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Somatic distress as a distinct psychological dimension

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Abstract *Background*: Somatoform disorders such as neurasthenia and chronic fatigue are characterized by a combination of prolonged fatigue and disabling neuropsychological and neuromuscular symptoms. However, the debate concerning the theoretical underpinnings of somatic disorders resembles the perennial dispute over the taxonomy of anxiety and depression. The objective of this study is to analyse the dimensional structure of items measuring anxiety, depression, phobic anxiety, somatic distress, and insomnia. It is anticipated that somatic distress should emerge as empirically distinct from measures of anxiety and depression, thereby lending support to proponents of the construct as independent of both anxiety and depression symptomatology. *Methods*: A 33-item self-report symptom inventory derived from the SCL-90 and DSSI/sAD scales was used to measure recently experienced psychiatric distress in the form of depression, anxiety, phobic anxiety, somatic distress, and insomnia. SCL and DSSI/sAD items were measured on a four-point distress scale from 1 'not-at-all' to 4 'unbearably'. The inventory was administered to a community-based sample of 3468 Australian twins between the ages of 18 and 28. *Results*: Factor analysis using Polychoric correlations and a Promax rotation criterion produced four factors: depression, phobic anxiety, somatic distress, and sleep disturbance. *Conclusion*: Results from the current factor analysis, together with the documented prevalence of somatic disorders, including evidence regarding the genetic and biological independence of somatic symptomatology, lend support to the argument that somatic symptoms, although correlated, are independent of anxiety and depression.

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Introduction

Somatoform disorders such as neurasthenia and chronic fatigue are characterised by a combination of prolonged fatigue and disabling neuropsychological and neuromuscular symptoms (Lloyd et al. 1990; Angst and Koch 1991; Hickie et al. 1995). Differences between these syndromes are qualitative and reflect variations in duration criteria rather than symptom constructs (Hickie et al. 1997c). The ICD-10 (World Health Organization 1992) includes a formal diagnosis of neurasthenia based on mental and physical fatigue of at least 3 months' duration. However, despite current international and epidemiological interest in this disorder, the DSM-IV continues to include prolonged fatigue syndromes within the 'Undifferentiated Somatoform Disorders-300.81' category (American Psychiatric Association 1994) and largely discounts the notion of discrete syndromes like neurasthenia.

The debate concerning the theoretical underpinnings of somatic disorders resembles the perennial dispute over the taxonomy of anxiety and depression. The proponents can be summarized as those espousing distinct-syndrome versus those espousing unitary-syndrome models of classification (Derogatis et al. 1972). Adherents to the distinct-syndrome model, including the ICD-10 (World Health Organization 1992), argue that neurasthenia and depression-anxiety disorders are

qualitatively distinct. Conversely, the unitary-syndrome model, first espoused by Sir Aubrey Lewis, suggests a continuum between the disorders, and that any differences are essentially quantitative not qualitative (Derogatis et al. 1972; Goldberg 1996).

Critics of neurasthenia as an independent disorder base their objections on the co-morbidity of the syndrome with conventional measures of anxiety and depression (Wessely and Powell 1989; Goldberg and Bridges 1991). Somatic symptoms are moderately correlated with anxiety (0.53) and depression (0.48), although these correlations are smaller than those found between anxiety and depression alone (0.68) (Goldberg 1996). Fatigue states are frequently co-morbid with anxiety and depressive disorders. Nevertheless, a number of studies (Kroenke et al. 1988; Wessely and Powell 1989; Hickie et al. 1990) have demonstrated that a significant proportion of patients with somatic disorders such as chronic fatigue do not meet the criteria for other psychological disorders. Kirk et al. (1997) in a factor analysis showed a clear separation of fatigue items and questions relating to anxiety and distress.

In addition, patients with fatigue do not show a specific response to antidepressant pharmacotherapy (Wilson et al. 1994; Vercoulen et al. 1996), and longitudinal data sets have demonstrated that patients tend to maintain their unique characteristics over time (Merikangas and Angst 1994; Hickie et al. 1999b). With regard to specific neurobiological markers, somatic disorders like chronic fatigue and neurasthenia do not appear to be associated with either the characteristic sleep abnormalities (i.e. shortened REM sleep) (Moldofsky 1993) or hypothalamic-pituitary-adrenal (HPA) axis changes encountered in at least some depressive subtypes (Demitrack et al. 1991). Chronic fatigue patients also have a wide range of minor and non-specific immunological changes (Lloyd et al. 1994), but of greater severity than those encountered in patients with depressive disorders (Lloyd 1992).

