THE STRUCTURE OF NEGATIVE EMOTIONAL STATES: COMPARISON OF THE DEPRESSION ANXIETY STRESS SCALES (DASS) WITH THE BECK DEPRESSION AND ANXIETY INVENTORIES

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Summary—The psychometric properties of the Depression Anxiety Stress Scales (DASS) were evaluated in a normal sample of $N = 717$ who were also administered the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI). The DASS was shown to possess satisfactory psychometric properties, and the factor structure was substantiated both by exploratory and confirmatory factor analysis. In comparison to the BDI and BAI, the DASS scales showed greater separation in factor loadings. The DASS Anxiety scale correlated 0.81 with the BAI, and the DASS Depression scale correlated 0.74 with the BDI. Factor analyses suggested that the BDI differs from the DASS Depression scale primarily in that the BDI includes items such as weight loss, insomnia, somatic preoccupation and irritability, which fail to discriminate between depression and other affective states. The factor structure of the combined BDI and BAI items was virtually identical to that reported by Beck for a sample of diagnosed depressed and anxious patients, supporting the view that these clinical states are more severe expressions of the same states that may be discerned in normals. Implications of the results for the conceptualisation of depression, anxiety and tension/stress are considered, and the utility of the DASS scales in discriminating between these constructs is discussed.

INTRODUCTION

Historically, the relationship between the negative affective conditions of depression and anxiety has been of considerable theoretical and clinical interest (Akiskal, 1985; Clark, 1989; Clark & Watson, 1990; Dobson, 1985; Stavrakaki & Vargo, 1986; Watson, Clark & Carey, 1988). Conceptually, depression and anxiety are quite distinct, but the clinical overlap between the two conditions has long exercised both clinicians and researchers. The concept of stress poses additional problems in the study of negative affective conditions. In addition to precipitating episodes of anxiety and depression, stressful life events are often thought to lead to a characteristic stress response involving chronic arousal and impaired function (e.g. Selye, 1952). Considered as an affective or emotional state (e.g. Lazarus, 1993), the concept of a stress response has clear affinities with anxiety.

Recently Gotlib and Cane (1989) emphasised the limitations of existing self-report scales for anxiety and depression, and Clark and Watson (1990) have summarised the evidence relating to the assessment of the two conditions. The essential findings are as follows: (a) Self-report anxiety and depression scales typically correlate between 0.40 and 0.70 across a wide range of patient and non-patient samples; (b) Anxiety scales frequently correlate as highly with depression scales as with other anxiety scales, and depression scales show equal lack of specificity; (c) Clinicians' ratings of anxiety and depression duplicate the relationships found with self-report scales; and (d) Only about half the patients diagnosed as having a depressive or an anxiety disorder exhibit relatively pure syndromes of one type or the other.

The two most ambitious research programs designed to differentiate anxiety and depression were conducted by Costello and Comrey (1967) and Beck, Epstein, Brown and Steer (1988). Costello and Comrey began with a large pool of items derived for the most part from existing anxiety and depression scales. The items were administered to successive clinical samples, and iterative factor analyses were performed in the search for items that would define orthogonal factors of anxiety

and depression. In the case of the Beck *et al.* research, a widely used depression scale, the Beck Depression Inventory (BDI), was already available (Beck, Ward, Mendelson, Mock & Erbaugh, 1961; Beck, Rush, Shaw & Emery, 1979). The task was to develop an anxiety scale that would provide maximum discrimination from the BDI and other measures of depression. An initial pool of items was drawn from pre-existing scales, and was refined on the basis of factor analyses of the responses of a series of outpatient samples. The final 21-item anxiety scale (the Beck Anxiety Inventory; BAI) was found to correlate in the region of 0.50 with the BDI. It is of interest that the final form of the anxiety and depression scales of Costello and Comrey (1967) also correlated in the region of 0.50, despite the stated goal of the authors to derive orthogonal anxiety and depression factors.

