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The Speech Anxiety Thoughts Inventory: scale development and preliminary psychometric data

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Abstract

Cognitions have been known to play a central role in the development, maintenance, and treatment of speech anxiety. However, few instruments are currently available to assess cognitive contents associated with speech anxiety. This report describes three studies examining the psychometric characteristics of a revised English version of the Speech Anxiety Thoughts Inventory (SATI)—an instrument measuring maladaptive cognitions associated with speech anxiety. In Study 1, factor analyses of the SATI revealed a two-factor solution—"prediction of poor performance" and "fear of negative evaluation by audience", respectively. In Study 2, the two-factor structure was replicated. In addition, results revealed stability over a four-week period, high internal consistency, and good convergent and discriminant validity. In Study 3, the scale demonstrated sensitivity to change following brief exposure-based treatments. These findings suggest that the SATI is a highly reliable, valid measure to assess cognitive features of speech anxiety.

Keywords: Speech anxiety; Cognitive assessment; Reliability; Validity; Sensitivity

1. Introduction

Cognitions have been well known to play a central role in the development and maintenance of social anxiety disorder. Current conceptualizations of social anxiety disorder have emphasized that it is associated with perceived negative evaluation from others, negative self-evaluation, and biased information processing (e.g. Clark & McManus, 2002; Clark & Wells, 1995; Foa, Frank-

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lin, & Kozak, 2001; Rapee & Heimberg, 1997). Treatments directly targeting maladaptive cognitions related to social evaluative concerns have demonstrated clinical efficacy in several well-controlled clinical trials (e.g. Chambless, Tran, & Glass, 1997; Heimberg & Juster, 1995; Lucas & Telch, 1993; Taylor, 1996). Moreover, evidence from several studies suggests that the change in negative cognitions may mediate symptom reduction in social anxiety (e.g. Foa, Franklin, Perry, & Herbert, 1996; Lucas & Telch, 1993; Lucock & Salkovskis, 1988; Mattick & Peters, 1988; Mattick, Peters, & Clarke, 1989). These findings highlight the importance of assessing the cognitive features of social anxiety disorder.

Public speaking is the single most commonly feared situation reported in both community and university samples (Cho & Won, 1997; Holt, Heimberg, Hope, & Liebowitz, 1992; Mannuzza et al., 1995; Pollard & Henderson, 1988; Stein, Walker, & Forde, 1996) with prevalence estimates from 20% (Cho & Won, 1997; Pollard & Henderson, 1988) to 34% (Stein et al., 1996). Despite evidence supporting the importance of cognitive assessment in speech anxiety, instruments for assessing the cognitive features associated with speech anxiety are few in number and have significant limitations.

The Personal Report of Confidence as a Speaker (PRCS) which is Paul's (1966) shortened version of an instrument originally developed by Gilkinson (1942) is used widely to measure fear of public speaking. However, only a few items of the PRCS tap cognitive aspects of public speaking anxiety, and its utility is limited due to its true–false format (e.g. McNeil, Ries, & Turk, 1995).

The Self-Statements During Public Speaking Scale (SSPS; Hofmann & DiBartolo, 2000) contains five positive and five negative statements involving speech-related cognitions. Most of the items were derived from the social interaction self-statement test (Glass, Merluzzi, Biever, & Larsen, 1982) developed to assess cognitive features related to heterosocial interactions. Its major limitation is the inadequate coverage of the full range of cognitive features related to public speaking anxiety (cf. Glass & Arnkoff, 1994).

The Speech Anxiety Automatic Thoughts Questionnaire (SAATQ; Cho, 2001) consists of 32 items originally drawn from negative thoughts reported by clinic-based samples of social phobic sufferers and non-anxious university students. Respondents rate the frequency of occurrence of each thought on a 1 (never) to 5 (very often) scale. However, the utility of this instrument is limited since it is a Korean version and not yet translated into English. Moreover, the frequency rating method adopted by the SAATQ may be susceptible to selective memory biases (Clark, 1988).

In the light of the above-mentioned limitations of existing measures, we developed a new instrument designed to assess the cognitive features associated with speech anxiety. This paper presents data from three studies examining the psychometric properties of the Speech Anxiety Thoughts Inventory (SATI),[1] a significantly revised English version of the SAATQ. In Study 1, we investigated the factor structure and internal consistency of the SATI. The factor structure, test–retest reliability, internal consistency, and convergent and discriminant validity of the SATI was examined in Study 2. In Study 3, we examined the sensitivity of the STAI in measuring pre-

[1] We renamed the revised English version SATI to distinguish from the original Korean version.

to posttreatment change associated with cognitive-behavioral treatment. There was no participant overlap between any of the three studies.