However, there still exists a widespread belief in psychiatry that somatic forms of distress are not common in developed or English-speaking countries (Hickie et al. 1998), and that disorders such as neurasthenia in non-English communities can be largely equated with anxiety and/or depression in English speaking countries (Kleinman 1982; Katon and Russo 1992; Hickie et al. 1998). Cases where somatic distress completely dominates the clinical picture are not rare (Katon and Russo 1992; Hickie et al. 1998). The ICD-10 (World Health Organization 1992) criteria indicate that, even when tightly defined (i.e. duration greater than 3 months), neurasthenia occurs with a prevalence ranging from 3.4% to 10.7%.

Critics argue that the inclusion of a large number of somatic symptoms creates a radically different symptom content, wherein a separate dimension is certain to emerge (Goldberg 1996). Naturally, the method of data collection and statistical model chosen place limits on both the nature of the outcome and on the empirical support (Derogatis et al. 1972). If the conceptual model assumes that personality dimensions/disorders lie along trait-like continua (see Eysenck and Eysenck 1985), then factor analysis is the 'most pertinent technique' (Derogatis et al. 1972). Factor analysis is used as a technique to account for the observed correlations between a relatively large number of symptoms in terms of the effects of a small number of latent dimensions or clusters (Maxwell 1971; Kendler et al. 1987). Somatic symptoms are likely to emerge as a separate factor if (1) they are indeed prevalent, and (2) they occur independently of anxiety and depression (Hickie et al. 1997c).

The objective of this study is to analyse the dimensional structure of items measuring anxiety, depression, phobic anxiety, somatic distress, and insomnia. It is anticipated that somatic distress should emerge as empirically distinct from measures of anxiety and depression, thereby lending support to proponents of the construct as independent of both anxiety and depression symptomatology.

Subjects and Methods

Subjects

In 1989 an extensive Health and Lifestyle Questionnaire (HLQ) was mailed to 4269 twin pairs listed with the Australian National Health and Medical Research Council (NH&MRC) Twin Registry (ATR). The HLQ covered a wide range of health issues affecting younger people. The mean age of respondents was 23.3 ± 2.2 years, with an age range for males and females combined of 18–28. Most of these twins had been recruited when at school some 10 years earlier, so that despite extensive follow-up efforts, we were unable to re-establish contact with 1000 pairs. Those twins who failed to return a completed questionnaire were followed-up by telephone up to five times, at which point they were asked to complete an abbreviated telephone interview to obtain basic demographic information. Both members of 2294 pairs (70% of contactable pairs) completed a questionnaire or abbreviated phone interview, plus a further 474 single twins, making an individual cooperation rate of 83% of those with whom contact was established (5074/6122). In all, 3469 questionnaire responses (1374 from males and 2095 from females) in which all "Feelings" items were completed were received.

Measures

A 33-item self-report symptom inventory (see Appendix A), designed to measure recently experienced psychiatric distress, was included in the HLQ, which incorporated the Anxiety (ANX1) (seven items) and Depression (Dep1) (seven items) scales of the Delusion Symptoms States Inventory (DSSI/sAD; Bedford and Deary 1997; Foulds and Bedford 1975). Also included was a 19-item subset of the 90-item Symptom Checklist (SCL-90) (Derogatis et al. 1973). Eighteen items were chosen from four SCL subscales : Anxiety (ANX2) (four items); Depression (DEP2) (five items); Phobic Anxiety (PHOB) (five items); and Somatic Distress (SOMAT) (four items). One item, dealing with early morning awakening or insomnia (AWAK), was chosen from additional items available in the SCL-90. The SCL-90 was originally measured on a five-point scale of distress from 'not at all' (0) to 'extremely' (4) (Derogatis et al. 1973). However, in the HLQ the SCL was scored identically to the DSSI/sAD on a four-point distress scale, from 1 'not-at-all' to 4 'unbearably'.

Statistical methods

The imputation option of PRELIS 2.20 (Jöreskog and Sörbom, 1998) was used to impute missing values, using sex and the full 33 items as matching variables. This approach obtains the substitute value from other cases with similar response patterns provided there are no missing values in the matching variables (Jöreskog and Sörbom, 1993).

