THE PERSONAL DISTURBANCE SCALE (DSSI/sAD): DEVELOPMENT, USE AND STRUCTURE

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Summary—This is the second in a series of three articles reviewing and reassessing Foulds' theoretical conceptions of personality disturbance and personal illness and the scales that were developed to assess them. In this report we review the theoretical development of DSSI/sAD (Delusions-Symptoms-States Inventory/states of Anxiety and Depression, otherwise known as the Personal Disturbance Scale) and describe how it fits into Foulds' theories. The intended use of SAD is discussed and the many past and current applications of the SAD are reviewed. Studies of the SAD's psychometric structure are rare and we present a new analysis, including confirmatory factor analysis of SAD in 480 psychiatric patients. The SAD items' factorial structure fits largely with its authors' conceptions. However, the SAD items cover an anxiety-depression continuum, rather than distinct states of anxiety and depression. The SAD's item structure may be interpreted within three current conceptualisations of mood: (1) that of general psychological distress; (2) that of clinical states of anxiety and depression; and (3) that of 'normal' mood dimensions of hedonic tone and tense arousal. It is argued that the SAD might provide a theoretical bridge for the integration of these ideas, and help to bring about a unified model of normal and pathological mood states.

INTRODUCTION

Foulds (1955, 1965) proposed that it was logically necessary to assess separately personality traits and the symptoms and signs of personal (psychiatric) illness before any possible interrelationship could be studied. Such a view, in its employment of Axis 1 and Axis 2 diagnoses, now forms a major part of official psychiatric nomenclature, e.g. Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV; American Psychiatric Association, 1994). Accordingly, Foulds and his colleagues devised distinct psychometric measures for such separate assessments. Subsequently, as he modified his theory of personality and personal illness (Foulds, 1971, 1976) a second generation of self-report measures was produced. This report is the second in a series of articles, the first being by Deary, Bedford and Fowkes (1995), which examine the subsequent literature on these measures and reassess their psychometric properties.

Foulds and Bedford (1975) proposed a hierarchy of classes of personal illness model in which the relationship between the symptom-classes was inclusive and non-reflexive. Each higher class included all the lower classes whilst the converse did not hold. Figure 1 shows the models' four classes ranging from Dysthymic States up to those of delusions of disintegration which their data supported for 93.3% of 480 psychiatric patients. As persons scoring in the higher classes almost invariably scored in all of the lower ones it followed that a scale derived from the Dysthymic States class could be efficient and economical for 'case' selection or treatment evaluation. Hence, the Personal Disturbance Scale (DSSI/sAD) is empirically derived from the full Delusions-Symptoms-States Inventory (Bedford & Foulds, 1978a) and logically from the hierarchy of classes of personal illness model (Foulds & Bedford, 1975; Foulds, 1976). Data on the scale were first reported by Bedford, Foulds and Sheffield (1976), and were followed by a test manual with updated norms (Bedford & Foulds, 1978b).

The DSSI/sAD is a self-report scale consisting of seven state of anxiety items and seven state of depression items and is shown in full in Appendix A. All items are prefixed by “Recently” which can be explained as “During the last month or so”. Testees are first asked whether an item is true

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or false for them. Affirmed items—those circled 'true'—are then scored 1, 2 or 3 mostly according to the degree of distress claimed, e.g. 'a little, a lot, or unbearably'. The possible range of scores is, therefore, 0–21 for each state and 0–42 for the combined SAD scale. Scores of 4 and above for a seven item set mean that at least two items have been affirmed at some level, and are taken as indicating 'presence' of that adverse mood state.

The item content of the SAD was validated against the judgements of experienced clinical psychologists and psychiatrists with a very high degree of concordance. Similarly, the psychiatrists' ratings of their inpatients were statistically significantly related to the patients' scores on anxiety, depression and SAD total (Bedford & Foulds, 1978b). Norms were presented in the manual by the authors from their database of 200 normal Ss and 480 psychiatric patients and are summarised in Table 1. Goldberg, in evaluating his General Health Questionnaire (GHQ; 1972), states that the test "missed chronic schizophrenics, organics and hypomanics". Much the same was anticipated for the SAD, which, however, enquiries about current state and the degree of distress caused, whereas the GHQ asks about change from 'usual self'.

As opposed to the 3 vs 4+ dichotomy of anxiety and depression scores, Bedford and Foulds (1978b) employed a three category classification for total SAD scores. They adopted the following rules:

(a) let scores of 0, 1 and 2 be considered non-personally disturbed (PD);
(b) let scores of 3, 4, 5 and 6 be considered personally disturbed (PD);
(c) let scores of 7 and above be considered personally ill (PI).

Table 2 shows the result of so doing.

Other studies by the authors and Edinburgh co-workers include the following: Foulds and Bedford (1977) uses the Personal Disturbance Scale and the Personality Deviance Scales (Bedford & Foulds, 1978c) to examine self-esteem in affective and non-affective patient groups. Three hundred and twenty-five psychiatric patients were allocated to classes within the hierarchy of personal illness model by means of their Delusions-Symptoms-States Inventory scores. When each of these classes were dichotomised, on the grounds of clinical expectation, into 'affective' and 'non-affective' groups,
Table 2. Totals and percentages of normal Ss' and patients' sAD scale scores falling into the three Personal Illness categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Healthy Ss (N = 200)</th>
<th>Patients (N = 480)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>PD</td>
<td>2-162</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>81.0</td>
<td>11.8</td>
</tr>
<tr>
<td>PD</td>
<td>3, 4, 5, 6</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>14.0</td>
<td>13.5</td>
</tr>
<tr>
<td>PI</td>
<td>7+</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5.0</td>
<td>74.7</td>
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</table>

it was found that both intropunitiveness of the Personal Deviance Scales and the Personal Disturbance Scale (DSSI/sAD) discriminated highly significantly. Evidence was adduced, however, that these two measures were not tapping the same attributes (Foulds & Bedford, 1977). Bedford and McIvor (1978) confirmed, in both a normal and a patient group, Foulds' (1971) suggestion that, of the 16 PF (Cattell, Eber & Tatsuoka, 1970) primary traits, C, O and Q4 were more like states whereas G, L and Q3 were deviant traits. Ingham (1981) conducted epidemiological studies of normal Ss in the community and found that “about 10 per cent of a general population sample, excluding any who had consulted their GPs within three months” were classified as personally ill. This illness threshold he believed to be close to Index of Definition Category 5 of the Present State Examination (a structured psychiatric interview; Wing, Cooper & Sartorius, 1974). Conversely, Ingham and Miller (1982) noted that “thirty seven per cent of women who reached the personally ill criterion score on the SAD had consulted their doctors, whereas for the men the figure was 22%”. Bedford and Bedford (1985) found similar SAD scores in the general population and in British social workers and social work trainees. The social workers had a mean of 2.2 with a standard deviation of 4.3.

