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The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample

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Objectives. To test the construct validity of the short-form version of the Depression anxiety and stress scale (DASS-21), and in particular, to assess whether stress as indexed by this measure is synonymous with negative affectivity (NA) or whether it represents a related, but distinct, construct. To provide normative data for the general adult population.

Design. Cross-sectional, correlational and confirmatory factor analysis (CFA).

Methods. The DASS-21 was administered to a non-clinical sample, broadly representative of the general adult UK population ($N = 1,794$). Competing models of the latent structure of the DASS-21 were evaluated using CFA.

Results. The model with optimal fit (RCFI = 0.94) had a quadripartite structure, and consisted of a general factor of psychological distress plus orthogonal specific factors of depression, anxiety, and stress. This model was a significantly better fit than a competing model that tested the possibility that the Stress scale simply measures NA.

Conclusions. The DASS-21 subscales can validly be used to measure the dimensions of depression, anxiety, and stress. However, each of these subscales also taps a more general dimension of psychological distress or NA. The utility of the measure is enhanced by the provision of normative data based on a large sample.

Although anxiety and depression are phenomenologically distinct, it has proven very difficult to distinguish between these constructs by empirical means either using clinicians' ratings or self-report measures (Clark & Watson, 1991). It has been suggested that this is because most existing self-report scales for anxiety and depression predominantly measure the common factor of negative affectivity (NA; Watson & Clark, 1984). NA is conceptualized as a dispositional dimension where high NA reflects the experience of subjective distress and unpleasurable engagement, and low NA reflects the absence of these feelings. Studies have supported the existence of a dominant NA

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dimension, and provide evidence that it is highly related to the symptoms and diagnosis of both anxiety and depression (Brown, Chorpita, Korotitsch, & Barlow, 1997; Clark & Watson, 1991; Watson & Clark, 1984). However, the tripartite model posits that in addition to this common factor, there are specific components to anxiety and depression that allow them to be differentiated. In the case of anxiety, the specific component is physiological hyperarousal and, in the case of depression, low positive affectivity (PA; low PA is similar to the psychiatric concept of anhedonia).

The Depression Anxiety Stress Scales 21 (DASS-21) is a short form of Lovibond and Lovibond's (1995) 42-item self-report measure of depression, anxiety, and stress (DASS). Brown *et al.* (1997) have suggested that the subscales of the DASS-21 may measure the three dimensions specified in the tripartite model; low PA (DASS-Depression), physiological hyperarousal (DASS-Anxiety), and NA (DASS-Stress). However, while there is evidence that the DASS-Depression and DASS-Anxiety scales do constitute valid measures of the constructs they were intended to represent (Crawford & Henry, 2003; Lovibond & Lovibond, 1995), it remains unclear whether the DASS-Stress scale should be regarded as a measure of general psychological distress (i.e. NA), or instead, as a measure of stress component that is related to, but distinct from NA.

Theoretically, there are grounds for suggesting that the Stress scale is synonymous with NA, particularly given that during scale development, this scale originated from items believed to relate to both anxiety and depression. Moreover, empirical studies have found the stress factor's correlations with the depression and anxiety factors to be substantially higher than the depression and anxiety factors correlations with one another (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown *et al.*, 1997; Clara, Cox, & Enns, 2001).

However, Lovibond (1998) argues that the Stress scale reflects a construct that is distinct from NA. In a study of the long-term temporal stability of the DASS, Lovibond found results consistent with this perspective. It was argued that if the Stress scale is simply an index of non-specific vulnerability to distress (i.e. NA), then Stress scores at Time 1 should have been a more powerful predictor of anxiety at Time 2 than depression was, and a more powerful predictor of depression scores at Time 2 than anxiety was. Neither pattern was seen, yet stress scores at Time 1 were relatively good predictors of stress scores at Time 2.