Imputation of missing values increased the total effective sample size to 1414 males (gain of 3%) and 2218 females (gain of 3%). In total, 164 item responses (0.001% of total items) were imputed. Data were analysed using maximum likelihood factor analysis in SAS 6.11. Polychoric correlations between each of the 33 Feelings items were calculated using PRELIS. The Central Limit Theorem of theoretical statistics suggests that, since the trait that underlies responses to items is likely to be multifactorial, this liability will be approximately normally distributed. Polychoric correlations are calculated under this assumption, viz. that underlying each item on which responses are measured on a four-point scale, there is a continuously distributed scale of liability, and that the joint distribution of this scale with liability scales underlying other items is bivariate normal (Martin et al. 1988). Factor analysis using both Varimax and Promax rotation was then applied to obtain factors approximating simple structure (Harman 1976) using the Statistical Analysis System (SAS Institute 1985).

Results

Factor analysis

Maximum Likelihood factor analysis was used to investigate the factor structure of the scales, with separate analyses for males and females. Since Varimax rotation produced factor structures that were heavily cross-loaded, a Promax rotation was applied to obtain oblique factors. The first seven eigenvalues of the correlation matrices exceed 1.0 both for males (77.1, 6.7, 3.7, 3.4, 2.3, 2.1, and 1.4) and for females (56.3, 5.2, 2.8, 2.2, 1.1, 1.3, and 1.1).

All but five items for males, and three items for females, met the criteria for a loading greater than 0.40 on at least one factor. When two and three factors were rotated, several items were highly cross-loaded and appeared heterogeneous for males and females, making interpretation difficult. A four-factor solution, which was interpretable and consistent across sex, was derived: depression; phobic anxiety with panic features; somatic distress; and sleeping difficulty (see Table 1). Rotating five, six, and seven factors only resulted in fragmentation of the factor structure, with content items on each loading again appearing heterogeneous for males and females.

The interfactor correlations for the four-factor solution ranged from 0.44 to 0.63 for males, and from 0.46 to 0.64 for females and are shown in Table 2. All scales were positively and significantly correlated with one another. The first factor, labeled 'depression', included all of the DDSI depression items with the exception of item 2 (so miserable have difficulty sleeping) for females. In addition, four SCL depression items (20, 21, 29, and 31) loaded significantly onto this factor for females, while for males, only two SCL depression items (17 and 31) loaded onto this factor. Factor 2 emerged as a factor denoting phobic anxiety with panic features. In addition to all SCL phobic anxiety items, item 7 (feeling of panic), and items 32 and 32 (felt fearful, had spells of terror) also loaded onto this factor for females and males alike, except that item 7 fell just short of the 0.40 criterion for males. Items 17 (lost interest in sex), 20 (felt trapped or caught) and item 16 (felt faint) also loaded onto this factor, but only for males. Factor 3 was clearly interpreted as somatic distress, with all SCL somatic distress items loading highly onto this factor for both males and females. In addition, DSSI anxiety items 3 (breathless or pounding heart) and 9 (pain or tension in head/neck) also loaded onto this factor. Although somewhat less congruently across sex, Factor 4 was labeled 'sleep difficulty'. For females, items 1, 4 and 27, denoting agitation (worried about everything, so worked up can't sit still, felt tense or shaky inside), together with items 2 and 11 measuring sleeping disturbance (worry has kept me awake all night, so miserable have difficulty sleeping), loaded onto this factor. Items 2 and 11 did not load onto this factor for males, unless the loading criterion of 0.40 was relaxed to 0.35.

Split-half analyses were then carried out on the four-factor solution by separating subjects by sex, and then later by separating pairs of twins into two samples of unrelated individuals according to their order of registration with the NH&MRC Twin Registry. Using Tucker's (1951) Congruence coefficient, congruency coefficients between the first and second twin groups for Factors 1–4 were 0.94, 0.94, 0.81 and 0.70 respectively. Congruency coefficients between the male and female subjects were 0.93, 0.91, 0.80 and 0.70 for Factors 1–4 respectively.