2. Study 1

The objectives of the first study were: (a) to develop an English version assessing the cognitive features of speech anxiety using factor analyses and (b) to examine its internal consistency.

2.1. Method

2.1.1. Participants

Three hundred and sixty-one introductory psychology students (215 females, 146 males) from the University of Texas at Austin completed a preliminary 34-item version of the scale. Participants ranged in age from 16 to 29 years with a mean of 18.26 years (SD = 1.14). The ethnic breakdown of the sample was 64% Caucasian, 15% Asian, 13% Hispanic, 3% Blacks, and 5% others. Participants received partial course credit for their participation.

2.1.2. Item construction and selection

For the scale construction of the SATI, 32 items of the original Korean version of the SAATQ were translated into English and back translated into Korean. Originally, the items were derived from dysfunctional thought records of 35 social phobia patients collected during cognitive-behavioral treatment (Cho & Kim, 1999; Cho, Won, & Pyo, 2000), and thoughts reported by 140 undergraduate students while imagining a public speaking situation (Cho, 2001).

The scale construction process led to three modifications from the original version. First, original items thought to be ambiguous in content (e.g. “If I don’t speak well, the audience will think I’m stupid and in final reject me”) were divided into two separate statements (e.g. “If I don’t speak well, the audience will think I’m stupid” and “If I don’t speak well, the audience will reject me”). Subsequently, the item (e.g. “If I don’t speak well, the audience will think I’m stupid”) judged to be very similar to the other (e.g. “If I make a mistake, the audience will think I’m stupid”) was deleted.

Second, the original items thought to be ambiguous in the kinds of biases (e.g. “My voice will tremble, which would be terrible”) were divided into two separate statements (e.g. “My voice will tremble or crack” and “It would be terrible if my voice will tremble”). As a result of the two revisions, the total number of preliminary items was 34.

Third, following Clark’s (1988) suggestion, the response scale was changed from a frequency rating to a *strength of belief* rating. The revised instructions read “This questionnaire is concerned with thoughts associated with public speaking. Please read each statement carefully and rate the degree to which you believe each statement on a scale from 1 (“I do not believe the statement at all”) to 5 (“I completely believe the statement”). Base your ratings on what you typically think when you are in a public speaking situation”.

The item selection procedure was based on factor analyses. To increase the factor analytic validity of the scale, only items with clear factor loading patterns were selected. The items were dropped if they loaded on two factors (Floyd & Widaman, 1995).

2.2. Results

2.2.1. Factor analyses

The 34 items were subjected to a principal axis factoring. Five factors with eigenvalues greater than 1 were identified, but a scree test and model interpretability indicated a two-factor model best fit the data. The first two factors explained 49.04% of the total variance. The items were then subjected to an oblique rotation (delta = 0) and 11 items that loaded almost equally on two factors were eliminated from the final scale. The size of obliqueness was empirically chosen after considering correlation between the factors.

The remaining 23-item scale was then again subjected to a principal axis factoring with oblique rotation (delta = 0). The two-factor solution was replicated using 23 items. The two factors explained together 51.30% of the variance and the eigenvalues of factors I and II were 9.81 and 1.99, respectively. The correlation between the two factors was 0.64. Thirteen items in the first factor reflected "prediction of poor performance." Ten items in the second factor reflected "fear of negative evaluation by audience". The factor pattern matrix for the final set of items is presented in Table 1.

2.2.2. Item validity and internal consistency

The corrected item-total correlations ranged from 0.51 to 0.70 (all $ps < 0.001$), suggesting adequate item validity. The internal consistency was high for the Total scale ($\alpha = 0.94$), as well as for Subscale 1 ($\alpha = 0.91$) and Subscale 2 ($\alpha = 0.89$). The mean Total scale score was 53.44 (SD = 16.60). The means for subscales 1 and 2 were 30.12 (SD = 10.32) and 23.33 (SD = 7.79), respectively.

2.3. Discussion

We developed a revised 23-item English version of the social anxiety thoughts questionnaire to assess negative thoughts relevant to speech anxiety. The revised scale has two factors—prediction of poor performance and fear of negative evaluation by the audience. The overall instrument as well as its two subscales demonstrated good item validity and internal consistency.

