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CROSS-CULTURAL COMPARISONS OF PERSONALITY DIMENSIONS: ENGLAND AND AMERICA

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Summary—Two large-scale applications of the EPQ were carried out on U.S. samples and the dimensions of personality resulting from factor analyses of the resulting matrices of intercorrelations compared with similar data obtained from the original standardization groups of the EPQ in England. It is concluded that very similar factor structures obtained in the two countries, but that quota samples obtained by polling agencies may be less reliable than less representative samples obtained in more usual ways. U.S. *Ss* are lower on P and higher on E than the U.K. *Ss*.

INTRODUCTION

The Eysenck Personality Questionnaire (EPQ; Eysenck and Eysenck, 1975) was constructed to measure the three major dimensions emerging from psychometric studies of ratings and self-ratings (Royce and Powell, 1983; Eysenck and Eysenck, 1985), namely P (psychoticism vs ego-control), E (extraversion vs introversion) and N (neuroticism vs emotional stability). These dimensions are often given other names, but the similarities in each case outweigh the differences. Also included in the EPQ is a L(ie) scale measuring dissimulation, conformity or social desirability; the precise meaning of the scores depends on the motivational test situation (Michaelis and Eysenck, 1971). These dimensions of personality are strongly determined by genetic factors (Eaves and Eysenck, 1985), find close analogues in animal work (Chamove, Eysenck and Harlow, 1972; Garcia-Sevilla, 1984) and have a firm basis in physiological systems (Eysenck, 1967; Stelmack, 1981). They have strong longitudinal consistency (Conley, 1984) and it has been suggested that the resulting model of personality (Eysenck, 1981) has the status of a paradigm (H. J. Eysenck, 1983; Eysenck and Eysenck, 1985).

Of particular interest is the cross-cultural stability of the factors (Eysenck and Eysenck, 1982; S. B. G. Eysenck, 1983). Application of the EPQ in 25 different cultures, followed by factor analysis and four-factor oblique rotation of inter-item correlation matrices for males and females separately, resulted in indices of factor comparisons (Kaiser, Hunka and Bianchini, 1969) which averaged over 0.95, comparing each country with each other. In fact, most indices were in excess of 0.98, indicating close similarity of factor structure, and hence applicability of the concepts underlying P, E, N and L to these countries (Barrett and Eysenck, 1984). The aim of the present study was to extend this inquiry to the U.S.A.; no systematic study has hitherto been undertaken along these lines, although the EPQ has been widely used in the U.S.A. as well as in England (Friedman, 1984). Such an investigation is vital as it cannot be assumed that items applying to one culture will necessarily apply in another; it has not been found possible, for instance, to replicate the factor structure of the Cattell 16PF in other countries like Canada, England, Germany etc. (Eysenck and Eysenck, 1985).

Cultural comparisons, in fact, involve three related problems:

(1) Is the factor structure in the two countries being compared sufficiently similar to draw conclusions about the similarities or identity of the personality dimensions in question?

(2) Is it necessary to change the scoring key from one culture to the second country, either by elimination of items or by changing the scoring for a given item?

(3) Is it possible to produce a reduced scoring matrix for direct comparisons between the two countries, such that only items having similar loading patterns are included?

The problems reviewed, and the methods for dealing with them, have been discussed elsewhere (Eysenck and Eysenck, 1982; Barrett and Eysenck, 1984).

One problem in studies of this type is that of sampling. Random samples may be ideal, but are difficult or impossible to obtain; in addition the need to have random samples can be questioned. Eysenck (1975) suggested guidelines for the optimal selection of samples and in cases where there is little or no correlation between the trait under consideration and such variables as socio-economic status, education or other indicators of social class, non-quota samples may suffice, i.e. samples collected from a variety of backgrounds, along different lines, attempting to approach as variegated a selection process as possible. Fortunately, P, E, N and L show little correlation with social class, and non-quota samples have usually been used in our studies (Eysenck and Eysenck, 1976).