Discussion

Factor analysis of the DSSI and SCL scales using oblique rotation identified four readily interpretable factors: depression; phobic anxiety with panic features; somatic distress; and a factor reflecting sleep difficulty. Kendler et al. (1995a, c), in factor analysis of SCL subscales using a large twin sample, obtained an almost identical factor structure, except that item 26 (have woken early in the morning) failed to load onto Factor 4 for both males and females. Nevertheless, results from this sample lend support to the hypothesis of a distinct construct of somatic distress. Somatic distress symptoms emerged as an interpretable dimension, with consistent loadings across sex. All SOMAT items had significant loadings on this factor. Item 16 (felt faint of dizzy) cross-loaded onto Factor 2 for males. Two DSSI anxiety items (breathless/pounding heart, pain or tension in head/neck) also loaded strongly onto this factor. Kirk et al. (1997) in a factor analysis of fatigue, anxiety, and depression measures also found that the same DSSI anxiety items loaded onto a somatic distress factor. This is not surprising given that they refer to physical symptoms (e.g. pounding of the heart, tension in the neck or

Table 1 Promax rotated four-factor solution for both male and female respondents

Measure	Item	Males (n = 1416)				Females (n = 2219)			
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3	Factor 4
DSSI/S$_{AD}$									
□ Anxiety	1. Worried about everything	0.19	0.15	0.04	**0.45**	0.28	0.07	−0.02	**0.49**
	3. Breathless or pounding heart	0.10	0.13	**0.56**	−0.01	−0.05	0.17	**0.43**	0.22
	4. So worked up can't sit still	0.08	0.08	0.37	0.28	0.09	0.09	0.14	**0.54**
	7. Feelings of panic for no reason	0.08	0.39	0.26	0.25	0.16	**0.48**	−0.04	0.28
	9. Pain or tension in neck/head	0.00	−0.04	**0.56**	0.24	0.04	−0.13	**0.63**	0.21
	11. Worry has kept me awake all night	0.33	−0.07	0.31	0.37	0.18	−0.04	0.01	**0.71**
	13. So anxious can't make up mind re simple things	0.30	0.26	0.10	0.32	0.37	0.20	0.14	0.24
□ Depression	2. So miserable have difficulty in sleeping	**0.42**	−0.05	0.20	0.37	0.33	−0.12	0.04	**0.68**
	5. Depressed without knowing why	**0.48**	0.06	0.10	0.20	**0.44**	0.04	0.10	0.25
	6. Gone to bed not caring if I never awake	**0.92**	−0.10	0.11	−0.06	**0.78**	0.07	−0.10	0.12
	8. Low in spirits sit for ages and do nothing	**0.60**	−0.04	0.05	0.32	**0.67**	−0.03	0.11	0.11
	10. Future seems hopeless	**0.77**	0.00	0.00	0.11	**0.89**	0.00	−0.06	0.00
	12. Lost interest in just about everything	**0.62**	0.11	0.00	0.20	**0.81**	−0.07	0.09	0.09
	14. So depressed thoughts of doing away with myself	**0.81**	0.25	0.12	−0.20	**0.77**	0.10	−0.14	0.11
SCL-90									
□ Anxiety	15. Felt nervous or shaky inside	0.22	0.30	0.22	0.23	0.21	0.36	0.10	0.28
	27. Felt tense or keyed up	−0.06	0.09	0.26	0.65	0.18	0.14	0.18	**0.44**
	32. Felt fearful	0.17	**0.58**	−0.01	0.31	0.24	**0.61**	−0.04	0.16
	33. Had spells of terror or panic	0.16	**0.69**	0.09	0.03	−0.08	**0.78**	−0.04	0.31
□ Depression	17. Lost interest in sex, sex unpleasurable	**0.40**	**0.40**	−0.02	−0.07	0.28	0.00	0.29	0.00
	20. Felt 'trapped' or 'caught'	0.16	**0.47**	0.04	0.26	**0.43**	0.26	0.10	0.04
	21. Blamed myself for things	0.22	0.15	−0.04	**0.52**	**0.52**	0.10	0.11	0.10
	29. Felt that everything is an effort	0.23	0.29	0.00	0.36	**0.61**	0.06	0.25	0.02
	31. Felt worthless	**0.66**	0.20	−0.19	0.27	**0.81**	0.13	−0.01	−0.02
□ Phobic anxiety	19. Felt afraid in open spaces or in street	0.02	**0.74**	0.21	−0.02	0.12	**0.62**	0.23	−0.16
	23. Afraid to travel on buses or trains	−0.07	**0.82**	0.02	−0.01	0.01	**0.55**	0.23	−0.12
	24. Avoid certain things that frighten me	0.01	**0.78**	−0.17	0.17	0.11	**0.63**	0.18	−0.11
	28. Felt uneasy in crowds	0.04	**0.53**	−0.04	0.34	0.30	**0.52**	0.12	−0.08
	30. Felt nervous when left alone	0.22	**0.44**	0.15	0.06		**0.75**	−0.08	0.10
□ Somatization	16. Felt faint or dizzy	−0.07	**0.45**	**0.51**	−0.04	0.06	0.14	**0.50**	0.05
	18. Had pains in the heart or chest	0.05	0.19	**0.63**	−0.12	0.01	0.19	**0.49**	0.01
	22. Pains in the lower back	0.04	−0.12	**0.52**	0.09	−0.03	0.03	**0.62**	0.04
	25. Felt weak in parts of the body	0.02	0.18	**0.43**	0.19	0.03	0.19	**0.65**	−0.01
□ Awakening	26. Have woken early in the morning	0.05	−0.08	**0.35**	0.21	0.06	0.02	0.22	0.30

