Pergamon

*Person. individ. Diff.* Vol. 16, No. 2, pp. 203–210, 1994
Copyright © 1994 Elsevier Science Ltd
Printed in Great Britain. All rights reserved
0191-8869/94 $6.00 + 0.00

# A CROSS-CULTURAL STUDY OF PERSONALITY: IRANIAN AND ENGLISH CHILDREN

SYBIL B. G. EYSENCK,[1] AZAR MAKAREMI[2] and PAUL T. BARRETT[1]

[1]Institute of Psychiatry, De Crespigny Park, London, England and [2]Shiraz University, Shiraz, Iran

*(Received 24 June 1993)*

**Summary**—Four hundred and eighty three Iranian boys and 593 Iranian girls completed the Junior Eysenck Personality Questionnaire. Reliabilities (alpha coefficients) were all high except that for extraversion in girls. Intercorrelations of the scales showed a high social desirability involvement with Psychoticism (P) and Neuroticism (N), suggesting dissimulation may well have taken place. Mean sex differences were mainly in line with studies in other countries, i.e. boys scoring higher on P but lower on N and Social Desirability (L) than girls, with a slight tendency for girls to score higher than boys on extraversion. Cross-cultural comparisons, using only items Iranian and English scoring keys had in common, elicited highly significant differences on L with Iranians giving much higher social desirability scores than their English counterparts. Possibly due to this, Iranian children scored lower than the English children on all other scales.

## INTRODUCTION

The Eysenck Personality Questionnaire (EPQ) was standardized in England (Eysenck & Eysenck, 1975) together with the Junior Eysenck Personality Questionnaire (J.EPQ). This was followed by many cross-cultural studies of both the EPQ and the J.EPQ (Barrett & Eysenck, 1984). The adult cross-cultural study in Iran was carried out by Nikjoo (1982), and it was deemed of interest to attempt a study of Iranian children using the J.EPQ. To this end this study was undertaken.

There are three main aims of our cross-cultural studies of personality. First, we would like to show that the factors of Psychoticism (P), Extraversion (E), Neuroticism (N) and Social Desirability (L) exist and are measurable in whichever country we are studying. Secondly, to make a viable, reliable scoring key available for that country and finally, to compute any cross-cultural differences in norms, although this is of minor importance.

## METHOD

The 97-item J.EPQ was translated and completed by 483 boys aged $12.52 \pm 1.28$ and 593 girls aged $11.89 \pm 1.68$ in Iran.*

The psychometric analyses are given here in some detail because these have not been applied to the J.EPQ before and could, therefore, be of some theoretical interest and importance.

### *Psychometric analysis*

The primary aim of this analysis was to demonstrate the structural concordance of the Iranian male and female Junior EPQ data with that from the respective U.K. reference samples. Factor analyses of Pearson correlation matrices were undertaken using principal components analysis, followed by hyperplane maximized direct oblimin rotation (Jennrich & Sampson, 1966; Barrett & Kline, 1982), with the $\delta$ parameter swept from $-10.5$ to 0.5 in steps of 0.5. Hyperplane bandwidth was set at $\pm 0.1$. Factor comparisons were undertaken using orthogonal congruential methods

*The data was collected from elementary and secondary schools in Shiraz, the capital of Southern Province Fars. Since boys and girls are in separate schools, 8 elementary schools (4 girls and 4 boys schools) and 9 secondary schools (5 boys and 4 girls schools) were selected randomly from the three education areas in Shiraz. The 97 questions of the J.EPQ were translated into Farsi, the Iranians' native language, by the second author, translated back into English and were then checked by the first author. Some corrections were made and the second author then collected the data. Standard instructions were given to the *S*s who had no difficulty in understanding the questions. *S*s answered the questionnaire in group sessions.

based upon the Kaiser, Hunka and Bianchini (1971) methodology, and Tucker (1951) congruence coefficients computed over both the derived orthogonally congruent and direct oblimin factor patterns. Barrett and Hammond (submitted) provide further details on the specific methodologies and strategies involved in this form of factor comparison analysis. In order to graphically display the homogeneity of the final item scales, the Iranian and U.K. male and female datasets were scored using the newly developed Iranian score key. MINISSA (Guttman, 1968; Lingoes & Roskam, 1973) non-metric smallest space analyses were then undertaken on the derived distances computed from Pearson correlation similarity matrices.

