THE FACTOR STRUCTURE OF THE 60 ITEM GENERAL HEALTH QUESTIONNAIRE

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Male school children (N = 241), all aged 16 years, and 144 men facing redundancy completed the 60 item version of the General Health Questionnaire. Data from the two groups was analysed seperately using unrotated first principal components analysis followed by oblique rotation. The unrotated first principal component accounted for 23% of the variance in the school group, and 13.2% in the group facing redundancy. No subsequent component accounted for more than 6.1% of the variance. For both samples the first five components were subjected to an oblique rotation. Results were discussed in relation to previous findings of the GHQ. The factor struture was found to be unstable across groups. The implications of these findings were considered in the context of proposed subscales of the GHQ.

The General Health Questionnaire (GHQ) (Goldberg 1978) was designed to be a self administered screening test, aimed at detecting non-psychotic psychiatric disorder amongst respondents in community settings. The GHQ concerns itself with two major classes of phenomena: the inability to continue to be able to carry out ones normal healthy functions, and the appearance of new phenomena of a distressing nature (Goldbert & Hillier, 1979). For each item the respondent is asked to compare his recent state with his usual state. It thus tends towards a state, rather than a trait measure. The original test specification is described in Goldberg(1972) and covers the four areas of: depression, "felt psychological disturbance", observable behaviors and hypochondriasis. The pilot version of the questionnaire contained 140 items about equally divided between these four areas. Item analysis led to a 60 item version of the questionnaire which discriminated between three levels of severity of psychiatric disturbance as diagnosed by experienced psychiatrists. The item reduction techniques used favoured the emergence of a single unidimensional scale, and this general GHQ-60 score, and its shortened versions, have been widely and successfully used in research.

A subsequent attempt has been made by Goldberg to construct several subscales from the component parts of the GHQ-60 (Goldberg & Hillier 1979). Using 523 general practice attenders as subjects, they proceed by orthogonal varimax rotation to identify four subscales of (i) somatic symptoms, (ii) anxiety and insomnia, (iii) social dysfunction, and (iv) severe depression. However, this endeavour depended on a factor analysis of the 60 item version, which itself had already selected items to a one dimensional criterion. Efforts at reconceptualization were rudimentary, and success consequently was extremely dependent on the generalizability of the rotated factor structure they found.

In the present study the 60 item version of the GHQ has been factor analysed in two distinct groups of subjects, using oblique rotations. The stability of factors with respect to the possible identification of subscales is investigated.

METHOD

Data was collected from two distinct samples. The first was composed of 241 white English male pupils, age 16, taken from 5 mixed comprehensive schools set in essentially rural areas, with both academic and technical streams being represented. All data was obtained over a six week period (January to mid February) so timed as to capture as many 16 year olds as possible whilst at the same time ensuring that the results, relative to states of well-being, would not be confounded with examination stress. Individuals forming the second sample were 144 male predominantly English, skilled and semi-skilled employees taken from 4 firms set in urban areas, about to face redundancy. Redundancy was selective in all cases, therefore the dubious consolation of mass lay-offs did not arise. The mean age of this group was 32.9 years, median age 30 years, with a range between 17 and 62 years. 83 were married and 61 single. Both samples completed the 60 item GHQ as the first of a series of questionnaires, and a guarantee of confidentiality was given. The school group at their own leisure. The GHQs were scored by the binary method (0-0-1-1), rather than the Likert (0-1-2-3). Goldberg (1978) has shown the two methods to be equivalent in terms of classification. There are clearly problems with factor analysis involving binary data, particularly where a number of items are heavily skewed, as in the GHQ, however, in analysing the data in this way we are replicating the technique used by Goldberg and his associates when they arrived at their subscale structure, as well as that of other workers who have factor analysed th GHQ. The sample size/item number ratios of 3.65 and 2.40 respectively for these two groups are large enough to demonstrate factor stability across groups, should it exist at any reasonable level.