Factor analytic studies of the DASS and DASS-21

If the use of the DASS and the DASS-21 in research and clinical practice is to be optimal, then it is necessary to delineate the underlying structure of the instrument. However, as is clear from the preceding discussion, the validity of stress as an emotional syndrome as distinct from NA remains unclear. Five studies have used factor analysis to test the construct validity of the full length DASS, with two of these also assessing the DASS-21 (Antony *et al.*, 1998; Brown *et al.*, 1997; Clara *et al.*, 2001; Crawford & Henry, 2003; Lovibond & Lovibond, 1995). In both psychiatric (Antony *et al.*, 1998; Brown *et al.*, 1997; Clara *et al.*, 2001) and non-clinical samples (Crawford & Henry, 2003; Lovibond & Lovibond, 1995), the optimal model consisted of three factors corresponding to the test author's proposed scales, with no, or only minor, misspecifications apparent. However, none of these studies have compared the fit of this three-factor model against a model that specifies that all of the variance in the Stress scale can be explained by a more general NA component (i.e. testing the proposal that stress and NA are synonymous).

In the present study, we will use confirmatory factor analysis (CFA) to assess competing models of the factor structure of the DASS-21 in order to better understand the relationship between stress, as indexed by this scale, and NA. The shortened version of the DASS was selected in preference to the full-scale version of the DASS for these analyses because, in contrast to the full DASS, no study has yet tested the construct validity of the DASS-21 in the general adult population. Moreover, factor-analytic studies that have directly compared the two measures in clinical populations suggest that the DASS-21 is associated with a cleaner factor structure relative to the DASS-42 (Antony *et al.*, 1998; Clara *et al.*, 2001). The relative superiority of the DASS-21 compared with the full-length DASS may be attributable to the fact that 3 items have consistently been shown to reduce the discriminant validity of the measure. These are anxiety Item 9 and stress Item 33 (both of which double-load; Antony *et al.*, 1998; Brown *et al.*, 1997; Clara *et al.*, 2001; Crawford & Henry, 2003), and anxiety Item 30 (which does not load strongly on any factor; Antony *et al.*, 1998; Brown *et al.*, 1997; Crawford & Henry, 2003). It is of note that all three of these weak items have been omitted in the shortened version.

Psychometric properties of the DASS-21 and normative data

Preliminary evidence suggests that the full-length DASS possesses adequate convergent and discriminant validity in samples drawn from the normal population (Crawford & Henry, 2003; Lovibond & Lovibond, 1995). Reliability, assessed using Cronbach's alpha, has also been shown to be acceptable for all three scales in both clinical and non-clinical samples (Antony *et al.*, 1998; Brown *et al.*, 1997; Crawford & Henry, 2003; Lovibond & Lovibond, 1995). For the DASS-21, Antony *et al*. reported substantially lower between – than within – construct correlations, and in two independent psychiatric samples, the DASS-21 was associated with very good reliability estimates (Antony *et al.*, 1998; Clara *et al.*, 2001). However, these are the only studies that have examined the psychometric properties of the DASS-21, and no normative data exist.

The lack of normative data may be attributable to the fact that Lovibond and Lovibond (1995) maintain that doubling DASS-21 scores is directly equivalent to deriving scores from the full version of the DASS because the DASS-21 encompasses the full range of symptoms measured by the original DASS. That is, the DASS consists of a number of subscales comprising items of similar content. In developing the DASS-21, at least one item was selected from each of these subscales. However, no study to date has actually assessed whether it is legitimate to assume that norms derived from the full version of the instrument are directly equivalent to doubling DASS-21 scores.

The aims of the present study were: (1) to provide normative data for the DASS-21; (2) to obtain estimates of the reliability of the DASS-21; and (3) to evaluate competing models of the latent structure of the DASS-21 using confirmatory factor analysis. When deriving competing models, particular attention will be given to assessing whether the DASS-21 Stress subscale is distinct from, or synonymous with NA.

Method

Participants

Complete DASS-21 data were collected from 1,794 members of the general adult UK population (979 female, 815 male). Participants were unpaid volunteers recruited from a wide variety of sources including commercial and public service organizations.

