The national personality – what's changed over the last 18 years?

Authors: Paul Deakin, Heather Coop, Rob Bailey (OPP Ltd)

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Summary

In 1994, the 5th edition of the 16PF personality questionnaire was standardised for the UK, using data gathered from a large, nationally representative sample of 1,322 people.

In 2011, a follow-up project was undertaken to ensure the instrument remains up-to-date. This poster describes the extent to which personality characteristics of the UK and Irish general population were found to change over time, and discusses the implications of the findings for psychometric test publishers and the practitioners who use these instruments.

Introduction

The 16PF is one of the most well-known and respected measures of normal adult personality. It is a self-report, norm-referenced questionnaire comprising sixteen scales, each measuring one of the sixteen factors that emerged from the research of Raymond Cattell. The first edition of the 16PF was launched in 1949. Since that time, it has been regularly updated and revised, with the latest version (the 5th edition) being standardised for the UK in 1994.

A comprehensive taxonomy of personality traits such as the 16PF allows comparisons across many different groups, for example, occupations, genders and age groups. There has also been a considerable amount of work to look at cross-national comparisons of personality traits, using various personality questionnaires (for example, McCrae (2002), Heine et al (2008), Schmitt et al, (2007)).

Research has shown within-group differences to be considerably larger than between-group differences in terms of national personality characteristics (McCrae et al, 2005). **In other words, differences within a population are likely to be larger than differences between national populations.**

Whilst several studies have looked at how an individual's personality traits may change over their lifetime (e.g. Warr et al, 2001), very little work has been done to look at changes in national personality profiles over time.

The most important step in conducting research to compare groups is that of obtaining the sample. If the research is to provide valid results, then the sample must accurately represent the population. The challenges of collecting comparable data for large, nationally representative samples may have contributed to the lack of research in this area. We intend for this study to help address this.

As well as furthering our understanding of the extent to which national personality characteristics may evolve over time, we hope that this research will provide empirical evidence for psychometric test publishers to use when deciding how frequently personality questionnaires should be re-normed.

Design

Sample & Method

In 1994, the 16PF 5th edition was standardised for the UK, using data collected by The Office of Population Censuses and Surveys (OPCS) the previous year.

During early 2011, a follow-on project was conducted to collect updated, nationally representative data. The sample comprised 1,212 panellists who had signed up to participate in online data collection. It was designed to be representative of the working age population and was matched closely to the most recent census figures on variables such as country/region of residence, gender, age, ethnic origin, educational level, employment status, job level and job type.

Results

Raw score means and standard deviations for the two samples are shown in Table 1, along with the differences in mean scores between samples.

Independent t-tests showed the differences to be significant (p<0.05) for nine out of the sixteen Primary Factors (Warmth (A), Emotional Stability (C), Social Boldness (H), Vigilance (L), Abstractedness (M), Apprehension (O), Openness to Change (Q1), Self Reliance (Q2), Tension (Q4).

Cohen's effect sizes were used (Cohen, 1988) to determine if observed differences were not only statistically significant but also meaningful. The effect sizes were found to be small (<0.50) for all of the factors. An effect size of +/- 0.50 corresponds to a sten difference of approximately 1 sten, which is approximately the same as the standard error of measurement for each factor. The differences in mean scores therefore would have very little impact on profile interpretation.

However, in saying this, the differences for a few of the factors were approaching the 0.50 value, for example Emotional Stability (C) and Vigilance (L). This could be a result of sampling, or it could reflect a real, albeit small, change over time. This is something that should be monitored.

Table 1. Means, standard deviations, raw score mean differences and effect sizes for 16PF Primary Factors

	Primary Factor	2011 working age sample (N = 1,212)		1994 standardisation sample (N=1,322)		Raw score mean diff	Effect size (d)
		Mean	SD	Mean	SD		
A	Warmth	12.37	4.82	13.5	4.6	-1.13	-0.24
B	Reasoning	9.11	3.08	9.1	3.4	0.01	0.00
C	Emotional Stability	11.02	5.13	13.0	4.7	-1.98	-0.40
E	Dominance	12.43	4.36	12.5	4.4	-0.07	-0.02
F	Liveliness	11.76	4.71	11.4	4.9	0.36	0.07
G	Rule-Consciousness	11.87	4.15	12.2	4.8	-0.33	-0.07
H	Social Boldness	9.01	6.15	10.0	6.4	-0.99	-0.16
I	Sensitivity	12.16	5.02	12.2	5.4	-0.04	-0.01
L	Vigilance	13.87	3.65	12.5	3.8	1.37	0.37
M	Abstractedness	9.06	4.92	8.0	4.9	1.06	0.22
N	Privateness	12.60	4.86	12.7	4.7	-0.1	-0.02
O	Apprehension	12.17	5.33	11.5	5.3	0.67	0.13
Q1	Openness to Change	15.96	5.15	14.8	5.4	1.16	0.22
Q2	Self-Reliance	11.02	5.30	9.3	5.1	1.72	0.33
Q3	Perfectionism	11.60	4.76	11.7	5.0	-0.1	-0.02
Q4	Tension	11.61	4.68	11.1	4.9	0.51	0.11