RESULTS

Results for the two groups were analysed separately. The first stage of the analysis was carried out by principal components to maintain comparability with the majority of other workers in the area. Replications using principal factoring with iterations (Nie et al., 1975) yielded virtually identical results (Harris, 1967). For both groups the results showed a large first component, and a single factor solution would clearly be the most parsimonious. However if we are to investigate subscales and make comparisons with other workers the nature of a several factor solution needs to be investigated. Selection of factor numbers, was made by the following criteria: (a) No factors were selected which had eigenvalues less than one; (b) The Scree test (Cattell, 1965) was applied, but as an aid rather than a sufficient criterion; (c) interpretability of unrotated factors (Armor, 1974); (d) the number of items on a factor with loadings greater than .35 (Overall & Klett, 1972); and (e) comparability with the GHQ factorial structure found by other researchers. The choice of five, rather than four or six, factors made on this basis was rather arbitary, however criteria "e" fortified this choice. Following this, the selected factors were subjected to an oblique direct oblimin rotation (Jennrich & Sampson, 1966) with delta set to Zero (Harman, 1976). A wider range of delta options, sweeping between parameters of -.5 and +.5, provided support for stability of effects.

SCHOOL GROUP

For the gross GHQ-60 the mean for this group was 5.47 with an s.d. of 8.09. The principal components analysis produced 17 factors with eigenvalues greater than unity that accounted for 69.9% of the total variance. The first factor appeared, as expected, to be a general factor. Only 16 items had loadings on it of less than .3, and only 2 less than .25. The first five factors were deemed suitable for rotation, and

TABLE 1: FACTOR ANALYSES OF THE 60 ITEM GENERAL HEALTH QUESTIONNAIRE ON TWO GROUPS: 16 YEAR OLD SCHOOLBOYS (N = 241), AND 144 MALE EMPLOYEES ABOUT TO BE MADE REDUNDANT.

Items indicating positive health have been reversed. Factor loadings on the oblique rotations of the five factor solutions are given. Items with loadings of greater than .35 are considered to be of significance and have been italicized. The wordings of some of the longer items has been paraphrased to save room, and should only be taken as descriptive.

		Factor solutions								
Items	School Group					Redundant Group				
	I	II	III	IV	V	I	II	III	IV	V
1. Well and in good health	.09	.09	-.74	.05	.10	.20	.09	.13	-.61	.18
2. In need of a good tonic	.24	.32	.46	.14	.06	.08	.01	.22	-.52	.10
3. Run down and out of sorts	.27	.18	-.38	.01	.05	.02	.22	.06	-.45	.28
4. Felt that you are ill	.07	.17	-.73	.02	.04	.03	.12	.23	-.65	.13
5. Getting any pains in head	.33	-.01	-.40	-.04	.16	-.08	.21	.35	.40	.07
6. Getting head tightness/pressure	.41	.16	-.36	-.05	.05	.02	.20	.35	-.22	.03
7. Able to concentrate	.02	-.02	-.32	.18	.27	.18	-.10	.09	-.38	.15
8. Afraid going to collapse	.42	.13	.06	.05	.07	.18	.00	.08	.03	.31
9. Having hot or cold spells	-.22	.07	-.60	-.02	.13	.07	.00	.32	-.57	.21
10. Perspiring a lot	-.07	-.06	-.50	-.23	.36	.06	.14	.34	-.10	.15
11. Unable to get back to sleep	-.06	.49	.30	.50	-.03	.13	-.02	.46	.21	.20
12. Sleep hasn't refreshed you	.03	.40	-.14	.27	.01	.43	.15	.02	.06	.09
13. To tired/exhausted to eat	.18	.64	-.01	-.09	-.15	.21	.03	.04	.26	.20
14. Lost much sleep over worry	.13	.44	-.19	-.15	.14	.11	.15	.58	.11	.01
15. Mentally alert and awake	-.15	.35	-.36	.20	.20	.31	.11	.04	.32	.12
16. Feeling full of energy	.65	.31	-.19	.28	.05	.27	-.19	-.06	-.30	-.09
17. Difficulty getting to sleep	-.10	.60	.06	.25	.09	.13	.01	.52	-.03	.01
18. Difficulty staying asleep	.02	.65	-.10	-.04	.06	-.09	.23	.58	.01	.16
19. Frightening/unpleasant dreams	.14	.44	.18	-.09	.13	.20	-.08	.10	.25	.30
20. Restless disturbed nights	.04	.68	-.01	.10	.04	.01	.07	.59	-.01	.03
21. Busy and occupied	.12	.10	.11	.54	.03	.10	.18	.09	.18	-.24
22. Taking longer over things	.12	.09	-.37	.32	.02	.16	.19	.19	-.37	.01