The present paper focuses on a third research program which aimed to develop self-report anxiety and depression scales that would (a) cover the full range of core symptoms of anxiety and depression, (b) meet high psychometric standards, and (c) provide maximum discrimination between the two scales. The research was carried out over the period 1979–1990 and data were obtained from 30 samples. During testing of the depression and anxiety scales, a new factor emerged from analysis of the non-discriminating anxiety and depression items, with the highest loading items referring to difficulty relaxing, nervous tension, irritability and agitation. Further items were tested to explore the limits of this factor, leading to the development of a new scale which was labelled 'stress' by virtue of perceived similarity of the items to the symptoms of tension or stress (cf. Selye, 1952, 1974). The resulting scales, now referred to as the Depression Anxiety Stress Scales (DASS), were first described by Lovibond (1983; see also Wilson, 1980, 1982). A detailed account of the scale development, normative data, and research applications is provided in the DASS manual (Lovibond & Lovibond, 1993), available from the authors. The DASS items are listed in Table 3.

The DASS research strategy differed in several ways from both previous studies (Costello & Comrey, 1967) and subsequent studies (Beck *et al.*, 1988). First, the scales were developed using a boot-strapping strategy in which factors were defined initially in terms of clinical consensus, but were refined empirically using a confirmatory factor analytic technique, multiple groups factor analysis (Harman, 1976). Items were added as well as deleted over successive samples in an iterative procedure which led to the emergence of the stress factor (cf. Tellegen, 1985, pp. 685–688). Second, because of the overlap and inconsistencies between existing anxiety and depression scales, and between the various diagnostic systems for anxiety and depression, no external criteria were used in the development of the DASS scales. In contrast, Beck *et al.* (1988) selected items in part on the basis of their relationship to *DSM-III* (American Psychiatric Association, 1980) diagnostic categories for anxiety and depression. Finally, the major development of the DASS scales was carried out with normal, non-clinical samples. Thus, the central aim underlying development of the DASS scales was to generate measures of general negative affective syndromes, guided by existing conceptions but ultimately determined on empirical grounds.

The present study was designed to evaluate the psychometric properties of the DASS scales in an independent sample of normal *S*s. In particular, it was considered important to assess the generality of the factor structure derived from multiple groups factor analysis by using conventional exploratory and confirmatory factor analyses. Inclusion of the Beck scales (BDI and BAI) provided an interesting comparison in that these scales were developed with a different research strategy but with similar aims to the DASS scales. Furthermore, the factor structure obtained for the Beck scales in the present normal sample could be compared with the factor structure reported by Beck *et al.* (1988) in a clinical sample, thus providing information about the degree of convergence between the emotional states experienced by normals and by depressed and anxious patients.

METHOD

Subjects

The *S*s were 717 (486 female and 231 male) first year psychology students at the University of New South Wales. The mean age was 21.0 years.

Table 1. Means, standard deviations and alpha coefficients for the DASS scales, the BDI, and the BAI

	Mean	SD	Alpha
DASS			
Depression	7.19	6.54	0.91
Anxiety	5.23	4.83	0.81
Stress	10.54	6.94	0.89
BDI	7.72	6.47	0.84
BAI	9.15	7.41	0.88

Table 2. Intercorrelations between the DASS scales, the BDI, and the BAI

	DASS			BDI	BAI
	Depression	Anxiety	Stress		
DASS anxiety	0.54	—			
DASS stress	0.56	0.65	—		
BDI	0.74	0.58	0.60	—	
BAI	0.54	0.81	0.64	0.59	—

Measures

The DASS (Lovibond & Lovibond, 1993) consists of 42 negative emotional symptoms (see Table 3). Ss rate the extent to which they have experienced each symptom over the past week, on a 4-point severity/frequency scale. Scores for the Depression, Anxiety and Stress scales are determined by summing the scores for the relevant 14 items. Internal consistencies (coefficient alpha) for each scale for the DASS normative sample were: Depression 0.91; Anxiety 0.84; Stress 0.90.

The revised BDI (Beck & Steer, 1987) is a 21-item self-report questionnaire in which each item consists of four statements indicating different levels of severity of a particular symptom experienced over the past week. Scores for all 21 items are summed to yield a single depression score. The internal consistency of the BDI, based on a number of clinical samples, is 0.86 (Beck & Steer, 1987). The BAI (Beck & Steer, 1990) consists of 21 symptoms that are rated on a 4-point severity scale referring to experience of symptoms over the past week. Scores for the 21 items are summed to yield a single anxiety score. The internal consistency of the BAI over a number of samples has been found to be in the range 0.85 to 0.94 (Beck & Steer, 1990).

