



Re-introduction to cross-cultural studies of the EPQ

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ABSTRACT

Cross-cultural projects were undertaken, over some 25 years, to standardise the EPQ (both Adult and Junior forms) for many countries (See Appendix B for a list).

Together with the rationale as to why these studies were undertaken, the statistical methodology is explained. Although the studies were published, it seemed timely to list them, together with their references, in this article.

The authors also decided to publish the data for interested researchers and student psychologists, and it can be found in the Supplementary Material.

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1. Introduction

Most readers of PAID will be familiar with the Eysenck Personality Questionnaire (EPQ) and its final version the Eysenck Personality Scales (EPS), (Eysenck & Eysenck, 1975; Eysenck & Eysenck, 1991, respectively). They purport to measure the factors of Psychoticism (P), Extraversion (E), Neuroticism (N) and a Lie Scale (L), for descriptions of these see Appendix A. All of these have been shown to be reliable and valid in the UK.

When several psychologists from other countries applied to use the EPQ we were presented with a dilemma. On the one hand we wanted them to have access to our questionnaire but on the other hand we felt uneasy for them to apply our UK norms and items without first standardising it in their own country. Just using UK norms could have given erroneous results.

Thus the idea came to us that we should undertake cross-cultural studies with those countries where psychologists were willing to embark on such projects. Briefly then, the purpose of all our cross-cultural studies was: (a) to verify that the factors P, E, N and L were applicable in that country and (b) to standardise the EPQ so that the particular country would then have a valid and reliable measuring instrument.

There were several stages of this task. Firstly, we needed the items of the EPQ translated and back-translated into English by the method advised by Brislin, Lonner, & Thorndike, 1973. We ourselves then checked the back-translation to make sure the meaning of each item was correctly captured. Secondly, we insisted on a subject sample of no less than 500 men and 500 women (or 500 boys and 500 girls of different ages in the case of the Junior

EPQ). Thirdly, when we received the data it was analysed statistically in the manner described by Paul Barrett in this article.

However, when trying to interpret some of the initial results we found that, not surprisingly, some of the items were not appropriate in some countries so that these resulted in low and unsatisfactory factor loadings. When these items were omitted some of the scale reliabilities dropped. Therefore we subsequently invited the co-operating psychologists to add several items before testing the subjects, which they deemed more appropriate for their subjects. These items were positioned after our usual 90 or 100 items so that statistical comparisons on items in common with UK data could still be carried out.

It may be helpful to readers if we list the cross-cultural studies we undertook, both Junior and Adult (see Appendix B). Additionally, when our Impulsiveness Questionnaire (I₇) was published (available as part of the EPS), there were two countries, Germany (Eysenck, Daum, Schugens, & Diehl, 1990) and Egypt (Eysenck & Abdel-Khalek, 1992), who applied similar cross-cultural comparisons for this questionnaire. Finally, a very early comparison of American and English subjects on Sensation Seeking was undertaken by Zuckerman, Eysenck and Eysenck in 1978.

Much of the details of our cross-cultural work is explained in greater detail in an article by Eysenck written in 1983. Subsequently, we achieved 61 articles to announce these cross-cultural studies, (see Appendix B), although some were attempted (e.g. India) but never published.

As these data were collected over many years and analysed in several ways as explained by Paul Barrett in this article, we thought it would now be timely to release it for psychologists and especially psychology students to have access to, and hence it is now available in the Supplementary Material appended to this article.

