

Psychometric Properties of the 42-Item and 21-Item Versions of the Depression Anxiety Stress Scales in Clinical Groups and a Community Sample

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The factor structure, reliability, and validity of the Depression Anxiety Stress Scales (DASS; S. H. Lovibond & P. F. Lovibond, 1995) and the 21-item short form of these measures (DASS-21) were examined in nonclinical volunteers ($n = 49$) and patients with *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) diagnoses of panic disorder ($n = 67$), obsessive-compulsive disorder ($n = 54$), social phobia ($n = 74$), specific phobia ($n = 17$), and major depressive disorder ($n = 46$). This study replicates previous findings indicating that the DASS distinguishes well between features of depression, physical arousal, and psychological tension and agitation and extends these observations to the DASS-21. In addition, the internal consistency and concurrent validity of the DASS and DASS-21 were in the acceptable to excellent ranges. Mean scores for the various groups were similar to those in previous research, and in the expected direction. The implications of these findings are discussed.

Although anxiety and depression are generally believed to be distinct from one another, anxiety and mood disorders often co-occur (Sanderson, Di Nardo, Rapee, & Barlow, 1990), and scores from various instruments designed to measure each of these states tend to be highly intercorrelated (Clark & Watson, 1991). These two consistent findings have led several theorists to develop models to help explain the overlap between anxiety and depression. For example, in their tripartite model of anxiety and depression, Clark and Watson (1991) suggested that anxiety and depression have both shared and unique features. Although both states are characterized by symptoms of elevated negative affect (e.g., distress, irritability), they differ with respect to the presence of positive affect (e.g., happiness, confidence, enthusiasm) and physiological hyperarousal. Spe-

cifically, Clark and Watson (1991) proposed that low levels of positive affect are unique to depression, and physiological hyperarousal is unique to anxiety. This tripartite view has been supported in a variety of studies, including a factor analytic study by Watson et al. (1995) in which three separate variables (general distress, anhedonia vs. positive affect, and somatic anxiety) were found.

Traditional measures have failed to distinguish well between anxiety and depression. The popular Hamilton scales for anxiety (Hamilton, 1959) and depression (Hamilton, 1960) have been shown to overlap greatly in content and to correlate with one another quite highly (Clark, 1989; Moras, Di Nardo, & Barlow, 1992). In addition, our findings (Bieling, Antony, & Swinson, in press) suggested that the trait version of the State-Trait Anxiety Inventory (STAI-T; Spielberger, 1983) is at least as sensitive to symptoms of depression as it is to symptoms of anxiety. Finally, although the Beck Anxiety Inventory (BAI; Beck & Steer, 1990) may overlap less with measures of depression compared with other anxiety measures (Beck, Epstein, Brown, & Steer, 1988), we have argued elsewhere (Antony, Swinson, Purdon, & Downie, 1997; Cox, Cohen, Dircenfeld, & Swinson, 1996) that this instrument has limitations as a measure of general anxiety, primarily because the items tend to overlap almost exclusively with the panic attack symptoms and do not adequately capture other important features of anxiety, such as worry, agitation, and muscle tension.

The Depression Anxiety Stress Scales (DASS; S. H. Lovibond & P. F. Lovibond, 1995) may hold more promise for distinguishing between anxiety and depression, as well as between symptoms of physical arousal and symptoms of generalized

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anxiety (e.g., tension or agitation). Factor analytic studies with nonclinical (P. F. Lovibond & S. H. Lovibond, 1995) and clinical samples (Brown, Chorpita, Korotitsch, & Barlow, 1997) have confirmed that the DASS items can be reliably grouped into three scales: (a) Depression (DASS-D), (b) Anxiety (DASS-A), and (c) Stress (DASS-S). The Depression scale includes items that measure symptoms typically associated with dysphoric mood (e.g., sadness or worthlessness). The Anxiety scale, like the BAI, includes items that are primarily related to symptoms of physical arousal, panic attacks, and fear (e.g., trembling or faintness). Finally, the Stress scale includes items that measure symptoms such as tension, irritability, and a tendency to overreact to stressful events—symptoms that are not assessed by the BAI.