Procedure

The students completed the DASS, BAI and BDI, in that order, during tutorial classes. Ratings were made in pencil on answer sheets that were read by an optical scanner. The data were analysed by means of principal components and confirmatory factor analyses. A criterion of $\alpha = 0.05$ was used in significance tests.

RESULTS

Descriptive statistics

Means, standard deviations and alpha coefficients for the five scales are shown in Table 1. Inter-correlations between the scales are shown in Table 2. Initial analyses indicated a similar factor structure for males and females, so the factor analyses reported below are all based on the full sample.

Principal components factor analysis

The first approach used to test the factor structure of the DASS, which had been developed using multiple groups factor analysis, was a principal components analysis. Three factors were specified, in order to allow factors corresponding to the three scales to emerge, if supported by the data.* The first three factors together accounted for 41.3% of the item variance. Oblique rotation yielded three correlated factors that reproduced the three DASS scales, with one exception: Anxiety item 10 ("I feared that I would be 'thrown' by some trivial but unfamiliar task") loaded more highly on the Stress factor than on the Anxiety factor. In general, most items received a moderate to high loading on their own factor and low loadings on the other two factors (see Table 3). The correlations between factors were: Depression-Anxiety $r = 0.42$; Anxiety-Stress $r = 0.46$; and Depression-Stress $r = 0.39$.

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*When two factors were specified, the anxiety and stress factors collapsed into one. When four factors were specified, the items describing impatience in the stress scale formed a separate factor, and when five factors were specified, the anxiety scale split into two factors, corrresponding to autonomic and subjective symptoms.

For comparison purposes, a similar principal components analysis, with two factors specified, was carried out on the BDI and BAI items. The first two factors accounted for 22.5% and 6.6% of the variance. Rotation yielded two factors corresponding to Depression and Anxiety, with three exceptions: BAI items 5 ("Fear of the worst happening") and 14 ("Fear of losing control") loaded more highly on the Depression factor than on the Anxiety factor, and BDI item 19 (Loss of weight) loaded more highly on the Anxiety factor than on the Depression factor. The correlation between the two factors was $r = 0.47$. In comparison to the DASS analysis, there was a greater degree of overlap in the loadings of the Depression and Anxiety factors in the BDI/BAI analysis. Several BAI items loaded moderately on both factors. The BDI items did not tend to load strongly on the Anxiety factor, but several BDI items had low loadings on the Depression factor. The BDI items with loadings below 0.3 were item 19 (Weight loss: 0.0), item 21 (Loss of libido: 0.18), item 11 (Irritability: 0.27), item 18 (Loss of appetite: 0.27) and item 20 (Somatic preoccupation: 0.27).

Confirmatory factor analysis

The second approach to testing the DASS factor structure was confirmatory factor analysis. The statistical program Lisrel7 (Joreskog & Sorbom, 1988) was used to test the adequacy of the allocation of items to the three DASS scales. The first model tested was a single factor model, which yielded a very large and significant chi-square value [$\chi^2(819) = 5413$, $P < 0.05$], indicating a significant discrepancy between the model and the data. The adjusted goodness of fit index was 0.60. Next, a two-factor model was tested in order to assess the validity of the distinction between Depression and the other two DASS scales. This model yielded an improved fit [$\chi^2(818) = 3942$, $P < 0.05$; adjusted goodness of fit = 0.74], and differed significantly from the one-factor model [$\chi^2(1) = 1471$, $P < 0.05$]. Finally, three factors were defined, corresponding to the three DASS scales. This model yielded a lower chi-square value again [$\chi^2(816) = 3559$, $P < 0.05$; adjusted goodness of fit = 0.76]. The phi coefficients, which assess the strength of the links between the three factors, were: Depression-Anxiety 0.61; Anxiety-Stress 0.76; Depression-Stress 0.62. The three-factor model provided a significantly better fit than the two-factor model [$\chi^2(2) = 383$, $P < 0.05$]. These comparisons indicate that distinguishing between depression and the other two scales yields a large improvement in fit to the data, and that distinguishing between anxiety and stress yields a further moderate improvement in fit.