The mean age of the sample was 41.0 ($SD = 15.9$) with an age range of 18–91 years. Participants had an average of 13.8 years of education ($SD = 3.1$).

Materials and procedure

Each potential participant received an introductory letter, a DASS form (from which the items corresponding to the DASS-21 were extracted), and a form for recording demographic variables. A subset of participants also received and completed a measure of positive and negative affect, the positive and negative affect schedule (PANAS, $N = 740$; Watson, Clark, & Tellegen, 1988). This subgroup did not differ significantly from the overall sample with respect to age, gender, or education. Participants sealed the completed forms in an envelope, and these were either collected by the researcher or returned by mail. The refusal rate was approximately 18%.

Each participant's occupation was coded using the Office of Population Surveys (1990) classification of occupations. Retired participants, those currently unemployed, and househusbands/housewives were coded by their previous occupation. Those who had never worked were coded as 5 (unskilled). The percentage of participants in the occupational codes of professional (1), intermediate (2), skilled (3), semi-skilled (4) and unskilled (5) was 11, 38, 34, 9, and 7%, respectively. The corresponding percentage for each code in the general adult population census is 7, 32, 42, 14, and 5%, respectively. Thus, while the sample is broadly representative, there is a slight overrepresentation of professional occupations, and a slight under representation of skilled and semi-skilled occupations. The percentage of participants in each of four age bands (18–29, 30–44, 45–59, 60 plus) was 30, 30, 26, and 14%, respectively. The corresponding percentage for each age band in the general adult population census is 27, 25, 22, and 26%, respectively. Again, it can be seen that the match to the population figures is good, although there is a relative under representation in the oldest age group.

Self-report scales

The DASS consists of three 14-item self-report scales that measure depression, anxiety, and stress. A 4-point severity scale measures the extent to which each state has been experienced over the past week. The DASS-21 consists of three 7-item self-report scales taken from the full version of the DASS. The PANAS is a 20-item self-report measure of positive affect and negative affect that has been found to be a valid, reliable measure of these constructs (Crawford & Henry, 2004; Watson *et al.*, 1988). For the PANAS, the 'past week' format was used.

Statistical analysis

Basic statistical analyses were conducted using SPSS Version 8. CFA (robust maximum likelihood) was performed on the variance–covariance matrix of the DASS-21 items using EQS for Windows Version 5.4 (Bentler, 1995). The fit of CFA models was assessed using the Satorra–Bentler scaled chi-squared statistic (S–Bχ^2), the robust comparative fit index (RCFI), the standardized root mean squared residual (SRMR), and the root mean squared error of approximation (RMSEA). For further discussion of these statistics, see Crawford and Henry (2003). The scaled difference chi-squared test (Satorra & Bentler, 2001) was used to test for differences in the fit of nested models (a model is considered to be nested within another model if it differs only in imposing additional constraints on the relationships between variables specified in the initial model).

Results

Summary statistics and normative data for the DASS-21

The means, medians, *SD*s, and ranges for each of the three DASS-21 scales and total scale are presented in Table 1 for the total sample. It should be noted that the influence of gender, occupation, education, and age on DASS-21 scores was investigated. These results are not presented in the manuscript because they mirrored the pattern of results found for the full DASS (see Crawford & Henry, 2003), and indicated that these demographic variables exert only a minimal influence upon DASS-21 scores. To test the assumption that doubling DASS-21 scores is directly equivalent to scores on the full version of the DASS, the summary statistics for the full DASS are also presented alongside the values for the DASS-21 multiplied by 2. It can be seen that the values for the full version are very similar to the values obtained from doubling scores on the DASS-21. Kolmogorov–Smirnov tests revealed that the distributions of raw scores deviated significantly from a normal distribution (z ranged from 5.51 to 11.12, all ps $< .001$). Given the positive skew, use of means and *SD*s from a normative sample are not useful when interpreting an individual's score. Therefore, Table 2 was constructed for conversion of raw scores on each of the DASS-21 scales to percentiles.