3. Study 2

The objectives of the second study were: (a) to replicate the initial factor structure found in the previous sample and (b) to collect additional data on the reliability and the convergent and discriminant validity of the scale. We assumed that the initial factor structure found in the previous sample would be replicated and that the SATI would have good psychometric properties.

3.1. Method

3.1.1. Participants

Five hundred and forty-eight introductory psychology students (331 females, 217 males) from The University of Texas at Austin participated in this study. No subjects were from Study 1.

Table 1
Factor pattern matrix of the SATI in Studies 1 and 2

Items		Factor 1	Factor 2
1	I'll get tongue-tied.	**0.624(0.787)**	0.089(−0.058)
2	My speech won't impress the audience.	**0.546(0.569)**	0.139(0.192)
3	My speech will be incoherent.	**0.556(0.733)**	0.108(−0.018)
4	I won't be able to speak as well as others.	**0.682(0.756)**	0.066(0.059)
5	When others are not paying attention to my speech, I worry that the audience is thinking poorly of me.	−0.051(0.079)	**0.680(0.614)**
6	If I perform poorly, then the audience will remember me negatively.	−0.099(−0.019)	**0.748(0.733)**
7	It would be terrible if my voice will tremble.	0.161(0.266)	**0.501(0.487)**
8	If I make a mistake, the audience will think I'm stupid.	0.174(0.166)	**0.627(0.659)**
9	If I am anxious in this situation, the audience will not like me.	−0.008(0.013)	**0.705(0.722)**
10	I won't know what to say when I'm called on to make a speech.	**0.797(0.815)**	−0.148(−0.049)
11	If I don't speak well, the audience will reject me.	0.125(0.009)	**0.643(0.804)**
12	What I say will sound stupid.	**0.611(0.516)**	0.182(0.305)
13	It would be terrible if others think I'm not intelligent.	−0.070(−0.037)	**0.726(0.710)**
14	It would be terrible if I make a mistake during my speech.	0.206(0.341)	**0.535(0.467)**
15	I will not be able to control my anxiety.	**0.447(0.699)**	0.207(0.088)
16	It would be terrible if people notice that I'm anxious.	0.267(0.198)	**0.518(0.620)**
17	My behavior will appear awkward to the audience.	**0.499(0.525)**	0.286(0.291)
18	I will be unable to give a good speech.	**0.818(0.856)**	−0.077(−0.014)
19	I won't be able to complete my speech.	**0.527(0.478)**	0.113(0.157)
20	My mind will go blank.	**0.717(0.814)**	−0.088(−0.085)
21	I must deliver a good speech in order to gain approval from the audience.	0.041(−0.114)	**0.556(0.724)**
22	I worry that I will be asked to give a speech.	**0.730(0.839)**	−0.049(−0.070)
23	I won't be able to answer questions from the audience.	**0.671(0.662)**	0.025(0.052)

Note: Numerical values in boldface refer to high loading on the corresponding factor, and those in parentheses represent the results of Study 2.

Participants ranged in age from 17 to 40 years with a mean of 19.02 (SD = 2.14). The ethnic breakdown of the sample was 66% Caucasian, 19% Hispanic, 8% Asian, 4% Blacks, and 3% others. Participants received partial course credit for their participation.

3.1.2. Procedure

Participants completed a questionnaire battery via computer. The battery consisted of six questionnaires (see below) and were administered during group testing sessions lasting approximately 60 min.

3.1.3. Instruments

In order to evaluate the convergent and discriminant validity of the scale, all the participants completed the SATI, the SSPS, the Appraisal of Social Concerns (ASC; Lucas & Telch, 1993), the PRCS, the self-report version of the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987), and the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

The SSPS is a 10-item self-report scale that assesses negative and positive self-statements related to public speaking. This scale has good psychometric properties (Hofmann & DiBartolo, 2000).

The ASC is a 20-item self-report scale that asks participants to rate their concern about visibility of anxiety symptoms, impaired performance, and negative responses from others in a public speaking situation. For purposes of the present study, only those items ($N = 10$) appropriate to a public speaking situation were administered. The original ASC has excellent internal consistency and test–retest reliability and good convergent and discriminant validity (Lucas & Telch, 1993). In this study, the coefficient α of the shortened scale was 0.89.

