



Differentiating symptoms of social anxiety and depression in adults with social anxiety disorder

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Abstract

Although studies have suggested a strong overlap between social anxiety disorder and depression, this is the first study to examine the ability of commonly used measures to differentiate symptoms of these disorders in a sample of clients with social anxiety disorder. Structural equation modeling revealed that commonly used measures of social anxiety and depression can differentiate the two constructs, rather than simply reflecting a single construct of overall distress. Logistic regression analyses indicated that scores on depressive symptom measures could predict which socially anxious clients met criteria for a comorbid depressive disorder.

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1. Introduction

A number of studies have noted the lack of discriminant validity traditionally found among measures of anxiety and depression (for a review, see [Gotlib & Cane, 1989](#)). Given this, [Clark and Watson \(1991\)](#) proposed the tripartite model of anxiety

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and depression in which they predicted that certain symptom clusters that would be relatively unique to anxiety and to depression as well as symptoms that would be common to both disorders or emotional states. Specifically, they suggested that both anxiety and depression would be characterized by negative affect and that symptoms of physiological arousal would be relatively unique to anxiety whereas symptoms of anhedonia or low positive affect would be relatively unique to depression. Despite general support for the tripartite model (e.g., Brown, Chorpita, & Barlow, 1998; Joiner, 1996; Joiner, Cantanzaro, & Laurent, 1996; Watson et al., 1995a, b), there is evidence that social anxiety disorder, as well as depression, may be characterized by anhedonia (Brown et al., 1998; Watson, Clark, & Carey, 1988), suggesting that measures of anhedonia or low positive affect may not differentiate the two disorders.

Given the high degree of symptom and diagnostic comorbidity between social anxiety and depression (Alpert et al., 1999; Alpert, Maddocks, Rosenbaum, & Fava, 1994; Kessler et al., 1996; Kessler, Stang, Wittchen, Stein, & Walters, 1999; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992; Van Ameringen, Mancini, Styan, & Donison, 1991; Zimmerman, McDermut, & Mattia, 2000), it is important for researchers to be able to validly discriminate between the two disorders. Specifically, it is important to determine whether measures of social anxiety and depressive symptoms assess the constructs of interest rather than simply assessing shared symptoms of negative affect.

The goal of this study, therefore, was to determine whether commonly used measures of social anxiety and depression can be used to differentiate the two constructs in a sample of clients with social anxiety disorder. Specifically, we used structural equation modeling to test a model in which social anxiety and depression were specified as separate constructs versus one in which they were specified as a single construct, representing overall general distress. We then examined the ability of the depressive symptom measures to predict which clients met criteria for a comorbid depressive disorder.

2. Method

2.1. Participants

The sample consisted of 113 clients who sought treatment for performance and/or interpersonal anxiety. All clients were between the ages of 18 and 65 ($M = 36.5$, $SD = 9.8$) and 58 (51.3%) were female. Clients were recruited through advertisements in local newspapers and flyers. After completing a brief initial phone-screening interview, prospective clients were scheduled for a diagnostic interview. All participants in this study met *DSM-III-R* (American Psychiatric Association, 1987) criteria for a principal diagnosis of social anxiety disorder after a semi-structured interview with the Anxiety Disorders Interview Schedule-Revised (ADIS-R; DiNardo & Barlow, 1988). ADIS-R interviews were conducted by advanced graduate students and post-doctoral fellows trained to reliability standards (DiNardo, Moras, Barlow, Rapee, & Brown, 1993). Clinicians using the ADIS-R

have demonstrated strong inter-rater agreement for diagnoses assigned by this interview, with excellent inter-rater agreement for the principal diagnosis of social anxiety disorder ($k = .79$) and adequate inter-rater agreement for additional diagnoses of any mood disorder (major depression or dysthymia; $k = .56$) (DiNardo et al., 1993). Sixty-eight of the clients (59.6%) in this study met criteria for the generalized subtype of social anxiety disorder. In addition, 22 clients (19.3%) received comorbid diagnoses of current depressive disorders (i.e., major depression ($n = 13$), dysthymia ($n = 4$), and depressive disorder not otherwise specified ($n = 5$)).

Exclusion criteria included symptoms of schizophrenia, prominent risk of self-harm, organic mental disorder, alcohol or substance abuse within the last 6 months, or history of bipolar-I disorder. Although clients with a principal diagnosis of a depressive disorder were excluded, those whose depressive disorder was secondary to their social anxiety disorder were included. All measures were administered as part of pre-treatment assessment.

