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Psychometric Properties of the State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA): Comparison to the State–Trait Anxiety Inventory (STAI)

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The State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA; M. J. Ree, C. MacLeod, D. French, & V. Locke, 2000) was designed to assess cognitive and somatic symptoms of anxiety as they pertain to one's mood in the moment (state) and in general (trait). This study extended the previous psychometric findings to a clinical sample and validated the STICSA against a well-published measure of anxiety, the State–Trait Anxiety Inventory (STAI; C. D. Spielberger, 1983). Patients ($N = 567$) at an anxiety disorders clinic were administered a battery of questionnaires. The results of confirmatory factor analyses (Bentler–Bonnett nonnormed fit index, comparative fit index, and Bollen fit index $> .90$; root-mean-square error of approximation $< .05$); convergent and discriminant validity analyses; and group comparisons supported the reliability and validity of the STICSA as a measure of state and trait cognitive and somatic anxiety. In addition, compared with the STAI (anxiety: rs $\leq .52$; depression: rs $\geq .64$), the STICSA was more strongly correlated with another measure of anxiety (rs $\geq .67$) and was less strongly correlated with a measure of depression (rs $\leq .61$). These findings suggest that the STICSA may be a purer measure of anxiety symptomatology than is the STAI.

Keywords: anxiety, psychometrics, assessment, State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA), State–Trait Anxiety Inventory (STAI)

The distinction between state and trait anxiety was introduced by Cattell (1966) and elaborated on by Spielberger (1966, 1972, 1976). Spielberger (1983) described state anxiety as existing in a transitory emotional state that varies in intensity and fluctuates over time. On the other hand, trait anxiety refers to a stable susceptibility or a proneness to experience state anxiety frequently. Spielberger (1966) described this disposition to experience anxiety as a personality trait. Although the initial conceptualization was based primarily on introspective reports, the validity of the state–trait anxiety distinction, as investigated through psychometric evaluation, has consistently been supported in the literature (Spielberger, 1989; Spielberger, Vagg, Barker, Donham, & Westberry, 1980).

Spielberger's model of state and trait anxiety (1966, 1972) described the process of experiencing anxiety as resulting from a temporal sequence of interacting internal and external stimuli, cognitive factors, and defense mechanisms. Within the model, an anxious state, characterized by physiological arousal and thoughts of impending doom, is initiated by either an external stressor (e.g., threat of shock) or an internal cue (e.g., muscular or visceral activity). If the internal or external stimuli are cognitively appraised as threatening, an anxious state is caused and cognitive and behavioral defense processes are activated to combat the anxiety. Trait anxiety is described as a reflection of frequent past experiences of state anxiety, which increase an individual's proneness or sensitivity to experience future state anxiety by interacting with the cognitive appraisal of threatening internal or external stimuli.

State–Trait Anxiety Inventory

To further investigate state and trait anxiety, Spielberger (1983) developed the State–Trait Anxiety Inventory (STAI). The STAI consists of two 20-item self-report measures. The STAI State assesses how respondents feel "right now, at this moment" (e.g., "I feel at

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ease"; "I feel upset"), and the STAI Trait targets how respondents "generally feel" (e.g., "I am a steady person"; "I lack self-confidence"). In addition, the STAI State and Trait each have been found to contain two factors, which Spielberger labeled *anxiety-present* and *anxiety-absent* (Spielberger, 1983). Respondents are asked to rate themselves on each item on the basis of a 4-point Likert scale, ranging from *not at all* to *very much so* for the STAI State and from *almost never* to *almost always* for the STAI Trait.

The STAI has appeared in over 3,000 studies and has been translated into over 30 languages (Spielberger, 1989). In fact, a recent PsycINFO search for the STAI revealed over 400 journal articles since the Spielberger (1989) review, which suggests that the measure continues to be very popular in psychological research. In an investigation of the reliability generalization of the STAI, the measures demonstrated excellent internal consistency (average αs $> .89$), and the STAI Trait has evidenced excellent test–retest reliability (average $r = .88$) at multiple time intervals (Barnes, Harp, & Jung, 2002). Also, as would be expected given the nature of the construct, Barnes et al. (2002) reported lower temporal stability for the State version of the STAI (average $r = .70$). The measures have evidenced adequate convergent and discriminant validity with other measures of state and trait anxiety and have been shown to differentiate patient from control samples on the STAI Trait and participants in highly stressful situations (e.g., military recruits) from control samples (e.g., student samples) on the STAI State (Spielberger, 1983).

However, despite these generally positive psychometric features, the original STAI State and Trait measures have been criticized for their inability to adequately discriminate between the symptoms of anxiety and depression; their psychometric properties in younger, less educated populations; and their two-factor structure of anxiety-present and anxiety-absent. Despite a revision to deal with some of these concerns (for a review, see Spielberger, 1983), critiques of the STAI have persisted (e.g., Bieling, Antony, & Swinson, 1998; Caci, Bayle, Dossios, Robert, & Boyer, 2003). In particular, Bieling et al. (1998) argued that the STAI Trait does not assess pure anxiety; rather, they found support for a hierarchical factor solution, with a higher order factor of Negative Affect and two lower order factors: Anxiety, characterized by rumination, worry, and distressing thoughts items, and Depression, characterized by dysphoric mood and negative self-appraisal items.[1] According to Bieling et al., the items that Spielberger (1983) described as reflecting the constructs of anxiety-present and anxiety-absent appear, rather, to map onto the two separate factors of Anxiety and Depression. The presence of a Depression factor in the STAI is consistent with the findings of an additional factor analytic investigation (Caci et al., 2003), which indicated that the STAI may not provide an accurate assessment of anxiety, as distinct from depression. Together, these studies suggest that a new measure of state and trait anxiety may be needed.

State–Trait Inventory for Cognitive and Somatic Anxiety

Ree, MacLeod, French, and Locke (2000) developed such a new measure, entitled the State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA), to assess state and trait anxiety. The STICSA was based on Spielberger's (1966, 1972) theoretical formulation of state and trait anxiety and replicates the STAI's format of independent State and Trait scales. Each scale is composed of 21 self-report items. The STICSA State assesses how respondents "feel right now, at this very moment, even if this is not how you usually feel," whereas the STICSA Trait asks respondents "how often, in general, the statement is true of you." Respondents rate each item on a 4-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*).

Although the STAI and STICSA have several similarities, the STICSA was designed to improve upon several of the limitations of the STAI that were described earlier. The primary improvement of the STICSA was the design of its structure. Rather than making the distinction between anxiety-present and anxiety-absent made in the STAI, the STICSA separates anxiety into cognitive and somatic symptoms. The distinction of cognitive and somatic symptoms of anxiety has been theorized in the past (e.g., Schachter & Singer, 1962) and has been adapted to other modern measures of anxiety, such as the Four Systems Anxiety Questionnaire (Koksal & Power, 1990). Related to the improved structure, the STICSA also was designed to better discriminate between the symptoms of anxiety and depression in order to provide a more accurate assessment of pure anxiety; that is, it was designed to be a measure of anxiety with good discriminant validity that favored symptoms relatively unique to anxiety (e.g., physiological arousal and anxious thoughts) and disfavored nonspecific symptoms or symptoms unique to depression.