The SAD scale was originally intended for use in treatment evaluation and for detecting the personally disturbed in the community. The following sections present and discuss applied work with the SAD.

Normative data and validation

Lyketsos, Blackburn and Mouzaki (1979) translated the SAD and a companion measure, the Personality Deviance Scales, into Greek and collected data on 220 normal Ss. Women, with means for anxiety of 3.2 and for depression of 2.2, scored significantly higher than Greek men. By contrast with the initial British norms (Foulds, 1976), both Greek sexes had the higher SAD mean scores. The authors believed that the results highlighted the need for local norms in transcultural research.

In an Australian epidemiological study Henderson, Byrne and Duncan-Jones (1981) introduced the SAD together with the GHQ, the SDS (Zung, 1965) and his own 4NS scale. Table 3 shows the SAD results. Again, the women are the higher scorers and more often exceed the depression 4+ threshold. The correlations among the four different tests were all highly significant, ranging from 0.50 to 0.62. The Canberra team again included the SAD in a battery of psychological tests of psychiatric symptoms and personality where repeated measures were needed to evaluate the “retest artefact in longitudinal studies” (Jorm, Duncan-Jones & Scott, 1989). They found that this mean change towards less psychopathology is unrelated to the time lag between occasions, ranging from 4 to 34 weeks, but was confined to measures assessing negative self-characteristics and administered by an interviewer. In a further two-wave community survey, Henderson and Jorm (1990)

Table 3. State of anxiety (sA) and state of depression (sD) means, standard deviations and percentages scoring 4+ for Canberra men and women

<table>
<thead>
<tr>
<th></th>
<th>Men (N = 101)</th>
<th>Women (N = 142)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of Anxiety</td>
<td>State of Depression</td>
</tr>
<tr>
<td>Mean</td>
<td>1.2</td>
<td>0.7</td>
</tr>
<tr>
<td>SD</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>%4+</td>
<td>15.8</td>
<td>7.0</td>
</tr>
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found that respondents who reported that the interviews had made them feel anxious/depressed gained significantly higher scores on both state measures on both occasions.

In another article from the Canberra Research Unit, Braithwaite (1987) outlined a newly developed measure of neuroticism, the Scale of Emotional Arousability (SEA), intended to avoid "the consistent pattern of negatively worded items that plagues the neuroticism (N) Scale of the Eysenck Personality Inventory" (Eysenck & Eysenck, 1964). The sAD scales, in common with other "well-known measures of neurosis" correlated moderately with the SEA, i.e. 0.55 with anxiety and 0.48 with depression.

Economou and Angelopoulos (1989) collected data on 754 Greek high school students, mean age 16.9 years. For the males the mean sAD score was 4.7 (SD 4.8) and for the females was 9.1 (SD 7.1), all considerably in excess of the British adult norms. In a separate Greek translation, involving also the Personality Deviance Scales, Vaslamatzis, Bazas, Lyketsos and Katsouyanni (1985) compared female nursing, teaching and physiotherapy trainees with Lyketsos et al.'s (1979) Greek female norms. The only significant difference for the sAD scales was that student nurses gained the highest depression scores. On total sAD the nurses' mean was 6.9 and the Greek women sample mean was 5.4 with the other two trainee groups intermediate. Angelopoulos and Economou (1994) assessed 1080 high school students of a Greek provincial town a few weeks before their June examinations. The boys' and girls' mean anxiety scores were 2.4 (SD 3.0) and 5.0 (SD 4.2) respectively, and for depression were 3.1 (SD 3.3) and 5.2 (SD 4.2). The total sAD means were, therefore, 5.4 for males and 10.2 for females. The authors suggested that their findings should encourage discussion of gender differences in adolescent mood disorders. Again, it is clear that different norms from those of the UK are needed for Greek Ss, particularly the young. For Australian research purposes the evidence of such a need is less compelling. When employing categories, however, as per Table 2, it is necessary to demonstrate that terms are being employed identically.

In a sample of 604 young convicted male offenders Cookson (1994) found, inter alia, high anxiety and depression sAD scores among drug users and the highest mean sAD scores of all in children of problem drinking parents. sAD correlated 0.43 with Neuroticism from the short form of the standard EPQ-R. In a factor analysis of all six scales sAD loaded highly with Neuroticism and Self-esteem on one factor; the second was defined by psychoticism and impulsiveness.

**Psychosomatic groups**

A series of Greek studies has examined the personality characteristics, using the Personality Deviance Scales, and mood state, employing the sAD, of various psychosomatic hospital inpatient groups.

In comparison to norms collected by Lyketsos et al. (1979), a study of consecutive hospital admissions for hypertension and ulcers found the hypertensives to be significantly more anxious and depressed and both groups to exceed a control group and the norms. The sAD means for the experimental clinical groups were 12.7 and 6.7 on admission whilst the controls and norms were both 3.9. At discharge "the state differences persisted" (Lyketsos, Arapakis, Pears, Photiou & Blackburn, 1982). Likewise the bronchial asthma inpatients' sAD mean of 13.4 on admission grossly exceeded control and norms scores (Lyketsos, Karabetos, Jordanoglou, Liokis, Armaganidis & Lyketsos, 1984). Indeed, this is the kind of score found among psychiatric patients under treatment in the United Kingdom. Three skin disease groups (urticaria, psoriasis and alopecia) also completed these two questionnaires and obtained sAD means of 11.0, 12.8 and 12.7, respectively, all significantly greater than a control group of patients with other skin diseases (Lyketsos, Stratigos, Tawil, Pears & Lyketsos, 1985). Inpatients with ulcerative colitis and irritable bowel syndrome had means of 7.4 and 8.9 compared to a control group of medical admissions (with neither psychiatric nor psychosomatic complaints) with a mean score of only 1.5. In all these groups, anxiety was the much greater element in the total sAD mean (Arapakis, Lyketsos, Gerolymatos, Richardson & Lyketsos, 1986).

An article summarising the sAD findings "in physical conditions of presumably psychogenic origin" and controls involved nine and five groups respectively (Lyketsos, Lyketsos, Richardson & Beis, 1987). The authors concluded that "on the sAD, all the above [physical] groups scored significantly higher than somatically ill controls in anxiety, and all except the ulcer patients scored significantly higher in depression". The authors added that "while all experimental groups showed..."
similar levels of anxiety, depression varied considerably.” The former tends not to improve with remission of some ‘psychosomatic’ disturbances whilst depression may lessen with the amelioration of such symptoms.

Male hypertensives and a control group in a Chicago hospital recorded similar total SAD means of only 1.2 and 1.0 respectively (Aritzi, Demakis, Demakis, Fareed, Reid, Dunkas, Richardson & Lyketsos, 1989).