Finally, a signal-to-noise ratio was computed for each identified scale factor; the ratio indexes the size of salient loadings in relation to the size of the non-salient loadings. For each factor, salient loadings are defined as those values for items that form a proposed scale. The non-salient loadings are the values from the remaining non-scale items. Two ratios may be computed from the mean salient and non-salient item groups, the Fleming (1985) coefficient, and a modified, corrected, Fleming coefficient (Barrett & Hammond, submitted) that uses the absolute value of the loadings rather than the squared values. The Fleming coefficient is basically the ratio of the mean squared salient loadings over the mean square of the salient + mean square non-salient loadings. The modified Fleming (absolute noise ratio: ANR) is the ratio of the sum of absolute valued salients over this sum + the sum of the absolute valued non-salients. The ANR coefficient was used below, computed over factor pattern rather than factor structure matrices. This latter coefficient more closely reflects the size disparity between salients and non-salients. Both coefficients vary between 0 and 1.0, 1.0 being the maximum signal to noise separation, requiring all non-salients to sum to 0. The ANR coefficient is then corrected (C-ANR) for the number of non-salients above 0.3 on any target scale factor. That is, the ANR coefficient is reduced by a proportionate amount determined by the ratio of high-loading non-salients to the number of salients. Used in conjunction with the mean loading coefficients for salient and non-salient items on each scale, the C-ANR coefficient is a useful and very sensitive index of the clarity of salient item loading pattern for any individual factor. Given a value of 0.1 for the mean loading of non-salient items, a value of 0.75 for the C-ANR would indicate a mean salient item loading of 0.3. C-ANR values above 0.8 indicate extremely clear salient factor structures. Anyone interested in more detail of the methodology might care to read the article dealing with the adult EPQ in Canada (Eysenck, Barrett & Barnes, 1993).

## RESULTS

Table 1 presents the results from the factor comparisons between the oblique factor patterns of the Iranian and U.K. data, using the 97-item dataset. However, since the U.K. factors are defined

Table 1. Factor comparisons

| Sample comparisons | MSC | P | E | N | L |
|---|---|---|---|---|---|
| 81 Items | | | | | |
| U.K. males vs U.K. females | 0.98 | 0.97 | 0.97 | 0.98 | 0.97 |
| U.K. males vs IRAN males | 0.79 | 0.63 | 0.68 | 0.84 | 0.78 |
| U.K. females vs IRAN females | 0.83 | 0.69 | 0.83 | 0.87 | 0.85 |
| IRAN males vs IRAN females | 0.84 | 0.27 | 0.84 | 0.92 | 0.79 |
| 97 Items | | | | | |
| U.K. males vs U.K. females | 0.98 | 0.97 | 0.97 | 0.98 | 0.97 |
| U.K. males vs IRAN males | 0.79 | 0.65 | 0.76 | 0.86 | 0.84 |
| U.K. females vs IRAN females | 0.81 | 0.67 | 0.82 | 0.89 | 0.80 |
| IRAN males vs IRAN females | 0.85 | 0.71 | 0.81 | 0.91 | 0.83 |
| 56 Items | | | | | |
| U.K. males vs U.K. females | 0.97 | 0.96 | 0.96 | 0.99 | 0.97 |
| U.K. males vs IRAN males | 0.86 | 0.71 | 0.88 | 0.92 | 0.79 |
| U.K. females vs IRAN females | 0.90 | 0.81 | 0.89 | 0.96 | 0.89 |
| IRAN males vs IRAN females | 0.90 | 0.79 | 0.90 | 0.95 | 0.75 |
| 67 Items | | | | | |
| U.K. males vs U.K. females | 0.97 | 0.95 | 0.95 | 0.99 | 0.97 |
| U.K. males vs IRAN males | 0.84 | 0.74 | 0.83 | 0.92 | 0.77 |
| U.K. females vs IRAN females | 0.86 | 0.77 | 0.83 | 0.95 | 0.85 |
| IRAN males vs IRAN females | 0.90 | 0.84 | 0.90 | 0.94 | 0.74 |

using just 81 out of the 97 items, a further comparative analysis was undertaken using the U.K. 81 items scorekey on both the Iranian and U.K. data. Although congruence coefficients were computed over the Kaiser *et al.* (1971) maximally congruent orthogonal factors, these orthogonalized factors are not maximized to any form of simple structure, hence they cannot be interpreted in the usual manner by noting the high loading salient variables. Thus, although the similarity coefficients between these factors are informative in one sense, they impart little information as to the similarity of a factor that is defined by a salient loading pattern, generally produced by maximizing the variance or hyperplane count of a factor. The optimal coefficient for interpretation from the Kaiser *et al.* procedure is the mean solution cosine (MSC). This coefficient, ranging between 0 and 1.0, is an estimate of the similarity of the entire factor space of one solution in comparison to another. Values above about 0.90 indicate a high degree of spatial congruency.