The PRCS is a 30-item self-report scale that measures fear of public speaking. It is an instrument originally developed by Gilkinson (1942). The PRCS has demonstrated adequate internal consistency (Daly, 1978; Klorman, Weerts, Hastings, Melamed, & Lang, 1974), good convergent validity (Daly, 1978; Tarico, van Velzen, & Altmaier, 1986), and sensitivity to change with treatment (e.g. Newman, Hofmann, Trabert, Roth, & Taylor, 1994; Paul, 1966).

The LSAS is a 24-item scale measuring fear and avoidance of various social situations (13 performance; 11 social interaction situations). The LSAS has shown good internal consistency, test–retest reliability, and convergent and discriminant validity (Baker, Heinrichs, Kim, & Hofmann, 2002; Cox, Ross, Swinson, & Direnfeld, 1998; Fresco et al., 2001).

The BDI is a commonly used 21-item self-report scale to assess depressive symptoms. Its psychometric characteristics have been extensively validated (Beck, Steer, & Garbin, 1988; Steer & Beck, 1988).

The SSPS, ASC, PRCS, and LSAS were administered to examine convergent validity with the SATI, whereas the BDI was used to evaluate discriminant validity with the scale.

3.2. Results

3.2.1. Cross-validation of the factor structure

The 23 items of the SATI were subjected to a principal axis factoring. The analysis identified again two factors with eigenvalues greater than 1. The two factors explained 50.80% and 8.05% of the total variance with eigenvalues of 11.69 and 1.85, respectively. The oblique rotation (delta = 0) replicated the previous factor structure (see Table 1). The two SATI factors showed a correlation of 0.70 ($p < 0.001$).

3.2.2. Comparison with previous study sample

The mean Total scale score was 54.34 (SD = 18.35). The means for subscales 1 and 2 were 30.88 (SD = 11.24) and 23.46 (SD = 8.41), respectively.[2] The Studies 1 and 2 samples did not differ significantly on the SATI total scores or on the two subscale scores (all ps > 0.20).

3.2.3. Item validity and reliability

The corrected correlations ranged from 0.52 to 0.77 (all ps < 0.001), suggesting adequate item validity. The internal consistency was high for the Total scale ($\alpha = 0.95$), as well as for Subscale

[2] Gender difference on the SATI Total scale and subscales was not significant (all ps > 0.10). These scores were not significantly correlated with age (all ps > 0.09)

1 ($\alpha = 0.94$) and Subscale 2 ($\alpha = 0.91$). The four-week test–retest reliability was acceptable for Total scale ($r = 0.71$), Subscale 1 ($r = 0.73$), and Subscale 2 ($r = 0.64$).

3.2.4. Convergent and discriminant validity

As shown in Table 2, the SATI total scores and subscales were highly correlated with the ASC, the negative self-statements scale of the SSPS, and the PRCS. Correlations ranged from 0.52 to 0.85 (all ps < 0.001). Moderate correlations were also found between the SATI total score and the positive self-statements scale of the SSPS and the LSAS total score (rs $= -0.56$ and 0.50, respectively). Furthermore, the SATI total scores and subscales were moderately to highly correlated with fear and avoidance scores from the public speaking items of the LSAS[3] Correlations ranged from 0.44 to 0.67 (all ps < 0.001).

The SATI total and subscale scores were also significantly correlated with the BDI. Correlations ranged from 0.34 to 0.37 (all ps < 0.001). Similar correlations were also found between the BDI and the positive and negative self-statements scales of the SSPS (rs $= -0.34$ and 0.43, respectively). To further examine the discriminant validity of the SATI, we tested differences in the magnitude of their association with the PRCS and the BDI. The SATI total score correlated more strongly with the PRCS than with the BDI, $t(526) = 14.35$, $p < 0.001$. The same results were also found on the two subscales of the SATI. In addition, partial correlations were calculated between the SATI total and subscale scores and the BDI controlling for the PRCS. The coefficients were still significant but much lowered (Subscale 1: partial $r = 0.14$, $p < 0.001$; Subscale 2: partial $r = 0.24$, $p < 0.001$; Total scale: partial $r = 0.21$, $p < 0.001$).