**Physical problems**

(a) Acquired hearing loss. Thomas (1984) reported at length on a sample of 211 hearing-impaired adults of employment age with regard to their social and psychological status. In a series of separate publications, different aspects of these findings were discussed. For example, Thomas and Gillhouse Herbst (1980a) noted that using the Manual cutting score of 7+ identified 19% of the people as psychiatrically disturbed compared to 5% of the general population. Such disturbance related significantly to “unhappiness at work, changing jobs due to deafness, being lonely, having no friends, deafness adversely affecting marriage, feeling near to a nervous breakdown and overall dissatisfaction with life”. A significantly greater proportion of such ‘SAD cases’ were found among those with severe (as contrasted to moderate or mild) pure tone loss (Thomas & Gilhome Herbst, 1980b). Similar results applied to the standard of speech discrimination ability. Thomas (1981) reviewed descriptive and experimental studies on the relationship between acquired deafness and psychological disturbance.

In a random sample of 657 patients aged 70 and over from a general practice ‘hearing difficulty’ was associated with both depression and anxiety (Jones, Victor & Vetter, 1984).

(b) Obesity. In a three-month double blind trial of 100 obese women, a significant correlation between change in mood and change in weight was found. Weight loss was associated with improved mood state and weight gain with increased disturbance (Weighill & Buglass, 1984). By contrast, a placebo controlled double-blind trial of fluvoxamine maleate in 40 females showed a significant improvement in mood for both groups over three months but no “significant relationship between improved mood and weight change” (Abell, Farquhar, Galloway, Steven, Philip & Munro, 1986).

(c) Lower limb amputation. Stephen (1982) reported that, of 22 patients admitted at a median of 22 weeks post amputation, only one had a significant score for anxiety and only two for depression.

**Elderly**

The majority of studies under this heading were completed either by the Research Team for the Care of the Elderly, Welsh National School of Medicine, Cardiff, or the Department of Health, Care of the Elderly, Nottingham University Medical School with colleagues.

The first reported use of the sAD with old people, however, would appear to be by McNab and Philip (1980). Health visitors were able to assess 41 elderly people, 85 years or over, and found that their distribution into sAD categories did not differ significantly from the normative data of younger adults. Vetter, Jones and Victor (1982) had 1288 people, aged 70 years and above, interviewed regarding mental and physical disability and the use of services. The sAD results are presented in terms of “normal, borderline and pathological” categories in relation to these variables as well as age and sex. The authors concluded that the “relationship between anxiety, depression and the use of services is a close one” and that anxiety/depression are important predictors of the need for services. When carers for the elderly at home were assessed they were found to be more often anxious—“23% and 13% scored as borderline and pathological”—than depressed (9% and 6%). In general “there was a great deal of distress and psychological morbidity among the carers” (Jones & Vetter, 1984). A report on hearing difficulty and its psychological implications by this team was cited earlier (Jones et al., 1984). “Both anxiety and depression showed a close relationship and loneliness” in urban and rural 70 plus year olds, increasingly so with age (Jones, Victor & Vetter, 1985). That the anxiety and depression scores were higher in an urban (than a rural) general practice and in females, and were closely associated with physical disability in these old people was reported by Vetter, Jones, Victor and Philip (1986).

The Nottingham team assessed mental health and psychological well-being in 507 (65–74 year olds) and 535 (75+ years) individuals in the community. Both groups reported similar levels of anxiety and personal disturbance and showed a similar prevalence of depression. A Cronbach alpha
coefficient of 0.85 was calculated for the 14 item sAD scale. Employing a higher cut-off score, clinical and survey ratings of depression showed an overall agreement of 84.6% with a Kappa coefficient of 0.66 \( (p < 0.001) \). Separate tables for the anxiety and depression subscales scores distributions \((0-8+))\) by age in conjunction with information in the text could provide useful normative data for those aged 65+ years (Morgan, Dallosso, Arie, Byrne, Jones & Waite, 1987a). When these persons were classified on sAD score as psychiatrically normal, borderline or ill, those classified as ill were significantly more likely to report recent GP and social services contact and be receiving psychotropic drugs. The rank-order correlation between a 12-item physical health problems checklist and the sAD was 0.41 \( (p < 0.001; \) Morgan, Dallosso, Ebrahim, Arie & Fentem, 1987b). Subjective insomnia at least ‘sometimes’ was reported by 37.9% of this community sample, it being test predicted by sAD anxiety scores, sex and self-ratings of health (Morgan, Dallosso, Ebrahim, Arie & Fenten, 1988). To assess relationships between customary physical activity and mental health, the elderly were divided into two groups on the basis of sAD scale score 2—versus 3+, the latter being regarded as ‘disturbed’. In a stepwise discriminant analysis of variables predicting group membership, health, social engagement and age achieved significance for both sexes. For men, home maintenance activities also contributed (Morgan, Dallosso, Bassey, Ebrahim, Fentem & Arie, 1991).

From the Nottingham database recently widowed women were studied longitudinally with respect to their psychological and physical health and social functioning. Never-married and still-married subjects acted as controls. All groups showed an age-related decline in mental and physical health. While widows showed significantly greater changes in morale and personal disturbance, as assessed by the sAD, their levels of social functioning remained stable over the four year period (Bennett & Morgan, 1992). A battery of psychometric measures, including the sAD, was employed by Pearson and Beech (1990) in illustrating the inter-relationships of personality variables and symptoms in an elderly patient suffering pain.

*Psychiatric disorders of childbirth*

Postnatal depression was investigated by the antenatal screening of a sample of 166 women for factors that might be predictive of later disturbance. sAD anxiety, amongst other measures, was positively associated with postnatal depression six weeks after birth. It was suggested that, for a number of women, depression found postnatally might already be present before childbirth (Hayworth, Little, Bonham Carter, Raptopoulos, Priest & Sandler, 1980). Similarly “women with high anxiety or hostility scores had a more pronounced ante-natal heart response to the sound of a baby crying than to noise of similar frequency and intensity. This more pronounced heart response was also related to later post-natal depression” (Little, Hayworth, Bonham Carter, Dewhurst, Raptopoulos, Sandler & Priest, 1981). As there were no significant differences in either anxiety (sAD) or hostility over the course of pregnancy it does not seem to matter very much at what point in pregnancy such questionnaires are administered in terms of the significance of the predictive power for later depressed mood (Little, Hayworth, Benson, Bridge, Dewhurst & Priest, 1982). Postnatal depression from six weeks to 12 months post-partum was positively associated with first trimester ante-natal scores on sAD anxiety and other psychometric measures (Bridge, Little, Hayworth, Dewhurst & Priest, 1985).