As can be seen from Table 1, the MSC coefficients are very high for the U.K. male vs female comparisons. Comparisons within and between the Iranian samples are less high. The factor congruences demonstrate that the P scale factor is the least similar to the U.K. factor loading pattern. The particular problem in the Iranian sample data is that in the male 81- and 97-item datasets, the P and L items are tending to overlap on the same factor, rather than load two separate factors as in the female sample. The effect is less in the 97-item dataset than that found in the 81-item subset.

From these initial factorings of the data, revised scales were drawn up (from the 97-item dataset) by removing items that did not significantly load their target factor or loaded on another non-target factor. Scale homogeneity was assessed and further optimized using coefficient alpha via classical item analysis. The U.K. sample data was then age-matched to the Iranian dataset. Following these procedures, an 'in-common' scorekey was produced that included only those items that were included in both the original U.K. scorekey and the new Iranian scorekey. This 56-item scorekey was then applied to both the Iranian and U.K. samples. The 56-item subsets were then re-factored and comparative analyses again undertaken. As can be seen from Table 1, the removal of the 'bad' items from the Iranian datasets results in greatly improved MSC coefficients. The Iranian males however, are still demonstrating less than optimal coefficients for the P and L factors. Finally, in order to demonstrate that the inclusion of 11 non-U.K. keyed items in the Iranian scorekey does not affect the stability of the factor comparisons to any significant degree, a final series of factor and comparative analyses were undertaken using the U.K. and Iranian datasets scored using the new Iranian scorekey. From Table 1, the results indicate that there is little change in the patterning of the coefficients. As a whole, the results in this Table show that modifying the item composition of the Iranian scales results in increased comparability within the Iranian samples, as well as between these and the U.K. samples.

Table 2 below provides the alpha coefficients for the three scorekeys that were applied to the data.

Table 3 below provided the mean corrected item-total correlations for each of the scales for the three different scorekeys applied to each dataset.

Table 2. Alphas

| Sample | P | E | N | L |
|---|---|---|---|---|
| 81 Items | | | | |
| U.K. Males | 0.70 | 0.77 | 0.84 | 0.83 |
| IRAN Males | 0.75 | 0.58 | 0.74 | 0.82 |
| U.K. Females | 0.63 | 0.73 | 0.83 | 0.88 |
| IRAN Females | 0.67 | 0.61 | 0.83 | 0.84 |
| 56 Items | | | | |
| U.K. Males | 0.68 | 0.69 | 0.82 | 0.80 |
| IRAN Males | 0.71 | 0.71 | 0.78 | 0.81 |
| U.K. Females | 0.55 | 0.67 | 0.82 | 0.87 |
| IRAN Females | 0.69 | 0.61 | 0.84 | 0.84 |
| 67 Items | | | | |
| U.K. Males | 0.63 | 0.70 | 0.82 | 0.80 |
| IRAN Males | 0.75 | 0.73 | 0.82 | 0.81 |
| U.K. Females | 0.48 | 0.67 | 0.82 | 0.87 |
| IRAN Females | 0.70 | 0.63 | 0.86 | 0.84 |

Table 3. Item-total *R*s

| Sample | P | E | N | L |
|---|---|---|---|---|
| 81 Items | | | | |
| U.K. Males | 0.29 | 0.29 | 0.42 | 0.41 |
| IRAN Males | 0.34 | 0.21 | 0.30 | 0.39 |
| U.K. Females | 0.25 | 0.28 | 0.41 | 0.49 |
| IRAN Females | 0.28 | 0.20 | 0.41 | 0.42 |
| 56 Items | | | | |
| U.K. Males | 0.37 | 0.31 | 0.42 | 0.40 |
| IRAN Males | 0.40 | 0.33 | 0.36 | 0.41 |
| U.K. Females | 0.27 | 0.29 | 0.41 | 0.49 |
| IRAN Females | 0.40 | 0.25 | 0.45 | 0.44 |
| 67 Items | | | | |
| U.K. Males | 0.29 | 0.31 | 0.37 | 0.40 |
| IRAN Males | 0.39 | 0.34 | 0.37 | 0.41 |
| U.K. Females | 0.21 | 0.29 | 0.36 | 0.49 |
| IRAN Females | 0.36 | 0.26 | 0.42 | 0.44 |