head), as opposed to the more cognitive aspects of anxiety and depression.

Interestingly, Kirk et al. (1997) also found that when somatic items were included, no clear separation of anxiety and depression scales was observed for either orthogonal or oblique solutions. Numerous other studies, regardless of the factor extraction technique employed or samples involved, have also failed to replicate independent dimensions of anxiety and depression when somatic items have been included (Hoffman and Overall 1978; Clerk and Friedman 1983; Holcomb et al. 1983; Cyr et al. 1985; Shutty et al. 1986; Brophy et al. 1988; Hafkensheid 1993; Carpenter and Hittner 1995). In the current study, depression emerged independent of anxiety items after oblique rotation. However, consistent with previous findings (Lipman et al. 1979; Hoffman and Overall 1978; Clerk and Friedman 1983; Holcomb et al. 1983; Kendler et al. 1995c), generalised anxiety failed to emerge as a distinct factor. Similar to Kendler et al. (1995c), we found that neither increasing the number of extracted factors nor using an orthogonal rotation led to the emergence of a coherent anxiety factor. Items denoting generalised anxiety loaded instead across the dimensions of phobic anxiety, sleep disturbance, and somatic distress.

Derogatis et al. (1972) argue that the pivotal question ought not to centre on whether distinctions can be made between syndromes, but rather whether any differences are of a magnitude to be clinically significant. In other words, is the difference between the somatic item clusters

Table 2 Inter-factor correlations for the derived four-factor solution

	Females ($n = 2218$)			
	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1		0.64	0.52	0.64
Factor 2	0.63		0.58	0.54
Factor 3	0.54	0.58		0.46
Factor 4	0.58	0.56	0.44	
	Males ($n = 1414$)			

(Factor 1 = Depression, Factor 2 = Phobic anxiety with panic features, Factor 3 = Somatic distress, Factor 4 = Sleep difficulty)

and other measures of psychological distress clinically meaningful? For instance, the eigenvalues for the first, second, third (somatic distress), and fourth factors were 77.1, 6.7, 3.7, 3.4 for males and 56.3, 5.2, 2.8, 2.2 for females respectively. Therefore, one might argue the current analysis of the DSSI/sAD and SCL scales within the twin sample supports previous findings that the first unrotated factor accounts for the largest proportion of the total variance (Hoffman and Overall 1978; Holcomb et al. 1983; Brophy et al. 1988). In addition, the one-factor solution demonstrated the strongest reliability in the current study. These results reinforce findings that the SCL-90 (Dinning and Evans 1977; Clerk and Friedman 1983; Cyr et al. 1985; Brophy et al. 1988) and DSSI/sAD (Bedford and Deary 1997; Shevlin et al. 1998) scales, when combined, are better seen as a measure of global, dysphoric distress rather than as distinct psychological syndromes. Support for the combined scales as a unitary measure of global distress is compelling. For instance, the DSSI/sAD scales correlate significantly with Eysenck's trait Neuroticism (Bristow 1981), while the SCL-90 scales all load significantly onto the Beck Depression Inventory (BDI), with correlations ranging from 0.46 to 0.73 ($P < 0.0001$) (Brophy et al. 1988). Furthermore, the SCL-90 offers only minimal diagnostic discriminability for the individual dimensions (Carpenter and Hittner 1995; Dinning and Evans 1997; Hafkenscheid 1993). Even more recently, Shevlin et al. (1998), using confirmatory factor analysis, and by specifying competing factorial models for the DSSI/sAD items, concluded that the items are best used as a measure of general psychological distress. Therefore, these results might caution against viewing somatic syndromes as conceptually distinct from anxiety and depression.