Forty-five pregnant women gained a mean sAD anxiety subscale score of 7.29, considerably in excess of normative score findings (Benson, Little, Talbert, Dewhurst & Priest, 1987). Maternal and foetal heart rates were recorded while they listened to a tape through headphones. The foetuses of anxious mothers showed pronounced responses to certain taped stimuli. This series of studies, and other work, is included in Priest, Tanner, Gandhi and Bhandari (1995).

Of 425 childbearing women, 230 completed the sAD and 10 visual analogue scales on four occasions pre- and post-pregnancy (Cox, Connor, Henderson, McGuire & Kendell, 1983). The authors concluded that self-report scales, unlike visual analogue scales, have a limited sensitivity to rapid mood changes and for several reasons may require re-design and revalidation for use during pregnancy and in the puerperium. Consequently, Cox, Holden and Sagovsky (1987) developed the Edinburgh Postnatal Depression Scale from an initial pool of 21 items. Some of the items were of their own devising whilst others were from existing scales including the sAD.
**Bereaved Parents**

A series of prospective studies by the Child Health Department of Queensland University has examined the stress responses and circumstances of 94 parents following sudden infant death (SIDS), 179 after a stillbirth (SB), and 192 with a neonatal death (NND). Among the measures used in the various research waves were the items of the sAD.

The first report examined the three bereaved groups' parents and 453 controls two months after loss. Parents were interviewed separately and each subject family was individually matched with a control family. The authors concluded that bereaved parents "manifest high levels of anxiety and depression two months after the death. Mothers have more symptoms than fathers, and parents affected by SIDS have the most symptoms of anxiety and depression" (Vance, Foster, Najman, Embelton, Thearle & Hodgken, 1991). They also report reliabilities close to 0.90 (Cronbach's alpha) for the two sAD scales.

More detailed "maternal anxiety" and "paternal anxiety" mean scores, based on a five-point scale are shown for four waves (2-25 months) on the above groups by Vance, Najman, Embelton, Foster, Thearle and Boyle (1993). Patterns of depressive symptoms are said to be very similar. The Ss are the same people on all occasions. In summary, bereaved "mothers' symptoms persist for longer than the fathers'. For mothers who have lost children from SIDS, these differences persist for two years. These symptoms persist for 15 months for those mothers who have lost infants from neonatal death or stillbirth."

Boyle (1993) concerned herself with the patterns of distress and predictors of recovery in mothers of SIDS bereavements. "Bereaved mothers who were not distressed at 2 months were unlikely to become so later. However, those who were still distressed at 8 months tended to remain distressed subsequently", i.e. at 15 and 30 months post loss. Boyle, Vance and Najman (1993) looked at the anxiety and depression rates for all bereaved mothers who did, and did not, become pregnant within 6-8 months of their loss and also those rates at the later interviews. They "found no evidence to suggest that an early pregnancy places women at risk for psychological disorder, at least within the first 25 to 30 months of the loss". Vance (1994) discussed the relevance of the Department's work to research into postnatal depression from the use of the seven-item depression component of the sAD as an effective way of detecting depression in a group of bereaved and control mothers.

A study including fifth wave interviewers, i.e. 60 months after loss, found that, while distress for mothers, as assessed by the sAD, may persist for at least 30 months, it appears to subside within five years. It was suggested that the lower manifestation of psychological symptoms in fathers may be due to grief expressed in other forms, e.g. increased alcohol use. Having used a marital adjustment scale (Spanier, 1976), marital status and "Quality of Life" questions, they added that parents "who experience the death of a baby are also more likely to experience an adverse marital outcome within five years of the loss" (Vance, Najman, Thearle, Embelton, Boyle & Lutvey, 1995b). When religious affiliation, church attendance, child loss and anxiety/depression rates were examined in the loss and control groups of parents at 2 months, the results did not "confirm a traditionally held belief that religious consolation for the grief of bereavement and the bereaved 'turn to God' as reflected in church attendance" (Thearle, Vance, Najman, Embelton & Foster, 1995). It was suggested, however, that the finding that "the bereaved who attend church regularly have less anxiety and depression" compared with the rest warrants further examination.

That bereaved parents have a marked reduction in symptoms (anxiety and depression) over the first 8 months after the loss was shown by Vance, Najman, Thearle, Embelton, Foster and Boyle (1995c). Compared with controls, however, these levels were still high for mothers "but far less evident for fathers". Finally, Vance, Boyle, Najman and Thearle (1995a) presented a wide range of findings covering the first four waves including "heavy alcohol ingestion" which was "significantly more prevalent at 2 and 30 months". Similarly, Keeping, Najman, Morrison, Western, Andersen and Williams (1989) introduced the first of four waves in a study of 8556 pregnant women whose first antenatal visit included completing at 117-item questionnaire that contained the sAD anxiety and depression scales.

**Genetic twin studies**

A series of studies involving Australian and American authors has reported on data gathered from the Australian National Health and Medical Research Council Twin Register. Both members
of 3810 twin pairs had responded by completing a questionnaire which included the sAD items. Jardine, Martin and Henderson (1984) found that for men and for women both “anxiety and depression scales show extreme ‘reverse-J’ shape distributions” unlike the EPQ (Eysenck & Eysenck, 1975). Neuroticism which showed “a reasonably symmetric distribution but... with a ‘basement-like’ effect”. The scale means were 2.4 for anxiety in women and 1.8 for men, 1.5 for depression in women and 1.1 for men. A genetic analysis of the trait of neuroticism and symptoms of anxiety and depression found that differences between people on these measures could be explained simply by differences in their genes and differences in their individual environmental experiences. There was no evidence that shared environmental experiences, i.e. by co-twins, were important.

Kendler, Heath, Martin and Eaves (1986) examined the sAD’s 14 individual items’ responses by sex and noted that “females scored higher than males on all items”, significantly so on 10 occasions. Their Table 4 provides normative data in the form of mean, standard deviation and per cent scoring positive by item. The main analysis again concludes that “the results strongly support the role of genetic factors in explaining twin resemblance for the large majority of symptoms. Contrary to prediction, evidence of a role for familial-environmental factors in influencing symptom scores was either absent or weak”.

Kendler, Heath, Martin and Eaves (1987) carried out four traditional factor analyses on 1978 same sex female and 918 same sex male and 902 opposite sex volunteer twin adult pairs having subdivided the sample by sex and then into first and second members from each twin pair. One depression item, relating to suicidal thoughts, was omitted because of its low response rate, and, as the most extreme response category (“unbearably”) was used infrequently, it was collapsed into a three-point scale. Using the eigenvalue criterion, three orthogonal factors were extracted. The first phenotypic factor, accounting for between 45.8% and 50.5% of the total variance was similar across the four groups, and was termed “depression-distress”. It accounted for two-thirds of the total variance of the depression subscale. The second factor, accounting for between 6.5% and 10.9% of the total variation, was also quite similar in the groups. This factor was termed “general anxiety” and accounted for over five times as much variance in the anxiety as in the depression subscale. A third factor, accounting for between 5.6% and 5.9% of the total variation, had in all four groups by far the highest loading on two items—“worrying kept me awake” and “miserable, difficulty with sleep”. This factor was termed “insomnia”. The authors then carried out what they believed to be the first application of multivariate genetic methods to individual psychiatric symptoms. They concluded that there was “little evidence that genes influenced specifically either symptoms of depression or symptoms of anxiety. However, certain environments appeared to be specifically depressogenic and others anxiogenic”.

