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A Dimensional Model for Common Mental Disorders

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Although categorical diagnoses are valued by clinicians and those wishing to collect homogeneous groups of patients for research projects, in the field of non-psychotic mental disorders they correspond poorly to actual clinical syndromes. Indeed, patients often satisfy several sets of categorical criteria simultaneously. A more parsimonious representation of symptomatology can be obtained by using a dimensional model for symptoms – with two correlated axes corresponding to anxiety and depression for ratings derived from the Present State Examination. The Composite International Diagnostic Interview is likely to produce a third dimension – somatic symptoms – because of a radically different symptom content. Preliminary data analysis indicates that the somatic symptoms dimension correlates with both anxiety and depression. Symptomatic individuals in particular areas of dimensional space will satisfy several criteria for categorical diagnoses, and thus display comorbidity. However, evidence that these disorders are distinct is far from persuasive, as they appear to share several common causes.

Categorical diagnoses have enormous strengths: they allow us to identify relatively homogeneous groups for research; they are a quick short-hand for clinicians; they often lead to particular treatments; they are the usual basis for statements about prognosis; they are used in some countries to justify reimbursements from insurance companies; and they can be adapted to cover a wide range of theoretically dissimilar disorders.

However, categorical models provide a better fit for the more severe mental disorders. Karl Jaspers (1923) divided mental disorders into three groups: known somatic illnesses with psychic manifestations; the major psychoses; and the neuroses and personality disorders. Although he favoured the disease entity approach for the first two groups, in the third group be observed that there is "no sharp line to be drawn between types, nor between what is healthy and what is not", and gave his opinion that "it is difficult to bring any diagnostic order of practical value into shifting phenomena which continually keep merging into one another". In the case of neuroses and personality disorders, "diagnosis must remain typological and multidimensional", and the only thing that is of any value is an extensive analysis of its phenomenological, meaningful, and causal aspects and precise grasp of the personality, its reactions and life history. These views have been echoed by recent authors. Kendell (1975) concluded his discussion on categorical versus dimensional models by showing that the advantages of a categorical model were greater in the psychoses, but the reverse was true for neurotic illness.

Despite these warnings, recent advances in taxonomy have applied a categorical model across the whole range of mental disorders. Where non-psychotic disorders are concerned, the use of 'shopping lists' of symptoms obscures the fact that many different diagnoses in Jasper's third group share a common core of minor symptoms, with a few specific symptoms justifying particular categorical diagnoses. If a severely ill patient has symptoms from more than one of these categories, the taxonomic systems that are currently fashionable declare that the patient has two different disorders at once: the phenomenon of comorbidity.

The idea of discrete clinical categories offers an overcomplicated model, which may slow up the advance of knowledge. It behoves us to seek a model for symptomatology that will correspond to derangements in the biological systems that underlie diseased states, rather than supposing that, for example, there are indeed 26 different categories of depression as found in ICD–10, and that they should all be separately understood (World Health Organization, 1992). By contrast, dimensional models are a way of trying to account for variations between the myriad different sets of symptoms offered by patients in the most economical way, and offer considerable advantages to those who wish to attempt to relate continuously distributed social variables to clinical variables.

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The designers of the ICD–10 system were uneasily aware of some of these problems, so that some of the 26 varieties of depressive illness represent three different degrees of severity of depression, so allowing raters a diagnostic system that is at least partly dimensional. However, such license is not extended to other diagnostic categories, so that the system does not really allow clinicians or researchers to use a dimensional system.

Another problem with categorical models is that those who use them come to believe in them. Instead of realising that a categorical diagnosis is both provisional and hypothetical, the true believer reifies it. When individuals occupy abnormal positions on more than one axis of symptomatology, it is frequently the case that the patient satisfies more than one set of criteria for a categorical diagnosis, and the patient is then referred to as though he or she is suffering from more than one disorder. For example, "double depression" (major depressive episode comorbid with dysthymia) refers to a patient who has been mildly depressed for some time, and whose symptoms have become somewhat worse in response to some life stress: we should be conceptualising a single process. "Comorbid generalised anxiety and major depression" describes someone who has developed symptoms of both depression and anxiety: this patient is unfortunate not because he or she has developed two different illnesses, but because these disorders have a worse prognosis than either set of symptoms on its own (Ormel *et al*, 1990).