Although the STICSA has not been formally published to date, Ree et al. (2000) presented data on the STICSA at the annual meeting of the Association for the Advancement of Behavior Therapy and released an unpublished manuscript to the authors of the present investigation. According to Ree et al., the STICSA was based on an initial pool of 131 items that were designed to reflect the symptoms of either cognitive or somatic anxiety. Item selection involved an expert review by a panel of graduate students in clinical psychology and preliminary data collection from 576 community members. The initial item pool was reduced from 131 to 21 items that represented the cognitive (10 items) and somatic (11 items) dimensions of anxiety.

Ree et al. (2000) conducted a series of studies to develop the STICSA and to evaluate its psychometric properties. The studies examined factor structure of the STICSA State and Trait scales using both exploratory and confirmatory factor analyses in both large community and student samples. Together, their results supported a two-

[1] One of the reviewers of the present study identified a possible anomaly in Bieling et al. (1998). The reviewer suggested that although Bieling et al. scored the STAI correctly, the reverse-scored items were not properly incorporated into the discussion of the findings. One example of this potential problem involved their discussion of the relationship between the two factors of the STAI, which stated that "if these items assessed absence of anxiety, as has been proposed, they should have been negatively correlated with other measures of anxiety and not more strongly associated with measures of depression" (Bieling et al., 1998, p. 786). As noted by the reviewer, this interpretation does not take into account the reverse scoring of the STAI's anxiety-absent items. However, we concluded that the potential problem in their interpretation was relatively minor and did not interfere with the validity of their overall message, for our purposes. In particular, the finding that the STAI contains some items that are more highly correlated with symptoms of depression than with anxiety was investigated correctly and is consistent with other investigations (e.g., Caci et al., 2003). Moreover, we partially replicated the same pattern in the findings of the present study.

factor structure for both the STICSA State and Trait scales—with confirmatory factor analysis (CFA) goodness-of-fit indices all within the adequate-to-excellent range, according to established standards in the field (e.g., Hu & Bentler, 1999)—and confirmed the presence of Cognitive and Somatic subscales. In addition, they reported that all items loaded strongly on the predicted factors (the factor intercorrelations were .73 and .66 for the STICSA State and Trait, respectively) and that both scales demonstrated excellent internal consistency ($\alpha s > .90$). Finally, as evidence of the sensitivity of the STICSA State to state anxiety, significantly higher scores were reported during periods of heightened stress (e.g., final exams and inhalation of CO_2-enriched air) when compared with baseline scores. In contrast, no changes were observed in the STICSA Trait during the same stress manipulations. Together, these initial findings support the reliability and validity of the STICSA.

Thus, the STICSA shows great promise as a measure of the cognitive and somatic features of anxiety. However, additional studies are needed to replicate the psychometric properties of the measure before it is widely adopted in research or clinical settings (e.g., Clark & Watson, 1995; Simms & Watson, 2007). For example, the initial analyses of the STICSA scales were completed with student and community samples. Responses of psychiatric patients should be used to cross-validate the factor structure of the STICSA to determine whether the factor structure replicates in a sample with heightened chronic anxiety. In addition, alternative assessments of anxiety and depression should be administered in conjunction with the STICSA scales to investigate the convergent and discriminant validity of the latter measures. Ideally, the STICSA scales should correlate more highly with measures of similar constructs (e.g., anxiety and stress) than with measures of distinct constructs (e.g., depression).

Construct Validity in the Assessment of Anxiety

Construct validity plays an integral role in the development of measures of psychological assessment (Cronbach & Meehl, 1955; Smith, 2005). Cronbach and Meehl stated that psychological constructs are unobservable; thus, psychological measures of constructs require repeated evaluation and comparison with measures of related constructs (convergent validity) and with measures of unrelated constructs (discriminant validity). Smith added that establishing construct validity is particularly problematic for those working with highly overlapping constructs. In particular, significant overlap between anxiety and depression measures has been found repeatedly in the literature (Brown, Chorpita, & Barlow, 1998; Clark & Watson, 1991; Krueger & Finger, 2001; Mineka, Watson, & Clark, 1998; J. Williams, Peeters, & Zautra, 2004); thus, purportedly pure measures of anxiety must be carefully evaluated in order to ensure that they demonstrate adequate discriminant validity with respect to depression measures. As discussed earlier, both the STAI and the STICSA were designed to assess pure symptoms of anxiety. The STAI generally has not yielded such evidence, and our knowledge about the STICSA is quite limited to date. Thus, an important potential contribution of the present study is to compare the construct validity of the STICSA to the STAI, with a particular eye toward identifying evidence of discriminant validity.

Present Study

We had three primary aims for this study. Our first goal was to replicate and extend the previous psychometric study of the STICSA scales. We investigated the factor structure, internal consistency, and convergent and discriminant validity of the STICSA scales in a patient sample, which is an important next step in assessing its construct validity.

Our second aim was to investigate the ability of the STICSA scales to discriminate between individuals with heightened chronic anxiety or with transient, less severe anxiety by comparing scores in the patient sample with scores from a comparison group. The clinical presentation of the patient sample was assessed with the Structured Clinical Interview for *DSM–IV* (SCID–IV; First, Spitzer, Gibbon, & Williams, 1996). Although a more methodologically diverse investigation is needed to be fully consistent with Campbell and Fiske's (1959) multitrait–multimethod approach, the use of the SCID interview represents a first step in incorporating multiple methodologies in the investigation of STICSA scales.

Our third aim was to compare the STICSA with the STAI. Primarily, given the critiques of the STAI, we investigated whether the STICSA has greater discriminant validity than does the STAI by comparing scores of the two measures with the two subscales of the Depression Anxiety Stress Scales (DASS; P. F. Lovibond & S. H. Lovibond, 1995). We hypothesized that relative to the STAI Trait scale, the STICSA Trait scale would be more positively correlated with the Anxiety scale of the DASS and less positively correlated with the Depression scale of the DASS. Although a similar pattern was expected in the STICSA State scale, we hypothesized that this pattern of data would be weaker, because of the influence and variability of potential external stressors and because fewer items on the STAI State appear to reflect face-valid exemplars of depression. Taken together, these three aims represent the first independent study of the STICSA and the first study on this measure to be reported in the literature.

Method

Participants

Responses from psychiatric patients were collected from an outpatient sample at the Anxiety Treatment and Research Centre (ATRC) at St. Joseph's Healthcare, Hamilton, Ontario, Canada. We administered a modified version of the SCID–IV to 567 participants to establish diagnoses. The sample ($N = 567$, age $M = 35.4$ years, $SD = 11.6$; 63% female) comprised patients with a principal diagnosis of panic disorder with or without agoraphobia (PD; $n = 142$, age $M = 36.9$ years, $SD = 11.3$; 66% female); social phobia (SP; $n = 148$, age $M = 33.5$ years, $SD = 11.6$; 48% female); obsessive-compulsive disorder (OCD; $n = 107$, age $M = 33.5$ years, $SD = 11.2$; 68% female); or another anxiety or mood disorder ($n = 170$, age $M = 37.1$ years, $SD = 11.9$; 71% female).[2]

[2] The other category consisted mostly of patients with a principal diagnosis of generalized anxiety disorder (28.2%), major depressive disorder (23.7%), specific phobia (10.0%), anxiety disorder not otherwise specified (5.9%), posttraumatic stress disorder (4.1%), agoraphobia without a history of panic disorder (3.5%), or one of 19 other codes from the *Diagnostic and Statistical Manual of Mental Disorders* (24.6%). Seven patients did not receive a principal diagnosis of a mental disorder; however, many of these patients reported significant distress and demonstrated features of the anxiety and/or mood disorders.