Female twin responders (1233 monozygotic and 750 dizygotic pairs) to the same six sAD depression items produced data on the items’ endorsement frequencies and inter correlations (the highest being +0.59 and the lowest being +0.40). When analysed the first two eigenvalues of the correlation matrix were found to be 3.36 and 0.67. The loadings for the items ranged only from +0.69 to +0.81 (Eaves, Martin, Heath & Kendler, 1987). The authors concluded that “there is strong support for a unidimensional model for the latent space”. For the purpose of genetic analysis of the liability to depression, the items were recorded dichotomously and led to the resulting comment that “a model which allows only for polygenic variation in the latent trait is supported as well as the ‘mixed model’ which also allows for the effects of a major gene. The likelihood is significantly lower when all genetic effects are ascribed to a single gene”. Silberg, Martin and Heath (1987) also studied these female twins with regard to genetic and environmental factors in primary dysmenorrhea and its relationship to anxiety, depression and neuroticism. Covariations between menstrual symptoms and the symptoms and personality variables of state anxiety (sA) and depression (sD) and trait neuroticism (N of the EPQ) were shown to be almost entirely genetic in origin.

Data from 2903 adult same-sex twin pairs were analysed to investigate whether the genetic determinants for symptoms of panic are different from those underlying the neuroticism personality trait (Martin, Jardine, Andrews & Heath, 1988). Two sAD anxiety items, numbers 3 and 7, were taken as the criteria for panic. Their results confirmed that “much of the genetic variation influencing the physical symptoms associated with panic is nonadditive, perhaps due to dominance or epistasis”.

Mackinnon, Henderson and Andrews (1990), in conducting a five-wave study of 462 twin pairs,
replicated the findings of previous single-wave twin studies, that trait neuroticism and symptom levels of anxiety and depression are substantially under genetic control with little influence coming from the twins' shared environment. "It has then produced evidence that gene action does not play a part in determining individual variability in these measures" but rather that this "was related to recent life events". Andrews, Stewart, Allen and Henderson (1990) interviewed 446 pairs of adult twins in respect of lifetime data for six common neuroses. The twins also completed measures of neuroticism and anxiety and depression symptoms. In agreement with earlier work there was a genetic contribution to neuroticism and to symptoms but no inheritance of specific disorders. Morris-Yates, Andrews, Howie and Henderson (1990) recruited a sample of 343 adult, same-sex pairs of twins from the Australian Twin Registry to test the equal environments assumption. Again EPQ Neuroticism and the separate anxiety and depression scales of the sAD were employed, and subjects were asked about the similarity of their social environment during childhood and early adolescence. Monozygotic twins reported experiencing more similar 'imposed' (by parents) and 'elicited' (by similar interests and behaviour) environments than dizygotic twins. The extent of imposed similar treatments was unrelated to current behavioural similarity as indicated by absolute intrapair differences on the questionnaires. "Therefore, for the purpose of most analyses, the equal environments assumption is valid."

Mellors, Boyle and Roberts (1994) investigated the association of personality, stress and lifestyle with self-reported hypertension in 4870 female and 2746 male twins from the Registry. The sAD comprised the measure of stress and means were obtained for males of 2.0 anxiety and 1.2 depression and for females of 2.58 and 1.71 respectively. For both sexes, anxiety was one of the five main significant predictors for hypertension in a discriminant function analysis.

In summarising these results Eaves, Eysenck and Martin (1989) say that "the same genetic effects create variation in neuroticism scores, depression scores and anxiety scores. The analysis also shows that some environmental effects are specific to anxiety and depression." They add that "there are distinct and independent environmental influences that increase the chance of expression of symptoms of depression rather than anxiety or vice versa, in individuals of high genetic liability. This means that two individuals with the same high genetic liability will have a higher chance of endorsing symptoms of both anxiety and depression, but that environmental experiences will determine whether they develop the symptoms of anxiety or depression."

Miscellaneous

Researchers of the Australian National University have included the sAD, as a measure of disturbed mood, in their investigations of a theoretical model of persistent gambling. In one study a mean of 7.2 (SD 7.9) for a group of 36 poker machine players is reported. For regular players (N = 15) the correlation between sAD and persistence was 0.76 (Dickerson & Adcock, 1987). When 10 high frequency players were studied, sAD mean 2.3 (SD 1.8), depression was "the only significant predictor in the regression equation", accounting for 36% of the variance, of persistence when losing. Overall they state that "the effect of dysphoria is to render the onset of a session less likely and to reduce the duration should a session occur" (Dickerson, Hinchy, England, Fabre & Cunningham, 1992).

A battery of questionnaires, including the sAD, GHQ and a short form of EPI Form B, was administered twice to 354 adults drawn from the electoral roll and subjected to principal components analysis. It was concluded that "neurotic symptoms and well-being scales do largely measure different ends of a single continuum, but well-being scales seem to have an extraversion component not shared by neurotic symptoms scales" (Jorm & Duncan-Jones, 1990).

Smith, Pearce, Pringle and Caplan (1995) evaluated a pilot therapy service for adults with a history of child sexual abuse. Clients completed three psychological measures—GHQ, sAD and a social activity and distress scale. At the start of therapy 72% of 58 clients were personally disturbed or personally ill, i.e. scored 3+ and/or 7+, whilst at the end of therapy only 31% did so.

George, Shanks and Westlake (1991) and Westlake and George (1994) carried out a census of 388 single homeless people over a 12 hour period in Sheffield. Raised sAD anxiety and depression scores did not differentiate between those with and without a self-reported psychiatric history or admissions. They suggested that these symptoms are a result rather than a cause of homelessness.
and that a broad social solution to mental illness in homeless people is needed in addition to specific medical interventions.

**Scale Structure**

In the Genetic Twin Studies section the series of Australian–American researchers also involved an investigation of the item structure of the scales. In summary they found: (a) a one factor solution for the six items used of the seven item depression scale in a normal sample; and (b) a three factor solution for thirteen items of the sAD, again omitting the same depression item, with a normal sample. No separate analysis was carried out for the anxiety items. The present report is the first to conduct a factor analysis of all sAD items in psychiatric patients using the full response range for each item.