To date, there are only two published articles addressing the psychometric properties of the DASS (Brown et al., 1997; P. F. Lovibond & S. H. Lovibond, 1995). Together, these studies suggest that the DASS has excellent internal consistency and temporal stability and provides a better separation of the features of anxiety and depression, relative to other existing measures.

The present study aimed to replicate and expand on previous studies of the DASS. In addition to replicating analyses of the factor structure, internal consistency, and concurrent validity of the DASS, the present study differs from previous studies in several ways. First, all patients were diagnosed according to *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV; American Psychiatric Association, 1994) criteria rather than *DSM-III-R* (3rd ed., rev.; American Psychiatric Association, 1987) criteria, as was the case in previous studies (e.g., Brown et al., 1997). Second, this is the first study to include several clinical groups as well as a comparison group of nonclinical controls. Finally, whereas previous studies have only reported the psychometric properties of the 42-item DASS, the present study also provides analyses based on the 21-item version (DASS-21).

Method

Participants were outpatients diagnosed with panic disorder with or without agoraphobia ($n = 67$; M age = 36.8 years; 64% female), obsessive-compulsive disorder ($n = 54$; M age = 36.4 years; 43% female), social phobia ($n = 74$; M age = 35.0 years; 44% female), specific phobia ($n = 17$; M age = 34.3 years; 78% female), or major depressive disorder ($n = 46$; M age = 44.9 years; 46% female). A group of nonclinical volunteers ($n = 49$; M age = 28.4 years; 61% female) served as a comparison group. All participants provided informed consent and were required to be between the ages of 18 and 65 years. Patients with current diagnoses of substance abuse-dependence, psychotic disorder, or bipolar disorder were excluded from the database. Diagnoses in the patient groups were based on the Structured Clinical Interview for DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 1996). Participants in the nonclinical volunteers group received a telephone interview that was based on the screening questions from the SCID-IV to ensure that they did not have a history of any of the major forms of psychopathology.

Participants completed the DASS as well as several other self-report measures (described below). In addition to the 42-item DASS, S. H. Lovibond and P. F. Lovibond (1995) suggested that a subset of these items (seven from each subscale) can be administered as a short version. The items that constitute this 21-item measure (DASS-21) are listed

in the DASS manual, although no data on the psychometric properties of the DASS-21 have been published. Totals for each scale on the DASS-21 are doubled, so that they are comparable to those for the 42-item DASS. In the present study, participants completed the DASS and the appropriate items were extracted for analyses of the DASS-21.

To assess concurrent validity of the DASS, participants also completed the BAI, Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979), and STAI-T. The BAI (Beck & Steer, 1990) is a 21-item scale designed to measure symptoms of clinical anxiety (e.g., "heart pounding or racing" or "fear of losing control") and has been shown to have good psychometric properties (Beck, Epstein, Brown, & Steer, 1988). The BDI is a widely used measure of depressive symptomatology, created in 1961 (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and revised in 1979 (Beck et al., 1979) to its current form. It is a 21-item scale derived from clinical observations and appears to be a reliable and valid measure of depression (Beck, Steer, & Garbin, 1988). Finally, the STAI-T (derived from the larger STAI Scale, Form Y) measures a stable propensity to experience anxiety and tendencies to perceive stressful situations as threatening. Test-retest reliabilities for the STAI-T are high, ranging from .73 to .86. Concurrent validity with other anxiety questionnaires ranges from .73 to .85 (Spielberger, 1983). The STAI-T was not included in the package completed by individuals in the major depressive disorder group; findings that are based on this measure are only reported for the anxiety disorders and nonclinical volunteers groups.