The typical participant in the patient sample was Caucasian (92.8% Caucasian, 2.1% Native Canadian, and 2.1% Black, Asian, or Hispanic); single (42.3% single, 36.7% married, 10.1% cohabiting, and 10.6% divorced, separated, or widowed); and had completed college (32.5% completed college, 25.7% completed some college, 18.3% completed high school, and 16.6% completed some high school). In addition, we collected responses from an unselected sample ($n = 311$, age $M = 19.2$ years, $SD = 2.4$; 51% female) of undergraduate psychology students at the University at Buffalo to create a nonclinical comparison group. The typical participant in the comparison sample was Caucasian (55.9% Caucasian, 25.4% Asian, 9.3% Black, 5.1% Hispanic, and <1% Native American) and a freshman in college (56.9% freshmen, 22.8% sophomores, 12.5% juniors, and 6.4% seniors).

Procedure

The procedures and measures used in this study were approved by the institutional review boards at both St. Joseph's Healthcare and the University at Buffalo. Patients were referred to the ATRC by a physician (usually their family doctor or psychiatrist). Upon receiving the referral, each patient was scheduled for an intake interview (including the SCID–IV), provided full informed consent, and completed a series of self-report questionnaires. Seven hundred and nine patients completed the SCID–IV, STICSA State and Trait scales, DASS, and STAI State and Trait scales. In cases with random missing data (i.e., <10% missing on any of the questionnaires), we used imputation with the within-participant mean response to prorate the total scale scores. However, patients who were missing substantial questionnaire data (i.e., >10% missing on any of the questionnaires) were excluded from all analyses, which resulted in a final sample of 567 participants in the patient sample. Using this criterion, 17% of patients were missing substantial data from the STICSA Trait scale, which accounted for the majority of the total missing data.

Although completers and noncompleters did not differ significantly in their sex, age, principal diagnosis, and scores on the DASS, STAI Trait, and STICSA Trait, the noncompleters evidenced significantly higher state anxiety than did the completers on the STAI State and the STICSA State. In addition to higher state anxiety, we suspect, the large amount of missing data may have been caused by the overlap between the STICSA State and Trait scales. As presented in Appendixes A and B, the only differences between the two scales were the instructions; thus, participants may have thought that the same questionnaire had been presented twice by mistake and skipped the second copy. The STICSA Trait was always presented after the STICSA State.

A second data collection phase was completed at the University at Buffalo. Three hundred and eighteen participants were recruited from the introductory psychology research pool and attended a 1-hr research session. Participants were administered consent documentation and a questionnaire packet, which included the STICSA State and Trait measures. Missing data were handled as in the patient sample, which resulted in the exclusion of 7 participants and a final sample size of 311 participants.

Measures

STICSA. The STICSA is an unpublished measure of state and trait anxiety (see Appendixes A and B). As described earlier, each scale consists of 21 items that are rated on a 4-point Likert scale. Both the STICSA State and Trait scales were designed to have two factors. One factor reflects the cognitive symptoms of anxiety (10 items), and the second factor reflects the somatic symptoms of anxiety (11 items).

STAI (Spielberger, 1983). The STAI is a widely used measure of state and trait anxiety. Similar to the STICSA, the STAI has both State and Trait scales. Each scale consists of 20 items that are rated on a 4-point Likert scale. As described earlier, the STAI has demonstrated good internal consistency, test–retest reliability in the STAI Trait, sensitivity to detection of stress in the STAI State, and convergent and discriminant validity (Barnes et al., 2002; Hishinuma et al., 2000; Kabacoff, Segal, Hersen, & Van Hasselt, 1997; Spielberger, 1989; Vautier, 2004). In addition, the STAI State ($\alpha = .95$) and the STAI Trait ($\alpha = .93$) demonstrated excellent internal consistency in the present study.

DASS 21-item version (S. H. Lovibond & Lovibond, 1995). The DASS is a 21-item measure with three subscales designed to assess dysphoric mood (Depression subscale: DASS–D), symptoms of fear and autonomic arousal (Anxiety subscale: DASS–A), and symptoms of tension and agitation (Stress subscale: DASS–S). Although not as widely used as other measures of anxiety and depression, the DASS has resulted in a small but growing literature that shows it demonstrates greater discriminant validity than do some more prominent measures, such as the Beck Depression Inventory (BDI; Beck & Steer, 1987) and the Beck Anxiety Inventory (BAI; Beck & Steer, 1993). For example, P. F. Lovibond & Lovibond (1995) analyzed the factor structure of the DASS scales, the revised version of the original BDI, and the BAI in a large college sample. There was a greater degree of overlap in the Depression and Anxiety factor loadings in the BDI/BAI analysis (e.g., BAI items loading on the Depression factor and a BDI item loading on the Anxiety factor) when compared with the DASS factor loadings. In addition, although the difference was not investigated with inferential statistics, the DASS–D and DASS–A were less strongly correlated ($r = .42$) than were the Depression and Anxiety factors in the BDI/BAI analysis ($r = .47$).

The DASS has been compared with the second version of the Beck Depression Inventory (BDI–II; Beck, Steer, & Brown, 1996) and the BAI; it demonstrated the predicted pattern of convergent and discriminant validity (Daza, Novy, Stanley, & Averill, 2002). Moreover, several studies have found support for the factor structure, convergent and discriminant validity, and internal consistency of the DASS in community (Crawford & Henry, 2003) and clinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown, Chorpita, Korotitsch, & Barlow, 1997; S. H. Lovibond & P. F. Lovibond, 1995). Together, these findings suggest that the DASS can be used successfully to differentiate the symptoms of anxiety and depression.[3]

SCID–IV (First et al., 1996). The SCID–IV is a semistructured diagnostic interview designed to assess the criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM–IV;* American Psychiatric Association, 2000) for Axis I

[3] Due to the focus on the symptoms of depression and anxiety in the present study, the analyses focused on the DASS–A and DASS–D scales. The DASS–S was not central to any of the hypotheses and, thus, was removed from all analyses.

disorders. Interviewers were psychologists, supervised postdoctoral fellows, or senior graduate students, each of whom received extensive training and supervision in conducting this interview. Initial training included watching three interviews and conducting three interviews under observation. In addition, all SCID–IV interviews for this study were presented at a weekly team meeting chaired by a psychologist with more than 5 years of experience in training others to administer the SCID–IV. At the meeting, diagnostic questions were reviewed, and a consensus diagnosis was reached. The principal diagnosis of each patient was based upon the disorder that was found to be most disabling at the time of the assessment. Earlier versions of the SCID have shown adequate interrater reliability for all disorders (*r*s range = .69–1.0; Zanarini & Frankenburg, 2001) and adequate test–retest reliability over a 1- to 3-week interval in patient samples (*r*s range = .40–1.0; J. B. W. Williams et al., 1992; Zanarini & Frankenburg, 2001).

In each of the anxiety disorders sections on the SCID (except for the posttraumatic stress disorder section), we added additional follow-up questions, adapted from the Anxiety Disorders Interview Schedule for *DSM–IV* (ADIS–IV; Di Nardo, Brown, & Barlow, 1994), to obtain more details about the range of situations affected by the disorder. For example, in the social phobia section, participants were asked the extent to which they feared 13 different social situations. As the SCID is a semistructured interview, its administration guidelines permit the addition of such follow-up questions.