Table 4. ANR coefficients

| Sample | P | E | N | L |
|---|---|---|---|---|
| 81 Items | | | | |
| U.K. Males | 0.71 | 0.84 | 0.77 | 0.84 |
| IRAN Males | 0.41 | 0.68 | 0.49 | 0.43 |
| U.K. Females | 0.79 | 0.86 | 0.84 | 0.75 |
| IRAN Females | 0.71 | 0.74 | 0.50 | 0.67 |
| 56 Items | | | | |
| U.K. Males | 0.64 | 0.85 | 0.90 | 0.87 |
| IRAN males | 0.26 | 0.76 | 0.60 | 0.46 |
| U.K. Females | 0.72 | 0.87 | 0.91 | 0.73 |
| IRAN Females | 0.86 | 0.83 | 0.86 | 0.69 |
| 67 Items | | | | |
| U.K. Males | 0.53 | 0.79 | 0.86 | 0.84 |
| IRAN Males | 0.18 | 0.84 | 0.81 | 0.65 |
| U.K. Females | 0.63 | 0.73 | 0.87 | 0.52 |
| IRAN Females | 0.75 | 0.84 | 0.80 | 0.63 |

These coefficients also show that, apart from the P scale, the application of an 81-, 67- or 56-item scorekey has little overall effect on the item homogeneity within each scale.

Finally, Table 4 presents the C-ANR coefficients for the scored datasets. These coefficients indicate that it is in the Iranian males that the P factor is least well defined. Although the 23,6 information in Tables 2 and 3 above indicate scale homogeneity amongst the P items, the C-ANR coefficient indicates that items, other than those targeted, are loading this factor. In addition, this table also confirms that there has possibly been some shift in the meaning of the P factor as we have moved away from the U.K. scorekey. Certainly, for the U.K. samples scored with the Iranian scorekey, the C-ANR has dropped significantly from its target value of 0.71. Note also the L factor in the UK females has also become less clearly defined using the Iranian scorekey.

In order to achieve an optimal scorekey for the Iranian datasets, we have rejected 25 items from the U.K. scorekey and included 11 extra items that are not included in the U.K. scorekey. The results in Table 4 present the first indication that in optimizing the Iranian scorekey, we may have altered the meaning or measurement definition of the P and L factors. It follows from classical test theory that the U.K. scales P, E, N and L are simply item samples from the universe of items measuring the trait concepts of P, E, N and L. In this framework, the inclusion and deletion of items in a scale is quite permissible, given that some target or anchor items remain in each scale, and that scale equivalence can be demonstrated at the subsequent scale score level. The target items serve as the defining clusters for the factor comparisons (as in the 'in-common' comparisons). These items also form the nucleus of the new scale scores. The information in Tables 1–4 suggest that overall, the Iranian scorekey yields comparable factor structures, and scales that share similar psychometric properties to those demonstrated using the U.K. scorekey. However, we need to test directly for scale equivalence in terms of practical measurement outcome in using the Iranian vs the U.K. scorekey. In order to achieve this, we correlated the scale scores computed using the U.K. 81-item scorekey, the 56-item 'in common' scorekey and the 67-item Iranian scorekey applied to the U.K. dataset. Since the U.K. sample define the target factors and scales of P, E, N and L, it is logical to use this data to assess the impact on scale score comparability of the application of different scorekeys. Table 5 below presents the results from this analysis.

As can be seen from this Table, all scale comparability coefficients are above 0.93 except for the P scale. As might be expected, comparability here is marginally worse for the females than the males. However, scale equivalence is certainly acceptable for E, N and L. The P scale, however, is of less optimal equivalence. In a sense this is no more than can be expected given the results from the previous analyses.

Table 5. U.K. age matched samples, scale correlations

| | Psychoticism | | Extraversion | | Neuroticism | | Social Desirability | |
|---|---|---|---|---|---|---|---|---|
| | 67 items | 56 items | 67 items | 56 items | 67 items | 56 items | 67 items | 56 items |
| U.K. Males, 81-item U.K. scorekey | 0.83 | 0.86 | 0.93 | 0.93 | 0.96 | 0.98 | 0.99 | 0.99 |
| U.K. Females, 81-item U.K. scorekey | 0.74 | 0.82 | 0.93 | 0.93 | 0.96 | 0.98 | 0.99 | 0.99 |