The internal consistency reliability of the scales was estimated using Cronbach's coefficient alpha. Table 2 presents the results.

Table 2. Internal consistency

	Primary Factor	2011 working age sample (N = 1,212)	1994 standardisation sample (N=1,322)
		alpha	alpha
A	Warmth	0.70	0.69
B	Reasoning	0.71	0.80
C	Emotional Stability	0.77	0.73
E	Dominance	0.68	0.68
F	Liveliness	0.74	0.74
G	Rule-Consciousness	0.62	0.70
H	Social Boldness	0.87	0.87
I	Sensitivity	0.71	0.76
L	Vigilance	0.64	0.60
M	Abstractedness	0.71	0.71
N	Privateness	0.76	0.72
O	Apprehension	0.79	0.77
Q1	Openness to Change	0.63	0.65
Q2	Self-Reliance	0.80	0.75
Q3	Perfectionism	0.73	0.74
Q4	Tension	0.73	0.73

A comparison of the alpha coefficients across the two samples shows that the differences are small, thus providing further evidence of stability.

Exploratory factor analysis is a statistical technique for discovering, within a large set of variables, a smaller set of variables that can explain much of the larger domain. This technique was employed to examine if the same factors could be extracted from the 2011 data as were found during Cattell's original work.

The factor structure of the items was examined using the procedure discussed by Conn and Rieke (1994). Items within each factor were grouped into 'parcels' based upon the strength of their correlations with items within the same scale. For each Primary Factor, three or four items were summed within each parcel in order to achieve a parcel score. Each scale was partitioned into three to four parcels, resulting in a total of 49 parcels.

These parcels, rather than separate items, were factor analysed. Principal Axis Factoring was conducted using the statistical package SPSS. This was followed by an oblique rotational method (Promax) with the Kappa value set at 3.

Overall, the pattern showed a very good, simple structure for the 16PF Primary Factors. All but three of the 49 parcels exhibited the highest loading onto the factor to which they were assigned. The factor loadings of the parcels onto their respective factors ranged from 0.20 to 0.84 (median of 0.64 and mean of 0.63); and 44 of the 49 parcels (90%) showed a loading of 0.50 or higher, thus suggesting strong links between the parcels and their assigned factor. In addition, there were only six cross-loadings equal to or larger than +/-0.20. All other parcels displayed close-to-zero loadings onto other factors, demonstrating that these parcels represent distinct constructs that are only represented in their assigned factor, and not in the remaining factors that measure other traits.

The results as a whole confirm empirically the strong conceptual links between the item parcels and their assigned factors.

In addition to the factor pattern showing that the 16PF items tend to associate with their own scale and not with others, the Primary Factor scales were also found to show a predictable pattern of intercorrelations.

In summary, 16 factors are clearly defined, corresponding to Cattell's 16 Primary Factors in the US 16PF questionnaire.

Discussion and conclusions

Overall, the results of this comparison study show that there is compelling similarity in the psychometric data from the two different points in time. This means that what we knew in 1994 about the European English version of the 16PF 5th edition questionnaire, and the personality characteristics of the general population is concurrent with what we found in our more recent data.

Despite this, market demands dictate that test publishers need to provide regularly updated norms for their instruments. Psychometrically, there may be little justification for this. Indeed, there is a danger that test users may be inclined to apply less appropriate, but more recent norms (eg based on small sample sizes) in the mistaken belief that new is necessarily better.

There is therefore an obligation upon test publishers to conduct periodic standardisations to ensure that published data remains current, and to publish evidence about size of shifts in personality over time. If and when sufficient evidence is accrued to support the re-norming of instruments, test publishers should take an appropriate course of action. There is also an argument for educating test users of the full range of issues they need to consider when choosing norm groups.

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For further info please contact: paul.deakin@opp.eu.com