Data Analysis Plan

Our data analytic strategies paralleled the specific goals of the project. For our first goal of replicating and extending the previous psychometric study of the STICSA scales, we conducted a series of CFAs to confirm the factor structure of the scales and computed Cronbach's alpha coefficients to assess the internal consistency of each scale. The CFAs were conducted using EQS Version 6.1 (Bentler & Wu, 1995). The second goal of testing the ability of the STICSA State and Trait scales to discriminate the patient sample from the comparison sample was assessed through a series of one-way univariate analyses of variance (ANOVAs), which was followed by Tukey-corrected post hoc tests using SPSS (Norusis, 2005). For our third goal of comparing the STICSA with the STAI, we assessed the convergent and discriminant validity of the two scales by calculating the correlations between the STICSA, STAI, and DASS scales. We calculated Fisher's *Z* scores to determine whether the STICSA or the STAI was a stronger predictor of the DASS–A and DASS–D scales.

Results

Structural Analyses

We conducted CFAs in both the patient and comparison samples to test four possible structural models underlying items of the STICSA: (a) a one-factor model (1F) in which all state, trait, cognitive, and somatic items were forced to load on a single higher order factor; (b) a two-factor model in which items across the state and trait measures loaded on either Cognitive or Somatic factors (2F–CS); (c) a two-factor model in which items loaded on either State or Trait factors (2F–ST); and (d) a four-factor model (4F) in which State–Cognitive, State–Somatic, Trait–Cognitive, and Trait–Somatic factors were directly modeled. The State–Trait loadings were based on the measure of origin (STICSA State vs. STICSA Trait). The Cognitive–Somatic loadings were based on previous research on the STICSA (Ree et al., 2000). All four models were tested using covariance matrices and maximum-likelihood estimation methods. Because the distributions of some model variables deviated from normality, we implemented robust maximum-likelihood estimation methods and goodness-of-fit statistics, as recommended by numerous authors (e.g., Kahn, 2006; Satorra & Bentler, 1994). For each analysis, models were identified by setting the variances of each factor to 1.0 and all factors were permitted to correlate. Finally, for each model, the error terms associated with corresponding items in the STICSA State and Trait were correlated, due to their overlapping content (e.g., STICSA State Item 1 was correlated with STICSA Trait Item 1).

The goodness of fit of the CFAs was evaluated with the Satorra–Bentler robust chi-square goodness-of-fit tests, the root-mean-square error of approximation (RMSEA), the Bentler–Bonnett nonnormed fit index (NNFI), the comparative fit index (CFI), and the Bollen fit index (IFI; for recent discussions of fit indices, see Finch & West, 1997; Hu & Bentler, 1998, 1999). Although there are no strict criteria for evaluating these fit indices, specific rule-of-thumb guidelines for interpreting the fit indices have been suggested (e.g., Hu & Bentler, 1999). In the present study, we considered NNFI, CFI, and IFI values of .90 and above to reflect adequate fit and values of .95 and above to indicate excellent fit. RMSEA values of .08 or less were considered to reflect adequate fit; values of .06 or less were considered to reflect excellent fit.

Goodness-of-fit statistics for all tested models are presented in Table 1.[4] The Satorra–Bentler chi-square goodness-of-fit tests for each of the CFA models were significant (chi-squares ranged from 1,116.1 to 4,176.3, ps $< .001$). When we investigated the nested models with scaled difference in chi-square tests (Brown, 2006; Satorra & Bentler, 1994), the 4F model demonstrated significantly better fit compared with the 1F model, $\Delta\chi^2(6, N = 567) = 1{,}229.0$, $p < .001$, and both of the two-factor models, $\Delta\chi^2(5, N = 567)$, ranged from 460.5 to 1,677.8 (ps $< .001$).

However, the utility of the chi-square goodness-of-fit test has been questioned in the literature, due to its sensitivity to large sample sizes (Hu & Bentler, 1995; Kahn, 2006; Kline, 1998). Thus, we calculated additional fit indices to support the fit of the models. According to these statistics, the 1F and both two-factor models generally fit the observed response data less than adequately (only the RMSEA values were within the adequate range). In contrast, the 4F factor model yielded adequate-to-excellent fit across all fit indices in the patient sample: RMSEA, CFI, and IFI were in the excellent range, and the NNFI was in the adequate range. A similar pattern was found in the college comparison sample, where only the 4F factor model demonstrated adequate fit to the data: RMSEA was in the excellent range, and the NNFI, CFI, and IFI were in the adequate range. Taken together, these results support both the state–trait and cognitive–somatic distinctions implied by the STICSA item pool and instruction sets.

The standardized factor loadings for the patient sample are presented in Table 2. All factor loadings were moderate to high

[4] We ran all models using both standard and robust maximum-likelihood estimation methods. As the pattern of findings was very similar between methods, we present only the robust statistics in this article.

Table 1
Fit Indices for Tested Models

Model	χ^2	*df*	NNFI	CFI	IFI	RMSEA	CI 90
Patient sample							
One factor	4,176.3	798	.77	.78	.78	.09	.084, .089
Two factor, Cognitive-Somatic	3,346.3	797	.82	.84	.84	.08	.072, .078
Two factor, State-Trait	2,731.8	797	.87	.88	.88	.07	.063, .068
Four factor	1,643.5	792	.94	.95	.95	.04	.041, .047
Comparison group							
One factor	1,747.6	798	.74	.76	.76	.06	.058, .066
Two factor, Cognitive-Somatic	1,492.0	797	.81	.82	.83	.05	.049, .057
Two factor, State-Trait	1,428.3	797	.83	.84	.84	.05	.046, .055
Four factor	1,116.2	792	.91	.92	.92	.04	.031, .041
Multigroup							
Four factor, unconstrained	2,723.3	1584	.93	.93	.94	.03	.027, .030
Four factor, constrained	2,847.3	1626	.93	.93	.93	.03	.027, .031

Note. The four-factor model was the best fitting model in both samples. NNFI = Bentler-Bonnett nonnormed fit index; CFI = comparative fit index; IFI = Bollen fit index; RMSEA = root-mean-square error of approximation; CI 90 = 90% confidence interval of RMSEA.

and statistically significant ($ps < .05$), with a range from .46 to .78, and were very similar across the STICSA State and Trait versions of the questionnaire. All of the factor intercorrelations were statistically significant ($p < .05$) and were consistent with the predicted pattern. The two state factors (State–Cognitive and State–Somatic, $r = .64$), the two trait factors (Trait–Cognitive and Trait–Somatic, $r = .57$), the two cognitive factors (State–Cognitive and Trait–Cognitive, $r = .84$), and the two somatic factors (State–Somatic and Trait–Somatic, $r = .76$) all demonstrated high correlations. However, the mismatching factors (State–Cognitive and Trait–Somatic, $r = .50$; and Trait–Cognitive and State–Somatic, $r = .45$) evidenced slightly lower correlations. The college sample demonstrated a pattern of factor loadings and factor intercorrelations similar to that of the patient sample.