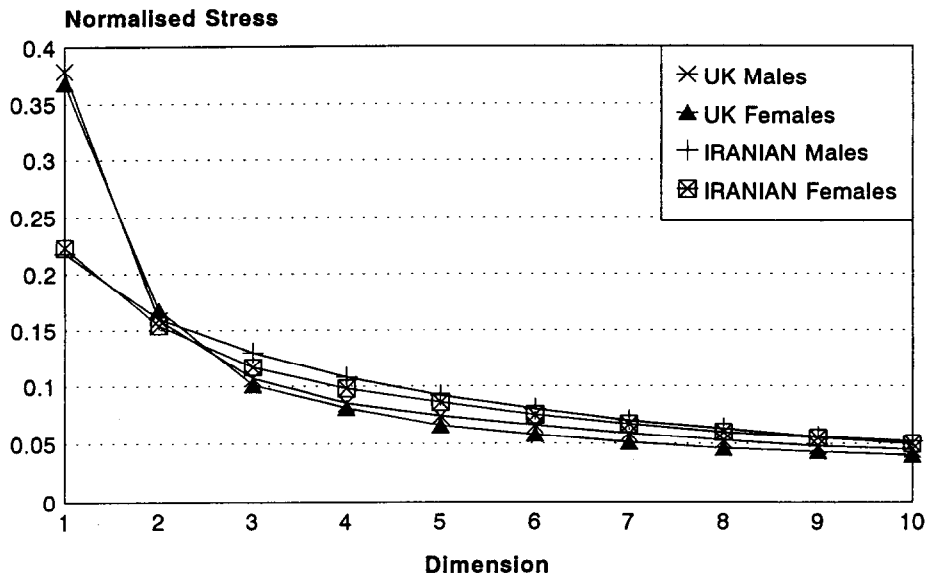


Fig. 1. U.K. and Iranian J.EPQ (67 items). Normalized stress as a function of dimensionality.

Finally, in order to graphically show the separation of the items into their component scales, a MINISSA analysis was computed for each of the U.K. and Iranian datasets, scored using the Iranian 67-item scorekey. Figure 1 below shows the plot of normalized stress as a function of dimensionality for each dataset.

Note the effect of the optimized scorekey on the 'simplicity' of the Iranian data within a 1-dimensional solution. However, given stress values of less than 0.2 are generally optimal for determining the minimum acceptable dimensionality of such solutions, the 2-dimensional solution was subsequently chosen for display and interpretation. Figures 2–5 show the recovered interitem distances for each of the U.K. and Iranian datasets. Note the clarity of the U.K. dataset scale clusters. Within the Iranian data, P and N tend to merge into one another, reflecting the very high scale correlations between the scales in these samples (0.42 and 0.50 within the male and female samples, respectively).

The factor loadings are not given here for the sake of brevity but can be obtained from the authors on request. Having chosen the optimum items for the Iranian scoring key (Table 6),

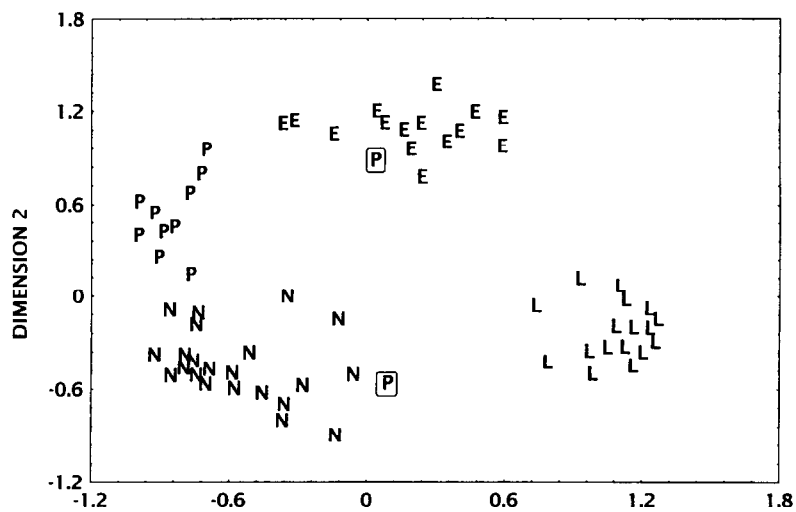


Fig. 2. U.K. males, 67-item Iranian scorekey. MINISSA analysis: stress = 0.16.