Table 1. Summary statistics for the DASS-21, full DASS, and DASS-21 multiplied by 2

	Median	*M*	*SD*	Range
DASS-21				
Depression	1	2.83	3.87	0–21
Anxiety	1	1.88	2.95	0–20
Stress	4	4.73	4.20	0–21
Total scale	7	9.43	9.66	0–61
Full DASS				
Depression	2	5.55	7.48	0–40
Anxiety	3	3.56	5.39	0–42
Stress	8	9.27	8.04	0–42
Total scale	13	18.38	18.82	0–121
DASS-21 doubled				
Depression	2	5.66	7.74	0–42
Anxiety	2	3.76	5.90	0–40
Stress	8	9.46	8.40	0–42
Total scale	14	18.86	19.32	0–122

Reliabilities of the DASS-21

The reliabilities (internal consistencies) of the DASS-21 Anxiety, Depression, Stress, and Total scales were estimated using Cronbach's alpha. α was .88 (95% CI = .87–.89) for the Depression scale, .82 (95% CI = .80–.83) for the Anxiety scale, .90 (95% CI = .89–.91) for the Stress scale, and .93 (95% CI = .93–.94) for the Total scale.

Testing competing confirmatory factor analytic models of the DASS-21

The fit statistics for the CFA models are presented in Table 3. Model 1a tested Lovibond and Lovibond's (1995) correlated three-factor structure, specifying the dimensions of anxiety, depression and stress. The fit statistics for this model indicate a fairly poor fit (e.g. RCFI = 0.882). The DASS consists of a number of subscales comprising items of

Table 2. Raw scores on the DASS-21 converted to percentiles

	Percentiles				
Raw score	Depression	Anxiety	Stress	Total	Raw score
0	34	44	15	9	**0**
1	43	54	20	12	**1**
2	58	69	30	19	**2**
3	68	79	41	27	**3**
4	75	86	51	33	**4**
5	81	89	60	40	**5**
6	85	92	69	46	**6**
7	88	94	77	51	**7**
8	91	95	82	57	**8**
9	92	96	86	61	**9**
10	93	97	89	65	**10**
11	95	97	92	69	**11**
12	96	98	93	73	**12**
13	97	99	95	76	**13**
14	97	99	96	79	**14**
15	98	99	97	81	**15**
16	98	99	97	83	**16**
17	99	> 99	98	85	**17**
18	> 99	> 99	99	87	**18**
19	> 99	> 99	99	88	**19**
20	> 99	> 99	> 99	89	**20**
21	> 99	> 99	> 99	90	**21**
22	–	–	–	91	**22**
23	–	–	–	91	**23**
24	–	–	–	92	**24**
25	–	–	–	93	**25**
26	–	–	–	94	**26**
27	–	–	–	94	**27**
28	–	–	–	95	**28**
29	–	–	–	95	**29**
30	–	–	–	95	**30**
31	–	–	–	95	**31**
32	–	–	–	96	**32**
33	–	–	–	96	**33**
34	–	–	–	96	**34**
35	–	–	–	97	**35**
36	–	–	–	97	**36**
37	–	–	–	97	**37**
38	–	–	–	98	**38**
39	–	–	–	98	**39**
40	–	–	–	98	**40**
41	–	–	–	98	**41**
42	–	–	–	98	**42**
43	–	–	–	99	**43**
44	–	–	–	>99	**44**

Table 3. Fit indices for CFA models of the DASS-21 (best fitting model in bold)

Model	S–Bχ^2	χ^2	*df*	RCFI	SRMR	RMSEA
1a. Lovibond and Lovibond's model with correlated factors	910.5	1598.9	186	0.882	0.040	0.065
1b. Lovibond and Lovibond's model; correlated factors plus correlated error (CE)	628.0	1092.1	180	0.927	0.034	0.053
2a. Alternate DASS-21; as Model 1a	992.9	1974.6	186	0.846	0.049	0.074
2b. Alternate DASS-21; as Model 1b	909.4	1797.0	181	0.861	0.047	0.071
3a. Quadripartite model	662.2	1153.3	168	0.920	0.038	0.057
3b. Quadripartite model plus CE	**522.7**	**893.7**	**162**	**0.941**	**0.026**	**0.050**
4a. Tripartite model (NA and specific A and D factors)	898.0	1560.1	175	0.882	0.046	0.066
4b. Tripartite model plus CE	620.3	1064.3	169	0.927	0.039	0.054