In an attempt to compare random (quota) and non-quota samples, Eysenck (1979) compared a Gallup Poll quota sample of the English population (600 males, 588 females) with the standardization groups:

> "Indices of factor comparison were all above 0.99, and all other comparisons, including means and SDs, showed similar results for the two samples. Correlations between personality factors and socio-economic status were very small, those with age somewhat larger and in the same direction as those in the original sample." (p. 1023)

Sex differences, too, were in the same direction. Clearly the precise method of obtaining the sample did not seriously affect the results obtained.

METHOD

Subjects

For England, *S*s from the original standardization samples were used, selected to be roughly equal in age to the U.S. samples respectively, as in all our other cross-cultural comparisons (Barrett and Eysenck, 1984). For the U.S.A., two large samples were used, one a non-quota, the other a quota sample. Relevant data are provided in Table 1.

The non-quota sample was much younger than the English or the U.S. quota samples, consisting mainly of Florida students, clearly a highly selected group. The quota sample was a national random probability sample chosen to replicate the work of Eysenck (1980) on personality correlates of smokers, non-smokers and successful and unsuccessful quitters, and hence had roughly equal

Table 1. Means, SDs and number of respondents in U.S. and U.K. non-quota and quota samples

	Males	Females
Non-quota Samples		
U.S.A.		
N	333	546
Age: $\bar{X}$	20	20
Age: SD	4	4
U.K.		
N	989	1217
Age: $\bar{X}$	20	20
Age: SD	3	3
Quota Samples		
U.S.A.		
N	694	647
Age: $\bar{X}$	40	41
Age: SD	14	14
U.K.		
N	600	600
Age: $\bar{X}$	34	34
Age: SD	12	12

numbers in the four cells. A lengthy questionnaire concerning smoking habits and history accompanied the administration of the EPQ: this may have put respondents on the defensive in the present rather hostile climate as far as cigarette smoking is concerned. The non-quota sample also answered questions about smoking, but this part of the enquiry was much shorter.

Analyses

For all four samples, both U.K. and U.S., the 90-item EPQ was used. The original U.K. unscored sample data were first analysed using principal-component analysis, extracting the first four components. Rotation to simple structure was implemented using an initial orthogonal maximization via Varimax (Kaiser, 1958) followed by an oblique Promax (Hendrickson and White, 1964) maximization. The power parameter was set at 4 for both Promax solutions. The U.S. unscored sample data were also factored using principal-component analysis. Although three tests of factor extraction quantity were computed [Autoscree, MAP and Kaiser α, see Kline and Barrett (1983)], the results were overridden in favour of extracting the first four components. Barrett and Kline (1980) demonstrated that with the 90-item EPQ, extracting more components as indicated by the factor extraction tests and carrying out a second-order factor analysis, the second-order solution invariably yields the same four factors that are found by extracting the first four factors at the first order.

Thus, the four factors from each U.S. sample were then rotated to maximal simple structure using hyperplane maximized Direct Oblimin (Jenrich and Sampson, 1966; Barrett, 1985). The δ-parameter was swept from -10.5 to $+0.5$ in steps of $+0.5$; hyperplane bandwidth was set at 0.1. This particular rotation technique computes several rotation solutions, constrained from near orthogonality to near maximal obliquity. The optimum solution is that where the overall hyperplane count is at a maximum. Hakstian and Abell (1974) have shown that the non-optimized Direct Oblimin is perhaps one of the best of the analytical rotation methods on a par with the Harris–Kaiser orthoblique method (Harris and Kaiser, 1964; Hakstian, 1971; Hakstian and Abell, 1974).

Factor similarity between and within both U.K. and U.S sample data was assessed using the coefficients provided by the Kaiser *et al.* (1969) method. This technique computes factor similarity between two factor patterns by first back transforming the oblique solutions to orthogonality, then rotating the second set of variables into maximum congruity with the first set (maximizing the average variable vector cosines between the two factor spaces), then computing the resultant factor vector intercorrelations between studies as defined by the original oblique factor transformation matrices from both studies. The angular separation between factor vectors is expressed as a cosine and can thus be intepreted in the same way as a more conventional correlation coefficient such as the Pearson. Its value lies between -1.0 and $+1.0$. Given the unequivocal identification of E, N, P and L as the first four factors in both the Gallup and non-quota samples in the U.K., the rationale of comparison of the U.S. factors with the U.K. factors is clear. Coefficients less than 0.95 are taken to be indicative of less than optimal similarity between factors, the actual dissimilarity being examined by checking the factor loadings accordingly.