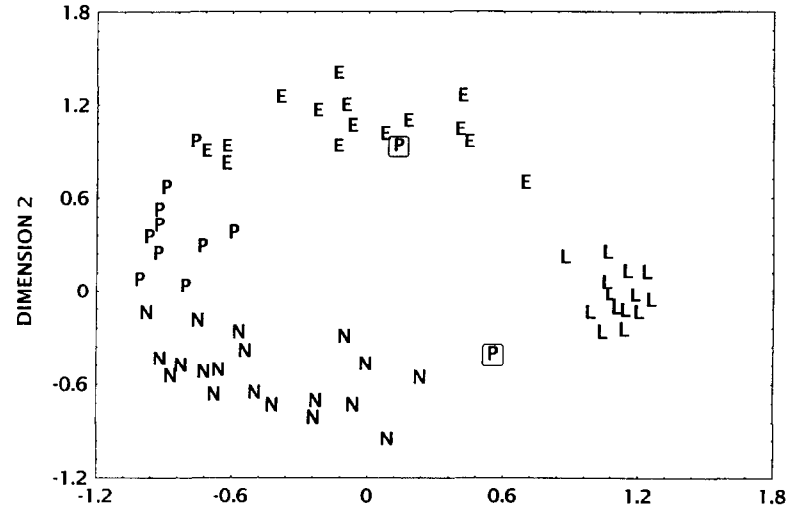


Fig. 3. U.K. females, 67-item Iranian scorekey. MINISSA analysis: stress = 0.17.

intercorrelations of the scales were computed and are given in Table 7, together with the alphas for the Iranian boys and girls (as highlighted from Table 2). It will be seen that the intercorrelations reveal highly significant correlations between P and L and N and L, plus an unusually high PN correlation. The size of the P and N correlations with L do suggest that a considerable amount of dissimulation has taken place, a possibility which is strengthened by the high lie means of the Iranian children (Michaelis & Eysenck, 1971).

Means and standard deviations of the Iranian children on all four scales, plus age are given in Table 8. The values appear mostly to be in line with results from other countries, namely that boys score higher on P but lower on N and L than girls. The tendency for girls to score slightly higher than boys on E is unusual.

Finally, although of minor interest, the norms of the Iranian and English children were compared, using only items in common to both scoring keys. The results are shown in Table 9 and suggest a considerable difference on L, the Iranian children scoring significantly higher on this scale than their English counterparts. Iranian children scored lower on all other scales, which may, or may not, be a function of their high Social Desirability responses.

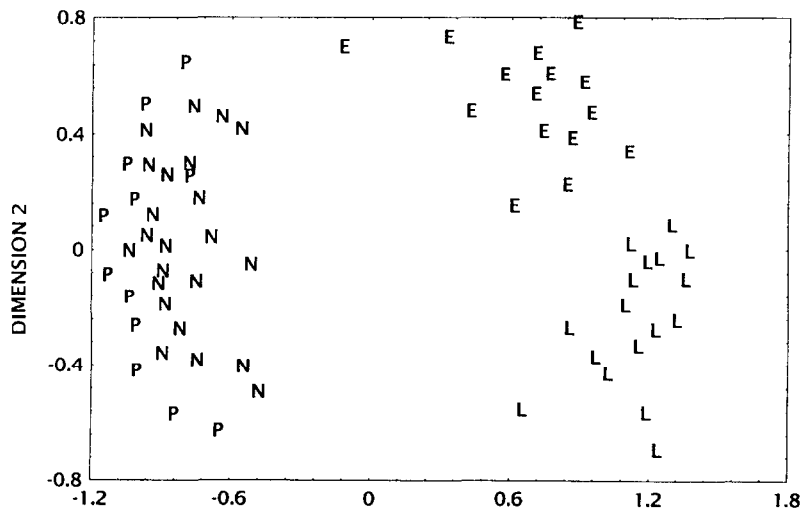


Fig. 4. Iranian males, 67-item Iranian scorekey. MINISSA analysis: stress = 0.16.

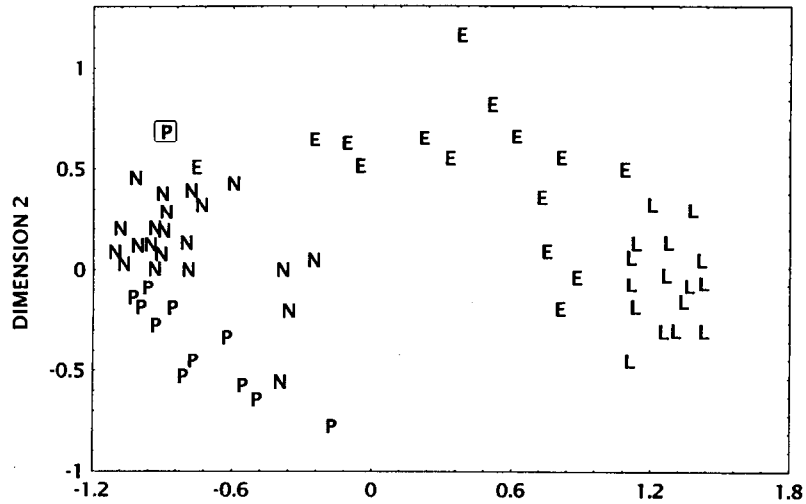


Fig. 5. Iranian females, 67-item Iranian scorekey. MINISSA analysis: stress = 0.15.