To evaluate the structural invariance of the STICSA across the patient and college samples, we investigated the 4F model with a multigroup CFA model with robust maximum-likelihood estimation methods. Two multigroup CFA models were investigated: a constrained model, in which all factor loadings were constrained to be identical across samples, and an unconstrained model, in which loadings were free to vary across samples. The multigroup 4F factor models both yielded adequate-to-excellent fit across all fit indices: RMSEA was in the excellent range, and the NNFI, CFI, and IFI were all in the adequate range. Although the scaled difference in chi-square indicated that constraining the factor loadings across samples significantly worsened model fit, $\Delta\chi^2(42, Ns = 567$ and 311 for the patient and college samples, respectively$) = 131.0$, $p < .001$, the Lagrange multiplier test for the constrained models indicated that only 6 of the 42 constraints were significant (chi-squares ranged from 3.9 to 10.3, $ps < .05$). This finding suggested that releasing a small number of constraints would equate the two models. Moreover, all other fit index values (e.g., CFI, RMSEA, NNFI) were nearly indistinguishable across the constrained and unconstrained models. Together, these findings suggest that the STICSA yielded a highly similar structure across the patient and college samples.

Internal Consistency

Internal consistency reliability coefficients for the STICSA, STAI, and DASS are presented in Table 3. All subscales of the STICSA demonstrated excellent internal consistency, with Cronbach's alpha coefficients of .88 for the Cognitive and Somatic subscales of the STICSA State and .87 for both subscales of the STICSA Trait. In addition, the average interitem correlations were .46 and .41 for the STICSA State Cognitive and Somatic subscales, respectively, and were .44 and .38 for the STICSA Trait Cognitive and Somatic subscales, respectively. A similar pattern of alphas and average interitem correlations was observed in the college sample; however, all coefficients were slightly weaker than were those observed in the patient sample. The full correlation matrix of all of the STICSA items is presented in Table 4.

Convergent and Discriminant Validity

The convergent and discriminant validity of the STICSA was investigated in the patient sample. To do this, we computed correlations between the STICSA scales and other measures of anxiety and depression. The resulting correlations are presented in Table 3. Both the STICSA State and Trait evidenced strong correlations with the STAI State and Trait and with both of the DASS scales examined in this study ($rs > .57$). As expected, the STICSA State was significantly more correlated with the STAI State than was the STICSA Trait ($z = 3.7$, $p < .01$, two-tailed), and the STICSA Trait was significantly more correlated with the STAI Trait than was the STICSA State ($z = 2.7$, $p < .01$, two-tailed).

Compared with the scales of the DASS, the STICSA Trait was significantly more correlated with the DASS–A scale than was the STAI Trait ($z = 7.9$, $p < .01$, two-tailed) and the STAI Trait was significantly more correlated with the DASS–D scale than was the STICSA Trait ($z = 4.2$, $p < .01$, two-tailed). Moreover, the STICSA Trait correlated more strongly with the DASS–A than with the DASS–D ($z = 3.8$, $p < .01$, two-tailed), whereas the opposite pattern was true of the STAI Trait ($z = 6.9$, $p < .01$, two-tailed). A similar pattern of results was found for the State versions of the STICSA and STAI; however, although the STICSA State correlated more strongly with the DASS–A ($z = 5.7$, $p > .01$, two-tailed), the correlations of the two measures with the DASS–D did not reliably differ ($z = -1.2$, $p > .05$, two-tailed). Thus, the STICSA scales were more closely related to an alternative measure of anxiety, whereas the STAI was more related to a measure of depression. These results suggest that the STICSA may better discriminate the symptoms of anxiety and depression and may provide a more specific assessment of anxiety than does the STAI.

Group Comparisons

To investigate whether the STICSA scales can discriminate between the patient and comparison samples and to compare the STICSA State and Trait scores across diagnostic groups, we con-

Table 2
Standardized Factor Loadings for Four-Factor Model in a Patient Sample (N = 567)

Item	State–Cognitive	State–Somatic	Trait–Cognitive	Trait–Somatic
STICSA State				
1. Heart beats fast.		.67		
2. Muscles are tense.		.57		
3. Feel agonized over problems.	.65			
4. Think others won't approve.	.57			
5. Can't make up mind.	.51			
6. Feel dizzy.		.62		
7. Muscles feel weak.		.62		
8. Feel trembly and shaky.		.71		
9. Picture future misfortunes.	.74			
10. Can't get thoughts out of mind.	.76			
11. Trouble remembering things.	.50			
12. Face feels hot.		.56		
13. Think worst will happen.	.73			
14. Arms and legs feel stiff.		.58		
15. Throat feels dry.		.61		
16. Avoid uncomfortable thoughts.	.55			
17. Irrelevant thoughts intruding.	.76			
18. Breathing is fast and shallow.		.69		
19. Cannot control thoughts.	.75			
20. Butterflies in the stomach.		.65		
21. Palms feel clammy.		.62		
STICSA Trait				
1. Heart beats fast.				.64
2. Muscles are tense.				.63
3. Feel agonized over problems.			.70	
4. Think others won't approve.			.57	
5. Can't make up mind.			.50	
6. Feel dizzy.				.62
7. Muscles feel weak.				.66
8. Feel trembly and shaky.				.72
9. Picture future misfortunes.			.72	
10. Can't get thoughts out of mind.			.77	
11. Trouble remembering things.			.46	
12. Face feels hot.				.55
13. Think worst will happen.			.70	
14. Arms and legs feel stiff.				.63
15. Throat feels dry.				.60
16. Avoid uncomfortable thoughts.			.50	
17. Irrelevant thoughts intruding.			.78	
18. Breathing is fast and shallow.				.66
19. Cannot control thoughts.			.72	
20. Butterflies in the stomach.				.56
21. Palms feel clammy.				.57

Note. STICSA = State–Trait Inventory for Cognitive and Somatic Anxiety. All factor loadings were significant at $p < .05$. Items are derived from *State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA)—State Version,* by Melissa J. Ree, Colin MacLeod, Davina French, and Vance Locke, 2000, Perth, Australia: The University of Western Australia. Copyright 2000 by Melissa J. Ree, Colin MacLeod, Davina French, and Vance Locke. Reprinted with permission.

ducted a series of one-way univariate ANOVAs followed by Tukey-corrected post hoc tests. The three diagnostic groups (OCD, PD, SP), a fourth group comprising a diagnosis of another anxiety or mood disorder, and the comparison sample were compared. Descriptive statistics for these groups are presented in Table 5. As expected, the groups differed on their scores on the STICSA State and Trait and their subscales; Fs(4, 873) ranged from 22.16 to 69.62, ps $< .001$. The Tukey-corrected post hoc tests revealed that the four patient groups scored significantly higher on both the STICSA State and Trait and their subscales than did the comparison sample (ps $< .001$, ds $> .91$). The only significant difference between any of the patient groups was found on the Cognitive subscale of the STICSA Trait, where the OCD group scored higher than did the PD group ($p < .01$, $d = .43$). A similar pattern was observed on the Cognitive subscale of the STICSA State; however, the difference was nonsignificant ($p = .09$, $d = .31$). No other group differences were observed. These findings suggest that the STICSA is sensitive to group differences in anxiety between a

Table 3
Correlations Between the STICSA State and Trait and Other Measures of Anxiety and Depression in a Patient Sample (n = 567)

Measure	1	2	3	4	5	6	7	8	9	10
1. STICSA State	(.92)									
2. STICSA State, Cognitive	.90	(.88)								
3. STICSA State, Somatic	.88	.59	(.88)							
4. STICSA Trait	.79	.74	.67	(.91)						
5. STICSA Trait, Cognitive	.71	.82	.43	.88	(.87)					
6. STICSA Trait, Somatic	.67	.47	.74	.87	.53	(.87)				
7. STAI State	.65	.63	.53	.58	.54	.47	(.95)			
8. STAI Trait	.60	.65	.42	.66	.70	.49	.71	(.93)		
9. DASS Anxiety	.67	.56	.65	.68	.51	.68	.52	.48	(.83)	
10. DASS Depression	.61	.64	.45	.58	.59	.42	.64	.68	.55	(.92)

Note. Cronbach's alphas are presented in parentheses on the diagonal. All correlations were significant at the .01 level. STICSA = State–Trait Inventory for Cognitive and Somatic Anxiety. STAI = State–Trait Anxiety Inventory. DASS = Depression Anxiety Stress Scales.

patient sample and a comparison group and that it may be sensitive enough to detect differences within the various anxiety disorders. However, the latter finding requires replication in future studies.

