) < 1.00.

In order to develop a shortened version of the SCS, the graded response item response theory (IRT) model\(^33\) was used to examine item characteristics for the full SCS. Items with the highest information and demonstrating good discriminative properties were selected as candidates for a shortened scale. The psychometric properties and validity of the SCS-S scale were subsequently evaluated using Cronbach’s alphas, Pearson correlation coefficients, and multivariate regression modeling. Due to skewed distributions in relevant outcome variables (worst-point suicide ideation, recent suicide ideation), generalized linear regression with a robust estimator was used. Overall, 30.4% of cases had missing data for at least 1 variable. Little’s test indicated that data were missing completely at random (χ\(^2\)(340) = 375.35, \(P = 0.091\)). Missingness was therefore handled with full information maximum likelihood estimation.

## RESULTS

### What is the Best Fitting Factor Solution for the SCS?

Results of the CFAs indicated that all 3 factor structures had reasonably good fit (Table 1), but the 3-factor solution showed especially good fit to the data: χ\(^2\)(132) = 187.05, \(P = 0.001\); RMSEA = 0.05 (90% confidence interval [CI]: 0.03, 0.07), CFI = 1.00; TLI = 1.00; WRMR = 0.79. In addition, the 3-factor solution showed a statistically significant better fit than the 1-factor solution (χ\(^2\)\(_{\text{diff}}\)(3) = 43.67, \(P < 0.001\)) and the 2-factor solution (χ\(^2\)\(_{\text{diff}}\)(1) = 28.31, \(P < 0.001\)). Item-factor loadings for the 3-factor solution are displayed in Table 2 along with item descriptive statistics, and all items had very high factor loadings (> 0.79).

### Which Items Should Be Included in a Shortened SCS Scale?

Consistent with the graded response IRT model, item information curves were derived to identify those items

### Table 1. Fit Statistics for Three Confirmatory Factor Analyses of the Suicide Cognitions Scale

<table>
<thead>
<tr>
<th>Model</th>
<th>χ(^2)</th>
<th>df</th>
<th>RMSEA (90% CI)</th>
<th>CFI</th>
<th>TLI</th>
<th>WRMR</th>
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<td>0.07 (0.05, 0.08)</td>
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<td>2 factors</td>
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<tr>
<td>3 factors</td>
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<td>132</td>
<td>0.05 (0.03, 0.07)</td>
<td>1.00</td>
<td>1.00</td>
<td>0.79</td>
</tr>
</tbody>
</table>

RMSEA, root mean square error of approximation; CFI, comparative fit index; TLI, Tucker-Lewis Index; WRMR, weighted root mean square residual.
from each factor that accounted for the greatest amount of variance. Item information curves are displayed in Figure 1. Three items were selected for each subscale since this is the number of items that must load significantly on each factor in a multidimensional scale in order to be successfully identified. As can be seen, the items that yielded the most information were (in descending order):

- **Unlovability:** “There is nothing redeeming about me” (item 14); “I am completely unworthy of love” (item 9); and “No one is as loathsome as me” (item 18).
- **Unsolvability:** “I don’t deserve to live another moment” (item 16); “Nothing can help me solve my problems” (item 10); and “Suicide is the only way to end this pain” (item 15).
- **Unbearability:** “I can’t cope with my problems any longer” (item 12); “It is impossible to describe how badly I feel” (item 11); and “I can’t imagine anyone being able to withstand this kind of pain” (item 13).

These items were used to create the shortened version of each scale, although for the Unsolvability scale, item 15 (“Suicide is the only way to end this pain”) was replaced with item 7 (“No one can help me solve my problems”) in order to eliminate the use of the word suicide from the shortened scales while providing a comparable amount of information. We eliminated items with the word suicide to reduce the likelihood of motivated responding specific to face-valid suicide risk instruments (eg, deliberate underreporting) and to eliminate explicit overlap of the SCS-S with suicide-specific measures. Overall, the item information curves for these selected items were predominantly located on the positive side of the latent variables (ie, to the right of 0), suggesting that these items are most useful for distinguishing between those with slightly higher than average levels of unlovable, unsolvable, and unbearable beliefs and those with high levels of these beliefs.