TABLE 1 (CONTINUED)

| | | Factor Solutions | | | | | | | | |
| | School Groups | | | | | Redundant Group | | | | |
Items	I	II	III	IV	V	I	II	III	IV	V
23. Lost interest in activities	.13	.09	-.18	.25	.00	.26	.14	-.30	-.31	-.03
24. Losing interest in appearance	-.01	.13	-.01	.00	.62	.22	.05	.43	.17	.03
25. Taking less trouble with clothes	.07	.04	-.02	-.06	.63	.13	.01	.47	.05	-.03
26. Getting out of house as usual	.19	.06	.02	.39	-.06	.09	.11	-.02	-.02	.04
27. Managing as well as most people	.02	-.21	.06	.58	-.06	.24	.15	.33	-.29	-.14
28. Doing things well	-.07	.00	-.12	.66	.17	.47	-.08	.04	-.29	-.10
29. Getting late to work/housework	-.03	-.21	-.03	.08	.33	.12	.11	.04	-.34	-.07
30. Satisfied way carried out tasks	.09	.11	.08	.36	-.07	-.01	.04	.11	-.11	-.07
31. Able to feel warmth/affection	.03	.15	-.13	.10	.35	.37	.13	-.05	-.06	.08
32. Easy to get on with others	.24	.00	.06	-.06	.59	.48	.25	-.05	.14	.13
33. Chatting with people	-.06	.13	.15	.30	.28	.80	.01	-.04	.16	.13
34. Afraid say anything to people	.08	-.06	-.08	.25	.47	.72	.03	.10	.05	.11
35. Playing a useful part	.00	-.11	-.14	.10	.61	.32	-.15	-.15	-.20	-.31
36. Felt capable of decisions	-.01	-.01	.02	.45	.20	.37	-.27	.19	.08	-.25
37. Can't make a start on anything	-.09	.22	.05	.54	.24	-.04	-.20	.27	-.35	-.49
38. Dreading things you have to do	.05	.07	.07	.15	.41	.35	-.08	-.04	-.05	-.36
39. Feel constantly under strain	.37	.27	-.19	.32	-.20	.05	.07	-.05	-.01	-.58
40. Feel couldn't overcome problems	.39	.22	-.13	-.01	-.28	.03	-.02	.00	.03	-.72
41. Finding life a struggle	.50	.30	-.05	.19	-.20	.16	.19	.19	.01	-.45
42. Enjoy normal activities	.44	.15	-.09	.11	-.04	-.11	.08	-.22	-.02	-.21
43. Been taking things hard	.58	-.13	-.27	.05	-.04	-.01	.32	-.02	-.02	-.32
44. Been edgy and bad tempered	.44	.02	.07	.23	.13	.23	-.07	.05	-.48	-.23
45. Been scared or panicky	.47	.14	-.17	-.02	-.02	-.01	.60	-.19	-.42	.04
46. Able to face up to problems	.19	-.14	-.15	.54	.03	-.02	.17	-.15	-.07	-.49
47. Things getting on top of you	.49	.10	-.03	.38	.03	.06	.28	.23	.04	-.60
48. Feeling people looking at you	.37	-.19	-.03	.18	.04	-.01	.30	-.25	.02	-.25
49. Feeling unhappy and depressed	.51	.10	-.03	.33	.13	.15	.16	.11	-.11	-.31
50. Lacking confidence in yourself	.31	-.15	-.12	.01	.56	.35	-.11	.06	-.01	-.39
51. Thinking self worthless	.43	-.10	-.05	-.18	.51	.53	-.10	.17	.21	.10
52. Feel life is entirely hopeless	.63	-.03	.06	.05	.24	.14	-.66	.03	.03	.13

