INTERACTIONS OF RELIABILITIES IN PERSONALITY MEASUREMENT

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Social Behavior and Personality, 2 (1): 108-10, 1974.

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A novel statistical technique was used to look at the interactions of the reliabilities of personality measures with each other and with the personality scores themselves. The personality test used was Eysencks' PQ questionnaire which gives measures of Psychoficism (P), Extraversion (E), Neuroticism (N) and a Lie scale (L). Lower reliability in the P scale for high P scorers was found. The reliabilities of the P, E, N and L scales were found to be correlated. A relationship was found between E and a common reliability factor.

Test retest data, as well as yielding simple reliabilities for variables, can be used to look at differences in reliability of a measure at different points in the scale, and also at the relationship between reliabilities of different variables. This can be done by examining the correlations between the sums and the absolute differences of the test and retest scores. The approach is similar to that used in biometrical genetics to test for genotype environment interactions (Jinks and Fulkner, 1970). In our case, however, we look at sums and absolute differences of two tests given to the same person rather than at one test for each of a monozygotic twin pair. Significant correlations for the test-retest data will suggest a reliability-score interaction.

Data used are PQ scores collected by S. B. G. Eysenck on 136 men and 121 women in various colleges in London. The PQ is a pencil and paper questionnaire with 101 items which gives scores on the personality measures of Psychoticism (P), Extraversion (E) and Neuroticism (N) together with a Lie scale (L). It is a later version of the PEN (Eysenck and Eysenck, 1972). The mean scores found for these measures on our sample were close to the population means.

Table 1 is the within groups correlation matrix (adjusted for sex differences) between the sums and absolute differences for the test retest scores. We see that the correlations between the personality scores and with age are what we would expect in a sample such as this (Eysenck and Eysenck, 1969). The correlation between the P score sum and absolute difference shows an interaction between the score on this scale and its reliability. This is such that a higher P score goes with lower reliability. This may be due to lower reliability of the P measure at higher points in the scale. Alternatively, high P scorers

TABLE 1: WITHIN GROUP CORRELATION MATRIX (ADJUSTED FOR SEX) OF THE SUMS AND ABSOLUTE DIFFERENCES OF FOUR PERSONALITY SCORES TOGETHER WITH AGE

	Age	*P sum*	*E sum*	*N sum*	*L sum*	*P diff*	*E diff*	*N diff*
P sum	—0.19**							
E sum	—0.21**	0.15*						
N sum	—0.18*	0.15*	—0.14*					
L sum	0.37**	—0.26**	—0.11	—0.19**				
P diff	—0.07	0.28**	0.01	0.04	—0.10			
E diff	—0.08	0.03	—0.08	0.02	0.04	0.19**		
N diff	—0.10	0.06	—0.04	0.02	—0.15*	0.21**	0.21**	
L diff	—0.06	—0.07	—0.10	—0.06	0.13	0.10	0.07	—0.05

* p less than 0.05. ** p less than 0.01.

may be less consistent in answering questionnaires or perhaps in their behavior in general.

The intercorrelations between the absolute difference scores seem to suggest a common reliability factor. This is confirmed by the principal components analysis of the matrix given in Table 2.

TABLE 2: PRINCIPAL COMPONENTS ROTATION OF THE CORRELATION MATRIX GIVEN IN TABLE 1. ONLY COMPONENTS WITH EIGENVALUES GREATER THAN 1 ARE GIVEN

Component	*I*	*II*	*III*
Age	0.64	—0.22	0.02
P sum	—0.62	0.03	0.10
E sum	—0.28	0.47	0.66
N sum	—0.38	0.01	—0.76
L sum	0.68	—0.23	0.16
P diff	—0.48	—0.50	0.24
E diff	—0.18	—0.67	0.12
N diff	—0.37	—0.50	0.10
L diff	0.24	—0.32	0.02
Eigenvalue	1.92	1.38	1.12

The common reliability comes out on factor II which also gives extraversion a loading of 0.47. The observation that subjects giving reliable responses on one test measure tend to be more reliable on others confirms previous results (Slater, 1965). It seems from our study that this characteristic is associated with extraversion. Either extraverts are more reliable in answering questionnaires, or they are more stable in their personality characteristics over time. From the principal components analysis we also see that factor I shows the expected changes in personality with age. Factor III indicates quite a strong negative relationship between E and N after other variables have been accounted for.

To conclude, a relationship was found between the P score and reliability on the P scale. A common reliability factor in questionnaire responses was demonstrated and found to be related to extraversion.

These results, as well as being interesting in themselves, demonstrate a method by which more information can be obtained from ordinary test-retest data.

ACKNOWLEDGEMENT

Thanks are due to S. B. G. Eysenck, Institute of Psychiatry, University of London, for providing the data for this study.

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