Statistical tests on IRT model parameters revealed statistically significant slopes ($P < 0.001$) for all steps on each items. Table 2 shows the proportion of participants endorsing each response option. Response options 4 (agree) and 5 (strongly agree) were endorsed infrequently for all items. Item characteristic curves were also calculated for the 9 items identified in the previous step and are displayed in Figure 2. The items showed excellent discriminative capacity, as indicated by the fairly discrete item characteristic curves (ie, nonoverlapping peaks). Taken together, these findings suggest that each item retained for the SCS-S contributes directly and meaningfully to their respective total factor scores.

### How does a Shortened SCS Scale Perform with Respect to Reliability and Validity?

In terms of internal consistency, Cronbach’s alphas for the SCS and the SCS-S subscales were, respectively, as
follows: Unlovability, $\alpha = 0.93$ and $\alpha = 0.90$; Unsolvability, $\alpha = 0.91$ and $\alpha = 0.85$; Unbearability, $\alpha = 0.92$ and $\alpha = 0.89$. The SCS-S subscales were very strongly correlated with the SCS subscales: Unlovability, $r = 0.97$; Unsolvability, $r = 0.96$; Unbearability, $r = 0.96$. Taken together, these results suggest the SCS-S subscales do not show dramatic decreases in internal consistency relative to the full scales, and account for more than 92% of the variance in the SCS subscale scores.

With respect to convergent and divergent validity, the pattern of correlations for the SCS and SCS-S subscales were comparable to each other, suggesting the SCS-S was associated with clinical variables to a similar degree as the full SCS (Table 3). As expected, SCS and SCS-S subscale scores had statistically significant positive correlations with recent suicide ideation and worst-point suicide ideation. The SCS-S Unbearability subscale was also significantly correlated with depression severity. None of the SCS or SCS-S subscales were significantly correlated with PTSD symptoms or any other pain-related variable, however, suggesting the subscales were independent of pain-related constructs and other clinical indicators of distress.

Incremental validity was assessed using multivariate regression analyses to determine the association of each SCS-S subscale with worst-point suicide ideation, beyond the effects of gender, depression, PTSD symptom severity, and history of suicide attempt. When adjusting for these covariates, worst-point suicide ideation continued to be significantly associated with all 3 SCS-S subscales: Unlovability ($\beta = 0.16, P = 0.008$), Unsolvability ($\beta = 0.15, P = 0.002$), and Unbearability ($\beta = 0.18, P = 0.023$). These results suggest that the SCS-S subscales are positively associated with severity of past suicidal crises beyond the effects of past suicidal behavior and other indicators of clinical distress. Results were unchanged when adjusting for pain severity.

These analyses were repeated for recent suicide ideation. When adjusting for gender, depression, PTSD symptom severity, and history of suicide attempt, the SCS-S Unlovability ($\beta = 0.16, P = 0.004$) and Unsolvability ($\beta = 0.17, P = 0.001$) subscales were significantly associated with recent suicide ideation. The SCS-S Unbearability subscale also showed a strong trend toward significance ($\beta = 0.20, P = 0.061$). When adding worst-point suicide ideation to the models as covariates, the Unlovability ($\beta = 0.08, P = 0.081$) and Unbearability ($\beta = 0.05, P = 0.227$) subscales were not significantly associated with recent suicide ideation, but the Unsolvability subscale was ($\beta = 0.10, P = 0.008$). Results were unchanged when adjusting for pain severity.

Sensitivity Analyses. We next conducted sensitivity analyses to determine if observed patterns from the multivariate analyses remained consistent across patient subgroups that were dichotomized according to (1) origin of pain (ie, injury- or non-injury-related) and (2) duration of pain (ie, < 5 years or 5 years or more). There were no between-groups differences in depression severity, PTSD symptom severity, worst-point suicide ideation, recent suicide ideation, or any of the 3 SCS-S subscales between groups according to origin of pain.
Specific to origin of pain, standardized effects with worst-point suicide ideation as the outcome were comparable among origin of pain subgroups as compared to the full sample: noninjury-related pain patients (Unlovability, $\beta = 0.28$, $P < 0.001$; Unsolvability, $\beta = 0.17$, $P = 0.010$; and Unbearability, $\beta = 0.29$, $P = 0.002$) and injury-related pain patients (Unlovability, $\beta = 0.21$, $P < 0.001$; Unsolvability, $\beta = 0.29$, $P < 0.001$; and Unbearability, $\beta = 0.48$, $P < 0.001$). Standardized effects with recent suicide ideation as the outcome were also comparable among origin of pain subgroups as compared to the full sample: noninjury-related pain (Unlovability, $\beta = 0.16$, $P = 0.304$; Unsolvability, $\beta = 0.22$, $P = 0.040$; and Unbearability, $\beta = 0.12$, $P = 0.694$) and injury-related pain (Unlovability, $\beta = 0.22$, $P = 0.024$; Unsolvability, $\beta = 0.17$, $P = 0.001$; and Unbearability, $\beta = 0.20$, $P = 0.003$).