Dimensional models for neurosis

Dimensional models have the advantage that there is no loss of information, in that the system allows us to register the severity of a disorder, rather than confounding all degrees of the disorder over an arbitrary threshold into a common category of 'sick', and all those below it as 'well'. We should expect that such a model would be more powerful if our aim were to demonstrate relationships between symptom variables and other continuously distributed variables, whether environmental or biological. Such systems will not distract attention from the atypical in favour of the typical, or distort the perception of patients with symptoms lying near the boundary between two categories.

Although neurotic symptoms seen among patients of psychiatrists tend to be normally distributed, in the normal population neurotic symptoms have a reverse J-shaped distribution, with most individuals not possessing the symptom in question. Latent trait analysis is a form of dichotomous factor analysis suitable for variables that are not normally distributed in the population, and which are either present or absent (Duncan-Jones *et al*, 1986). Both individual symptoms and categorical diagnoses satisfy these criteria, since a diagnosis is a set of symptoms.

A dimensional space can be constructed from the distribution of symptoms in a group of people all of whom have received a research interview (Goldberg *et al*, 1987). Categorical diagnoses can be projected onto this space, and compared with one another (Grayson *et al*, 1987). In our original work in Manchester we used the Psychiatric Assessment Schedule (PAS) (Dean *et al*, 1983) as our research interview, and found that two correlated dimensions – readily identified as anxious and depressive symptoms – accounted for all the common variance shared between symptoms. We found that neurasthenic symptoms corresponded to a cluster of symptoms low on the anxiety axis (Goldberg & Bridges, 1991), while dysthymic symptoms are also less severe but nearer to the depression axis (Goldberg & Bridges, 1990). In our original study we found that phobic symptoms occupied a rather anomalous position away from other anxious symptoms, and orthogonal to the depression axis.

Ormel *et al* (1995) have recently replicated our findings with two Dutch data-sets, one from general practice and the other a community sample. Both Dutch studies used the 40-item version of the Present State Examination (PSE) as the research interview: in our original study the PAS had the 40 items of the PSE, as well as about 20 others to allow diagnosis according to the DSM–III conventions. The replication used some items that had been omitted from the original study, as well as having to leave out items that were not to be found in the Dutch data-set. These changes allowed a third dimension of phobic anxiety to arise.

Both the depression and the anxiety axes were reasonably invariant between the three data-sets, but interesting differences emerged with the phobic dimension. Whereas phobic anxiety is sharply defined in Manchester with just phobic anxiety and avoidance, in the Dutch countryside situational and social anxiety load on this dimension, and in Gröningen simple ideas of reference, guilt, and self-depreciation are related to phobic anxiety. Our clinical colleagues in Gröningen were familiar with depressed, guilty patients who avoided going out because of ideas that people were talking about them. It is clear that looking at a different set of symptoms has

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allowed the dimensional structure to change, and that cultural variables may affect the structure of the observed dimensions.

Some diagnoses can be thought of as ways of dealing with states of anxiety or depression. These mechanisms lower the state of painful experience of symptoms, but may themselves be maladaptive. Phobic avoidance, hysterical dissociation and depersonalisation are all examples of this. Many problems with drugs and alcohol originally start as ways of dealing with anxiety or depression.

Method

The World Health Organization (WHO) study is briefly described by Norman Sartorius in this issue; a fuller account can be found elsewhere (Sartorius & Üstün, 1994). The research interview used in the study is strikingly different from that used in the previous studies, since it contains a large number of somatic symptoms which are virtually certain to emerge as a separate dimension. For the purposes of this chapter, three scores have been computed for each patient: these are counts of current symptoms of anxiety, depression and somatisation. These have been plotted against one another, and rank order correlations calculated between the variables. The extent to which diagnoses were comorbid with one another was cross-tabulated by taking diagnoses in order of their prevalence, and the prevalences were weighted back to the original sample, since a two-stage stratified sampling strategy had been adopted.

Results

The correlation between anxiety and depression was found to be +0.68, almost identical with that observed in previous studies. Somatisation is found to be related to each of these: +0.53 with anxiety, and +0.48 with depression.

