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AN IMPROVED SHORT QUESTIONNAIRE FOR THE MEASUREMENT OF EXTRAVERSION AND NEUROTICISM

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There is much evidence in the literature that there are two main dimensions which may serve to describe human personality: extraversion-introversion and neuroticism-stability (1). As a questionnaire measure of these two factors Eysenck (2) designed the Maudsley Personality Inventory (M.P.I.), which consisted of 48 questions in all; while this is short as modern personality inventories go, it seemed desirable to publish an even shorter version which still retained reasonable reliability, and correlated reasonably highly with the total scale. Accordingly a 12-item scale was published (3) which showed corrected split-half reliabilities of .79 and .71 for N and E respectively; the correlation between N and E was -.05. The number of subjects used was 1,600. Since then, an improved version of the M.P.I. has been published under the title of Eysenck Personality Inventory (E.P.I.), based upon a series of factorial analyses of various sets of items, and different populations (4). It is the purpose of this note to bring to the attention of research workers an improved brief scale for the measurement of E and N, based upon the E.P.I., and containing a selection of questions different from the earlier short scale. This selection is based upon extensive factor analyses done on intercorrelations between 108 items considered for inclusion in the E.P.I.; oblique first order factors were calculated, as well as oblique higher order factors, and an attempt was made

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in the selection of items to achieve a better representation than had been possible before of the main primary factors involved in both E and N (5). The resulting scale is given below. Also given are the results of a factor analysis of the correlations between items, carried out on a sample of 1053 men and 874 women separately. The method of principal axes was used and three factors extracted.

Table 1

	Men n = 1053			Women n = 874		
	E	N	?	E	N	?
1. Do you like plenty of excitement and bustle around you?	.52	.06	.01	.54	.10	-.07
2. Does your mood often go up and down?	.05	.57	.03	-.05	.55	.09
3. Are you rather lively?	.58	-.06	.04	.57	-.10	.03
4. Do you ever feel "just miserable" for no good reason?	.03	.53	-.01	-.05	.49	.06
5. Do you like mixing with people?	.50	-.11	.03	.48	-.12	.03
6. When you get annoyed do you need someone friendly to talk to about it?	.06	.23	.73	.16	.20	.04
7. Would you call yourself happy-go-lucky?	.50	-.06	.03	.47	-.05	-.06
8. Are you often troubled about feelings of guilt?	-.03	.38	.12	-.07	.32	.13
9. Can you usually let yourself go and enjoy yourself a lot at a gay party?	.56	-.13	.00	.61	-.07	-.03
10. Would you call yourself tense or "highly strung"?	-.06	.37	.08	-.01	.25	.48
11. Do you like practical jokes?	.41	.06	-.03	.28	.10	-.15
12. Do you suffer from sleeplessness?	-.10	.30	.02	-.05	.10	.47

It will be seen that for both men and women E and N items respectively have high loadings on the E and N factors; the third factor, headed "?", shows no agreement between the sexes, having a high loading on item 6 for the men, and on items 10 and 12 for the women. In view of this sex specificity we have

discarded it. Scores were next derived for men and women respectively, giving 1 point for agreement with the key, and no points for disagreement. These scores are given in Table 2. It will be seen that the men are very slightly more extraverted, although the difference is too slight to mention, and that the women are noticeably more neurotic by about $^1/_3$ S.D. With the previous short scales, women had a score roughly $\frac{1}{2}$ S.D. higher than the men on N, and $^1/_6$ S.D. lower than the men on E. There is thus good agreement between the two investigations.

Table 2

		E		N		n
		Mean	S.D.	Mean	S.D.	
Normals	Males	3.811	1.732	2.067	1.522	1,053
	Females	3.715	1.616	2.580	1.472	874
Psychotics	Schizophrenics	3.158	1.677	2.807	1.586	57
	Depressives	3.310	1.957	3.524	1.756	42
Neurotics	Unclassified Neurotics	2.869	1.793	3.754	1.670	61
	Anxiety Cases	2.322	1.684	4.035	1.633	115
	Hysterics	3.286	1.673	3.829	1.465	35
	Obsessionals	2.235	1.480	4.118	1.616	17

Table 3 shows correlations of the two short E and N scales with each other, and also with the long E and N scales. The latter correlations are of course increased by the fact that the same set of 12 items appears in both the long and the short scales; however, the figures do give some idea of the loss in validity that would have to be paid by substituting the short form for the long form.