In order to provide a reference point to evaluate the goodness of fit of the three-factor confirmatory model, a three-factor exploratory factor analysis was carried out using the same estimation method as the confirmatory analysis: maximum likelihood. This analysis also generated a large chi-square value [$\chi^2(738) = 3025$, $P < 0.05$]. This value represents the lowest possible chi-square that could be obtained for a three-factor solution, where all items are free to load on all factors. By comparison, therefore, the chi-square value of 3559 for the highly constrained three-factor confirmatory analysis is relatively low, particularly in comparison to the one-factor and two-factor values of 5413 and 3942, respectively.

A final analysis addressed the issue of how much of the variance in the three scales is due to a common factor. A second-order factor analysis was carried out, in which a common factor was allowed to influence all three scales, but the three scales were not allowed to influence each other. This model generated an identical fit and identical item loadings to the three-factor confirmatory analysis described above [$\chi^2(816) = 3559$, $P < 0.05$; adjusted goodness of fit = 0.76]. The gamma coefficients, which represent the strength of the links between the common factor and each of the scales, were: Depression 0.71; Anxiety 0.86; Stress 0.88. That is, the common factor accounted for 50.4% of the variance in Depression, 74.0% of the variance in Anxiety, and 77.4% of the variance in Stress. The larger values for Anxiety and Stress reflect the fact that these two scales are more highly correlated, and therefore dominated the definition of the common factor.

DASS subscale analysis

During development of the DASS, items in each scale were categorised into subscales of 2-6 items, on the basis of judgement of common content. In order to test the validity of the subscales, a second-order factor analysis model was tested using Lisrel. This model defined 16 lower-level factors corresponding to the subscales. Each lower-level factor was allowed to contribute to the relevant higher-order factor corresponding to the three scales, Depression, Anxiety and Stress. The

Table 3. List of DASS items with factor loadings from 3-factor principal components analysis with oblique rotation

SCALE *Subscale* Item	Factor loadings		
	1	2	3
DEPRESSION			
Dysphoria			
I felt downhearted and blue*	57		
I felt sad and depressed	56		22
Hopelessness			
I could see nothing in the future to be hopeful about	75		
I felt that I had nothing to look forward to*	80		
Devaluation of life			
I felt that life was meaningless*	76		
I felt that life wasn't worthwhile	73		
Self-deprecation			
I felt I was pretty worthless	69		
I felt I wasn't worth much as a person*	72		
Lack of interest/involvement			
I felt that I had lost interest in just about everything	67		
I was unable to become enthusiastic about anything*	67		
Anhedonia			
I couldn't seem to experience any positive feeling at all*	74		
I couldn't seem to get any enjoyment out of the things I did	60		
Inertia			
I just couldn't seem to get going	36		
I found it difficult to work up the initiative to do things*	45		
ANXIETY			
Autonomic arousal			
I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)*		55	
I perspired noticeably (e.g. hands sweaty) in the absence of high temperatures or physical exertion		34	
I was aware of dryness of my mouth*		47	
I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)*		53	
I had difficulty in swallowing		53	
Skeletal musculature effects			
I had a feeling of shakiness (e.g. legs going to give way)		61	
I experienced trembling (e.g. in the hands)*		64	
Situational anxiety			
I was worried about situations in which I might panic and make a fool of myself*		49	
I found myself in situations which made me so anxious I was most relieved when they ended		46	24
I feared that I would be "thrown" by some trivial but unfamiliar task		20	27
Subjective experience of anxious affect			
I felt I was close to panic*		53	
I felt terrified		48	
I felt scared without any good reason*	22	48	
I had a feeling of faintness	20	52	
STRESS			
Difficulty relaxing			
I found it hard to wind down*			48
I found it hard to calm down after something upset me		20	46
I found it difficult to relax*		27	47
Nervous arousal			
I felt that I was using a lot of nervous energy*		34	41
I was in a state of nervous tension		38	40
Easily upset/agitated			
I found myself getting upset rather easily	27		61
I found myself getting upset by quite trivial things			58
I found myself getting agitated*			63
Irritable/over-reactive			
I tended to over-react to situations*			62
I found that I was very irritable			60
I felt that I was rather touchy*			67
Impatient			
I was intolerant of anything that kept me from getting on with what I was doing*			73
I found myself getting impatient when I was delayed in any way (e.g. lifts, traffic lights, being kept waiting)			56
I found it difficult to tolerate interruptions to what I was doing			76

Note 1: Decimal points and values less than 0.2 in factor loadings omitted for clarity.