2.2. Measures

2.2.1. Social anxiety

Four measures of social anxiety, assessing the constructs of social interaction and performance fears, were included in the current study. This division of social anxiety into social interaction and performance fears is consistent with the model put forth by the *DSM-IV* (American Psychiatric Association, 1994) in which social anxiety concerns are discussed as occurring in social (interactional) or performance situations. In addition, factor analytic studies have suggested that these two forms of social anxiety load onto different factors (Habke, Hewitt, Norton, & Asmundson, 1997; Safren et al., 1999; Safren, Turk, & Heimberg, 1998). Finally, research has shown that performance anxiety may be strongly related to anxiety sensitivity and anxious arousal, whereas interaction anxiety may not (Brown et al., 1997; Hughes et al., 2004).

The Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) is a clinician-rated scale that assesses fear and avoidance in social interaction and performance situations. Fear ratings are assigned by the clinician from 0 = *none* to 3 = *severe*, while considering input from the client. The LSAS has been shown to have good internal consistency ($\alpha = .81-.92$) and strong convergent and discriminant validity (Heimberg et al., 1999). The 11-item LSAS Fear of Social Interaction (LSAS-FS) and 13-item Fear of Performance (LSAS-FP) subscale totals were used in the current study.

The Social Interaction Anxiety Scale and the Social Phobia Scale (SIAS and SPS, respectively; Mattick & Clarke, 1998) are 20-item companion self-report scales that assess fears of social interaction in dyads and groups (SIAS) and fears of scrutiny during routine (performance) activities (SPS). Items are rated on 0–4 Likert-type scales with higher scores indicative of greater severity. Both scales have been shown to be internally consistent ($\alpha s = .88-.94$) and stable over time (retest coefficients over intervals up to 13 weeks in individuals with social anxiety disorder $>.90$; Mattick & Clarke, 1998). Support for the convergent and discriminant validity of

these two measures has also been demonstrated (Brown et al., 1997; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992).

2.2.2. Depressive symptoms

Three measures of depressive symptoms were included in the current study. The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) is a 21-item self-report scale, which focuses primarily on the cognitive symptoms of depression. Each item is rated on a four-point Likert-type scale, with higher scores indicating more depressive symptoms. A number of studies have supported the strong reliability and validity of the BDI (Beck, Steer, & Garbin, 1988).

The 21-item Hamilton Rating Scale of Depression (HRSD-21; Hamilton, 1960) is a commonly used clinician-rated measure of depressive symptoms. In contrast to the BDI, the items of the HRSD-21 focus primarily on the somatic aspects of depression. Although other versions of the HRSD also exist, the 21-item version is the most commonly used (Marsella, Hirschfeld, & Katz, 1987).¹ The HRSD has shown good internal consistency and inter-rater reliability (Hedlung & Vieweg, 1979), as well as good concurrent validity with the BDI in psychiatric samples (r 's range from .55 to .96; Beck et al., 1988).

The Depression subscale of the Symptom Checklist-90R (SCL-90R-D; Derogatis, 1977) is composed of 13 self-report items rated on a scale from 0 = *not at all* to 4 = *extremely*. Items assessing a “broad range of the manifestations of clinical depression” (Derogatis, 1977, p. 9) are rated for the past week. The SCL-90R-D subscale score is calculated by averaging participants' responses to each of the 13 items, with higher scores indicating more depressive symptoms. The SCL-90 depression subscale has strong internal consistency ($\alpha = .90$) and good retest reliability over a period of one week ($r = .82$; Derogatis, 1977).

3. Results

Descriptive statistics for each of the measures, as well as their intercorrelations, are presented in Table 1. As shown in the table, all of the measures were significantly correlated with one another. Structural equation modeling was then used to test the hypothesis that the constructs of social anxiety and depression could be differentiated by commonly used measures of each construct. Specifically, confirmatory factor analysis of the sample variance–covariance matrix, using AMOS 4.01 (Arbuckle, 1999) with maximum likelihood estimation, was used to compare two different models: one with social anxiety and depressive symptoms specified as separate latent variables (Separate Constructs model) and another model

¹The HRSD-21 was also evaluated using the revised scoring procedure suggested by Riskind, Beck, Brown, and Steer (1987). Use of the revised scoring procedure yielded a pattern of results identical to that obtained using the original scoring procedure. Therefore, only results using the original scoring of the HRSD-21 are presented. Of interest, Moras, DiNardo, and Barlow (1992) also found that the revised scoring of the HRSD-21 differentiated anxiety and depression no better than did the original scoring method.