**SUBJECTS AND METHOD**

DSSI/sAD responses were collected on 253 psychiatric inpatients (142 women, 111 men), with a mean age of 33.6 years (SD = 12.1) in English, Scottish and Canadian hospitals within one week of admission. One hundred and eighteen outpatients (59 men, 59 women), with a mean age of 33.3 years (SD = 12.1), were seen at their first appointment. Similarly, 109 day patients (64 women, 45 men), with a mean age of 34.1 years (SD = 11.6), were assessed within their first week of attendance. Therefore, in total, 480 adults undergoing outpatient, daypatient and inpatient psychiatric treatment completed the DSSI/sAD. Some data concerning this group were reported in a series of publications, e.g. Bedford and Foulds (1978b), Foulds (1976) and Foulds and Bedford (1975).

**RESULTS**

The means and standard deviations of each of the 14 sAD items are shown in Table 4. Principal components analysis of the 14 items resulted in three components with an eigenvalue greater than one: 5.9, 1.4 and 1.0 respectively. These components accounted for 42.3%, 9.8% and 7.1% of total item variance, respectively. Using principal axis factoring, the percentages of variance were, respectively, 38.9%, 6.5% and 4.1%. Inspection of the scree slope implied that either a two or three factor solution might be appropriate (Cattell, 1966). As a result, and taking into account the disproportionately large amount of variance accounted for by the first unrotated factor, one, two and three factor solutions are shown in Table 4. For the factor solutions shown in Table 4 principal axis factoring was carried out using squared multiple correlations in the diagonals. Oblique solutions were sought.

The first unrotated factor had high loadings for all items, with 4 items $>0.7$ and all save two

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Abbreviated item text</th>
<th>Mean</th>
<th>SD</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Worried about every little thing</td>
<td>1.21</td>
<td>1.02</td>
<td>0.64</td>
<td>0.62</td>
<td>0.07</td>
</tr>
<tr>
<td>3</td>
<td>Been breathless/pounding heart</td>
<td>0.73</td>
<td>0.84</td>
<td>0.37</td>
<td>0.49</td>
<td>-0.10</td>
</tr>
<tr>
<td>4</td>
<td>Worked up/couldn't sit still</td>
<td>1.06</td>
<td>1.00</td>
<td>0.54</td>
<td>0.60</td>
<td>-0.02</td>
</tr>
<tr>
<td>7</td>
<td>Had feelings of panic</td>
<td>1.18</td>
<td>1.08</td>
<td>0.58</td>
<td>0.59</td>
<td>0.06</td>
</tr>
<tr>
<td>9</td>
<td>Pain/tense in neck/head</td>
<td>0.86</td>
<td>0.97</td>
<td>0.44</td>
<td>0.55</td>
<td>0.08</td>
</tr>
<tr>
<td>11</td>
<td>Worry kept me awake</td>
<td>1.14</td>
<td>1.03</td>
<td>0.71</td>
<td>0.73</td>
<td>-0.00</td>
</tr>
<tr>
<td>13</td>
<td>Couldn't make up my mind</td>
<td>0.98</td>
<td>1.07</td>
<td>0.71</td>
<td>0.59</td>
<td>0.18</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Difficulty with my sleep</td>
<td>1.06</td>
<td>1.04</td>
<td>0.68</td>
<td>0.62</td>
<td>0.07</td>
</tr>
<tr>
<td>5</td>
<td>Depressed without knowing why</td>
<td>1.25</td>
<td>1.20</td>
<td>0.59</td>
<td>0.40</td>
<td>0.24</td>
</tr>
<tr>
<td>6</td>
<td>Not caring if never woke up</td>
<td>0.71</td>
<td>1.00</td>
<td>0.65</td>
<td>-0.08</td>
<td>0.81</td>
</tr>
<tr>
<td>8</td>
<td>Low in spirits...sat for ages</td>
<td>1.17</td>
<td>1.04</td>
<td>0.71</td>
<td>0.28</td>
<td>0.50</td>
</tr>
<tr>
<td>10</td>
<td>Future seemed hopeless</td>
<td>1.36</td>
<td>1.14</td>
<td>0.68</td>
<td>0.00</td>
<td>0.75</td>
</tr>
<tr>
<td>12</td>
<td>Lost interest in everything</td>
<td>1.18</td>
<td>1.08</td>
<td>0.79</td>
<td>0.10</td>
<td>0.67</td>
</tr>
<tr>
<td>14</td>
<td>Thought of doing away with myself</td>
<td>0.82</td>
<td>1.01</td>
<td>0.58</td>
<td>-0.21</td>
<td>0.88</td>
</tr>
</tbody>
</table>
>0.5 (Table 4). The two which were lower than 0.5 were somatic anxiety symptoms relating to breathlessness/palpitations (0.37) and pain/tension in the head and neck (0.44). Therefore, the sAD scale as a whole has coherence as a general psychological disturbance scale.

The two factor solution shows a clear separation of anxiety and depression items (Table 4). All of the anxiety subscale items have high loadings (all very near or above 0.5, and going up to 0.73) on the first obliquely rotated factor. All of the anxiety items have low loadings on factor 2. Two nominally depression items have their highest loading on the first factor. “Recently I have been so miserable that I have had difficulty with my sleep” (0.62); and “Recently I have been depressed without knowing why” (0.40). The second obliquely rotated factor has high to very high loadings for five of the depression items, and no other item loads above 0.3, with most being below 0.1 (Table 4). The highest loading items relate to suicidal thought and feelings and to feelings of hopelessness (items 14, 6 and 10).

Therefore, the two factor solution appears to discriminate efficiently between anxiety and depression, with one of the 14 items (number 2) appearing to be misallocated (in this sample, at least) and one item (number 5) not having a high loading on either of the two factors. However, the large percentage of variance in the first unrotated factor should caution against necessarily viewing these two factors as conceptually distinct. In addition, the correlation between the anxiety and depression factors is 0.70, indicating a substantial amount of shared variance.

Also instructive is to examine the loadings derived from an orthogonal rotation of a principal components analysis (Fig. 2). This demonstrates clearly the relative continuity and separation of the items. For example, the five 'good' depression items (numbers 8, 12, 10, 6 and 14) do separate from the nominal anxiety items (numbers 3, 9, 4, 7, 11, 1 and 13), and the two items found to be 'poor' depression items in the present study have an intermediate position (numbers 2 and 5). However, the gap between the two item sets is not large, and another way to view Fig. 2 is that the items execute an efficient 90° sweep between the two axes. What characterises the anchors of the quarter circle? The items at one end (numbers 3, 9, 4 and 7) are related to somatic anxiety and at the other end (numbers 12, 10, 6 and 14) relate to anhedonia. Therefore, the two factor solution of the 14 sAD items offers at least 3 interpretations, as illustrated in Fig. 2. First, the first unrotated principal component might be viewed as indicating a construct of 'general psychological distress'. Second, the two highly correlated oblique factors might be taken as indicators of 'anxiety' and 'depression' constructs. Third, the 14 items might be seen as sampling just one quarter of an orthogonal bivariate space with axes indicating high and low tense arousal and hedonic tone. The
degree to which this last solution fits with current psychometric models of normal mood will be addressed in the discussion.