Note 2: The DASS scales are in the public domain. The above items are presented to Ss in random order, with a four-point scale for each item labelled "Did not apply to me at all" (0), "Applied to me to some degree, or some of the time" (1), "Applied to me a considerable degree, or a good part of the time (2), and "Applied to me very much, or most of the time" (3). Instructions at the top of the sheet read: "For each of the statements below, please circle the number which best indicates how much the statement applied to you OVER THE PAST WEEK. There are no right or wrong answers. Do not spend too much time on any one statement." Scores for each scale are obtained by summing the scores for the 14 items in the scale.

Note 3: Items which are included in the short (21-item) version are marked with an asterisk. The items were selected such that scale scores for the short version may be converted to full scale scores by multiplying by 2.

Note 4: The DASS is a minor revision of an earlier version of the scales, the SAQ (Lovibond, 1983), which contained 14 Depression items, 12 Anxiety items and 16 Stress items. SAQ scores may be converted to DASS scores by multiplying the Anxiety score by 1.037 and the Stress score by 0.921. The Depression scales are identical.

first attempt to test this model failed, as the Lisrel program could not generate a solution (psi matrix not positive definite). Examination of the standard errors suggested that Anxiety item 14 (faintness) was problematic. Reassignment of this item from the Autonomic to the Subjective subscale allowed a solution to be generated. This solution produced a better fit than the first-order models [$\chi^2(801) = 2399$, $P < 0.05$; adjusted goodness of fit $= 0.84$]. No further adjustments were made to item assignment, due to the likelihood of sample-specific artefacts (MacCallum, Roznowski & Necowitz, 1992). The final allocation of items to subscales is listed in Table 3. Since this allocation was based primarily on logical considerations, it cannot be defended as an optimal solution, since other groupings may have yielded similar or superior fit to the data. However, the subscales provide a means of reducing the information contained in the 42 items, and may be useful for descriptive and research purposes.

The relative contribution of each subscale to the three scales was examined to see whether the various types of symptoms tended to be associated with particular levels of severity. Mean subscale scores were calculated as a function of full scale score, for each scale. In the case of Depression, the Inertia and Dysphoria subscales had the highest mean values and were also more responsive at low levels of Depression than the other subscales, which did not show substantial scores until a full scale score of approximately 6. However, whereas the Dysphoria subscale continued to increase as the full scale Depression score increased, the Inertia subscale showed a slower rate of increase past a full scale score of 8. In the case of Anxiety, the Situational subscale had a higher mean than the other subscales, but all subscales discriminated across the full range of Anxiety scale scores. Finally, all of the Stress subscales showed similar means and discriminated across the full range of Stress scale scores.

BDI and BAI factor analyses

Two further factor analyses were carried out on the present data to replicate directly those reported by Beck *et al.* (1988),* which were based on a clinical sample of $N = 160$. Firstly, a four-factor principal factor analysis with orthogonal rotation was conducted on the 42 BDI and BAI items. The first three factors generated were virtually identical to those obtained by Beck: a depression factor, a somatic anxiety factor, and a subjective anxiety factor. The fourth factor was a somatic depression factor (e.g. loss of appetite, insomnia, somatic preoccupation), whereas in Beck's analysis this factor contained a mixture of BDI and BAI somatic items. The second replication analysis was an oblique two-factor principal factor analysis of the 21 BAI items. This analysis yielded a somatic factor (14 items) and a subjective factor (7 items), with identical item composition in each case to that reported by Beck *et al.* (1988). These results indicate that the factor structure of the BDI and BAI is essentially the same in a normal sample as in a clinical population with diagnosed depressive and anxiety disorders.