Results and Discussion

Factor Analyses

DASS. We used an exploratory factor analysis to examine the structure of the DASS in the entire clinical sample ($N = 258$), excluding the nonclinical controls. We used principal components extraction, and the number of factors was determined by eigenvalues and the scree test (Cattell, 1966). These criteria suggested a three-factor solution (eigenvalues 18.92, 4.24, and 2.06), accounting for 60% of the variance. We applied an oblimin rotation to this initial solution. Previous research and theory suggest that the three scales, and the constructs they are designed to measure, are correlated (P. F. Lovibond & S. H. Lovibond, 1995). Thus, a factor solution that was based on a nonorthogonal rotation was likely to result in a more interpretable simple structure. Correlations among factors were similar to those in previous research (P. F. Lovibond & S. H. Lovibond, 1995), with Stress and Depression factors correlating at .60, Stress and Anxiety correlating at .55, and Anxiety and Depression correlating at .40.

The factor loadings for each item are displayed in Table 1. Items with loadings of .30 or greater were considered to load on a particular factor. The first factor corresponded to the DASS-S scale, with all 14 items that make up this scale loading on the first factor. Two items on the DASS-S scale had a complex structure, also loading on the anxiety factor. The second factor paralleled the DASS-D scale. Each of the 14 items loaded on this factor, and no items had complex loadings. The final factor corresponded to the DASS-A scale. All but one of the 14 items that make up the DASS-A scale loaded on this factor. The one item on the Anxiety scale ("I feared that I would be thrown by some trivial but unfamiliar task") that did not load on this factor had a .32 loading on the Stress factor. One additional

Table 1
Items and Factor Loadings for the Depression Anxiety Stress Scale (DASS) Items

Item and item no. (in parentheses)	Factor 1	Factor 2	Factor 3
DASS Stress scale			
I found myself getting upset by quite trivial things (1).	.821	-.015	-.098
I found myself getting upset rather easily (11).	.809	-.126	-.080
I found that I was very irritable (27).	.771	-.199	-.143
I found myself getting agitated (39).	.762	-.022	.082
I felt I was rather touchy (18).	.748	-.157	-.074
I was intolerant of anything that kept me from getting on with what I was doing (35).	.742	.027	.006
I tended to over-react to situations (6).	.691	-.076	.083
I found myself getting impatient when delayed in any way (e.g., . . .) (14).	.620	-.000	.104
I found it difficult to relax (8).	.600	-.076	.177
I found it hard to calm down after something upset me (29).	.599	-.131	.106
I found it difficult to tolerate interruptions to what I was doing (32).	.592	-.075	.111
I felt that I was using a lot of nervous energy (12).	.572	.014	.245
I found it hard to wind down (22).	.518	-.007	.312
I was in a state of nervous tension (33).	.428	-.088	.373
DASS Depression scale			
I could see nothing to be hopeful about (37).	.107	.951	-.028
I felt that life was meaningless (38).	.070	.946	.023
I felt that I had nothing to look forward to (10).	.004	.896	.030
I felt I was pretty worthless (34).	.048	.875	-.043
I felt that life wasn't worthwhile (21).	-.005	.879	.040
I was unable to become enthusiastic about anything (31).	.021	.856	-.081
I felt I wasn't worth much as a person (17).	.024	.844	-.027
I felt I had lost interest in just about everything (16).	.039	.837	-.123
I couldn't seem to experience any positive feeling at all (3).	-.041	.835	-.050
I felt down-hearted and blue (26).	-.149	.768	.032
I couldn't seem to get any enjoyment out of the things I did (24).	-.126	.730	-.005
I felt sad and depressed (13).	-.205	.678	.026
I found it difficult to work up the initiative to do things (42).	-.165	.631	.003
I just couldn't seem to get going (5).	-.110	.570	.044
DASS Anxiety scale			
I experienced trembling (41).	-.183	-.189	.813
I had a feeling of shakiness (e.g., . . .) (7).	-.083	-.096	.812
I had a feeling of faintness (15).	-.173	-.025	.783
I experienced breathing difficulty (e.g., . . .) (4).	.104	.136	.731
I was aware of the action of my heart in the absence of physical exertion (e.g., . . .) (25).	.131	.086	.694
I felt I was close to panic (28).	.260	.032	.655
I had difficulty in swallowing (23).	.035	-.009	.615
I felt scared without any good reason (20).	.161	-.078	.597
I felt terrified (36).	.146	-.167	.595
I was worried about situations in which I might panic and make a fool of myself (40).	.184	-.018	.526
I was aware of dryness of mouth (2).	.060	-.074	.525
I found myself in situations which made me so anxious I was most relieved when they ended (9).	.419	.038	.417
I perspired noticeably in the absence of high temperatures or physical exertion (19).	.193	-.049	.366
I feared that I would be "thrown" by some trivial but unfamiliar task (30).	.316	-.129	.276