Discussion

In the present study, we assessed the psychometric properties of the State and Trait versions of the STICSA through structural analyses, examination of convergent and discriminant validity patterns, and comparisons between the patient and nonpatient groups. These findings replicated previous findings with the STICSA and extended them to a patient population, thereby supporting the reliability and construct validity of the STICSA as a measure of anxiety. In addition, the present study compared the STICSA with the STAI and found that the STICSA generally demonstrated a more differentiated pattern of convergent and discriminant relations with respect to measures of anxiety and depression. In short, the STICSA was more specifically related to an alternative measure of anxiety, whereas the STAI correlated more highly with a measure of depression.

Several factor models were investigated with the combined STICSA State and Trait scales. The results of these analyses—in both psychiatric patient and college comparison samples—suggested that the combined STICSA contained four factors: State–Cognitive, State–Somatic, Trait–Cognitive, and Trait–Somatic. These findings support the initial separation of state and trait and cognitive and somatic anxiety in the original, unpublished research (Ree et al., 2000). Together, these findings provide evidence for the overall structure of the STICSA and support its distinctions between state and trait forms of anxiety and between symptoms of cognitive and somatic anxiety.

The reliability and validity of the STICSA State and Trait scales also were investigated in the patient sample. The measure demonstrated good internal consistency and significant correlations with the STAI and DASS subscales. In addition, the patient sample scored significantly higher on both scales of the STICSA when compared with the comparison group. The individual diagnostic groups within the patient sample demonstrated limited differences among the various subscales of the STICSA State and Trait; however, these differences were not predicted and therefore require replication. Together, these findings support the reliability and validity of the STICSA State and Trait scales.

We also compared the STICSA with a widely used measure of anxiety, the STAI. As reviewed earlier, several criticisms of the STAI have been levied (e.g., Bieling et al., 1998; Caci et al., 2003), among them, problems related to its factor structure and its relative relations to other measures of anxiety and depression. The STICSA was developed, in part, to improve on the STAI and to create a measure of state and trait anxiety with a more favorable pattern of convergent and discriminant relations (Ree et al., 2000). The present findings support the use of the STICSA for this purpose. The STICSA Trait scale correlated more highly with another measure of anxiety (DASS–A) than with the STAI Trait scale, and the STAI Trait correlated more highly with a measure of depression (DASS–D) than with the STICSA Trait. Interestingly, the STAI Trait correlated more highly with the DASS–D than with the DASS–A, a finding consistent with previous research that suggested the STAI Trait may be more closely related to symptoms of depression than to symptoms of anxiety (e.g., Bieling et al., 1998; Caci et al., 2003). On the other hand, the STICSA Trait correlated more highly with the DASS–A than with the DASS–D. A similar pattern of findings was found in the State versions of both measures.

The findings of the present study can be discussed in the context of the tripartite model of anxiety and depression. As discussed earlier, the overlap between anxiety and depression has received much attention in the literature (Brown et al., 1998; Clark & Watson, 1991; Krueger & Finger, 2001; Mineka et al., 1998; J. Williams et al., 2004). Clark and Watson (1991) developed the tripartite model to explain the relationship between the two disorders. Their model suggests that anxiety and depression share a nonspecific component of generalized distress; called "negative affect," it partially explains the overlap between anxiety and depression. The other two components of the tripartite model are considered to be unique to either anxiety or depression. Anhedonia, or low positive affect, appears to be unique to depression, whereas physiological hyperarousal is unique to anxiety. Numerous studies have found support for the tripartite model (Brown et al., 1998; Gunthert, Cohen, & Armeli, 2002; Joiner, Catanzaro, & Laurent, 1996; Watson, Clark, et al., 1995; Watson, Weber, et al., 1995). On the basis of this model, a measure of anxiety should contain items that reflect elevated negative affect and physiological hyperarousal but not items that reflect low levels of positive affect (a feature of depression but not of anxiety). In contrast, a

Table 4
Correlations of the STICSA State (S) and Trait (T) Items in a Patient Sample (N = 567)