Specific to recency of pain onset, standardized effects with worst-point suicide ideation as the outcome were comparable in the < 5 years subgroup as compared to the full sample (Unlovability, $\beta = 0.21$, $P = 0.009$; Unsolvability, $\beta = 0.29$, $P = 0.001$; and Unbearability, $\beta = 0.26$, $P = 0.014$), but were reduced in the 5+ years subgroup (Unlovability, $\beta = 0.14$, $P = 0.713$; Unsolvability, $\beta = 0.16$, $P = 0.385$; and Unbearability, $\beta = 0.11$, $P = 0.903$). A similar pattern was found with
Table 3. Correlations of Full SCS Subscales and Shortened SCS Subscales With Other Clinical Variables

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SCS, Suicide Cognitions Scale; BSS, Beck Scale for Suicide Ideation; PCL, PTSD Checklist; BDI, Beck Depression Inventory; ODI, Oswestry Disability Index; PCS, Pain Catastrophizing Scale; CPAQ, Chronic Pain Acceptance Questionnaire; MPI, Multidimensional Pain Inventory. Values in bold are statistically significant at \( P < 0.05 \); values at or above \( r = 0.17 \) are statistically significant at \( P < 0.05 \); values at or above \( r = 0.23 \) are statistically significant at \( P < 0.01 \); values at or above \( r = 0.38 \) are statistically significant at \( P < 0.001 \).

recent suicide ideation as the outcome: standardized effects in the < 5 years subgroup were comparable to the full sample (Unlovability, \( \beta = 0.16, P = 0.042 \); Unsolvability, \( \beta = 0.12, P = 0.016 \); and Unbearability, \( \beta = 0.15, P = 0.037 \)) but were reduced in the 5+ years subgroup (Unlovability, \( \beta = 0.13, P = 0.794 \); Unsolvability, \( \beta = 0.01, P = 0.400 \); and Unbearability, \( \beta = 0.03, P = 0.663 \)).

**DISCUSSION**

Although suicidal thoughts and behaviors are common among chronic pain patients, accurate and early detection of high-risk patients is challenging due to the dynamic nature of many suicide risk factors, suicide ideation, and suicidal intent. Newer methods that can efficiently and reliably capture elevated suicide risk despite these fluctuations are therefore needed. The SCS was developed to assess identity-based suicide-specific beliefs and schemas that reflect the chronic dimension of suicide risk that persists as a more stable construct underneath the more dynamic and transient aspects of suicide risk. Previous research with the SCS supports its utility as a concurrent and prospective predictor of suicidal thoughts and behaviors within psychiatric samples,\(^7,8\) but to date no studies have evaluated the scale’s use in nonpsychiatric medical settings, and no studies have sought to reduce the full SCS from 18 items to a briefer version that can be implemented practically in busy clinical settings.

Similar to previous findings,\(^8\) results of the present study indicate that the full SCS is best conceptualized as a 3-factor scale composed of statements that assess the patient’s perceived worthlessness, failure, and self-hatred (ie, Unlovability); perceived hopelessness and deserving of punishment (Unsolvability); and perceived inability to tolerate or cope with emotional pain (Unbearability). Graded IRT analyses indicated that the full SCS could be reduced to a 9-item SCS-S with minimal adverse impact on the scale’s psychometric properties and construct validity. Consistent with the intent of the scale, which is to assess perceptions and belief that are highly specific to the suicidal state, patterns of SCS item endorsement were highly skewed, with greater than 75% of patients endorsing the lowest value possible (1, “strongly disagree”) on 14 of the 18 items. One notable exception was SCS item 3 (“I can’t stand this pain anymore”), which showed much less skew in endorsement, which is not surprising in a chronic pain population. Overall, these patterns suggest that most chronic pain patients do not subjectively identify the beliefs and perceptions assessed by the SCS as indicative of their internal state despite the strong validation of the SCS in the present sample. Lower reported levels of distressing cognitions may be a function of the complexity of chronic pain and a tendency among chronic pain patients to eschew psychiatric symptoms in favor of less stigmatizing medical symptoms (ie, somatization) resulting in increased utilization of medical care with increased emotional
distress. If true, then ongoing surveillance of cognitions and emotional states related to suicide risk in medical environments is highly indicated, and a pain-validated, abbreviated version of the SCS (as established in the present study) offers unparalleled capacity for this screening.