TABLE I (CONTINUED)

Factor Solutions

Items	School Group					Redundant Group				
	I	*II*	*III*	*IV*	*V*	*I*	*II*	*III*	*IV*	*V*
53. Feeling hopeful about future	.13	-.08	-.19	.36	.40	-.09	-.06	-.01	-.23	-.20
54. Feeling reasonably happy	.41	.16	.15	.00	.33	.34	.21	.04	-.40	-.12
55. Feeling nervous and strung up	.52	.03	-.01	.16	.25	.33	.08	.05	-.01	-.24
56. Felt life isn't worth living	.69	.05	.10	-.07	.22	.09	.56	.33	.04	-.22
57. Thought of making away with self	.78	.12	-.02	-.24	.09	.07	.61	.20	.13	-.11
58. Do little because nerves bad	.47	.11	.00	.07	.10	.46	.19	-.01	-.01	-.05
59. Wished you were dead	.63	.09	.28	.15	.02	.04	.81	.11	.06	-.10
60. Idea of taking your own life	.72	.07	.10	.01	.10	.05	.68	.28	-.20	.03

accounted for 23.8, 5.5, 4.1, 3.9 and 3.7 percent of the variance respectively (41% in total). The oblique rotation of these five factors appears in the first five numeric columns of Table 1.

Items indicating positive health have been reversed. Factor loadings on the oblique rotations of the five factor solutions are given. Items with loadings of greater than .35 are considered to be of significance and have been italicized. The wordings of some of the longer items has been paraphrased to save room, and should only be taken as descriptive.

The correlations between the five oblique factors appear in Table 2.

TABLE 2: CORRELATIONS BETWEEN THE FIVE OBLIQUE FACTORS FOR THE ANALYSIS OF THE SCHOOL GROUP (N = 24)

	Factor				
	I	*II*	*III*	*IV*	*V*
I	1.00	.18	.23	.31	.32
II		1.00	.18	.18	.23
III			1.00	.17	.20
IV				*1.00*	*.23*

The five factors can be interpreted as follows:

Factor I: Depression and anxiety. There were high loadings for items concerned with suicidal thoughts, and lesser loadings for items relating to unhappiness, bad nerves and poor self esteem.

Factor II: Insomnia and anergia. Six items were related to various aspects of sleep disturbance, while three were concerned with the lack of vigor.

Factor III: Somantic symptoms. A person with a somatic complaint might reasonably be expected to score highly on this factor.

Factor IV: Difficulty coping. Items were suggestive of poor performance in daily tasks.

Factor V: Loss of confidence, personal neglect and social dysfunction.

REDUNDANT GROUP

The overall GHQ-60 scores had a mean of 7.94 (s.d. = 6.73) for this group. In the principal components analysis 21 components had eigenvalues greater than 1 and accounted for 73.1% of the variance. The first component was a general factor, but less well defined than in the school group. Eighteen items had loadings under .3, and 10 under .25. Application of factor selection criteria again led to five factors being considered meaningful. These five accounted for some 33.2% of the total variance, with the first factor responsible for 13.2%. Factors II to V accounted for 6.1, 5.1, 5.0 and 3.8 percent of the variance respectively. The last five numeric columns of table 1 gives the results of the oblique rotation, with the correlations between the factors appearing in Table 3.

TABLE 3: CORRELATIONS BETWEEN THE FIVE OBLIQUE FACTORS FOR THE
REDUNDANT GROUP (N = 144)

	Factor				
	I	*II*	*III*	*IV*	*V*
I	1.00	.10	.13	-.12	-.21
II		1.00	.00	.01	-.06
III			1.00	-.06	-.06
IV				1.00	.20

These factors can be described as follows:

Factor I: Social dysfunction and loss of confidence. Items loading were similar to those reported for factor V of the school group.

Factor II: Severe depression. These were mostly items dealing with suicidal thoughts and worthlessness.

Factor III: Insomnia and personal neglect. Five of these items pertain to sleeping difficulties. Four relate to personal neglect.

Factor IV: Somatic symptoms. This is very similar to the general illness factor of the school group.

Factor V: Anhedonia. Most of these items reflected difficulties in daily life.