Table 2
Means (and SD) of the SATI and correlations among the SATI and other measures[a]

Scale	Mean (SD)	ASC	SSPS-P	SSPS-N	PRCS	LSAS	BDI
SATI-1	30.88(11.24) ($N = 548$)	0.83 ($N = 547$)	−0.57 ($N = 546$)	0.74 ($N = 545$)	0.78 ($N = 539$)	0.53 ($N = 518$)	0.34 ($N = 529$)
SATI-2	23.46(8.41) ($N = 548$)	0.74 ($N = 547$)	−0.47 ($N = 546$)	0.66 ($N = 545$)	0.52 ($N = 539$)	0.38 ($N = 518$)	0.36 ($N = 528$)
SATI-T	54.34(18.35) ($N = 547$)	0.85 ($N = 546$)	−0.56 ($N = 545$)	0.75 ($N = 544$)	0.72 ($N = 538$)	0.50 ($N = 517$)	0.37 ($N = 528$)

Note: The sample sizes differ from the total sample of 548 participants due to missing data across measures. SATI = the Speech Anxiety Thoughts Inventory (1 = Subscale 1, 2 = Subscale 2, T = Total scale); ASC = the Appraisal of Social Concerns; SSPS = the Self - Statements During Public Speaking (P = positive self - statements and N = negative self - statements); PRCS = the Personal Report of Confidence as a Speaker; LSAS = the Liebowitz Social Anxiety Scale; BDI = the Beck Depression Inventory.

[a] All correlations were significant at 0.001.

[3] Items 2, 6, 15, 16, and 20 of the LSAS were known to reflect public speaking (Safren et al., 1999). Fear and avoidance score of public speaking was obtained from sum of those in the LSAS fear and avoidance scales.

3.3. Discussion

In Study 2, the two-factor structure of the SATI found in Study 1 was replicated with an independent sample. The internal consistency was again high and test–retest reliability was satisfactory.

The SATI showed high correlations with the ASC, SSPS-N, and PRCS that specifically assess the constructs of public speaking anxiety and moderate correlation with the LSAS, a general social anxiety scale.

The correlation with the BDI was also significant but smaller than those with the scales to measure speech anxiety. Furthermore, although partial correlations controlling for the PRCS reached statistical significance, the coefficients were very low, thus providing some support for the discriminant validity of the scale.

4. Study 3

The purpose of the third study was to examine if the SATI is sensitive to treatment change. We assumed that it would be sensitive to assessing treatment effects.

4.1. Method

4.1.1. Participants

Ten students (6 males, 4 females) in the University of Texas at Austin, displaying a marked fear of public speaking, took part in the study. Participants ranged in age from 18 to 30 (M = 20.10, SD = 3.81) and were predominantly Caucasian (90%). All the participants met DSM-IV criteria for social phobia. Participants received partial course credit for their participation.

Participants were selected through a two-stage screening procedure from a large pool of over 1100 introductory psychology students who did not participate in Studies 1 and 2. Stage 1 consisted of assessment of social anxiety, using the LSAS. Those who reported marked social anxiety and who agreed to participate in the study (N = 35) completed a computerized diagnostic interview. Of those, 40% (N = 14) met DSM-IV criteria for social phobia, and reported significant fear of public speaking. Ten participants were assigned to exposure-based treatment, while four participants were assigned to a placebo condition with the digital audio visual integration device (DAVID) as a relaxation device. Only the data of those in treatment condition were included in the analyses.

4.1.2. Procedure

The study consisted of four sessions conducted over a one-week period. Session 1 consisted of a pre-treatment assessment, and was used to determine eligibility. Upon arrival, participants were asked to fill out the informed consent form, and the experimenter described the session. The participants were then asked to complete the composite international diagnostic interview (CIDI-auto). The CIDI-auto is a computerized diagnostic instrument developed by the World Health Organization (1997). Next, the participants completed several self-report questionnaires (see below). Lastly, participants gave a three-min speech (Behavioral Approach Test (BAT)) in front

of four audience members. Topics included nuclear power, corporal punishment in schools, mandatory seatbelt laws, and the American health system. Participants were allowed five-min preparation time, and completed post-BAT peak fear ratings.

Eligible participants were scheduled for Session 2 immediately following pre-treatment assessment. During Session 2, participants underwent five three-min public speaking trials. Instructions for the public speaking trials were similar to those given for the BAT. Session 3 was scheduled one day following Session 2. The procedure was identical to Session 1 with the difference that participants selected a new speech topic.

Session 4 consisted of treatment outcome assessment (see below). The session was identical to the procedure for the pre-treatment assessment, and lasted 1 h. Session 4 was held a week following treatment.

4.1.3. Treatment outcome assessments

Participants completed an assessment battery consisting of the SATI, PRCS, SSPS, and LSAS before and after treatment. Peak fear and ending fear ratings were collected during the BAT.