RESULTS

Non-quota sample

Table 2 presents the indices of factor comparison for P, E, N and L, for males and females separately. It will be seen that none of the U.K. vs U.S.A. indices is below 0.99; the U.S. non-quota sample gives factors as similar to those of the U.K. non-quota samples, as did the U.K. non-quota sample compared with the U.K. quota sample. It will also be seen that comparisons of U.S. vs U.K. males, and U.S. vs U.K. females, give *higher* indices of factor comparison than does the comparison of U.S. males vs U.S. females, or U.K. males vs U.K. females (Eysenck, 1979). In other words, sex differences are greater than national differences in this case.

The intercorrelations of the scales are shown in Table 3; they are very similar to those found in the U.K., and low throughout. The N vs L correlation is low enough to suggest that in this sample there was little if any dissimulation (Michaelis and Eysenck, 1971).

Table 2. Indices of factor comparison, U.S. vs U.K. non-quota samples

	P	E	N	L
U.S. males vs U.K. males	0.986	0.994	0.994	0.999
U.S. females vs U.K. females	0.988	0.997	0.996	0.998
U.S. males vs U.S. females	0.986	0.992	0.969	0.998

Table 3. Scale intercorrelations for U.S. males and females, non-quota samples

EPQ scales	Males	Females
P, E	0.03	−0.04
P, N	0.17	0.08
P, L	−0.09	−0.17
E, N	−0.19	−0.24
E, L	−0.07	−0.04
N, L	−0.21	−0.21

Table 4. Reliabilities (α) of P, E, N and L scales, non-quota samples

EPQ scale	Males	Females
P	0.54	0.59
E	0.81	0.84
N	0.87	0.85
L	0.72	0.74

Table 5. Comparison of means and SDs of U.S. and U.K. *Ss* on scales of common items, non-quota samples

	P		E		N		L	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
U.S. males	2.80	2.19	14.83	4.15	10.55	5.41	6.27	3.45
U.S. females	2.07	2.03	15.30	4.35	12.75	5.04	6.97	3.69
U.K. males	3.83	2.87	14.16	4.49	10.20	5.08	6.14	3.86
U.K. females	2.41	2.13	13.30	4.73	12.83	5.19	6.94	3.94

Table 4 gives the reliabilities (α) of the scales for males and females, respectively. Except for P, they are high and similar to those obtained in the U.K.; for P they are suprisingly low.

Detailed tables setting out the factor loadings for the U.S. sample can be obtained from the senior author. These suggest that the U.K. scoring keys for E, N and L can be used without change, but that three P items have to be omitted for lack of loading; namely Items 79, 18, 57. Table 5 gives the means and SDs for the male and female national groups, scored for both countries using only common items. It will be seen that the U.S. sample has *lower* P scores and *higher* E scores than the U.K. sample, with N and L failing to show any difference.

Quota sample

Table 6, gives the indices of factor comparison; these are well below those furnished by the non-quota sample. Of the eight U.S.–U.K. comparisons, only four are in the 0.99 region (those for E and L); for N they are 0.91 and 0.96 for males and females, respectively, and for P they are 0.87 and 0.94. The indices for the comparison of U.S. males and females are again lower than those between the national groups. Table 7 shows that comparing the U.S. non-quota and quota samples also gives a poor correspondence; it would seem that the quota sample is out of line with both criterion groups. P scales in particular seem to give odd and unusual results.