For the fit statistics, the following can be regarded as indicating good fit; RCFI $\geqq$ .95; SRMR $\geqq$ .08 and RMSEA $<$ .06.

similar content. Therefore, a variant on Model 1a – Model 1b – (in which correlated error between items from the same subscales was permitted) was also tested. To date, no study has tested a model parameterized to allow for such correlated error. Since these subdivisions reflect the original latent structure proposed by the test author's, and it was on the basis of these subdivisions that the DASS-21 was derived (i.e. at least 1 item was taken from each of the content categories), it is important to test whether models that permit such correlated error represent a significantly better fit than their more constrained counterparts. Permitting correlated error (Model 1b) led to an improvement in fit, and this model fulfilled the criteria for good fit according to both the SRMR and RMSEA.

In addition, a test of the 'alternative' DASS-21 was conducted (Model 2a). Compared with identical factor structures imposed on the alternative DASS-21 items (Models 2a and 2b were identical to Models 1a and 1b, respectively, but were conducted on the 21 items from the 42-item version of the DASS not included in the DASS-21), the original DASS-21 items were associated with better fit according to all criteria.

In Model 3a, a general distress factor was specified upon which all items were free to load. In addition, three orthogonal factors (depression, anxiety, and stress) were also specified on which items from the corresponding scales were permitted to load. No other study has tested a model parameterized according to these specifications for either the DASS or the DASS-21. Model 3b was identical to 3a except that it permitted correlated error between items from the same subscales. We term these models the quadripartite models. Although both models had good fit, Model 3b represented the optimal fit; the RCFI is high (.94), and the SRMR and RMSEA indicated very good fit.

The fit of models permitting correlated error between items from the same subscales are markedly superior to their more constrained counterparts. As noted, inferential statistics can be applied to compare nested models. Permitting correlated error leads to a statistically significant improvement in each of the relevant comparisons (Models 1b, 2b, 3b, and 4b versus 1a, 2a, 3a, and 4a, respectively), lending support to the method Lovibond and Lovibond (1995) used to select items for the DASS-21.

Finally, Model 4a tested the hypothesis that the Stress scale does not constitute a legitimate construct in its own right, but simply measures NA. Model 4b additionally permitted correlated error between items from the same subscales. Thus, Models 4a

and 4b were identical to Models 3a and 3b, respectively, except that the stress items were permitted to load only on NA (i.e. the stress factor was omitted, thereby testing the hypothesis that all the variance contributed by the Stress scale can be explained by this shared component, and therefore that NA and stress are synonymous). Again, this is the first time such models have been tested for either the DASS or the DASS-21. Chi-squared difference tests revealed that Models 4a and 4b had a significantly poorer fit than Models 3a and 3b, respectively.

Evaluation of the optimal model

All items in Model 3b loaded $\geqq .36$ on the general factor, with 20 of the 21 items loading higher on this factor than on the specific factor they were intended to represent (for the specific factors, a mean loading of 0.34 was observed; for the general factor, a mean loading of 0.60). Allowing correlated error led to a significant improvement in fit, and the correlated errors between items of related subscales were all positive in sign (mean $r = .20$). A schematic representation of the structure for the optimal Model is presented as Fig. 1. Latent factors are represented by large ovals or circles, error variances as smaller ovals or circles (as they are also latent variables), and manifest (i.e. observed) variables as rectangles or squares. Single-headed arrows connecting variables represent a causal path. Double-headed arrows represent covariance or correlation between variables but do not imply causality.