Despite the SCS items’ skewed endorsement patterns, the 5-point Likert response option format for the 9 items retained for the SCS-S nonetheless showed excellent discriminative capacity, such that the endorsement of higher scores on each item contributed useful incremental information. In other words, patients who endorsed a 2 (“disagree”) on any given item were meaningfully different from patients who endorsed a 1 (“strongly disagree”); those who endorsed a 3 (“neutral”) were meaningfully different from patients who endorsed a 2; and so on. This suggests that even very low levels of endorsement of SCS-S items are clinically relevant.

With respect to convergent and discriminant validity, comparison of the SCS and SCS-S subscale scores indicated that both versions were significantly correlated with severity of current and worst-point suicide ideation, but were not correlated with emotional distress, disability, pain-related cognitions, pain severity, or caretaker support. These patterns suggest the SCS and SCS-S are similarly tapping into constructs that are directly related to suicidal thoughts and desires but are independent of emotional distress and pain-related variables. This provides support for the specificity of the SCS-S to suicide risk, making the SCS-S valuable beyond more unidimensional measures of risk like depression screening measures (eg, BDI, Patient Health Questionnaire-9) commonly used in medical environments. Results of the multivariate regression analyses further support the construct validity of the SCS-S and also demonstrate incremental validity beyond the effects of other relevant risk factors like depression and PTSD symptom severity regardless of source of pain (ie, injury or noninjury).

Results of our post-hoc sensitivity analyses further suggest the SCS-S’s incremental validity may be most pronounced among chronic pain patients with relatively recent pain onset. Among patients with 5 or more years of pain, however, the strength of association between SCS-S scores and suicide ideation was reduced. It is possible that this is attributable to reduced statistical power associated with the small subgroup sizes, but the observed reductions in effect sizes suggest otherwise. An alternative possibility is that the nature of one’s beliefs about unlovability, unsolvability, and unbearability change over time as one’s pain continues to persist. Additional research using larger samples and longitudinal methods are needed to further understand this preliminary finding.

Consistent with the conceptualization of the SCS-S as a measure of chronic and persistent suicide risk, the SCS-S subscales (especially the Unbearability scale) had somewhat stronger correlations with worst-point suicide ideation as compared to current suicide ideation, although the present sample size was too small to detect a statistically significant difference between the correlation values. This aligns with the fluid vulnerability theory’s notion of chronic suicide risk, which is distinguished from the notion of acute or dynamic risk. Specifically, chronic suicide risk denotes that dimension of suicide risk that remains somewhat stable and persists over time, whereas acute suicide risk denotes that dimension of suicide risk that fluctuates concurrent with the individual’s context and psychological state. Worst-point suicidal crises are more strongly associated with risk for suicidal behaviors than current or recent suicidal crises, suggesting that the predictive utility of worst-point suicidal crises endures over time, even in the presence of more recent crises. The SCS-S might therefore be a useful measure because it taps into beliefs that are temporally stable and highly specific to suicide risk. These characteristics are noteworthy when one considers that none of the SCS-S’s items include the word suicide, which may enhance identification and detection of at-risk patients who are otherwise reluctant to disclose suicidal thoughts. Additional research is needed to confirm this possibility.

Limitations of the present study include restriction to a single sample composed of military beneficiaries; results should therefore be considered preliminary until replicated in additional samples. Second, our cross-sectional design restricts our ability to evaluate the utility of the SCS-S as a prospective predictor of future suicidal thoughts and behaviors. Longitudinal research is needed to confirm the predictive validity of the SCS-S. Third, we were unable to assess the age of participants, which limits our ability to understand the generalizability of results to the wider population of chronic pain patients. Despite these limitations, the results of the present study support the psychometric properties of the SCS-S in a nonpsychiatric population with elevated risk for suicide, and suggest the scale
may be a useful and practical tool for identifying and monitoring suicide risk.

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