Table 3

		Males	Females	Total	Psychotics Schiz.	Psychotics Depr.	Neurotics Unclass.	Neurotics Anx.	Neurotics Hyst.	Neurotics Obs.
E_s	N_s	-.040	-.062	-.052	-.102	-.304	-.117	-.234	-.267	+.406
E_s	E	.818	.817	.816	.731	.889	.820	.791	.753	.817
N_s	N	.799	.779	.792	.846	.867	.866	.847	.826	.768
	n	1053	874		57	42	61	115	35	17

Table 2 also shows results of administering the short scale to 99 psychotic patients, subdivided into schizophrenic and depressive, and 228 neurotic patients, subdivided into unclassified, anxiety state, hysteric, and obsessional. It will be seen that on N psychotics have lower scores than neurotics, with schizophrenics not far above the normal level, and depressives not far below the neurotic level. The N scores of the 4 neurotic groups are quite homogeneous; they run about 1 S.D. above the level of the normal group. On E the psychotic groups are $^1/_3$ S.D. below the normal group; the neurotic groups are $^2/_3$ S.D. below the normal group, with the exception of the hysterics who, as usual, are more extraverted than other neurotics. They, too, however, are still below the normal level.

Also given in Table 3 are the correlations between the short scales for E and N, and between the short and long scales. The figures are similar to those obtained from the normal sample, except that E and N are more highly correlated in all groups except the obsessional neurotics. This group is so small, however, that little interest attaches to this particular figure.

Table 4 shows correlations with age of our normal, psychotic and neurotic groups. It appears that in nearly all cases older people are less extraverted and less neurotic. These correlations are not very high, so that this effect should not be regarded as too important; however, with a wider range of ages than that represented in these samples larger correlations might have been obtained. (Details regarding the sample used are given in the Manual for the E.P.I. (4).)

Table 4

Correlations with Age

		E	N
Normals	Males	-.184	-.105
	Females	-.213	-.125
Psychotics	Schizophrenics	-.174	-.236
	Depressives	-.069	-.068
Neurotics	Unclassified	.200	-.197
	Anxiety cases	-.229	.170
	Hysterics	.063	-.101
	Obsessionals	-.139	-.181

Is the present scale superior to the M.P.I. short scale? The factor saturations for the M.P.I. scale are higher for both E and N, and on those grounds one might have concluded that the present scale was inferior. Such a judgment would not be correct, because it would leave out of account a very important statistical consideration which deserves consideration. E and N are higher-order factors, i.e. they are formed through the observed correlations between first order factors. For first order factors it would be true to say that they may be considered as Guttman-type scales, and that the higher the intercorrelations, and the closer their pattern approximated to a matrix of rank one, the better the scale. For them, size of factor saturations could indeed be said to determine goodness of scale. Higher order factors are made up of several first order factors, and here inclusiveness is an important consideration. Let us assume that factor E is made up of six primary factors, labelled A through F. Clearly a scale containing one question each from these six factors would be superior to one containing questions from factors A and B alone; yet the former scale would have lower correlations between questions,

and lower factor loadings, than the latter scale. Sociability is one of the primary factors entering into extraversion; it would be possible to construct a scale of sociability with very high intercorrelations between items and call this scale one of extraversion. (Some existing scales appear to have originated in this manner.) Yet such a scale would be inferior to the scale here suggested, although factor saturations would be very much higher. The reason for this inferiority of the sociability scale, of course, lies in its lower validity as a measure of extraversion; it fails to measure many important constituent traits in the constellation of traits labelled extraversion. In other words, though the factor may be measured more accurately in the case of the sociability scale, it is a different factor not collinear with extraversion; consequently the scale is inferior in validity. Thus for higher order factors too high loadings may be as undesirable as too low loadings; the former may indicate incomplete coverage, while the latter may indicate failure to cover the proper region. (Low loadings may also indicate inadequate conceptualization of the nature of the factor in question.) In the light of these considerations we would conclude that the present scale is superior to the previous scale, and that the reason (and the proof) for this assertion lies in the large-scale factor analysis on which the selection of items was based (5).

Summary

A short questionnaire measure of extraversion and neuroticism has been constructed on the basis of correlational and factor analytic studies of large numbers of personality inventory items. Normative data derived from a sample of 1,053 men and 874 women are presented, as well as a factor analysis of the correlations for men and women separately. Data are also given for psychotic and neurotic patients. It is concluded that the scales presented give a valid measure of E and N.

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