Note. From *Manual for the Depression Anxiety Stress Scales (2nd ed.)*, by S. H. Lovibond and P. F. Lovibond, 1995, Sydney, Australia: Psychology Foundation of Australia. The DASS items are in the public domain. Item numbers do not correspond to the item numbers reported by Brown et al. (1997). The present study used the questionnaire provided with the DASS manual (S. H. Lovibond & P. F. Lovibond, 1995), whereas Brown et al. (1997) used an earlier version with a different item order (T. A. Brown & P. F. Lovibond, personal communication, May 1997). Factor loadings > .30 are presented in boldface type.

Table 2
Items and Factor Loadings for the Depression Anxiety Stress Scale-21 (DASS-21) Items

Item and item no. (in parentheses)	Factor 1	Factor 2	Factor 3
DASS-21 Stress scale			
I was intolerant of anything that kept me from getting on with what I was doing (14).	.839	-.011	-.094
I felt I was rather touchy (18).	.806	.131	-.113
I found it difficult to relax (12).	.694	.030	.149
I found myself getting agitated (11).	.682	.114	.125
I felt that I was using a lot of nervous energy (8).	.671	-.054	.183
I found it hard to wind down (1).	.645	-.054	.256
I tended to over-react to situations (6).	.523	.199	.192
DASS-21 Depression scale			
I felt that life was meaningless (21).	-.025	.906	-.076
I felt that I had nothing to look forward to (10).	-.071	.898	.059
I couldn't seem to experience any positive feeling at all (3).	-.046	.858	.121
I was unable to become enthusiastic about anything (16).	.033	.849	.034
I felt that I wasn't worth much as a person (17).	.013	.802	-.002
I felt down-hearted and blue (13).	.102	.784	.021
I found it difficult to work up the initiative to do things (5).	.323	.550	-.120
DASS-21 Anxiety scale			
I was aware of the action of my heart in the absence of physical exertion (e.g., . . .) (19).	.011	-.092	.820
I experienced breathing difficulty (e.g., . . .) (4).	-.023	-.103	.805
I experienced trembling (e.g., in the hands) (7).	-.151	.230	.768
I felt I was close to panic (15).	.236	.041	.660
I felt scared without any good reason (20).	.167	.133	.583
I was worried about situations in which I might panic and make a fool of myself (9).	.176	.035	.543
I was aware of dryness of my mouth (2).	.123	.018	.483

Note. From *Manual for the Depression Anxiety Stress Scales (2nd ed.)*, by S. H. Lovibond and P. F. Lovibond, 1995, Sydney, Australia: Psychology Foundation of Australia. The DASS items are in the public domain. Items are based on item numbers on the DASS-21 provided with the DASS manual (S. H. Lovibond & P. F. Lovibond, 1995). Factor loadings >.30 are presented in boldface type.

item ("I found myself in situations which made me so anxious I was most relieved when they ended") loaded on both the Anxiety and Stress factors. Overall, the factor structure in the present sample was comparable with that found in other studies, and those items with complex loadings have been similarly identified previously (Brown et al., 1997).