4.2. Results

Treatment sensitivity was evaluated by paired *t*-test comparisons and pre- to posttreatment effect sizes. These results are presented in Table 3. The *t*-tests indicated that the PRCS, SSPS-N, LSAS, and peak and ending fear for the BAT reduced significantly from pre- to posttreatment. The increase in the SSPS-P scores from pre- to posttreatment was also significant. Similarly, pre- to posttreatment effect sizes on the PRCS, SSPS-N and -P, and peak and ending fear of the BAT

Table 3
Pre- and posttreatment means, standard deviations, and effect sizes for the treatment outcome measures

Measure	Pretreatment		Posttreatment		Paired *t*-test (two-tailed)	Effect size
	M	SD	*M*	SD		
SATI						
Subscale 1	53.30	5.79	40.90	11.42	$t(9) = 4.09$, $p < 0.01$	1.44
Subscale 2	38.30	6.33	26.70	9.26	$t(9) = 3.90$, $p < 0.01$	1.49
Total	91.60	9.32	67.60	20.30	$t(9) = 4.15$, $p < 0.01$	1.62
PRCS	25.50	2.07	20.70	6.17	$t(9) = 2.93$, $p < 0.05$	1.17
SSPS-P	9.40	3.72	13.40	4.72	$t(9) = -2.84$, $p < 0.05$	0.95
SSPS-N	16.70	4.60	12.10	6.67	$t(9) = 2.80$, $p < 0.05$	0.82
LSAS	74.50	23.68	58.70	26.56	$t(9) = 3.00$, $p < 0.05$	0.63
BAT						
Peak fear	80.00	14.76	50.00	25.39	$t(9) = 3.14$, $p < 0.05$	0.49
Ending fear	70.00	22.61	40.00	25.39	$t(9) = 2.91$, $p < 0.05$	1.25

Note: SATI = the Speech Anxiety Thoughts Inventory; PRCS = the Personal Report of Confidence as a Speaker; LSAS = the Liebowitz Social Anxiety Scale; BAT = the Behavioral Approach Test. Effect size = Cohen's d prime (pre- to posttreatment effect size).

were large, and the participants showed a moderate improvement on the LSAS from pre- to posttreatment assessment.

The analysis of the SATI showed significant changes in the total and subscale scores of the SATI from pre- to posttreatment assessment. Likewise, pre- to posttreatment effect sizes on the SATI were large.

4.3. Discussion

Social anxiety as measured by several empirically supported scales significantly improved as a function of exposure treatment. The treatments led to a significant reduction in the SATI scores. It was concluded that the SATI was sensitive to assessing treatment effects.

4.4. General discussion

We constructed the SATI using factor analyses of self-statements reported by both clinical and non-clinical samples during a public speaking situation. Two factors labeled "prediction of poor performance" and "fear of negative evaluation by audience" were extracted and replicated in an independent sample. The results of the factor analysis are consistent with cognitive models of social anxiety emphasizing the role of fear of negative evaluation by other(s) and negative self-evaluation (e.g. Clark & Wells, 1995; Hartman, 1983).

Moreover, the items loaded highly on a second factor indicated the predicted impaired performance and predicted display of visible signs of anxiety that will be perceived by the audience in a negative light. The two factors underlying the SATI seem to correspond to overestimated probabilities of negative social events and exaggerated cost estimates of such events (Foa et al., 1996). They proposed that these two kinds of judgmental biases play an important role in the development and maintenance of anxiety disorders and especially exaggerated cost estimates characterize social phobia. Furthermore, it was found that the reduction in cost estimates was strongly related to lower self-rated social anxiety after cognitive behavior treatment and seemed to mediate treatment efficacy.

The SATI showed high internal consistency, acceptable test–retest reliability, and good convergent and discriminant validity. In addition, the SATI scores improved significantly from pre- to posttreatment among a small group of social anxiety disorder sufferers undergoing a brief exposure-based treatment for public speaking anxiety, thereby providing some support for the sensitivity of the SATI in detecting treatment-related improvement.

Based on these findings, it appears that the SATI may be a useful instrument for both researchers and clinicians. Clinically, the scale can be used in treatment planning to identify specific targets for cognitive intervention. In addition, the scale can be used to help clinicians track their client's improvement on the cognitive features of social phobia.

As a research instrument, the SATI may be used as an outcome measure in clinical trials investigating both psychosocial and pharmacological treatments of public speaking anxiety. It may also be useful as both a potential moderator and mediator variable for testing specific hypotheses about the role of cognitive factors in public speaking anxiety and its treatment. Finally, the SATI may be used to test existing cognitive models of public speaking anxiety as well as assist in the refinement of new theory development.