Unfortunately, global models, while theoretically valid, may not adequately represent the variety of clinical syndromes or more specific symptom clusters (e.g. phobic anxiety and somatic distress) (Hickie et al. 1997c). For instance, clinical-based studies of chronic fatigue syndrome have demonstrate that at least 25–50% of these patients fail to meet criteria for other lifetime psychiatric disorders (Kroenke et al. 1988; Wessely and Powell 1989; Hickie et al. 1990). A further limitation of global models is that they can overshadow sex differences in symptom reporting. For instance, although Factor 1 emerged as a depression factor, females acknowledged more SCL Depression items than did males. Factor 4, which emerged strongly as a sleep disturbance factor for women, was less congruent across sex. Unless the loading criterion is relaxed to 0.35, items 2 and 11 denoting sleep disturbance do not load onto this factor for males. This sex difference is indicated by the weaker factorial congruency for Factor 4. However, factor analyses say nothing as to why items cluster together differently across sex.

The strongest emerging support for the current findings and the independence of a somatic distress construct comes from epidemiological twin research. For example, there is now strong evidence that both anxiety and depression, although correlated phenotypically, are underpinned by a common genetic vulnerability, whereby the separation of the two psychological constructs in the general population is largely the result of environmental factors (Kendler et al. 1987, 1992; Kendler 1996). Of greater importance is the finding that genetic factors leading to the development of prolonged fatigue syndromes appear to be distinct from anxiety and depression (Hickie et al. 1999a, b).

Unfortunately, no study to date has examined the covariance in liability between specific somatic distress symptoms and other psychiatric disorders. When three or more disorders are simultaneously considered, general and disorder-specific genetic and environmental factors can be estimated (Kendler et al. 1995b). This would allow future research to determine (1) whether or not the same genetic and environmental risk factors influence somatic distress and other disorders (common pathway model), and (2) whether genes and environment contribute to covariation through separate genetic and environmental factors (independent pathway) (see Kendler et al. 1987), which would provide stronger support for the aetiological independence of somatic distress. Furthermore, the use of multivariate genetic analysis would allow direct comparisons between scalar sex-dependent models, which assume that the same genetic or environmental risk factors are acting in both genders, but with varying magnitude, with nonscalar sex-dependent models, which assume different genetic and environmental factors, operating on both sexes (see Neale and Cardon 1992).

Many of the studies, but not all (see Kendler et al. 1987), which have investigated psychological distress using either the SCL-90 or DSSI/sAD scales, have focused almost exclusively on smaller in- and outpatient samples, with varying psychological and somatic complaints. The use of a large non-clinical sample in the current study eliminates the possibility of confounding due to (1) response sets associated with psychiatric outpatients (Dinning and Evans 1977; Brophy et al. 1988), (2) the effects of drug therapy on self-report validity, and (3) 'spurious' covariation of symptoms (see Kendler et al. 1987) found in clinical samples, whereby individuals with symptoms of both states, such as anx-

iety and depression, are more likely to present for treatment. The use of population-based samples limits the possibility of bias associated with help-seeking behaviour (Prusoff and Klerman 1974; Kendler et al. 1987). Furthermore, with regard to the generality of the current findings, Kendler et al. (1995a) found that, with the possible exception of panic-phobia, the level of common psychiatric symptoms and variability reported by twins are in fact similar to those found in the non-twin population.

A possible limitation to our current study is the use of exploratory factor analysis instead of confirmatory factor analysis (CFA). The chief advantage of exploratory factor analysis is that it is theory generating and allows researchers to determine the number of factors that account for the covariation between variables when there does not exist *a priori* sufficient evidence as to the number of factors. However, given the emerging consensus that somatic complaints are indeed distinct from anxiety and depression, future replications should make use of CFA, which would permit researchers to test explicitly hypotheses concerning factor structures specified in advance.

A second potential limitation was that the use of a primarily well sample led to a poor response distribution on some of the 33 items (see Appendix A). This may have meant that estimation of the Polychoric correlations between each of the 33 items measured on the four-point distress scale may have been unsatisfactory. Therefore, all items were re-coded onto a three-point scale. The resulting factor structure and Polychoric correlations remained almost identical.