The three factor solution in Table 4 retains the basic division between anxiety and depression items seen in the two factor solution. The major change is that there are two very high loading items in factor three, with all other item loadings being near to or below 0.1. In addition, the two items loading highly on factor 3 have no loadings above 0.1 on the other two factors. The two high loading items are: item 11, “Recently worrying has kept me awake at night” (0.88); and item 2, “Recently I have been so miserable that I have had difficulty with my sleep” (0.84). Therefore, factor 3 is a sleep factor. The former is nominally an anxiety item and the latter a depression item, though both are in the anxiety group of items in two factor space (Table 4 and Fig. 2). In the three factor solution, the factor intercorrelations are: anxiety versus depression = 0.40; anxiety versus sleep = 0.48; and depression versus sleep = 0.44. Again, all three factors show a substantial amount of shared variance.

**Confirmatory factor analysis**

To test some of the above alternative models competitively, the 14 SAD items were modelled using the EQS structural equation modelling programme (Bentler, 1989). All models were essentially confirmatory factor analyses which tested the hypothesis that a small number of latent variables underlie most of the SAD inter-item covariance. Test results for the various models are shown in Table 5 and these will be referred to as each model is described and assessed, and compared with other models.

Model 1 tested the hypothesis that a single latent trait underlies all of the inter-item covariance. Therefore, all items were allowed free loadings on a single latent variable and all other item variance was assumed to be item specific. This is the ‘general psychological distress’ model. The test results for this model are poor: the fit indices are well below 0.9 (the customary level at which models are deemed adequate) and the \( \chi^2 \) result is highly significant, indicating a poor fitting model. Moreover, the \( \chi^2 \) is much more than twice the number of degrees of freedom, a commonly used rule of thumb to indicate an acceptable value, especially because \( \chi^2 \) statistics are often significant in the presence of a good model when subject samples are large.

Model 2 tested the hypothesis that there were two correlated factors in the SAD in line with the nominal item allocations: thus, item numbers 1, 3, 4, 7, 9, 11 and 13 were allowed free loadings on the first latent variable (the anxiety factor, F1) but loadings fixed at zero on the second latent variable (the depression factor, F2); and items 2, 5, 6, 8, 10, 12 and 14 were allowed free loadings on the second latent variable (depression) and had fixed zero loadings on the first latent variable. The two latent variables were allowed to correlate. Model 2 fits the data significantly better than Model 1 (\( \chi^2 \) difference between the models = 105.1, d.f. = 1, \( p < 0.001 \)), and the two latent variables

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**Table 5. Results of confirmatory factor analyses models on the 14 DS1/SAD items. In all models factor 1 (F1) is the anxiety factor, factor 2 (F2) is the depression factor, and factor 3 (F3) is the general psychological distress factor. In models 2 and 3 the anxiety and depression latent traits are allowed to correlate**

<table>
<thead>
<tr>
<th>Model 1: 1 Factor</th>
<th>Model 2: 2 Factor</th>
<th>Model 3: 2 Factor with correlated sleep items</th>
<th>Model 4: 3 Factor with correlated sleep items</th>
<th>Model 5: Modified 3 Factor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average off-diagonal standardised residuals</td>
<td>0.056</td>
<td>0.048</td>
<td>0.047</td>
<td>0.022</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>615.1</td>
<td>498.0</td>
<td>282.2</td>
<td>253.2</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>77</td>
<td>76</td>
<td>75</td>
<td>62</td>
</tr>
<tr>
<td>( p ) value</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bentler-Bonnet normed fit index</td>
<td>0.785</td>
<td>0.822</td>
<td>0.899</td>
<td>0.955</td>
</tr>
<tr>
<td>Bentler-Bonnet non-normed fit index</td>
<td>0.771</td>
<td>0.814</td>
<td>0.907</td>
<td>0.966</td>
</tr>
<tr>
<td>Comparative fit index</td>
<td>0.806</td>
<td>0.844</td>
<td>0.924</td>
<td>0.977</td>
</tr>
<tr>
<td>Wald test: non-significant parameters</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Items 1, 11, 12 on F1</td>
</tr>
<tr>
<td>Lagrange test: parameters to be added to improve the model</td>
<td>None</td>
<td>Items 2, 5, 8, 14 on F1, item 11 on F2</td>
<td>Items 2, 5, 8, 14 on F1</td>
<td>None</td>
</tr>
</tbody>
</table>
are highly intercorrelated ($r = 0.82$). However, Table 5 shows that the $\chi^2$ is still very high with respect to the number of degrees of freedom, the fit indices are still well below 0.9, and five item-factor associations have been omitted that, if included, would significantly improve the model fit. Of these five associations, four are depression items that could be allowed to load on the anxiety factor and one is an anxiety item that could be freed to load on the depression factor.

Model 3 is comparable to the three factor solution in Table 4. The structure of the model was the same as that of Model 2 above, except that the item-specific variances of the two sleep-related items (numbers 2 and 11) were allowed to be correlated. This procedure was allowed for two reasons: first, two items is small to define a latent trait; and, second, the correlation of the error terms captures the possibility that the two items might represent a bloated specific, essentially having a similar item content. This model fitted significantly better than Model 2 ($\chi^2$ difference between the models = 215.8, d.f. = 1, $p < 0.001$), and the three fit indices were near to or above 0.9. Therefore, Model 3 is the first of the models to approach acceptability. However, there were still four depression items (2, 5, 8 and 14) which, if allowed a loading on the anxiety factor, would improve the fit of the model still further.

Rather than take this empirically-driven route, Model 4 was intended to be a combination of Models 1 and 3. In Model 4 the item variance was assumed to arise from three sources. First, all items were assumed to be influenced by general psychiatric disturbance; second, in line with the item allocations in the sAD, the items were assumed to be influenced by either anxiety- or depression-specific variance; third, each item contained item-specific variance, though this was allowed to be correlated in the case of the two sleep items. This model fits significantly better than Model 3 ($\chi^2$ difference between the models = 157, d.f. = 13, $p < 0.001$), and has highly acceptable fit indices, all well above 0.9 (Table 5). The $\chi^2$ value is approximately twice the number of degrees of freedom in the model. However, the model contains three associations that are non-significant, viz. the loadings of items 1, 11 and 13 on the anxiety factor (F1).