DASS-21. To evaluate the factor structure of the DASS-21, we performed exploratory factor analysis with principal components on the DASS-21 items in the clinical sample ($N = 258$). As in the DASS analysis, oblimin rotation was used to derive the best simple structure. Both the scree plot and eigenvalues greater than one suggested a three-factor solution (eigenvalues 9.07, 2.89, and 1.23), accounting for 67% of the variance. In the final solution, the Stress and Depression factors were correlated at .48, Stress and Anxiety were correlated at .53, and Anxiety and Depression were correlated at .28. These between-factor correlations were somewhat lower in magnitude than the correlations for the entire item set.

The factor loadings for each item of the DASS-21 are displayed in Table 2. Overall, the factor structure of the DASS-21 was very similar to the larger pool of items. Although both the

DASS and the DASS-21 displayed excellent factor structures, the DASS-21 solution was somewhat more interpretable in terms of lower intercorrelations of factors, higher mean loadings, and fewer cross-loading items.

Reliability and Concurrent Validity

To assess the internal consistency of the DASS and DASS-21 Scales in the entire sample, Cronbach's alphas were computed. Cronbach's alphas for the DASS Depression, Anxiety, and Stress subscales were .97, .92, and .95, respectively. Cronbach's alphas for the DASS-21 subscales were .94 for Depression, .87 for Anxiety, and .91 for Stress.

To examine the concurrent validity of the DASS and DASS-21 Scales, correlations with other measures of depression and anxiety were computed. Correlations between the various DASS and DASS-21 Scales and the BDI, BAI, and the STAI-T were computed in the clinical sample. The resulting correlation coefficients are displayed in Table 3. The DASS-S scale correlated to a moderately high level with measures of depression and anxiety. As expected, the DASS-D scale correlated most highly with another

Table 3
Correlations of the Depression Anxiety Stress Scale (DASS)
and 21-Item DASS (DASS-21) Subscales
With Other Measures of Anxiety and
Depression in Clinical Patient Groups

Measure	DASS and DASS-21 subscales		
	DASS-S	DASS-D	DASS-A
DASS-D	.63	—	—
DASS-A	.74	.44	—
BDI	.62	.77	.57
BAI	.64	.42	.84
STAI-T	.59	.65	.44

Measure	DASS21-S		
	DASS21-S	DASS21-D	DASS21-A
DASS21-D	.57	—	—
DASS21-A	.72	.46	—
BDI	.69	.79	.62
BAI	.70	.51	.85
STAI-T	.68	.71	.55

Note. Analyses did not include individuals in the nonclinical volunteer group. Because patients in the major depressive disorder group did not complete the STAI-T, analyses for this measure are based on the anxiety disorder groups only. Data collection with the ASI did not begin until this study was underway, so findings derived from this measure are based on a subset of the anxiety disorder patients only ($n = 85$). DASS-S = DASS Stress scale; DASS-D = DASS Depression scale; DASS-A = DASS Anxiety scale; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; STAI-T = State-Trait Anxiety Inventory—Trait version.

measure of depression and moderately with the anxiety measures. Finally, the DASS-A scale correlated most highly with the BAI and was moderately correlated with the STAI-T. Indeed, the STAI-T correlated most strongly with DASS-D ($r = .65$), suggesting that the STAI-T scale may contain items that assess depression in addition to anxiety. This pattern of results was very similar for the DASS-21 Scales. Although there were some changes in magnitude, the relative strength of the relationships of the DASS-21 scales to these other measures of anxiety and depression were virtually unchanged.