Figure 1 examines all those with depressive symptoms, and shows those who satisfy requirements for case depression with an open circle. With increasing numbers of depressive symptoms, there are increasing numbers of anxious symptoms. It can be seen that there is considerable overlap between the concepts of "subthreshold depression" and "major depressive episode", but with increasing

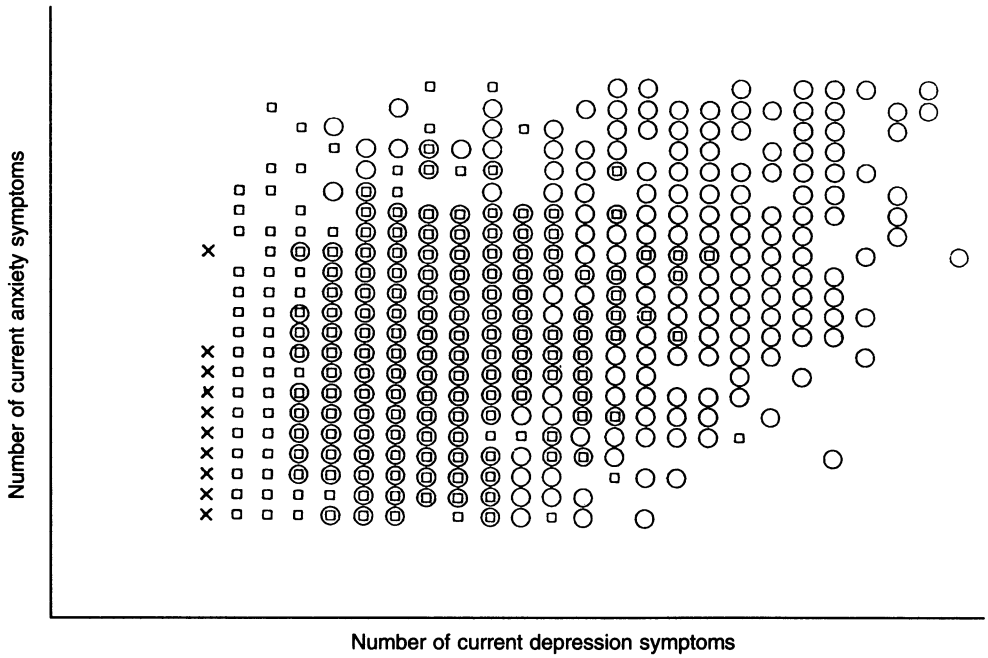


Fig. 1 Relationship between the number of symptoms of current anxiety and the number of symptoms of current depression. ○, satisfy criteria for major depressive episode; □, subthreshold disorders; ×, those without depression.

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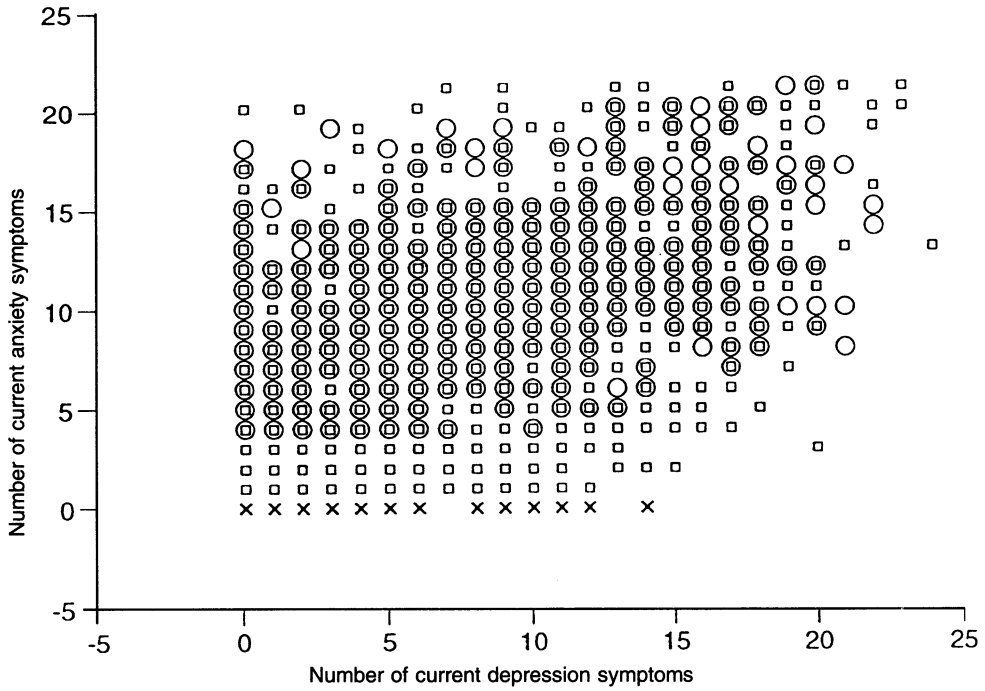