Correlations between the DASS-21 and the PANAS

The correlations between NA and PA and the DASS-21 total score were 0.69 and -0.40, respectively; the correlation between NA and PA was -0.24 (all ps $< .01$). The Depression scale's correlation with PA was highly significant and negative in sign (-0.48). Thus, scoring high on the Depression scale was associated with low levels of PA. Using Meng, Rosenthal, and Rubin's (1992) method of comparing sets of non-independent correlations, this correlation was significantly higher than the correlations between PA and the other two DASS-21 scales (-0.29 for anxiety and -0.28 for stress); $z = 8.1$, $p < .001$. The correlation between the Stress scale and NA (0.64) was significantly higher than the correlation of NA with the other two DASS-21 scales (0.58 for anxiety and 0.59 for depression, respectively); $z = 2.7$, $p < .01$.

Convergent and discriminant validity of the DASS-21

Finally, it should be noted that the convergent/discriminant validity of the DASS-21 was investigated by calculating Pearson product moment correlations between each of the DASS-21 subscales with two independent measures of anxiety and depression, the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983), and the Personal Disturbance Scale (Bedford & Foulds, 1978). These data are not presented here because they essentially replicate the results found for the full version of the DASS (see Crawford & Henry, 2003), but can be made available upon request. The essential findings indicate that, as for the full version of the DASS, the DASS-21 does evidence good convergent and discriminant validity when compared with other validated measures of depression and anxiety.

Discussion

Normative data

Comparison of the summary statistics for the DASS-21 and the full version of the DASS in Table 1 reveal that doubling DASS-21 scores yield values very similar to scores