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2. The analysis methodology¹

The 90 EPQ item responses are binary. The Yes/No responses were always coded as 3 for 'Yes' and 1 for 'No' in the initial *key-to-paper-tape*, *key-to-card*, and finally *key-to-disc* dataprep; in some datasets a rare missing response was coded as a '2'. Pearson correlations (mostly as phi coefficients) were computed between all item responses, separately for male and female data. Each correlation matrix was submitted to a principal components analysis. Four component factors were extracted from each analysis and rotated using an oblique Promax rotation. In later years, a Direct Oblimin rotation replaced Promax. As Barrett and Kline (1980) showed using a UK Gallup sample of EPQ data collected by the Eysencks, incorporating two tests of factor extraction quantity, up to 9 first-order factors could be reliably extracted from a principal component analysis, but these always folded back to the expected four EPQ factors when a second-order analysis was undertaken. Further informal analyses showed that extracting four component factors at the first order produced virtually equivalent results as using a hierarchical procedure. This result added some confirmation that the fixed extraction quantity within the Eysenck analyses was sensible and 'fit for purpose'.

Following the component analyses and rotations, the male and female factor pattern matrices for a specific country were compared to their respective male and female UK reference- sample counterparts (these UK datasets had been analyzed using exactly the same procedure as described above). The comparison was made using an orthogonal Procrustes solution published by Kaiser, Hunka, and Bianchini (1971). This procedure transformed each matrix (the target and comparison matrix) to an orthogonalized form prior to rotating the orthogonalized comparison matrix to the orthogonalized UK target matrix, utilizing a least-squares criterion to establish the optimal fit between the two matrices. The procedure reported the 'target-comparison' fit as a series of transformation cosines between each respective component factor from both matrices. These cosines were interpreted as congruence coefficients between the respective factors. The procedure also reported a 'mean solution cosine' which was the average congruence computed across all 90 items, where each target item vector was compared to its counterpart in the comparison matrix. Eysenck, Barrett, and Eysenck (1985) summarised the congruence results derived from 24 country comparisons, showing that all relevant UK-to-country comparisons averaged 0.983.

Given the factor comparison analyses were adjudged satisfactory, the final stage of analyses were conducted. These established scale-mean comparisons between the UK and the country, while forming a score-key specific to a particular country. If extra items were included over and above the standard 90-item EPQ set, two further PCA analyses were undertaken which now included all items in a country dataset. This provided the location of the new items and their loadings onto the now established factors, from which items which loaded highest on their 'target' factor were identified and used to construct the country-specific score-key.

However, in order to compute the scale-mean comparisons between the UK and a country's data, another score-key was constructed; an 'in-common' key. That is, it included those items which loaded substantively within a country's dataset and which were drawn solely from the 90-item EPQ. In some cases, not all of the 90 EPQ items loaded substantively on each of the four keyed factors within a country. So, in order to enable a comparison of

mean scores between the UK and a country's dataset (males, females, and now total sample), an 'in-common' score key was constructed and used to score the country datasets and re-score the UK dataset accordingly. Then a series of t-tests were undertaken between the respective scale means for each scored dataset (males, females, and total sample). Finally, the specific country score-key was constructed, the country-specific data scored, and the descriptive statistics reported for males, females, and the total sample dataset.

One major revision to the above methodology took place during the 1990s, in response to a valid criticism of the Kaiser-Hunka-Bianchini (KHB) similarity coefficients by both Bijnen and Poortinga (1988) and ten Berge (1996). In essence, the matrix of 'similarities' reported from the KHB analyses were in fact indices indicating the magnitude of angular transformation required to bring the orthogonalized comparison matrix to a position of maximum congruity with the orthogonalized target matrix. They were not 'factor similarity' congruence coefficients at all. Barrett, Petrides, Eysenck, and Eysenck (1998) subsequently undertook a complete re-analysis of 34 countries' datasets, using a revised KHB procedure which now reported actual congruences calculated from comparing the magnitudes of loadings within the target and maximally-congruent comparison matrix. It was shown that while the average congruence coefficients were lower than those indices previously reported, they were still sufficiently high (the majority above 0.90) to confirm the similarity of these factors across the countries analyzed.