Table 1
Correlations and descriptive statistics

	1	2	3	4	5	6	Mean	SD	Range
1. LSAS-FS							16.22	6.59	1–32
2. LSAS-FP	.73						17.76	5.49	5–30
3. SIAS	.77	.60					45.04	15.42	4–74
4. SPS	.52	.63	.66				31.67	15.72	2–75
5. BDI	.50	.44	.56	.50			12.44	8.78	0–35
6. HRSD-21	.43	.48	.47	.49	.72		9.99	5.96	0–30
7. SCL-90R-D	.51	.48	.59	.53	.82	.73	1.17	0.73	0.00–3.23

Note. LSAS-FS=Liebowitz Social Anxiety Scale-Fear of Social Interaction; LSAS-FP=Liebowitz Social Anxiety Scale-Fear of Performance; SIAS=Social Interaction Anxiety Scale; SPS=Social Phobia Scale; BDI=Beck Depression Inventory; HRSD-21=Hamilton Rating Scale for Depression, 21-item version; SCL-90R-D=Symptom Checklist-90R-Depression subscale.

All correlations significant at $p < .001$.

with one latent variable, composed of measures of both social anxiety and depressive symptoms (Single Constructs model). In the Separate Constructs model (see Fig. 1), the latent variable for Depression was specified with the BDI, SCL-90R-D, and HRSD-21. Depression was specified as a single latent construct given that each of the measures included assess general symptoms of depression rather than any hypothesized subtype (e.g., endogenous depression). Given evidence from factor analytic studies that interaction and performance concerns load onto different factors (Habke et al., 1997; Safren et al., 1999, 1998), the latent variable of Social Anxiety was specified with the latent variables of Interaction Concerns and Performance Concerns. The latent variable of Interaction Concerns was specified by the manifest variables SIAS and LSAS-FS. The latent variable of Performance Concerns was specified by the manifest variables SPS and LSAS-FP. Given that the LSAS-FS and the LSAS-FP scores are calculated from items that are interwoven throughout the same interview but were specified to load onto different latent variables, the error terms associated with these variables were allowed to correlate.² The latent variables of Social Anxiety and Depression were also allowed to correlate. Fit indices indicated that the Separate Constructs model provided an excellent fit to the data, $\chi^2(10) = 4.69$, $p = .91$, root mean square error of approximation (RMSEA) = .00, comparative fit index (CFI) = 1.00.³ Although this provides support

²This a priori decision was made before testing the model because many variables may systematically influence responses to this interview, therefore similarly influencing both scores (LSAS-FS and LSAS-FP). Effects such as the interpersonal dynamics between the interviewer and the client, the comfort level of the client with an interview format, and the overlapping time of administration for these items may all systematically affect scores on both scales. Supporting our decision to allow these error terms to correlate, the model with the correlation omitted provided a significantly worse fit to the data than did the model with the errors allowed to correlate, $\chi^2(1) = 30.16$, $p < .001$.

³The RMSEA is a measure of residual variability not accounted for by the model. Values of .05 indicate a close fit of the model to the data and values up to .08 indicate reasonable fit (Browne & Cudeck, 1993). The CFI measures the relative fit of a proposed model to a baseline model, typically the independence model. Values for the CFI range from 0 to 1, with larger values indicating better fit.