Fig. 2 Relationship between symptoms of current anxiety and current depressive symptoms. ○, satisfying criteria for generalised anxiety disorder; □, subthreshold anxiety; ×, no significant anxious symptoms.

numbers of depressive symptoms a formal diagnosis becomes more likely.

Figure 2 shows all those with anxious symptoms, only this time the circles are all those who satisfied criteria for generalised anxiety. This time, of course, open circles become more likely as we ascend the anxiety axis. Patients with comorbidity between anxiety and depression are those where an open circle is to be found in the same location in each figure. It can be seen that this corresponds to a wide area in the scatterplots. The possession of a single symptom will be enough to cause an individual to satisfy both sets of criteria, and thus be thought of as having two different illnesses!

Table 1 shows common comorbid conditions observed for all 15 centres participating in the WHO study, combined, ignoring combinations with a weighted prevalence below 0.1%. The

Table 1
Relative frequencies of depression, anxiety and somatoform disorders as single disorders, and comorbidity across the 15 centres

	n	Weighted prevalence (%)
Depression alone	506	4.9
Generalised anxiety alone	278	3.9
Somatoform disorders alone	46	1.1
Depression with:		
generalised anxiety	206	2.1
somatoform disorder	39	0.4
dysthymia	38	0.3
agoraphobia+panic	22	0.2
panic	17	0.1
Anxiety with:		
depression	206	2.1
somatoform disorder	10	0.1
dysthymia	27	0.4
Depression and GAD with:		
somatoform disorder	29	0.4
dysthymia	31	0.3

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commonest combination, as might have been expected, was between anxiety and depression; there are also combinations between depression and somatoform disorder, dysthymia, agoraphobia, and panic. Anxiety can be seen to be comorbid with dysthymia and somatoform disorder, and there are also some triple combinations that might have been expected from a dimensional model.

Discussion

The low frequency of the combination of either depression or anxiety and somatoform disorder may be related to the fact that the threshold for the categorical concept of somatoform disorder now requires the somatic symptoms to be multiple, varying, and persistent: with a lower threshold, there would of course have been far more combinations. At one time one symptom was enough, provided that it was the cause of the consultation, appeared to have no organic cause, and was accompanied by anxious depression (Goldberg & Blackwell, 1970). However, the association between the three groups of symptoms is fairly strong.

The size of the 'comorbidity' between anxiety and depression is not a measure of the frequency with which two independent morbid conditions coexist; it merely indicates the position of an arbitrary dividing line on a dimension, which could equally easily, and plausibly, be drawn elsewhere. In the right upper quadrant of Fig. 1 the patients all have broadly similar symptoms; however, if the set includes "depressed mood" they satisfy criteria for depression, whereas if it includes anxiety or worry they satisfy criteria for "generalised anxiety". If they have both sorts of key symptoms, they are called 'comorbidity'. Comorbidity has some meaning if we are referring to combinations of diabetes and schizophrenia, or even of depression and alcohol dependence, but it is surely stretching the concept to absurdity to allow one or two symptoms from correlated domains to produce the phenomenon.