Comparisons of the male and female scales show, as the low index of factor comparison might have suggested, that the two factors load on very divergent items, to such an extent that the

Table 6. Indices of factor comparison, U.S. vs U.K. quota samples

	P	E	N	L
U.S. males vs U.K. males	0.869	0.989	0.914	0.999
U.S. females vs U.K. females	0.940	0.988	0.963	0.996
U.S. females vs U.S. females	0.722	0.972	0.815	0.999

Table 7. Indices of factor comparison, U.S. males and females, U.S. non-quota vs U.S. quota samples

	P	E	N	L
U.S. males, non-quota vs quota sample	0.812	0.992	0.872	0.997
U.S. females, non-quota vs quota sample	0.936	0.973	0.937	0.997

Table 8. Scale. intercorrelation for U.S. males and females in the U.S. quota samples

EPQ scales	Males	Females
E, N	−0.11	−0.12
E, L	−0.06	−0.08
N, L	−0.22	−0.17

Table 9. Reliabilities (α) of E, N and L scales in the U.S. quota samples

EPQ scales	Males	Females
E	0.81	0.82
N	0.84	0.85
L	0.80	0.78

construction of a proper P scale is impossible—U.S. males and females are much more different from each other than U.S. and U.K. males, or U.S. and U.K. females. The reason for this is unknown, but as the non-quota sample data show, this is not characteristic of the U.S.A. as a whole. (Detailed factor loadings may be obtained from the senior author.)

Reliabilities of the other scales are acceptable, as is shown in Table 8, and the intercorrelations are very much as usual, as shown in Table 9. These tables, of course, only show values for E, N and L, as it proved impossible to construct a P scale from our data.

Table 10 gives means and SDs for the E, N and L scores in the two quota samples. E scores are again higher for the U.S. groups. The N scales for the U.S. sample give much lower values than the U.K. sample, while the L scale scores are much higher for the U.S. sample. All these differences are significant ($P < 0.001$).

It would seem that it is the very high L scores for both the males and females in the U.S. quota sample that may be responsible for the disintegration of the P scale and the low N values; E is practically uncorrelated with L and hence not likely to be so affected. It is difficult to know what might have been responsible for this difference in dissimulation, but clearly the data so obtained are less reliable than those coming from the non-quota sample. The correlations between P and L are nearly always higher than those between N and L, indicating a special inverse relationship between P and L (Eysenck and Eysenck, 1976).

DISCUSSION

The major result to emerge from this study is that indices of factor comparison between U.S. and U.K. samples of both males and females are extremely high (at the 0.99 level) when L scores indicate lack of dissimulation, as in the non-quota sample, and that the scales can be scored very much in the U.S.A. as they are in England. Furthermore, sex differences are similar in both countries, with males having higher P scores, females higher N scores. Correlations between scales are also similar, as are reliabilities—with the exception of the rather lower α for P in the U.S.A. U.S. males and females are lower on P, and higher on E, than U.K. *S*s, males showing a greater difference in P, females on E; N and L do not differ significantly. It is possible that the low reliability of the P scale in the U.S. sample is due to their greater homogeneity; SDs are lower for P and E.

For the quota sample, the P scale clearly presents problems, possibly due to the excessively high L scores, which are also probably responsible for lowering the N scores for males and females alike. It is possible that this may be due to the inclusion in the interview of detailed questions about smoking habits, which at the time of administration had acquired a strong emotional involvement for some people. This might have put respondents on the defensive. Such questions were also asked in the U.K. sample, but several years earlier, when the objections to smoking had been less vocal and in a country which never reached the same level of disapproval as the U.S.A. The E scale

Table 10. Comparison of means and SDs of U.S. and U.K. *S*s on scales of common items, quota samples

	E		N		L	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
U.S. males	14.30	4.32	7.99	4.80	10.84	4.37
U.S. females	14.09	4.53	10.49	5.28	11.76	4.91
U.K. males	12.60	5.24	9.83	5.39	7.61	4.15
U.K. females	12.71	4.94	13.21	5.21	9.32	4.13

remains unscathed for this sample also, with indices of factor comparisons of 0.99 for both males and females and the U.S. groups scoring higher than the U.K. groups.

It would seem that we must discard the results of P obtained by the quota sample and consider the N results questionable, as well as the L scores, even though for N the usual sex differences make an appearance, suggesting that the decrease of N due to high L scores has affected both groups equally. We would conclude that under proper test conditions, P, E, N and L factors identical with those appearing in the U.K. can be found in the U.S.A., and can be suitably measured using the EPQ; with a caution added regarding the low reliability of the P scale.

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