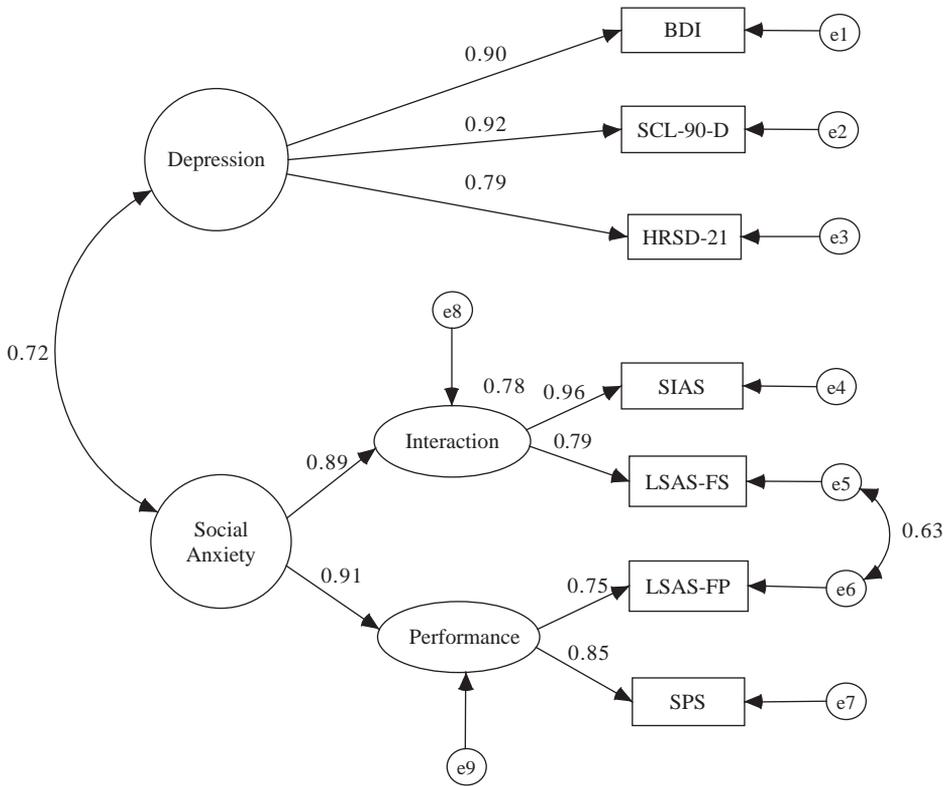


Fig. 1. Separate Construct Model. Numbers represent standardized coefficients: BDI= Beck Depression Inventory; SCL-90R-D= Symptom Checklist-90R-Depression subscale; HRSD-21= Hamilton Rating Scale for Depression, 21-item version; SIAS= Social Interaction Anxiety Scale; LSAS-FS= Liebowitz Social Anxiety Scale-Fear of Social Interaction; LSAS-FP= Liebowitz Social Anxiety Scale-Fear of Performance; SPS= Social Phobia Scale.

for separate constructs of depression and social anxiety, the two constructs were highly correlated ($r = .72$).

To rule out the alternative hypothesis that the relations among the variables were better accounted for by a single latent construct, a second model was tested. The Single Construct model was specified such that the three measures of depressive symptoms (BDI, HRSD-21, and SCL-90R-D), as well as the two latent variables for social anxiety (Interaction and Performance), loaded onto a single factor. Therefore, this model was identical to the Separate Construct model except that the correlation between the depression and social anxiety latent constructs was set to 1.00, indicating a single construct. Fit indices indicated that this model provided a poor fit of the data, $\chi^2(11) = 36.54, p < .001, RMSEA = .14, CFI = .95$.

Because the Single Construct model was nested within the Separate Construct model, direct comparisons between the models were also possible. Examination of model comparison statistics revealed that the Single Construct model provided a

significantly worse fit to the data than did the Separate Construct model, $\chi^2(1) = 31.85$, $p < .001$. Comparison of the Akaike Information Criterion (AIC), a linear combination of the χ^2 value and the degrees of freedom, between the two models also supported the superiority of the Separate Constructs model, which had a smaller AIC (AICs = 54.69 and 84.54 for the Separate and Single Construct models, respectively).

To further explore the utility of the two-factor model, we conducted a series of logistic regression analyses to determine whether the individual measures of depressive symptoms contributed significant unique variance to the prediction of which participants met criteria for a comorbid depressive disorder beyond that accounted for by the measures of social anxiety. Thus, three regression analyses were conducted, one for each of three measures of depressive symptoms. As an initial step in these analyses, we first computed Social Anxiety factor scores for each participant using the factor loadings obtained in the Separate Construct structural equation model. Then, using comorbid depression diagnosis (yes versus no) as the criterion variable, participants' factor scores were entered in the first step of a hierarchical logistic regression analysis. Then, participants' scores on the measure of depressive symptoms being explored were entered in the second step of the analysis. As can be seen in Table 2, for all three analyses, in the first step of each of the three logistic regression, Social Anxiety scores significantly predicted comorbid depression such that participants with higher Social Anxiety scores were significantly more likely to meet criteria for a comorbid depressive disorder. When each depressive symptom measure was entered in the second step of their respective regression analyses, two of the three measures significantly predicted comorbid depressive disorders. Further, in the second step of these regression analyses, the relation between Social Anxiety scores and comorbid depressive diagnoses was reduced to nonsignificance. Thus, participants' levels of depressive symptoms as assessed by the HRSD-21 and the

Table 2
Summary of logistic regression analyses predicting the presence of comorbid depression diagnoses