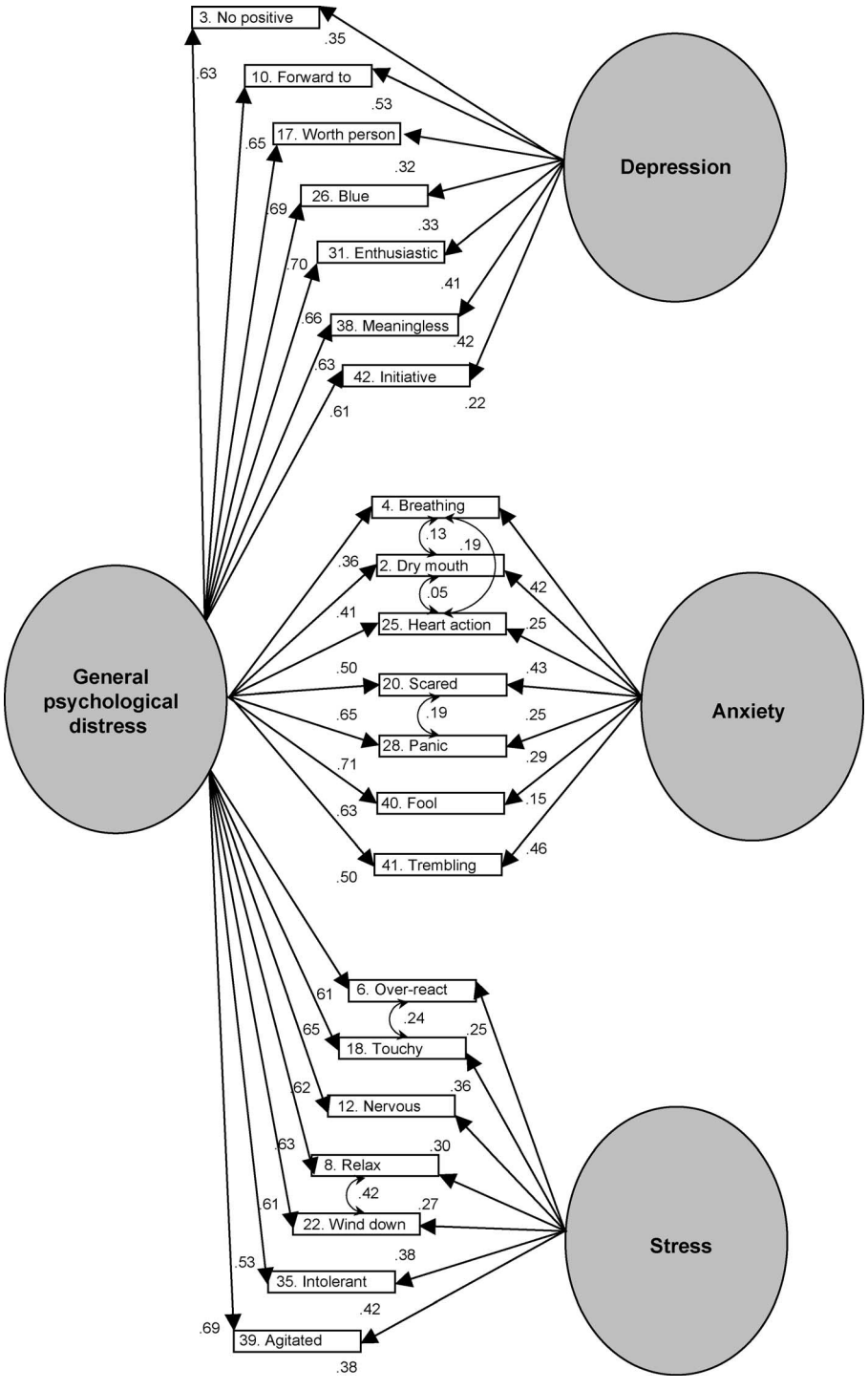

Figure 1. Graphical representation of the optimal model of the DASS-21 (Model 3b).

derived from the full version of the instrument. However, the current study complements this by providing normative data specifically derived from the DASS-21 from a large sample that is broadly representative of the general adult population. The tabulation method in Table 2 was adopted to permit conversion of raw scores to percentiles for all three DASS-21 scales and the Total scale using the same table. For example, a raw score of 11 on the Depression scale corresponds to the 95th percentile.

Reliabilities

The reliabilities of the DASS-21 scales were .88 for Depression, .82 for Anxiety, .90 for Stress, and .93 for the Total scale. There is no absolute criterion for the reliability of an instrument. However, as a rule of thumb, Anastasi (1990) has suggested that α should be at least .85 if an instrument is to be used to draw inferences concerning an individual. By this criterion the Depression, Stress, and Total scales can be viewed as possessing adequate reliability, while the Anxiety scale fell below this criterion, although only marginally. Moreover, alpha is strongly affected by the number of items (the smaller the number of items, the lower alpha is). Therefore, a particular alpha value needs to be interpreted relative to the number of items, not as an absolute figure. Given that the DASS-21 was designed to provide brief measures of broad constructs, these values are satisfactory. Were the alphas much higher than those observed then they could be taken as an indication that the scales have insufficient bandwidth (Boyle, 1985).

Competing models of the structure of the DASS-21

CFA was used to test competing models of the latent structure of the DASS-21. Models 1a and 1b represented tests of Lovibond and Lovibond's (1995) three-factor structure, with Model 1b additionally permitting correlated error. Both of these models proved better fits than Models 2a and 2b, respectively (which specified identical model structures, but tested the alternative DASS-21). Clara *et al.* (2001) also found that the original DASS-21 was a superior fit compared with the alternative DASS-21 in a psychiatric sample. It is of note that it was not intended for the alternative DASS items to be administered separately. When creating the short version, Lovibond and Lovibond's primary concern was to represent all the subscales, and the second criterion was that the items sum as close as possible to the full-scale scores. However, these two criteria still allowed some degrees of freedom in item selection, so where there was a choice, Lovibond and Lovibond always selected the item with the highest loading on its own factor and/or the lowest cross-loading, and this may explain why the DASS-21 items performed better than the remaining items.

As noted earlier, previous literature has consistently identified a three-factor model specifying the dimensions of depression, anxiety and stress as representing the optimal fit to the data, but have not compared the fit of this model with competing structures that incorporate a general distress factor (the quadripartite models examined in the present study), or models that constrains all the items in the Stress scale to load only on the general factor, thereby equating Stress with NA. In the present study, in order to provide a more rigorous assessment of the relationship between NA and stress, these additional models were tested.