DISCUSSION

Psychometric data

This study yielded means, standard deviations and intercorrelations for the DASS scales similar to those observed in previous samples (Lovibond & Lovibond, 1993), and confirmed the satisfactory reliability of the three scales. The factor structure of the DASS was confirmed with two different approaches. First, principal components factor analysis reproduced the three scales, with the exception of one Anxiety item that performed more weakly than in previous data sets. Second, confirmatory factor analysis indicated that the three scales provided a better fit to the data than either a one-factor or a two-factor solution, and yielded a chi-square value close to that of a completely unrestricted analysis. The analyses confirmed that while the DASS successfully discriminates between three negative emotional syndromes, these syndromes are still moderately highly correlated with each other, and in particular the Stress scale is more closely associated with Anxiety than with Depression.

Relationship between the DASS, BDI and BAI

The DASS Anxiety scale and the BAI were highly correlated ($r = 0.81$), while the DASS Depression scale and the BDI were somewhat less strongly correlated ($r = 0.74$). However, both of these correlations were much higher than the corresponding cross-correlations of $r = 0.58$ and $r = 0.54$ (respectively, $Z = 12.41$ and $Z = 9.25$, $P < 0.05$), indicating a greater degree of convergent validity than is typically the case for self-report scales (Clark & Watson, 1990). The primary reason for the lower correlation between the DASS Depression scale and the BDI appears to be the inclusion in the BDI of several items which are not strongly or uniquely related to depression. In particular, weight loss, loss of libido, irritability, loss of appetite and somatic preoccupation received low loadings on the Depression factor in the analysis of the combined BDI and BAI items, replicating the analysis reported by Beck *et al.* (1988). This difference is also reflected in the lower alpha coefficient for the BDI (0.84) compared to the DASS Depression scale (0.91), despite the larger number of items in the BDI (21 versus 14).

It is of interest that many of the BDI items with low factor loadings were among those that were tested during the development of the DASS, but had been rejected since they failed to discriminate between the Depression scale and the other two scales. These items included disturbance of appetite/weight loss, sleeping difficulties, tiredness for no reason, lack of energy, poor concentration, indecisiveness, agitation, guilt, lack of interest in sex, early awakening, feeling worst in the morning, mood changes during the day, crying, restlessness, and irritability. Some of these items were in fact more closely associated with the DASS Stress scale and form part of the final version of that scale. It should be noted that the first eight of the above symptoms are included among the criteria for diagnosis of major depression listed in the Diagnostic and Statistical Manual (*DSM-III-R*) of the American Psychiatric Association (1987).

The implication of the present data, that several traditional depressive symptoms are only poorly associated with other components of the depressive syndrome, is of course a contentious one. In particular, clinicians have long regarded somatic symptoms as core features of depression. However, the present findings are supported by previous research on the discriminant validity of individual symptoms. In a review of studies of both clinician-rated and self-reported symptoms of depression ands anxiety, Clark (1989, Table 4.3) reported that four symptoms (loss of sexual interest, loss of appetite, overeating/weight gain, and increased sleep) were weak or inconsistent discriminators between patients diagnosed with depressive and anxiety disorders. Thus it would appear that current conceptions of depression, reflected both in popular self-report instruments such as the BDI and in formal diagnostic systems, may include symptoms that are poorly associated with the core depressive syndrome, or that are not unique to depression. By contrast, these symptoms were excluded from the DASS Depression scale during scale development, where discrimination between the three scales was a primary criterion for symptom inclusion. Further research is necessary with clinical samples to determine systematically which symptoms are best related to the overall diagnosis of depression, and which discriminate depression from other diagnoses such as anxiety disorders.

Normal versus clinical emotional states

In the present normal sample, the factor structure obtained from factor analysis of the BDI and BAI was highly similar to that reported by Beck *et al.* (1988) for these instruments on a clinical sample. Similarly, in the development of the DASS, not only the factor structure but also the relative performance of individual items was found to be virtually the same in clinical and non-clinical samples. Furthermore, in the present study, the subscale analysis indicated that the contribution of the various symptoms within each syndrome was relatively constant across severity. All of these findings strongly suggest that the depression, anxiety and tension/stress manifested by non-psychotic clinical outpatients and by normal non-clinical groups differ primarily in severity. This conclusion does not, of course, deny the possibility that specific clinical sub-categories may be distinguished within these general affective disturbances. However, the results do add to evidence suggesting that emotional disorders fall on a continuum with less extreme emotional disturbance (e.g. Farmer & McGuffin, 1989; Vredenburg, Flett & Krames, 1993). That is, clinical disorders may

represent the severe, inappropriate or chronic manifestation of syndromes whose essential structure may be discerned in normal Ss.

