Person. individ. Diff. Vol. 6, No. 4, pp. 503–504, 1985
Printed in Great Britain.

0191-8869/85 $3.00 + 0.00

NOTES AND SHORTER COMMUNICATIONS

Indices of factor comparison for homologous and non-homologous personality scales in 24 different countries

H. J. Eysenck, P. Barrett and S. B. G. Eysenck
Department of Psychology, Institute of Psychiatry, De Crespigny Park, Denmark Hill, London SE5 8AF, England

(*Received 7 December* 1984)

INTRODUCTION

In a series of studies using the Eysenck Personality Questionnaire (Eysenck and Eysenck, 1975), comparisons have been made between 25 countries regarding the applicability of the personality system underlying that questionnaire (Eysenck and Eysenck, 1985). These comparisons have used an index of factor comparisons suggested by Kaiser, Hunka and Bianchini (1969). This index permits a comparison to be made between factors obtained in two studies using identical measuring instruments but different populations. While not a correlation coefficient, it varies from 1.00 to 0.00, indicating identity of factor structure or absence of any similarities of factor structure. The distribution of this index is not known, and hence questions of significance are difficult to answer. Data concerning these cross-cultural studies are reported elsewhere (Eysenck and Eysenck, 1983; Barrett and Eysenck, 1984).

Recently, Poortinga (1984) has suggested that the high values usually obtained in these cross-cultural comparisons do not indicate the essential identity of factors, and has suggested that chance factors might generate almost equally high indices of factor comparison. In this study, therefore, we have examined the respective size of indices of factor comparison for *homologous* scales (P vs P, E vs E, N vs N and L vs L), and for *non-homologous* scales, which can be used as an indicator of chance similarity. For one of the countries involved, mainland China, the necessary data were not available, as the original calculation had been carried out in that country, and the original data could not be sent to us for analysis. This leaves 24 countries, and within each country two sets of analyses, one for males and one for females.

For each of the 24 countries, three factor similarity matrices were obtained. Two matrices contained the coefficients computed from a comparison of factors of the males and females from a country and the English reference sample males and females, respectively; e.g. Australian females with English females and Australian males with English males. The third matrix contained the coefficients computed from a comparison of the males and females *within* a country, e.g. Australian females with Australian males. One such matrix was found to be missing. Thus 71 matrices were used for the purpose of analysis.

PROCEDURE

The absolute values for each similarity coefficient for P with P, E with E, N with N, and L with L were used. In addition the absolute values for P with E, P with N, P with L, E with N, E with L and N with L were also noted. The sample data being compared were not always ordered in the same way, i.e. whether the English reference sample factors were the first or second matrix to be entered into the similarity computations. This ordering would determine whether the English similarity coefficients formed the rows or columns of the 4 × 4 similarity matrix. Because the matrices are asymmetric, identification of say P with E provides two values, one for P row with E column, one for E row and P column. The arithmetic mean of these two values was taken as the similarity coefficient for this specific comparison (likewise for the other comparisons of P with N, P with L, E with N, E with L and N with L). Obviously for same factor comparisons such as P with P, only one coefficient was provided. By ordering each of the 71 matrices into a fixed order of P, E, N, L, for both the rows and columns, the main diagonal provided the same-factor similarity coefficients, while the off-diagonal elements provided the other coefficients. Thus, the perfect factor comparison matrix would be an identity matrix with ones in the main diagonal and zeros elsewhere.

The use of absolute similarity coefficients enabled the calculation of mean values that indicated the mean similarity of factors without regard to direction. To account for direction, it would have been necessary to note the predominant weighting for each factor in each country and use this information to 'undo' the signed similarity coefficients such that each matrix was directly comparable to every other matrix. This problem is caused by the factors in any two studies sometimes being predominantly weighted by opposite signs, e.g. E item loadings on the E factor could be positively signed in one study, while the same factor and its loadings could be negatively weighted in another. The same factor similarity coefficients would be negative, with the other P, N and L similarities assuming signed values corresponding to the predominant weighting of those factors. However, the hypothesis under examination does not specifically require directional information, rather it is sufficient to simply provide information on the mean coefficient size and stability. If the coefficients do not reflect similarity in a consistent manner, then mean size and stability parameters will reflect this inconsistency. Had we taken direction into account, the reported averages for non-homologous data would of necessity have been smaller, and might have been much smaller. Our choice therefore errs on the conservative side.

RESULTS

Results of the analysis are shown in Tables 1A, B. Table 1A provides the mean value for each comparison using only 48 of the 71 possible matrices; the 23 within-country between-sexes comparison matrices were excluded from these calculations. Table 1B provides the results computed from the 23 within-country comparisons, i.e. agreement between males

Table 1A. Indices of factor comparison for homologous (leading diagonal) and non-homologous pairs of scales, averaged over 24 countries and both sexes, excluding within-country comparisons

	P	E	N	L
P	0.96	0.09	0.14	0.19
E	0.09	0.99	0.14	0.08
N	0.14	0.14	0.99	0.15
L	0.19	0.08	0.15	0.99

Table 1B. Indices of factor comparison for homologous (leading diagonal) and non-homologous pairs of scales, averaged over 23 countries, excluding between-country comparisons

	P	E	N	L
P	0.97	0.10	0.14	0.17
E	0.10	0.99	0.11	0.12
N	0.14	0.11	0.99	0.15
L	0.17	0.12	0.15	0.99

and females within each country. For Table 1A, the mean value for homologous scales is 0.983; that for non-homologous scales is 0.132. For Table 1B, the mean value for homologous scales is 0.985; that for non-homologous scales is 0.132. Thus between-country comparisons are as close as within-country between-sex comparisons. Thus even using values regardless of sign for the non-homologous scales, the average value of the indices of factor comparison is very small, and not meaningfully different from zero, while that for homologous scales is very near unity. Not a single value for the homologous scales was as low as the highest value for the non-homologous scales; there was no overlap between the distributions.

The data indicate very clearly that Poortinga's criticism is mistaken, and that chance cannot explain the very high values obtained for homologous scale comparisons between cultures, and between sexes. We conclude that the use of indices of factor comparison for cross-cultural studies is entirely appropriate.

REFERENCES

Barrett P. and Eysenck S. B. G. (1984) The assessment of personality factors across 25 countries. *Person. individ. Diff.* **5**, 615–632.

Eysenck H. J. and Eysenck M. W. (1985) *Personality and Individual Differences.* Plenum Press, New York.

Eysenck H. J. and Eysenck S. B. G. (1975) *Manual of the Eysenck Personality Questionnaire.* Hodder & Stoughton/DIGITS, London/San Diego, Calif.

Eysenck H. J. and Eysenck S. B. G. (1983) Recent advances in the cross-cultural study of personality. In *Advances in Personality Assessment* (Edited by Butcher J. N. and Spielberger C. D.), pp. 41–69. Erlbaum, Hillsdale, N.J.

Kaiser H. F., Hunka S. and Bianchini J. (1969) Relating factors between studies based upon different individuals. In *Personality Structure and Measurement* (Edited by Eysenck H. J. and Eysenck S. B. G.), pp. 333–343. Routledge & Kegan Paul, London.

Poortinga Y. (1984) Interpreting cross-cultural differences in psychophysiological variables. Paper presented at the *2nd Eur. Conf. on Personality Psychology*, Bielefeld, F.R.G.