The arguments for supposing that anxiety and depression share a common cause are persuasive. In this issue, Kendler argues that they have a common genetic basis, Brown implicates parental neglect and physical and sexual abuse as common antecedents of both, and Kessler shows that once someone has been anxious they are very much more likely to develop a depression. We have argued elsewhere that some environmental variables help to determine which set of symptoms is predominant (Goldberg *et al*, 1990), and Finlay-Jones & Brown (1981) have also shown that there is a tendency for danger events to be followed by anxious symptoms, and loss by depressive symptoms. However, such demonstrations do not argue for independent disorders, they simply indicate which set of epiphenomena predominate at a particular time.

However, it must be conceded that clinicians would probably not wish to use a dimensional model in the same way as researchers, and would find a profile of scores – like the old somatotype – of limited value. Clinicians tend to convert dimensions to categories, and might wish to speak of anxious depression; somatised depression; somatised anxiety; and perhaps even somatised anxious depression. Dimensional models also do not help to distinguish between symptom dimensions on the one hand, and mechanisms such as phobic avoidance or dissociation on the other.

Latent structure models have not yet been applied to the WHO data-set; when they are, we may find that identical structures are not found across the world. It is also likely that a different research interview would have produced other dimensions, so that international agreement about the basic underlying dimensions may be several years away. It is evident that dimensional systems are an exercise in model-building; but then, so are the ICD–10 or DSM–IV systems. Each have their strengths and weaknesses, and in our present state of ignorance, neither can as yet be safely discarded.

References

DEAN, C., SURTEES, P. G. & SASHIDHARAN, S. P. (1983) Comparison of research diagnostic systems in an Edinburgh Community Sample. *British Journal of Psychiatry*, **142**, 247–256.

DUNCAN-JONES, P., GRAYSON, D. & MORAN, P. (1986) The utility of latent trait models in psychiatric epidemiology. *Psychological Medicine*, **16**, 391–405.

FINLAY-JONES, P. & BROWN, G. (1981) Types of stressful life event and the onset of anxiety and depressive disorders. *Psychological Medicine*, **11**, 803–816.

GOLDBERG, D. & BLACKWELL, B. (1970) Psychiatric illness in general practice. A detailed study using a new method of case identification. *British Medicial Journal*, **2**, 439–443.

———, BRIDGES, K., DUNCAN-JONES, P., *et al* (1987) Dimensions of neuroses seen in primary care settings. *Psychological Medicine*, **17**, 461–470.

——— & ——— (1990) Epidemiological observations on the concept of dysthymic disorder. In *Dysthymic Disorder* (eds S. Burton & H. Akiskal), pp. 104–111. London: Gaskell.

https://doi.org/10.1192/S0007125000298401 Published online by Cambridge University Press

———, ———, COOK, D., *et al* (1990) The influence of social factors on common mental disorders: destabilisation and restitution. *British Journal of Psychiatry*, **156**, 704–713.

——— & ——— (1991) Minor psychiatric disorders and neurasthenia in general practice. In *Problems of Psychiatry in General Practice* (eds M. Gastpar & P. Kielholz), pp. 79–88. Bern: Hogrefe-Huber.

GRAYSON, D., BRIDGES, K., DUNCAN-JONES, P., *et al* (1987) The relationship between symptoms and diagnoses of minor psychiatric disorder in general practice. *Psychological Medicine*, **17**, 933–942.

JASPERS, K. (1923) *Allgemeine Psychopathologie*. Berlin: Springer-Verlag.

KENDELL, R. (1975) *The Role of Diagnosis in Psychiatry*. Oxford: Blackwell Scientific.

ORMEL, J., VAN DEN BRINK, W., KOETER, M., *et al* (1990) Recognition, management and outcome of psychiatric disorder in primary care: a naturalistic follow-up study. *Psychological Medicine*, **20**, 909–923.

ORMEL, H., OLDEHINKEL, T., GOLDBERG, D., *et al* (1995) The structure of common psychiatric symptoms: how many dimensions of neurosis? *Psychological Medicine*, **25**, 521–530.

SARTORIUS, N. & ÜSTÜN, B. (1994) *Psychological Disorders in General Medical Settings: A WHO Collaborative Study*. Chichester: John Wiley.

WORLD HEALTH ORGANIZATION (1992) *The Tenth Revision of the International Classification of Diseases and Related Health Problems* (ICD–10). Geneva: WHO.

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