## DISCUSSION

In general, we consider that this study of the J.EPQ in Iran has been successful. It has confirmed that the factors of P, E, N and L are measurable reliably in Iranian children. Moreover, these factors are the same factors as for English children, albeit that some item changes were necessary for valid, appropriate scales to be constructed.

Clearly the elevated L scores of the Iranian children are of central interest in this study. It may, perhaps, not be all that much higher than in studies of other countries, but it is certainly much higher than responses of the English children and has quite unusually high intercorrelations of L with P and N. This does suggest a certain degree of dissimulation and may place the results of the other scales in some doubt.

The question of dissimulation is gone into in some greater detail in a Danish cross-cultural study (Nyborg, Eysenck & Kroll, 1982) in which the possibility is suggested that countries in which there is greater permissiveness seem to score lower on L [e.g. Canada (Eysenck & Saklofske, 1983); Denmark (Nyborg *et al.*, 1982); N. Ireland (Eysenck & Kay, 1986); Sweden (Eysenck, von Knorring

Table 6. Scoring key for Iranian children on the J.EPQ

| | | |
|---|---|---|
| P | | |
| Yes: | 3, 7, 12, 15, 19, 29, 37, 49, 53, 62, 92, 93 | 12 |
| No: | | |
| E | | |
| Yes: | 26, 30, 35, 43, 47, 55, 59, 63, 67, 75, 79, 83, 90, 96 | 15 |
| No: | 87 | |
| N | | |
| Yes: | 2, 6, 10, 14, 18, 22, 31, 34, 36, 40, 44, 48, 52, 56, 60, 61, 68, 72, 76, 78, 80, 84, 88 | 23 |
| No: | | |
| L | | |
| Yes: | 8, 24, 33, 38, 46, 50, 54, 58, 66, 82 | 17 |
| No: | 4, 16, 20, 42, 70, 86, 89 | |

Table 7. Reliabilities (alpha coefficients) and intercorrelations of the P, E, N, L scales

| | Reliabilities | | | Intercorrelations (scales) | |
|---|---|---|---|---|---|
| | Boys | Girls | | Boys | Girls |
| P | 0.75 | 0.70 | PE | −0.20 | 0.01 |
| E | 0.73 | 0.63 | PN | 0.50 | 0.42 |
| N | 0.82 | 0.86 | PL | −0.63 | −0.54 |
| L | 0.81 | 0.84 | EN | −0.22 | −0.10 |
| | | | EL | 0.28 | 0.09 |
| | | | NL | −0.54 | −0.52 |

Table 8. Means and standard deviations of P, E, N, L and age for Iranian children

| | P | | E | | N | | L | | Age | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | SD | *M* | SD | *M* | SD | *M* | SD | *M* | SD | *n* |
| Boys | 2.74 | 2.56 | 10.88 | 3.03 | 8.83 | 4.93 | 11.51 | 3.88 | 12.52 | 1.28 | 483 |
| Girls | 1.60 | 1.94 | 11.08 | 2.55 | 10.19 | 5.44 | 12.64 | 3.75 | 11.89 | 1.68 | 593 |

Table 9. Comparison of means and standard deviations of Iranian and English children on scales of common items

| | P | | E | | N | | L | | Age | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | SD | *M* | SD | *M* | SD | *M* | SD | *M* | SD | *n* |
| Iranian boys | 1.65 | 1.84 | 10.18 | 2.82 | 6.58 | 3.82 | 11.51 | 3.88 | 12.52 | 1.28 | 483 |
| Iranian girls | 0.89 | 1.40 | 10.33 | 2.40 | 7.99 | 4.42 | 12.64 | 3.75 | 11.89 | 1.68 | 593 |
| English boys | 2.27 | 1.90 | 11.15 | 2.45 | 8.88 | 4.19 | 5.28 | 3.71 | 12.45 | 1.51 | 1280 |
| English girls | 1.07 | 1.27 | 10.43 | 2.49 | 9.90 | 4.14 | 7.22 | 4.45 | 11.91 | 2.05 | 1760 |
| Boys | <0.001 | | <0.001 | | <0.001 | | <0.001 | | NS | | |
| Girls | <0.01 | | NS | | <0.001 | | <0.001 | | NS | | |

& von Knorring, 1988) etc] than those with stricter, more formal regimes [e.g. Greece (Eysenck & Dimitriou, 1984), Korea (Eysenck & Lee, 1985) and Bangladesh (Eysenck & Rahman, 1991) etc].