Finally, a minor limitation in the current study was the use of the Tucker's (1951) Congruence coefficient as a test for split-half reliability between male and female subjects as well as between twin 1 and twin 2. The Congruence coefficient is sensitive to any transformations made to factor patterns. This is not a problem if the matrices (Polychoric correlations) are rotated to a criterion such as simple structure (see Barrett 1986). However, given the high congruency firstly between male and female subjects and then between twin 1 and twin 2, this is unlikely to be a cause of concern.

As mentioned, somatic disorders have been appropriately criticized (Goldberg and Bridges 1991) prior to the presentation of sufficient data to support their validity. However, results from the current factor analysis, together with the documented prevalence of somatic disorders, including evidence regarding the genetic and biological independence of somatic symptomatology, lend additional support to the argument that somatic symptoms, although correlated, are independent of anxiety and depression.

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Appendix A

Questionnaire and item responses for the "Feelings" section of the HLQ. This is a reduced form of the Delusion States Symptoms (DSSI/sAD), and Symptom Checklist-90 (SCL-90) scales.

The following statements describe feelings people may have. For each statement please tick the box which best describes how you are feeling.

(1) Not at all (2) A little (3) A lot (4) Unbearably

Measure	Item	Males (n = 1414) (%)				Females (n = 2218) (%)			
DSSI /S_{AD}		1	2	3	4	1	2	3	4
□ Anxiety (ANX1)	1. Worried about everything	56	34	7	2	40	42	15	3
	3. Breathless or pounding heart	79	16	4	1	76	19	5	1
	4. So worked up can't sit still	67	24	7	2	66	26	7	2
	7. Feelings of panic for no reason	88	11	1	1	82	15	2	1
	9. Pain or tension in neck/head	67	23	8	2	53	3	13	3
	11. Worry has kept me awake all night	69	24	6	2	61	28	8	3
	13. So anxious can't make up mind re simple things	82	15	2	1	79	16	3	1
□ Depression (DEP1)	2. So miserable have difficulty in sleeping	76	18	5	2	67	23	8	3
	5. Depressed without knowing why	73	20	5	2	58	31	8	3
	6. Gone to bed not caring if I never awake	88	7	3	2	88	8	2	2
	8. Low in spirits sit for ages and do nothing	74	20	5	2	69	22	6	2
	10. Future seems hopeless	76	18	5	2	75	18	5	2
	12. Lost interest in just about everything	83	13	3	1	82	13	4	1
	14. So depress' thoughts of doing away with myself	93	5	1	1	93	5	1	1
SCL-90									
□ Anxiety (ANX2)	15. Felt nervous or shaky inside	74	22	3	1	68	26	5	1
	27. Felt tense or keyed up	60	31	8	1	51	36	10	2
	32. Felt fearful	88	10	2	1	80	16	3	1
	33. Had spells of terror or panic	95	5	1	0	91	7	2	1

Appendix Table (Contd.)

□ Depression (DEP2)	17. Lost interest in sex, sex is unpleasurable	86	10	3	1	76	17	6	2
	20. Felt 'trapped' or 'caught'	85	11	3	1	82	13	3	1
	21. Blamed myself for things	65	58	6	1	57	34	8	2
	29. Felt that everything is an effort	73	23	4	1	70	24	4	2
	31. Felt worthless	82	14	3	1	77	16	5	2
□ Phobic anxiety (PHOB)	19. Felt afraid in open spaces or in street	95	4	1	0	94	5	1	0
	23. Afraid to travel on buses or trains	96	3	1	0	94	5	1	1
	24. Avoid certain things that frighten me	88	9	2	1	87	11	2	1
	28. Felt uneasy in crowds	82	14	4	1	83	12	4	1
	30. Felt nervous when left alone	89	9	2	0	78	17	4	1
□ Somatic distress (SOMAT)	16. Felt faint or dizzy	88	10	1	1	77	20	3	1
	18. Had pains in the heart or chest	84	14	2	1	84	13	3	1
	22. Pains in the lower back	52	15	10	1	60	28	9	3
	25. Felt weak in parts of the body	74	21	4	1	73	22	4	1
□ Awakening (AWAK)	26. Have woken early in the morning	46	35	16	2	46	35	17	3

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