The archive specifics:

- (1) The archive consists of 35 countries' data, consisting of male and female samples.
- (2) Each country's raw data (*unscored, items in questionnaire order, male, female, total dataset*) has been created in each of four formats:
 - Excel 2003 {*.xls}
 - Text {*.csv}
 - SPSS {*.sav}
 - Statistica {*.sta}
- (3) Each country's data (*male, female, total dataset*) has been scored using the UK scorekey, with items now stored in scale order, with these UK-scored datasets being created in the same 4 file formats as #2. This was done solely as a convenience. Pro-rated (for missing items) scale scores have been computed and stored as the last 4 variables per case in each of these files.
- (4) Every file contains a Case ID, Age (in years), and gender variable (male/female).
- (5) 840 data files comprise the processed data archive (*the original files and documents are extra to this quantity*).
- (6) The original Institute of Psychiatry punched card, paper tape, or key-to-disc files are also stored and labeled appropriately in an 'Original Files' group.
- (7) All available scorekeys for a selection of countries, referenced to the Original data file where relevant, are available in the 'Documentation' file group. This file-group also contains the complete data dictionary, some other information on scale means and SDs etc. taken from the original published research articles (where they were available), in addition to a pdf scan of the EPQ questionnaire itself.
- (8) A single zipped archive comprises the fileset, requiring ~240 Mb storage. The zipped archive is ~26 Mb in size.

3. In Conclusion

Although by today's analysis standards, the methodology employed by the Eysencks may appear out-of-date and inferior, this

¹ Initially, Owen White was the psychometrician who first worked with the Eysencks on establishing a coherent cross-cultural analysis procedure and the computer programming. Paul Barrett joined the team in 1983, and over the following years gently extended the Eysenck/White's pioneering efforts as new technologies and problems were encountered.

is not the case at all. Modern invariance methodology and latent variable theory is based upon a set of assumptions which remain untested, and are for all intents and purposes, untenable and illusory (Maraun & Halpin, 2008; Michell, 2012; Saint-Mont, 2012). As Barrett (2009) has already shown one can work with these data in an entirely non-metric manner, and still recover the essential features and results reported by the Eysencks over the 25 years of analyses.

However, this is not the place to discuss such matters. Many students and academic researchers might wish to make use of the archive to further investigate and elaborate on these very issues concerning quantitative measurement, personality theory, structure and description, and cross-cultural comparability.

The archive is unique in its breadth and quality of information. It represents 25 or more years of hard, systematic, and careful research, much of it carried out during a period of time when computing facilities were not as ubiquitous and powerful as they are today. By providing open access to this body of data, we hope it may prove useful to others.

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Appendix A

A.1. Extraversion

The typical extravert is sociable, likes parties, has many friends, needs people to talk to and does not like reading or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on the spur of the moment and is impulsive. He is fond of practical jokes, always has a ready answer and likes change. He is carefree, easy going, optimistic and likes to “laugh and be merry”. He prefers to keep moving and doing things and tends to lose his temper quickly. Altogether his feelings are not kept under tight control and he is not always a reliable person.

A.2. Introversion

The typical introvert is a quiet, retiring sort of person, introspective and fond of books rather than people. He is reserved and distant except to intimate friends, tends to plan ahead, “looks before he leaps” and distrusts the impulse of the moment. He does not like excitement, takes matters of everyday life with proper seriousness and likes a well-ordered mode of life. He keeps his feelings under close control, is seldom aggressive and does not lose his temper easily. He is reliable, somewhat pessimistic and places great value on ethical standards.

A.3. Psychoticism (toughmindedness)

The typical toughminded person is cold, impersonal, hostile, aggressive, foolhardy, lacking in empathy, unfriendly, untrusting, rude, unmannered, unhelpful, unemotional and lacking in human feeling. He has a liking for odd, unusual things, shows a disregard for danger and likes making fools of other people and upsetting them.

A.4. Neuroticism (emotionality)

The typical emotional person is moody, fed-up, a worrier, irritable, nervous, apprehensive, tense and highly-strung.