By omitting the three non-significant associations Model 5 was tested and found to have similar fit indices to Model 4 while having 3 extra degrees of freedom. Model 5 is shown in Fig. 3. All of the items had substantial loadings on the general psychological distress factor. Item 3 had the only large loading on factor 1—anxiety—and was followed by item 9. Both are related to somatic aspects of anxiety. The items with the highest loadings on factor 2—depression—were those related to suicidal thoughts and feelings and feelings of hopelessness.

**DISCUSSION**

As the literature review in the Introduction indicates, the Personal Disturbance Scale (DSSI/sAD) has been widely employed. Contrary to the authors' expectations, most studies have not been epidemiological (bar notably Australian–American exceptions), nor of treatment monitoring in the clinical psychology–psychiatry fields, but of general medicine. Given that the items were devised from clinical and research experience in psychiatric settings, this might appear surprising, particularly when item content is considered. For example, an item enquiring about enjoying "a good book or radio or TV programme", an item in the Hospital Anxiety and Depression Scale (HAD; Zigmond & Snaith, 1983), seems of a different order from the sAD's "I have thought of doing away with myself". However, validity and statistical considerations apart, perhaps, paradoxically, such item 'strength' is an advantage for non-psychiatric clinicians and non-clinical researchers in addition to using a self-report questionnaire instead of an interview. Also, the sAD and the forementioned HAD are the only British produced and standardised measures confined to anxiety and depression. (A specific comparison of these two scales is in preparation by Bedford, de Pauw & Grant.) Other measures such as those of Goldberg's (1978) General Health Questionnaire and Kellner and Sheffield's (1970) Symptom Rating Test also include other scales, e.g. assessing somatic and cognitive symptoms, and/or are scored as unidimensional. A broader scope still is found in measures such as the Experiential Index of Crown and Crisp (1979), formerly the Middlesex Hospital Questionnaire, which purports to cover six variables.

Regardless of the reason for choosing the sAD, it is clear that the breadth of studies carried out, involving associations with other assessments including psychometric ones, interviews, clinical
judgements and demographic factors, has added considerably to our knowledge of the utility, reliability and validity of the SAD scales. For future intending researchers it should be reassuring that high compliance has been reported in both nonpsychiatric patient and non-patient groups.

The factor analytic results reported for our psychiatric patients indicate that the SAD scale as a whole is statistically a highly acceptable measure of general psychological disturbance. Twelve of the items have factor loadings above 0.53, with three sharing the highest loading of 0.71. Similarly, a two factor oblique solution produced a clear coherent scale from all of the a priori anxiety items whilst five of the putative depression items loaded highly (0.50 or above) on what is obviously a depression factor. Of the two poorest depression items, one (item 2—"difficulty with my sleep") joins with item 11 of the anxiety scale in the three factor oblique solution. The other item (number 5—"depressed without knowing why") is inconsistent in its loadings between the anxiety and depression factors. It is also the poorest of the 14 items other than when considered as a part of a general psychological disturbance scale (see table 4). Hence, the items have apparent credibility at three levels.

The present results on the SAD may, perhaps, be used to build a theoretical bridge between clinical and non-clinical mood measures. In addition to the scales mentioned above, and used largely in clinical settings, there is a number of mood scales, used more typically in experimental settings, which assess 'normal' moods. Many of these scales are based on a theory of mood which has two

![Diagram of the best fit model of the 14 SAD items using EQS. Parameter estimates for paths in the model are shown beside the relevant arrows. Not shown are the item-specific variance contributions or a parameter of 0.60 connecting the error terms of items 2 and 11. For actual item content see Appendix A. F1 is the 'anxiety' items' factor, F2 is the 'depression' items' factor and F3 is a 'general psychological distress factor'. For fit statistics for this model see Table 5.](image-url)
orthogonal factors (though a notable exception is the three oblique factor structure of Matthews, Jones & Chamberlain, 1990). The axes of the two factor mood space have been called energy and tension (Thayer, 1989), arousal and stress (Cox & Mackay, 1985), arousal and pleasure–displeasure (Russell, 1980; Russell, Weiss & Mendelsohn, 1989), and arousal and affect (Watson & Tellegen, 1985). Matthews et al. (1990) illustrate these four congruent accounts in a useful circumplex diagram, and Russell (1980) gives examples of adjectives that appear at different co-ordinates of his circumplex model of mood. How might the quarter-circle of mood covered by the items in the sAD map onto such a circumplex? Examining both circumplexes mentioned above in the light of Fig. 2 from the present study suggests that, in Russell’s (1980) terms, the sADs is covering the region of mood that, at one extreme, involves high arousal and high displeasure (the state of anxiety items) and, at the other extreme, involves low arousal and high displeasure (the state of depression items). This account is also congruent with Thayer’s (1989) views on the bases of anxiety and depression in terms of basic mood factors. Thus, it might be theoretically possible and clinically useful to bring together clinical and experimental mood scales which, at present, exist largely in isolation (cf. Goldberg, 1996).

The more general conclusion from the present study is that apparently contradictory accounts of mood may be reconciled within a hierarchical structure, much as different facets of cognitive ability may be so reconciled (Carroll, 1993). The fact that all of the items of the sAD fall within less than 90° in a two-factor model, suggests that it is allowable to refer to general psychological distress, in the way that the GHQ is often used. Second, the fact that the sAD items congregate into (largely) two separable, correlated components, allows us to refer to clinical anxiety and depression levels, as is done with the HAD. Finally, when one imposes an orthogonal structure on the sAD items, they appear to map out a quarter of the two-factor circumplex model of mood arrived at by several authors working within a psychometric tradition; thus, the sAD items may also be construed in terms of basic, uncorrelated mood factors. Therefore, in future, it would be useful to see not only more clinical investigations with the sAD, but also more theoretical research where the sAD was used in conjunction with ‘normal’ mood scales in experimental studies of mood structure and mood change.

REFERENCES


**APPENDIX A**

Personal Disturbance Scale (DSSI/sAD) Items. (The state of anxiety items are indicated by an asterisk.)

1. Recently I have worried about every little thing.
2. Recently I have been so miserable that I have had difficulty with my sleep.
3. Recently I have been breathless or had a pounding of my heart.
4. Recently I have been so 'worked up' that I couldn't sit still.
5. Recently I have been depressed without knowing why.
6. Recently I have gone to bed not caring if I never woke up.
7. Recently, for no good reason, I have had feelings of panic.
8. Recently, I have been so low in spirits that I have sat for ages doing absolutely nothing.
9. Recently I have had a pain or tense feeling in my neck or head.
10. Recently the future has seemed hopeless.
11. Recently worrying has kept me awake at night.
12. Recently I have lost interest in just about everything.
13. Recently I have been so anxious that I couldn't make up my mind about the simplest thing.
14. Recently I have been so depressed that I have thought of doing away with myself.