The nature and differentiation of depression, anxiety and stress

The present study confirms that three syndromes, labelled depression, anxiety and stress, may be distinguished from self-report data by the DASS scales. Descriptively, the Depression scale is characterised principally by a loss of self-esteem and incentive, and is associated with a low perceived probability of attaining life goals of significance for the individual as a person. The coherence of these symptoms supports the view that the depressive syndrome is considerably broader than sadness of mood, although as discussed above, several symptoms traditionally regarded as part of this syndrome are not represented in the DASS Depression scale, since they do not appear to be specific to depression.

The DASS Anxiety scale emphasises the links between the relatively enduring state of anxiety and the acute response of fear. It is of interest that the conventionally derived anxiety scale of Costello & Comrey (1967) does not share this feature. Indeed, the content of the Costello & Comrey anxiety scale is very narrow, and the scale appears to tap a dimension that might be termed 'nervousness'. By contrast, the BAI, which was constructed by a multi-stage procedure emphasising discrimination from depression at every stage, shares with the DASS Anxiety scale an emphasis on fear-related symptoms. Both scales give weight to somatic and subjective symptoms (cf. Morris, Davis & Hutchins, 1981), and the DASS Anxiety scale additionally addresses situational anxiety.

The content of the Stress scale suggests that it is measuring a state of persistent arousal and tension with a low threshold for becoming upset or frustrated. The items that showed the greatest overlap in factor loadings with the Anxiety scale (see Table 3) were those involving nervous tension and nervous energy. This overlap suggests that there is a natural continuity between the syndromes assessed by the Anxiety and Stress scales, and that the point of division between the two may be somewhat arbitrary. Nonetheless, the analyses confirmed that the Stress scale as a whole contains a coherent set of symptoms that may be differentiated from depression and anxiety. The existence of such a syndrome has important implications for any attempt to provide a full analysis of negative emotional states. However, the present results do not comment on the appropriateness of labelling the scale as measuring 'stress'. Further research is clearly necessary to clarify the external validity of this scale, in particular its relationship to constructs in stress research such as life events, appraisal and coping (Coyne & Downey, 1991), and its discriminant validity from anxiety.

A central theoretical question that arises in the present research is the basis of the measured association between depression, anxiety and tension/stress. Our findings concur with those of other investigators who have expended considerable effort in attempts to obtain the maximum meaningful discriminations between measures of anxiety and depression. Indeed, the findings of Costello and Comrey (1967) and Beck *et al.* (1988), together with those of the present study, suggest that $+0.50$ may well be an irreducible minimum correlation between self-report scales designed to measure depression and anxiety. In the case of the DASS scales, no item was retained which loaded substantially (greater than 0.25) on the other scales. The absence of overlapping items is largely confirmed by the present data set. Nonetheless, the intercorrelations between the scales are still moderately high. It therefore may be argued that the associations between the DASS scales are not the result of the scales measuring *overlapping constructs*. Rather, these correlations may reflect *common causes* of anxiety, depression and stress (cf. the correlation between height and weight). There would seem to be two possible types of common cause of negative affective states: a common vulnerability factor which influences all three states, such as neuroticism (Eysenck & Eysenck, 1964) or negative affectivity (Watson & Clark, 1984), and common environmental activation. We are currently engaged in research aimed at identifying the common and specific factors, both trait and environmental, that underlie the states of depression, anxiety and stress.

In summary, the present research provides support for the psychometric properties of the DASS scales and their convergent and discriminant validity with other instruments developed on clinical populations. The DASS scales not only provide measures of anxiety and depression that have been specifically designed to maximise internal consistency and differentiation, but both of these scales are further differentiated from the related state of tension/stress. The capacity to separately measure these three related states may be of considerable use for researchers dealing with the complex links

between environmental demands and emotional and physical disturbance. The scales may also be useful to the clinician in clarifying the locus of emotional disturbance, as part of the broader task of clinical assessment (cf. Kendall, Hollon, Beck, Hammen & Ingram, 1987).

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