Several limitations of the studies presented deserve comment. First, it is necessary to replicate the present findings in both community and clinical samples. The samples in all three studies consisted of non-treatment seeking college students though none participated in more than one study. Future research with clinical samples is needed. Second, the SATI currently assesses only negative thoughts related to public speaking. Although improvement in psychological adjustment may be related more closely to a decrease in negative thinking than an increase in positive self-statements (Kendall & Hollon, 1981), the predictive validity of cognition measures may be improved by including both positive and negative self-statement items (Schwartz & Garamoni, 1986). Finally, our data suggest that the SATI taps two reliable factors. The two factors seem to correspond to overestimated probabilities of negative social events and exaggerated cost estimates of such events. Confidence in the two-factor structure and the relative role of each factor in contributing to public speaking anxiety warrants additional investigation using confirmatory factor analyses.

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References

Baker, S. L., Heinrichs, N., Kim, H., & Hofmann, S. G. (2002). The Liebowitz Social Anxiety Scale as a self-report instrument: a preliminary psychometric analysis. *Behaviour Research and Therapy*, *40*, 701–715.

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation. *Clinical Psychology Review*, *8*, 77–100.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561–571.

Chambless, D. L., Tran, G. Q., & Glass, C. R. (1997). Predictors of response to cognitive-behavioral group therapy for social phobia. *Journal of Anxiety Disorders*, *11*, 221–240.

Cho, Y. (2001). Cognitive assessment of speech anxiety: development and validation of an automatic thoughts questionnaire. *Korean Journal of Clinical Psychology*, *19*, 831–851.

Cho, Y., & Kim, H. (1999). An preliminary study of cognitive-behavioral group therapy for social phobia. *Medical Journal of Chosun University*, *24*, 165–179.

Cho, Y., & Won, H. (1997). Cognitive assessment of social anxiety: a study on the development and validation of the social interaction self-efficacy scale. *Issues in Psychological Research*, *4*, 397–434.

Cho, Y., Won, H., & Pyo, K. (2000). The effect of group cognitive therapy for social phobia. *Korean Journal of Clinical Psychology*, *19*, 181–206.

Clark, D. A. (1988). The validity of measures of cognition: a review of the literature. *Cognitive Therapy and Research*, *12*, 1–20.

Clark, D. M., & McManus, F. (2002). Information processing in social phobia. *Biological Psychiatry*, *51*, 92–100.

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). Guilford Press: New York.

Cox, B. J., Ross, L., Swinson, R. P., & Direnfeld, D. M. (1998). A comparison of social phobia outcome measures in cognitive-behavioral group therapy. *Behavior Modification*, *22*, 285–297.

Daly, J. (1978). The assessment of social-communicative anxiety via self-reports: a comparison of measures. *Communication Monographs*, *45*, 204–218.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, *7*, 286–299.

Foa, E. B., Franklin, M. E., & Kozak, M. J. (2001). Social phobia: an information-processing perspective. In S. G. Hofmann, & P. M. DiBartolo (Eds.), *From social anxiety to social phobia: Multiple perspectives* (pp. 268–280). Allyn and Bacon: Boston.

Foa, E. B., Franklin, M. E., Perry, K. J., & Herbert, J. D. (1996). Cognitive biases in generalized social phobia. *Journal of Abnormal Psychology*, *105*, 433–439.

Fresco, D. M., Coles, M. E., Heimberg, R. G., Liebowitz, M. R., Hami, S., Stein, M. B., & Goetz, D. (2001). The Liebowitz Social Anxiety Scale: a comparison of the psychometric properties of self-report and clinician-administered formats. *Psychological Medicine*, *31*, 1025–1035.

Gilkinson, H. (1942). Social fears as reported by students in college speech classes. *Speech Monography*, *9*, 141–160.

Glass, C. R., & Arnkoff, D. B. (1994). Validity issues in self-statement measures of social phobia and social anxiety. *Behaviour Research and Therapy*, *32*, 255–267.

Glass, C. R., Merluzzi, T. V., Biever, J. L., & Larsen, K. H. (1982). Cognitive assessment of social anxiety: development and validation of a self-statement questionnaire. *Cognitive Therapy and Research*, *6*, 37–55.