Appendix B

Country	Adult	Junior
America	Eysenck, Barrett, Spielberg, Evans, and Eysenck (1986)	Eysenck and Jamison (1986)
Australia	Eysenck, Humphery, and Eysenck (1980)	
Austria		Eysenck and Renner (1987)
Bangladesh	Rahman and Eysenck (1980)	Eysenck and Rahman (1991)
Brazil	Tarrier, Eysenck, and Eysenck (1980)	
Bulgaria	Paspalanov, Shtetinski, and Eysenck (1984)	
Canada	Eysenck, Barrett, and Barnes (1993)	Eysenck and Saklofske (1983)
China	Gong (1984)	Gong (1984)
Czechoslovakia	Eysenck and Kozeny (1990)	
Denmark		Nyborg, Eysenck, and Kroll (1982)
Egypt	Abdel-Khalek and Eysenck (1983)	Eysenck and Abdel-Khalek (1989)
Finland	Eysenck and Haapasala (1989)	
France	Eysenck et al. (1980)	
Germany	Eysenck (1982)	
Greece	Dimitriou and Eysenck (1978)	Eysenck and Dimitriou (1984)
Holland	Sanderman, Eysenck, and Arrindell (1991)	
Hong Kong	Eysenck and Chan (1982)	
Hungary	Eysenck, Kozeki, and Kalmanchey-Gallenne (1980)	Eysenck, Kalmanchey-Gallenne, and Kozeki (1981) and Eysenck and Matolcsi (1984)
Iceland	Eysenck and Haraldsson (1983)	Haraldsson and Eysenck (1987)
Iran		Eysenck, Makaremi, and Barrett (1994)
Israel	Eysenck and Yanai (1985)	Eysenck and Margalit (1992)
Italy	Eysenck (1985)	
Italy (Sicily)	Eysenck (1981)	
Japan	Iwawaki, Eysenck, and Eysenck (1977)	Iwawaki, Eysenck, and Eysenck (1980b)
	Iwawaki, Eysenck, and Eysenck (1980a)	
Korea	Eysenck and Lee (1985)	
Lebanon	Eysenck and Abdel-Khalek (1988)	
Lithuania	Eysenck, Pakula, and Gostantas (1991)	
Mexico	Eysenck and Lara-Cantu (1989)	Eysenck and Lara-Cantu (1992)
New Zealand		Saklofske and Eysenck (1978)

(continued on next page)

Appendix B (continued)

Country	Adult	Junior
Nigeria	Eysenck, Adelaja, and Eysenck (1977)	
Northern Ireland	Eysenck and Kay (1986)	
Norway	Eysenck and Tambs (1990)	
Poland	Zaleski and Eysenck (1989)	
Portugal	Fonseca, Eysenck, and Simoes (1991)	Fonseca and Eysenck (1989)
Puerto Rico	Eysenck and Porrata (1984)	Porrata and Eysenck (1988)
Rumania	Eysenck, Baban, Derevenco, and Pitariu (1989)	
Russia	Hanin, Eysenck, Eysenck, and Barrett (1991)	
Singapore	Eysenck and Long (1986)	
Spain	Eysenck and Seisdodos (1978) and Eysenck, Escolar, Lobo, and Seva-Diaz (1982)	
Spain (Catalan)	Eysenck, Garcia-Sevilla, Torrubia, Avila, and Ortet (1992)	Eysenck, Garcia-Sevilla, Perez, and Ortet (1994)
Sri Lanka	Perera and Eysenck (1984)	
Sweden		Eysenck, von Knorring, and von Knorring (1988)
Uganda	Eysenck and Opolet (1983)	
Yugoslavia	Lojk, Eysenck, and Eysenck (1979)	Eysenck and Sipka (1981)

B.1. Sensation Seeking

America: Zuckerman, Eysenck, and Eysenck (1978)

B.2. Impulsiveness

Germany: Eysenck, Daum, Schugens, and Diehl (1990)
 Egypt: Eysenck and Abdel-Khalek (1992)

Appendix C. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.paid.2012.09.022>.

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