Models 3a and 3b were identical to Models 2a and 2b, respectively, but also incorporated a general distress factor. These models tested the hypothesis that, while depression, anxiety, and stress do represent legitimate constructs, they nevertheless share a great deal of common variance. Unlike the foregoing models (in which

the influence of a common factor is captured by permitting correlations between the factors), Models 3a and 3b did not impose the potentially unrealistic constraint that all items will be equivalent in the extent to which they index general psychological distress. Of all the models tested, Model 3b represented the optimal fit, with good fit according to all criteria.

Models 3a and 3b were then retested, but with the unique stress factor removed (Models 4a and 4b, respectively), thereby testing the hypothesis that stress and NA are synonymous. Satorra and Bentler's (2001) chi-squared difference test revealed that Models 4a and 4b were associated with a significantly poorer fit than their less constrained counterparts, Models 3a and 3b, respectively. Therefore, the conclusion from the CFA modelling is that the DASS-21 Depression, Anxiety, and Stress scales index a substantial common factor of general psychological distress. However, the variance contributed by the Stress scale cannot be explained by the shared component alone, and thus the Depression, Anxiety, and Stress scales represent legitimate constructs in their own right.

It is important to consider the practical implications of the present CFA results for use of the DASS-21 in clinical research and practice. The results indicate that combining the Depression, Anxiety, and Stress scales for use as a measure of general psychological distress has considerable validity, although it should be noted that further work is needed to clarify whether this common factor should be labelled as NA.

Nevertheless, regardless of whether the shared general distress dimension should be regarded as NA, in common with most putative measures of anxiety and depression, the present results provide strong evidence that a substantial proportion of the variance in the DASS-21 scores is attributable to a general factor rather than being specific to depression, anxiety, or stress. However, just as there is evidence from CFA of a substantive common factor in the DASS-21, there is also strong evidence of substantial specific factors underlying the depression, anxiety, and stress items. Therefore, it would also be acceptable to use these scales separately with the caveat that the clinician or researcher should be aware that the DASS-21 scales are a blend of variance common to anxiety, depression, and stress, and variance specific to these constructs.

Correlations between the DASS-21 and the PANAS

The results of correlational analyses also support Lovibond and Lovibond's (1995) contention that the Stress scale represents a legitimate measure in its own right and is not simply equivalent to NA. It is clear from the absolute magnitude of the correlation between NA and stress (0.64) that, although the constructs are associated, they cannot be viewed as interchangeable. This correlation is attenuated by measurement error in the NA and Stress scales but, as both instruments are very reliable, the degree of attenuation is modest. When a correction for attenuation was applied to the correlation (Nunnally & Bernstein, 1994), it rose to 0.73. The reliability coefficients (Cronbach's alpha) used in this formula were calculated in the present sample; alpha for the Stress scale is reported in the text, alpha for the NA scale was .85 (Crawford & Henry, 2004). Therefore, the present results indicate that even if the constructs could be measured without error, only 53% of the variance would be shared variance. This conclusion is also consistent with the results from CFA modelling. As noted, removing the specific stress factor and thereby equating stress with NA (Model 3b versus Model 4b) produced

a significant loss of fit. Finally, it is also consistent with Lovibond's (1998) findings from the aforementioned longitudinal study of the DASS.

Conclusion

The DASS-21 has been shown to possess adequate construct validity. The results from CFA modelling indicate that although the three DASS-21 scales index a substantial common factor (i.e. general psychological distress), they also contain variance that is specific to each scale. The reliabilities of the DASS-21 scales are high. To the best of our knowledge, the normative data presented here are the only norms derived specifically from DASS-21 items, and were based on a large sample broadly representative of the general adult population.

The DASS-21 has a number of advantages over the full length DASS. It is shorter and, hence, more acceptable for clients with limited concentration, and yet still possesses adequate reliability. In addition, it omits items from the full DASS identified as problematic, and it has a cleaner latent structure.

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