DISCUSSION

The results give clear support for a single GHQ factor of mental well-being. This is supportive of Goldberg's own results and of those of other workers who have factor analysed the GHQ (Parkes, 1982; Medina-Mora et al., 1983; Worsley et al., (1978). In considering possible sub-scales it is notable that in the present study factors subsequent to the first were small. In fact in all factor analytic studies of the 60 item GHQ subsequent factors have accounted for rather small percentages of variance, values for the second factor ranging from 7.2% (Parkes, 1982) to 5.4% (Medina-Mora etal., 1983).

The number of factors selected for rotation in the various studies are different, ranging from 4 (Goldberg & Hillier 1979) to 8 (Worsley et al., 1978). Selection of factor numbers is necessarily rather arbitary, particularly as it is so dependent on the relative size of the first factor, and each analysis needs to be interpreted on its merits. All studies in the literature use orthogonal varimax rotations.

Worsley et al. (1978) identified a social dysfunction factor, and a general illness factor which is probably equivalent to Goldberg's somatic symptoms factor. They did not identify any clear anxiety and insomnia factor, or severe depression. Benjamin et al. (1982) found no specific severe depression factor or any clear equivalents to Goldberg's anxiety or somatic symptoms factors, but they did identify social dysfunction. It may be that severe depression factors only appears in clinical samples (Benjamin used normal menopausal women), but this on its own would not augur well for any generalized population subscale. Parkes (1982) found that the factor structures of field dependent and field independent student nurses were different. Medina-Mora et al. (1983), in a six factor rotation of data from 557 patients, identified severe depression, general illness and interpersonal relations, but somatic symptoms loads on a factor with depression and insomnia forms a separate factor from anxiety.

In the present study, using oblique rotation, a somatic symptoms factor (III in the school group and IV in the group facing redundancy) is clearly identified. Severe depression is identified (factor II) for the redundant group only. Social dysfunction loads on a common factor with loss of confidence (Factor V for the

school group and factor I for the group facing redundancy). For the school group anxiety loads with depression (Factor I), as was found by Worsley et al. (1978) and by Medina-Mora et al. (1983). Insomnia with both groups (factor II for the school group and factor III for the group facing redundancy) forms a separate factor, but contaminated with anergia (school group) or personal neglect and headaches (group facing redundancy). Within both groups there is very strong evidence of major contamination by acquiesence and response bias effects. Item loadings within all the factors almost uniformly lie in the same direction.

The general plan of two of Goldberg's subscales (Social dysfunction and somatic symptoms) thus receives some support both from the literature and from the present study. The remaining two (severe depression and anxiety/insomnia) seem much less stable. Even for social dysfunction and general illness, the items which might have been selected to form the subscales would have been different in the different analyses.

Worsley et al. (1978) suggest that sample differences are the main cause of differences in the factor structure of the GHQ. Male and female combined (Goldberg 1972, Goldberg et al. 1976, Goldberg & Hillier 1979, Medina-Mora et al. 1983), and females separately (Worsley et al. 1978, Benjamin et al. 1982, Parkes 1982) have formed·the bases of analyses. The studies by Goldberg and his colleagues, Worsley et al. (1978), Benjamin et al. (1982) and Medina-Mora et al. (1983) have employed subjects drawn from medical environments. From a cultural perspective six published reports refer to UK subjects, Goldberg et al.'s (1976) analysis was based in American subjects, whilst Worsley and his colleagues employed Australians, and Medina-Mora et al., Mexicans. But if these sample differences do account for the differences in subscale structure, then there is no possibility of using the GHQ as a basis for generalized subscales.

All this having been said, the GHQ in its various versions has successfully been used to identify degree of overall severity of psychiatric symptoms. Overall severity is such a powerful factor that it shines through any inadequacies in the test construction. But the construction of subscales of psychiatric severity requires rather more conceptual precision. Such subscales, if they are to have any diagnostic value, need to be measuring the same constructs on both sides of the cut-off forming the basis of diagnosis. The factor structure therefore needs to be the same in both clinical and non-clinical populations. This does not seem to be the case with the GHQ.

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