Bearing in mind the need for general care in the interpretation of the J.EPQ in Iran, in view of the considerable L responses, the scales have good reliability and we feel confident that the J.EPQ with the Iranian scoring key can be used in Iran both clinically and for research.

*Acknowledgements*—Thanks are due to all the children who completed the J.EPQ forms and to Jackie Marshall for help with the data processing.

## REFERENCES

Barrett, P. T. & Eysenck, S. B. G. (1984). The assessment of personality factors across 25 countries. *Personality and Individual Differences*, *5*, 615–632.

Barrett, P. T. & Hammond, S. (submitted). Factor similarity: orthogonal vs oblique comparisons. *Multivariate Behavioural Research*.

Barrett, P. T. & Kline, P. (1982). An item and Radial Parcel factor analysis of the 16PF questionnaire. *Personality and Individual Differences*, *3*, 259–270.

Eysenck, H. J. & Eysenck, S. B. G. (1975). *Manual of the Eysenck Personality Questionnaire*. Hodder & Stoughton: London.

Eysenck, S. B. G. & Dimitriou, E. C. (1984). Cross-cultural comparison of personality: Greek children and English children. *Social Behavior and Personality*, *12*, 45–54.

Eysenck, S. B. G. & Kay, W. (1986). A cross-cultural study of personality: Northern Ireland and English children. *Irish Journal of Psychology*, *7*, 98–105.

Eysenck, S. B. G. & Lee, H.-S. (1985). Cross-cultural study on the characteristics of personality dimensions: Korean and English. *Korean Journal of Psychology*, *5*, 51–66.

Eysenck, S. B. G. & Rahman, M. A. (1991). A cross-cultural study of personality Bangladeshi and English children. *Bangladesh Psychological Studies*, *1*, 132–139.

Eysenck, S. B. G. & Saklofske, D. H. (1983). A comparison of responses of Canadian and English children on the Junior Eysenck Personality Questionnaire. *Canadian Journal of Behavioral Science*, *15*, 121–130.

Eysenck, S. B. G., Barrett & P. T. Barnes, G. E. (1993). Cross-cultural study of personality: Canada and England. *Personality and Individual Differences*, *14*, 1–9.

Eysenck, S. B. G., von Knorring, A. L. & von Knorring, L. (1988). A cross-cultural study of personality: Swedish and English children. *Scandinavian Journal of Psychology*, *29*, 152–161.

Fleming, J. S. (1985). An index of fit for factor scales. *Educational and Psychological Measurement*, *45*, 725–728.

Guttman, L. (1968). A general non-metric technique for finding the smallest coordinate space for a configuration of points. *Psychometrika*, *33*, 469–506.

Jennrich, R. I. & Sampson, P. F. (1966). Rotation for simple loadings. *Psychometrika*, *31*, 313–323.

Kaiser, H. F., Hunka, S. & Bianchini, J. (1971). Relating factors beween studies based upon different individuals. *Multivariate Behavioural Research*, *6*, 409–422.

Lingoes, J. C. & Roskam, E. E. (1973). A mathematical and empirical analysis of two multidimensional scaling algorithms. *Psychometrika*, *38*, Part 2, Monograph Supplement.

Michaelis, W. & Eysenck, H. J. (1971). The determination of personality inventory factor patterns and intercorrelations by changes in real-life motivation. *Journal of Genetic Psychology*, *118*, 223–234.

Nikjoo, N. (1982). Factorial structure of the EPQ in Iran. Unpublished PhD thesis, New University of Ulster, Northern Ireland.

Nyborg, H., Eysenck, S. B. G. & Kroll, N. (1982). Cross-cultural comparison of personality in Danish and English children. *Scandinavian Journal of Psychology*, *23*, 291–297.

Tucker, L. R. (1951). A method for synthesis of factor analytic studies. *Personnel Research Section Report* No. 984. Department of the Army, Washington, DC.