Step	Variable entered	B	SE B	Wald	OR	95% CI	% Correctly classified		
							Yes	No	Overall
1	Social anxiety	1.40	.40	12.41***	4.04	1.86-8.79	15.8	96.3	80.8
2a	Social anxiety	0.80	.56	2.03	2.22	0.74-6.66	31.6	96.3	83.8
	BDI	0.07	.05	1.93	1.07	0.97-1.18			
2b	Social anxiety	0.62	.45	1.89	1.85	0.77-4.47	36.8	97.5	85.9
	HRSD-21	0.21	.07	8.97**	1.23	1.08-1.41			
2c	Social anxiety	0.32	.51	0.39	1.37	0.51-3.71	26.3	93.8	80.8
	SCL-90-R-D	1.85	.63	8.57**	6.36	1.84-21.95			

Note. Steps 2a, 2b, and 2c show results for the regression analyses in which BDI, HRSD-21, and SCL-90-R-D, respectively, were entered in the second step of the analysis. OR = Odds Ratio; CI = Confidence Interval; Social Anxiety = Factor score for Social Anxiety latent variable; BDI = Beck Depression Inventory; HRSD-21 = Hamilton Rating Scale for Depression, 21-item version; SCL-90R-D = Symptom Checklist-90R-Depression Subscale.

** $p < .01$. *** $p < .001$.

SCL-90-R-D, but not the BDI, significantly predicted unique variance in the presence of comorbid depression diagnoses beyond that accounted for by levels of Social Anxiety. And, as can be seen in the last column of Table 2, scores on the HRSD-21 were able to correctly classify a higher percentage of clients in terms of whether or not they met criteria for a comorbid depressive disorder than were scores on the other two depressive symptom measures. In contrast, levels of Social Anxiety did not significantly predict the presence of comorbid depressive disorders once levels of depressive symptoms were statistically controlled.

4. Discussion

The results from this study indicate that, although highly correlated, the constructs of social anxiety and depression could be validly discriminated by commonly used measures of each disorder in clients with social anxiety disorder. Specifically, a structural equation model with social anxiety and depression specified as separate constructs provided an excellent fit to the data, significantly better than a model in which social anxiety and depression were specified as a single construct reflecting overall distress. In addition, two of the three measures of depressive symptoms accounted for significant unique variance in the prediction of comorbid depressive disorders even after statistically controlling for the severity of social anxiety symptoms. Given the lack of discriminant validity traditionally found among measures of anxiety and depression (Gotlib & Cane, 1989), the current findings are encouraging and allow greater confidence in the use of measures of depressive symptoms among clients with social anxiety disorder. The results of the regression analyses suggest, however, that scores on the HRSD-21 have greater predictive power for identifying which clients meet criteria for a comorbid depressive disorder than either of the two self-report measures of depressive symptoms.

Strengths of this study included the use of a treatment-seeking sample with clinically significant levels of social anxiety disorder and depression, as well as the inclusion of both self-report and clinician-administered measures of each construct. However, the study's limitations should also be noted. First, because only clients with a principal diagnosis of social anxiety disorder were included, it is unclear the extent to which these results are generalizable to other samples. In addition, the sample size was relatively small. Future studies, therefore, should seek to replicate these results in larger, more representative samples (e.g., a general sample of outpatients). Third, clients were diagnosed using *DSM-III-R* rather than *DSM-IV* criteria. However, because of the similarity in diagnostic criteria for social anxiety disorder and the depressive disorders across both versions of the *DSM*, the current findings should be equally applicable to individuals diagnosed with *DSM-IV*.

In summary, therefore, it appears that commonly used measures of social anxiety and depression can be used to validly discriminate the two constructs. This said, however, there is still room for improvement. Studies may be able to better discriminate between the two disorders by focusing on symptoms specific to each disorder. For example, Clark and Watson (1991), in proposing the tripartite model,

hypothesized that, although anxiety and depression share some symptoms (i.e., negative affect), there are also symptoms unique to anxiety (i.e., physiological hyperarousal) and to depression (i.e., anhedonia or low positive affect). Although the tripartite model has generally been supported, there is evidence that both depression and social anxiety disorder are characterized by low positive affect (Brown et al., 1998; Watson et al., 1988). This may be because positive affect taps interpersonal concerns, which are central to both disorders (Clark, Watson, & Mineka, 1994). Thus, the tripartite model may be less successful in differentiating depression from social anxiety than from the other anxiety disorders. Future studies, therefore, should seek other factors that may be unique to depression versus social anxiety.

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