Comparing DASS and DASS-21 Scores Across Groups

To compare DASS and DASS-21 scores across groups, we conducted a series of one-way analyses of variance (ANOVAs). Five diagnostic groups (panic disorder, obsessive-compulsive disorder, social phobia, specific phobia, and major depressive disorder), as well as the nonclinical volunteers group were compared. As indicated in Table 4, the pattern of findings was identical for the DASS and DASS-21. For all three subscales, the overall ANOVAs were significant and were followed up with Duncan's multiple-range tests. Overall, patients in the major depressive disorder condition tended to score highest on the Depression and Stress subscales, whereas individuals in the panic disorder group scored highest on the Anxiety subscale. Individuals in the nonclinical volunteers group scored lower on all three subscales than individuals in all of the clinical groups.

Conclusion

The present study confirms previous findings indicating that the DASS is a reliable and valid method of assessing features

Table 4
Comparison of Diagnostic Groups and Controls on the Depression Anxiety Stress Scale
(DASS) and 21-Item DASS (DASS-21) Scale

Subscale	PD	OCD	SOC	SP	MDD	NCV	F	η^2
DASS								
Stress								
M	20.27 _a	17.57 _{a,b}	17.07 _{a,b}	14.18 _b	25.54 _c	4.12 _d	26.60*	.31
SD	10.82	10.67	10.36	11.17	9.03	3.81		
Depression								
M	12.76 _a	13.43 _a	13.20 _a	10.59 _a	29.74 _b	2.18 _c	46.25*	.43
SD	9.47	11.51	8.94	10.72	8.42	2.83		
Anxiety								
M	16.19 _a	8.80 _b	11.22 _c	6.35 _b	12.85 _c	1.43 _d	22.13*	.27
SD	9.96	6.69	8.90	6.13	8.67	1.86		
DASS-21								
Stress								
M	20.00 _a	17.59 _{a,b}	16.57 _{a,b}	13.29 _b	24.30 _c	3.51 _d	23.36*	.28
SD	11.60	10.98	10.91	11.85	9.84	3.78		
Depression								
M	12.75 _a	13.30 _a	13.19 _a	10.82 _a	29.96 _b	2.12 _c	42.30*	.41
SD	10.15	11.83	9.28	11.25	9.18	3.64		
Anxiety								
M	18.72 _a	9.26 _b	12.22 _c	6.59 _b	14.04 _c	1.22 _d	24.86*	.29
SD	10.77	7.56	10.20	6.59	9.78	1.77		

Note. PD = panic disorder with or without agoraphobia; OCD = obsessive-compulsive disorder; SOC = social phobia; SP = specific phobia; MDD = major depressive disorder; NCV = nonclinical volunteers. Means sharing the same subscripts (across groups) do not differ at $p < .05$.

* $p < .001$.

of depression, anxiety, and tension-stress. The present findings are also somewhat consistent with the tripartite model of anxiety and depression described earlier (Clark & Watson, 1991). Specifically, the DASS-D scale appears to measure features that are unique to depression (low positive affect), the DASS-A scale measures features proposed to be unique to anxiety (physical hyperarousal), and the DASS-S scale measures features of both anxiety and depression (e.g., tension or irritability). This view is supported by the observation that DASS-S scores were elevated across anxious and depressed groups, whereas DASS-D scores were elevated only in depressed patients. Less consistent with this view was the finding that depressed patients had moderately elevated DASS-A scores, second only to patients in the panic disorder group. According to the tripartite model, DASS-A scores might have been expected to be lower in the depressed group than in the various anxiety disorders groups.

In summary, the DASS appears to be an excellent instrument for measuring features of depression, hyperarousal, and tension in clinical and nonclinical groups. Furthermore, the 21-item version of the measure appears to have several advantages relative to the 42-item version, including fewer items, a cleaner factor structure, and smaller interfactor correlations. Although findings for the DASS-21 remain to be replicated in an independent sample, the 21-item version may be preferable to the full 42-item DASS. The main advantage of the larger version is the additional clinical information provided. Future studies should begin to assess the sensitivity of the DASS and DASS-21 for measuring change that follows treatment for anxiety disorders and major depression.

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