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
1. S01	—																																									
2. S02	.50	—																																								
3. S03	.33	.39	—																																							
4. S04	.26	.27	.48	—																																						
5. S05	.24	.24	.38	.52	—																																					
6. S06	.41	.31	.25	.19	.20	—																																				
7. S07	.36	.42	.31	.24	.30	.42	—																																			
8. S08	.48	.44	.35	.22	.22	.47	.48	—																																		
9. S09	.30	.28	.48	.45	.36	.25	.32	.29	—																																	
10. S10	.27	.28	.49	.38	.37	.24	.25	.27	.59	—																																
11. S11	.27	.31	.33	.30	.32	.25	.35	.28	.36	.35	—																															
12. S12	.36	.26	.26	.24	.25	.38	.30	.40	.27	.29	.25	—																														
13. S13	.32	.30	.50	.44	.37	.26	.29	.29	.67	.55	.33	.27	—																													
14. S14	.32	.40	.25	.22	.23	.35	.56	.37	.26	.18	.34	.27	.25	—																												
15. S15	.36	.38	.26	.20	.23	.37	.41	.42	.22	.22	.30	.35	.22	.49	—																											
16. S16	.24	.25	.33	.26	.23	.20	.20	.29	.38	.46	.32	.25	.39	.26	.27	—																										
17. S17	.24	.27	.46	.40	.42	.23	.32	.32	.49	.61	.43	.26	.47	.26	.25	.45	—																									
18. S18	.50	.42	.31	.29	.29	.36	.41	.43	.33	.32	.31	.42	.35	.44	.41	.26	.34	—																								
19. S19	.30	.27	.43	.39	.36	.27	.32	.35	.48	.55	.41	.28	.50	.26	.29	.46	.69	.39	—																							
20. S20	.43	.28	.29	.32	.26	.37	.31	.44	.36	.35	.24	.41	.35	.29	.35	.30	.31	.45	.37	—																						
21. S21	.41	.27	.27	.27	.24	.32	.32	.47	.28	.23	.23	.43	.32	.32	.39	.28	.26	.45	.31	.54	—																					
22. T01	.59	.36	.25	.15	.18	.29	.23	.31	.22	.20	.22	.28	.23	.24	.24	.24	.22	.39	.21	.26	.30	—																				
23. T02	.37	.66	.26	.21	.20	.31	.35	.35	.28	.23	.28	.26	.23	.41	.34	.21	.28	.38	.24	.24	.25	.50	—																			
24. T03	.15	.26	.57	.39	.32	.14	.23	.24	.41	.44	.28	.15	.43	.20	.21	.30	.46	.21	.42	.19	.16	.24	.35	—																		
25. T04	.16	.18	.35	.77	.43	.12	.19	.18	.39	.35	.28	.18	.37	.18	.15	.24	.35	.21	.34	.25	.19	.18	.24	.46	—																	
26. T05	.14	.18	.30	.43	.80	.12	.27	.20	.30	.31	.27	.20	.31	.21	.21	.23	.39	.23	.31	.18	.17	.18	.23	.39	.48	—																
27. T06	.22	.25	.15	.11	.13	.61	.31	.31	.19	.13	.18	.27	.16	.33	.26	.20	.15	.24	.16	.14	.20	.39	.37	.17	.10	.14	—															
28. T07	.27	.35	.22	.19	.24	.34	.67	.37	.24	.18	.34	.27	.23	.53	.37	.18	.25	.36	.26	.24	.25	.31	.45	.27	.22	.28	.49	—														
29. T08	.33	.33	.23	.17	.20	.32	.34	.61	.23	.16	.26	.29	.19	.30	.32	.22	.27	.35	.27	.32	.37	.43	.44	.29	.19	.21	.47	.48	—													
30. T09	.17	.21	.34	.33	.30	.15	.18	.16	.67	.45	.27	.14	.57	.17	.12	.31	.42	.24	.41	.26	.22	.23	.26	.48	.42	.35	.22	.23	.25	—												
31. T10	.15	.17	.34	.31	.32	.18	.15	.16	.46	.63	.28	.18	.45	.12	.18	.39	.54	.21	.51	.22	.17	.23	.24	.55	.36	.35	.20	.18	.21	.56	—											
32. T11	.21	.28	.26	.25	.29	.23	.30	.21	.28	.25	.81	.21	.23	.32	.28	.22	.39	.25	.34	.18	.21	.23	.31	.28	.30	.30	.22	.37	.29	.29	.29	—										
33. T12	.24	.22	.23	.23	.24	.29	.26	.30	.23	.24	.22	.69	.22	.28	.32	.22	.23	.30	.23	.30	.34	.32	.29	.22	.22	.25	.36	.33	.40	.20	.25	.26	—									
34. T13	.15	.20	.34	.34	.32	.14	.17	.12	.56	.42	.26	.14	.67	.15	.13	.33	.40	.24	.41	.20	.18	.26	.25	.46	.40	.35	.22	.22	.21	.71	.54	.28	.21	—								
35. T14	.25	.35	.15	.20	.20	.31	.48	.30	.25	.18	.33	.23	.18	.71	.42	.21	.23	.37	.20	.21	.24	.33	.53	.23	.23	.22	.45	.64	.41	.21	.17	.37	.30	.20	—							
36. T15	.24	.30	.24	.20	.23	.26	.32	.32	.22	.22	.31	.31	.15	.38	.68	.31	.24	.31	.24	.24	.28	.35	.37	.28	.24	.26	.36	.40	.42	.22	.25	.33	.43	.15	.48	—						
37. T16	.17	.19	.20	.18	.24	.14	.11	.19	.30	.36	.22	.22	.30	.17	.15	.75	.32	.24	.37	.23	.22	.24	.22	.28	.23	.24	.19	.17	.27	.36	.40	.22	.27	.35	.18	.27	—					
38. T17	.19	.21	.38	.34	.39	.17	.25	.25	.40	.52	.37	.19	.40	.22	.21	.40	.77	.28	.61	.24	.24	.29	.31	.55	.42	.44	.18	.29	.32	.49	.65	.43	.25	.46	.24	.27	.41	—				
39. T18	.39	.33	.24	.21	.21	.29	.27	.30	.25	.25	.27	.29	.27	.33	.30	.24	.27	.64	.30	.32	.32	.56	.42	.23	.23	.22	.38	.42	.46	.32	.30	.28	.34	.31	.38	.36	.26	.36	—			
40. T19	.22	.23	.31	.31	.30	.20	.26	.25	.37	.42	.34	.22	.39	.22	.20	.38	.57	.29	.75	.27	.22	.27	.26	.46	.39	.32	.21	.27	.34	.47	.58	.38	.26	.48	.22	.27	.42	.68	.34	—		
41. T20	.26	.18	.13	.20	.17	.24	.20	.27	.23	.23	.20	.25	.23	.17	.17	.19	.21	.27	.20	.63	.36	.34	.28	.23	.26	.20	.24	.28	.42	.30	.29	.20	.36	.28	.23	.25	.24	.30	.36	.28	—	
42. T21	.29	.18	.21	.18	.20	.23	.20	.32	.20	.14	.18	.31	.20	.26	.29	.25	.22	.31	.22	.34	.70	.36	.26	.18	.19	.19	.31	.29	.44	.21	.19	.20	.42	.22	.33	.38	.26	.27	.37	.23	.45	

Note. All correlations were significant at the .01 level. STICSA = State–Trait Inventory for Cognitive and Somatic Anxiety.

Table 5
Comparison of Diagnostic and Comparison Groups on the STICSA State and Trait Scales

Scale	PD (n = 142)			OCD (n = 148)			SP (n = 107)			Other (n = 170)			Comparison (n = 311)	
	M	*SD*	*d*	*M*	*SD*	*d*	*M*	*SD*	*d*	*M*	*SD*	*d*	*M*	*SD*
STICSA State	45.4	12.3	0.92	47.3	14.3	0.99	47.1	13.6	1.00	47.3	14.2	0.99	35.0	10.3
STICSA State, Cognitive	24.9	7.6	0.86	27.3	8.0	1.17	26.4	7.9	1.05	26.6	8.1	1.06	18.9	6.3
STICSA State, Somatic	20.5	6.7	0.73	20.0	7.6	0.60	20.7	7.3	0.72	20.7	7.8	0.69	16.1	5.3
STICSA Trait	50.3	12.0	1.18	52.2	13.2	1.30	51.2	12.6	1.23	50.7	13.2	1.15	37.0	10.4
STICSA Trait, Cognitive	26.6	7.3	0.92	29.7	7.2	1.38	28.2	7.0	1.18	28.4	7.6	1.15	20.3	6.4
STICSA Trait, Somatic	23.7	6.5	1.21	22.4	7.3	0.92	23.0	7.3	1.01	22.3	7.6	0.88	16.6	5.2

Note. Scores reported as means, standard deviations, and effect sizes (Cohen's *d*). All effect sizes were computed with the patient group versus comparison group comparison. All patient groups evidenced significantly higher scores on all measures than did the comparison group ($ps < .001$). STICSA = State–Trait Inventory for Cognitive and Somatic Anxiety; PD = panic disorder with or without agoraphobia; OCD = obsessive-compulsive disorder; SP = social phobia; Other = other anxiety disorders and depression.

measure of depression should include items that reflect low levels of positive affect and high levels of negative affect but not items that measure physiological hyperarousal, which is thought to be a unique feature of anxiety.

An examination of the content of the STAI and STICSA items provides some support for the notion that the STICSA measures symptoms that are more specific to anxiety (i.e., elevated negative affect and physiological hyperarousal), whereas the STAI Trait measures symptoms that are more closely related to depression (i.e., high negative affect, low positive affect). In the case of the STICSA, items from the Cognitive Anxiety factor (e.g., "I think the worst will happen"; "I feel agonized over my problems") appear to reflect symptoms of negative affect, whereas symptoms from the Somatic Anxiety factor (e.g., "My heart beats fast"; "My muscles are tense") appear to reflect physiological hyperarousal. In the case of the STAI (particularly the Trait version), some items seem to measure negative affect (e.g., "I am tense"; "I am regretful"; "I am worried") or positive affect (e.g., "I am happy"; "I feel joyful"), but no items tap physiological hyperarousal (although there are a number of arousal items in the State version). Given these content differences, it is not surprising that the STICSA was more closely related to a measure of anxiety (DASS–A) than to a measure of depression (DASS–D), whereas the STAI Trait was more closely related to the depression measure. However, for full understanding of the nature of the cognitive and somatic components of anxiety measured by the STICSA with respect to the tripartite model, additional studies are needed that compare responses on the STICSA with measures specifically geared toward the primary components of the tripartite model, such as the Mood and Anxiety Symptom Questionnaire (Watson, Clark, et al., 1995).