Hartman, L. M. (1983). A metacognitive model of social anxiety: implications for treatment. *Clinical Psychology Review*, *3*, 435–456.

Heimberg, R. G., & Juster, H. R. (1995). Cognitive-behavioral treatments: literature review. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneider (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 261–309). Guilford: New York.

Hofmann, S. G., & DiBartolo, P. M. (2000). An instrument to assess self-statements during public speaking: scale development and preliminary psychometric properties. *Behavior Therapy*, *31*, 499–515.

Holt, C. S., Heimberg, R. G., Hope, D. A., & Liebowitz, M. R. (1992). Situational domains of social phobia. *Journal of Anxiety Disorders*, *6*, 63–77.

Kendell, P. C. & Hollon, S. D. (Eds.) (1981). *Assessment strategies for cognitive-behavioral interventions*. New York: Academic Press.

Klorman, R., Weerts, T. C., Hastings, J. E., Melamed, B. G., & Lang, P. J. (1974). Psychometric description of some specific-fear questionnaires. *Behavior Therapy*, *5*, 401–409.

Liebowitz, M. R. (1987). Social phobia. *Modern Problems in Pharmacopsychiatry*, *22*, 141–173.

Lucas, R. A., & Telch, M. J. (1993). Group versus individual treatment of social phobia. *Paper presented at the annual meeting of the Association for Advancement of Behavior Therapy*, Atlanta, GA.

Lucock, M. P., & Salkovskis, P. M. (1988). Cognitive factors and its treatment. *Behaviour Research and Therapy*, *26*, 297–302.

Mannuzza, S., Schneier, F. R., Chapman, T. F., Liebowitz, M. R., Klein, D. F., & Fyer, A. J. (1995). Generalized social phobia: reliability and validity. *Archives of General Psychiatry*, *52*, 230–237.

Mattick, R. P., & Peters, L. (1988). Treatment of severe social phobia: effects of guided exposure with and without cognitive restructuring. *Journal of Consulting and Clinical Psychology*, *56*, 251–260.

Mattick, R. P., Peters, L., & Clarke, J. C. (1989). Exposure and cognitive restructuring for social phobia: a controlled study. *Behavior Therapy*, *20*, 3–23.

McNeil, D. W., Ries, B. J., & Turk, C. L. (1995). Behavioral assessment: self- and other-report, physiology, and overt behavior. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneider (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 202–231). Guilford: New York.

Newman, M. G., Hofmann, S. G., Trabert, W., Roth, W. T., & Taylor, C. B. (1994). Does behavioral treatment of social phobia lead to cognitive changes? *Behavior Therapy*, *25*, 503–517.

Paul, G. L. (1966). *Insight versus desensitization in psychotherapy*. Stanford: Stanford University Press.

Pollard, C. A., & Henderson, J. G. (1988). Four types of social phobia in a community sample. *Journal of Nervous and Mental Disease*, *176*, 440–445.

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety of social phobia. *Behaviour Research and Therapy*, *35*, 741–756.

Safren, S. A., Heimberg, R. G., Horner, K. J., Juster, H. R., Schneier, F. R., & Liebowitz, M. R. (1999). Factor structure of social fears: the Liebowitz Social Anxiety Scale. *Journal of Anxiety Disorders*, *13*, 253–270.

Schwartz, & Garamoni (1986). A structural model of positive and negative states of mind: a symmetry in the internal dialogue. In P. C. Kendall (Ed.), (pp. 1–62). *Advances in cognitive-behavioral research and therapy*, 5. Orlando: Academic Press.

Steer, R. A., & Beck, A. T. (1988). The Beck Depression Inventory. In M. Hersen, & A. S. Bellack (Eds.), *Dictionary of behavioral assessment techniques* (pp. 44–46). Pergamon Press: New York.

Stein, M. B., Walker, J. R., & Forde, D. R. (1996). Public speaking fears in a community sample: prevalence, impact on functioning, and diagnostic classification. *Archives of General Psychiatry*, *53*, 169–174.

Tarico, V., van Velzen, D., & Altmaier, E. (1986). Comparison of thought-listing rating methods. *Journal of Counseling Psychology*, *33*, 81–83.

Taylor, S. (1996). Meta-analysis of cognitive-behavioral treatment for social phobia. *Journal of Behavior Therapy and Experimental Psychiatry*, *27*, 1–9.

World Health Organization (1997). *Composite International Diagnostic Interview (CIDI) (Version 2.1)*. Sydney, Australia: World Health Organization.