These findings raise questions about the utility of the STAI for assessing the pure symptoms of anxiety. In agreement with Bieling et al. (1998), the results suggest that the STAI contains items that reflect depression and general negative affect, rather than the anxiety-absent construct proposed by Spielberger (1983). Although a significant overlap exists between the symptoms and presentations of anxiety and mood disorders (Brown, Campbell, Lehman, Grisham, & Mancill, 2001), several authors have highlighted the importance of a reliable and valid measure of general anxiety that specifically targets the relatively unique symptoms associated with the experience of anxiety (Antony, Orsillo, & Roemer, 2001; Bufka, Crawford, & Levitt, 2002). However, the STAI does not appear to be a pure measure of anxiety symptomatology, a fact that suggests it may need to be revised to better target anxiety or renamed to reflect its mixed assessment of anxiety and depression symptoms. In contrast, the present findings suggest that the STICSA may represent a more attractive measure of pure anxiety. Although a single measure of anxiety must be evaluated in conjunction with additional related measures of various presentations of psychopathology (Antony & Rowa, 2005), the STICSA, a multidimensional and psychometrically sound measure of pure anxiety, should have significant utility in clinical and research settings with both patient and nonpatient samples.

This study includes several limitations that should be addressed in future studies. First, the present study sampled its comparison group from an undergraduate population. On average, the comparison group was younger, more highly educated, and more culturally diverse than was the patient sample. Future studies should sample a comparison group from the community and should attempt to match the samples on age, education, and ethnicity. In addition, clinical samples with different principal diagnoses (e.g., individuals with major depression) could serve as useful comparison groups and should be included in future research.

A second limitation of the present study was that the convergent and discriminant validity analyses were limited to two alternative measures: the STAI and the DASS. Although the DASS is a relatively newer measure of depression and anxiety than are other well-published measures, such as the BDI and BAI, the initial convergent and discriminant findings were promising and in the expected direction. Future studies, conducted with different measures of state and trait anxiety and depression and different methods of administration (e.g., collateral reports, behavioral assessments, or psychophysiological measures), are necessary before firm conclusions regarding the merits and shortcomings of the STICSA can be drawn. In particular, future studies should include measures to assess the convergent and discriminant validity of the Cognitive and Somatic subscales of the STICSA, which was not directly assessed in the present study. Similarly, the extent to which the STICSA outdoes alternative measures of anxiety, such as the STAI, in detecting the existence of an anxiety disorder should be further investigated in a diverse clinical sample.

In summary, the STICSA represents a new measure of general anxiety. The present study replicated and extended the previous psychometric findings of the STICSA to a patient sample, thereby supporting its reliability and validity as a measure of state and trait anxiety. Moreover, our data suggest that the STICSA demonstrates a more favorable convergent and discriminant validity pattern than does the STAI, which may make the STICSA more attractive to researchers and clinicians looking for a purer self-report measure of general anxiety.

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Appendix A

STICSA: Your Mood at This Moment

Instructions

Below is a list of statements which can be used to describe how people feel. Beside each statement are four numbers which indicate the degree with which each statement is self-descriptive of mood at this moment (e.g., 1 = *not at all,* 4 = *very much so*). Please read each statement carefully and circle the number which best indicates how you feel right now, at this very moment, even if this is not how you usually feel.	Not at all	A little	Moderately	Very much so
1. My heart beats fast.	1	2	3	4
2. My muscles are tense.	1	2	3	4
3. I feel agonized over my problems.	1	2	3	4
4. I think that others won't approve of me.	1	2	3	4
5. I feel like I'm missing out on things because I can't make up my mind soon enough.	1	2	3	4
6. I feel dizzy.	1	2	3	4
7. My muscles feel weak.	1	2	3	4
8. I feel trembly and shaky.	1	2	3	4
9. I picture some future misfortune.	1	2	3	4
10. I can't get some thought out of my mind.	1	2	3	4
11. I have trouble remembering things.	1	2	3	4
12. My face feels hot.	1	2	3	4
13. I think that the worst will happen.	1	2	3	4
14. My arms and legs feel stiff.	1	2	3	4
15. My throat feels dry.	1	2	3	4
16. I keep busy to avoid uncomfortable thoughts.	1	2	3	4
17. I cannot concentrate without irrelevant thoughts intruding.	1	2	3	4
18. My breathing is fast and shallow.	1	2	3	4
19. I worry that I cannot control my thoughts as well as I would like to.	1	2	3	4
20. I have butterflies in the stomach.	1	2	3	4
21. My palms feel clammy.	1	2	3	4

Note. From *State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA)—State Version,* by Melissa J. Ree, Colin MacLeod, Davina French, and Vance Locke, 2000, Perth, Australia: The University of Western Australia. Copyright 2000 by Melissa J. Ree, Colin MacLeod, Davina French, and Vance Locke. Reprinted with permission.

Appendix B

STICSA: Your General Mood State

Instructions

Below is a list of statements which can be used to describe how people feel. Beside each statement are four numbers which indicate how often each statement is true of you (e.g., 1 = *not at all,* 4 = *very much so*). Please read each statement carefully and circle the number which best indicates how often, in general, the statement is true of you.	Not at all	A little	Moderately	Very much so
1. My heart beats fast.	1	2	3	4
2. My muscles are tense.	1	2	3	4
3. I feel agonized over my problems.	1	2	3	4
4. I think that others won't approve of me.	1	2	3	4
5. I feel like I'm missing out on things because I can't make up my mind soon enough.	1	2	3	4
6. I feel dizzy.	1	2	3	4
7. My muscles feel weak.	1	2	3	4
8. I feel trembly and shaky.	1	2	3	4
9. I picture some future misfortune.	1	2	3	4
10. I can't get some thought out of my mind.	1	2	3	4
11. I have trouble remembering things.	1	2	3	4
12. My face feels hot.	1	2	3	4
13. I think that the worst will happen.	1	2	3	4
14. My arms and legs feel stiff.	1	2	3	4
15. My throat feels dry.	1	2	3	4
16. I keep busy to avoid uncomfortable thoughts.	1	2	3	4
17. I cannot concentrate without irrelevant thoughts intruding.	1	2	3	4
18. My breathing is fast and shallow.	1	2	3	4
19. I worry that I cannot control my thoughts as well as I would like to.	1	2	3	4
20. I have butterflies in the stomach.	1	2	3	4
21. My palms feel clammy.	1	2	3	4

Note. From *State–Trait Inventory for Cognitive and Somatic Anxiety (STICSA)—Trait Version,* by Melissa J. Ree, Colin MacLeod, Davina French, and Vance Locke, 2000, Perth, Australia: The University of Western Australia. Copyright 2000 by Melissa J. Ree, Colin MacLeod, Davina French, and Vance Locke. Reprinted with permission.

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