

## **CONSTANCY AND VARIABILITY OF THE HSPQ ACROSS TWO ISRAELI CULTURES**

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### **ABSTRACT**

The study aimed at investigating the content and pattern of second-order personality factors of the HSPQ across cultures and sex groups in Israel, and the similarity of the obtained pattern to the American normative group. The HSPQ was administered to 366 Israeli Jews and 353 Israeli Arabs of both sexes. The scales of the primary traits were subjected to factor analysis, where the number of factors was assessed by the chi-square goodness-of-fit method.

In general, the factor pattern found on the combined sample of Israeli children resembled past research for *exvia*, *anxiety*, *cortertia*, and *superego*, though different methods of factorization and determination of the number of factors were employed. When the data were treated separately for sexes or for cultures, factors which lend support to the hypothesis of the existence of certain unique group characteristics emerged.

### **INTRODUCTION**

The cross-cultural research of personality has been criticized on its various methodological flaws. Campbell's criticism (1961) on sampling procedures, the critical analysis on the choice of instruments (Lindzey, 1961) or on translation problems (Brislin, et al., 1975) are among the well-discussed issues in this regard. Cattell's criticism (1969, 1973, pp. 330-348) summarizes the logical argument: When quantitative comparisons are made between cultures, there must be a proof that the concept measured is the same, and that the scale units are comparable. For example, is there a unitary concept of anxiety applicable to boys and girls, or to different national groups? If so, is the test for measuring anxiety equally valid for these populations? In the last 20 years or so (probably from Whiting & Child's work in 1953 to Holzman, Diaz-Guerrero & Swartz, 1975, and to the collected works on the anxiety measured by Spielberger & Diaz-Guerrero, 1976) the field of quantitative cross-cultural research addresses itself to this transferability concept.

When the personality space is examined over individual differences, over growth increments, or over constitutional differences, clearly defined simple structure factors are found for many of the known constructs. Yet, the operational identity of concepts arises in every comparison of social subgroups (Nesselrode & Reese, 1973).

The answer suggested by Cattell (1969) that identity of concepts must rest on either the identity of factors or the identity of class is acceptable provided such tests be made on partly overlapping subgroups. That is, in order to assess identities (or better, the degree of congruences), it seems helpful at least to examine the personality space over one major difference at a time, holding other differences constant.

The minimum requirements for assessing congruences of personality factors are the availability of two major differences between at least two samples (e.g., culture and sex, or culture and SES and the like).

Differences in personality structure across countries are already well established (for extensive work on the 16 PF, see Cattell & Nichols, 1972; Cattell, 1973). It would be worthwhile investigating the pattern of a common structure within one country where cultural differences are salient and in turn determining to what extent the common structure is affected by cultural and sex differences. One country which satisfies these conditions is Israel, where a minority of Arabs (approximately 15% of Israel's population) preserve their identity through language, child-rearing practices, schooling, and distinct environment living among a Jewish majority that preserves its own identity in like manner. This investigation, therefore, aimed at defining both the common and the unique configuration of personality structure among male and female Israeli adolescents of both Jewish and Arab national groups.

An additional objective is a comparison of the adolescent personality structure with that of the adult population. Adult personality structure has been defined, at least in part, both as to primary and secondary factors by Cattell, et al. (1970), and rechecked by Cattell and Nichols (1972) in the Sixteen Personality Factor Questionnaire (16 PF). Research has also established that 12 out of the 16 PF factors are common to children and adults (Cattell, et al., 1970). Recently, Burdsal and Cattell (1974), Cattell and Cattell (1975), and Nesselroade and Baltes (1975) reaffirmed that the High School Personality Questionnaire (HSPQ) produces second-order factors comparable to the 16 PF. Those studies were conducted mostly on American data. Only a few were published on the structure of the HSPQ in countries other than the U.S. (See Cattell & Cattell, 1975). Consequently, this study aimed to contribute more evidence to the culture transferability problem, with an emphasis on the developmental aspects of personality structures. That is, in order to observe in a quantifiable manner changes in the personality as a child matures, and in order to assess cultural influences in different countries, it is necessary to establish comparable measures on the same factors across age and cultural groups.

The problems addressed in this study were: *a*) What are the content and the pattern of second-order personality factors in adolescents? *b*) Are these patterns invariant across cultural or sex groups within one country? *c*) Is there a common structure of personality across countries?

## METHODOLOGY

### SAMPLES AND ADMINISTRATION

The 1975 English version of the HSPQ Form A was translated into Hebrew and Arabic. A back translation was used for checking accuracy and equivalency. The tests were administered to 366 Jewish boys and girls and 353 Arab boys and girls in the 8th and 9th grades of the Intermediate (compulsory) schools in several areas in Israel.<sup>1</sup> Although a full stratified sampling procedure was not followed, efforts were made to assure comparability of the samples: (1) In order to overcome the existing differences in SES between the Arab and the Jewish populations in Israel, the Arab sample was drawn from urban

localities only. Thus, academic and other professional, technical, and related occupations (the first two categories of the occupational index of the Israeli Central Bureau of Statistics) were "over-represented" by the fathers of the present Arab sample (15.8% comparing to the 9.9% in the Israeli-Arab population), yet still below the percentage in the Jewish one (19.6%). (2) In order to assure heterogeneity of abilities, intact "homeroom" classes were selected within each population (Jews from all-Jewish schools and Arabs from all-Arab schools). Table 1 defines the samples by sex, age, and nationality.

Table 1

## CHARACTERISTICS OF THE SAMPLE

Groups	Arabs		Jews			Mean Age
	N	Age	N	Age	N	
Boys	160	14.9	197	14.3	357	14.7
Girls	193	14.8	169	14.4	362	14.5
N	353		366		719	
Mean Age		14.8		14.3		14.6
Translation	Arabic		Hebrew			

The tests were administered by guidance counselors, following the standard procedures. The scoring followed the standard key, the position of items being the same in both translations as in the English form. Factor B (the intelligence factor) was not interwoven with the other items. The B factor in the Israeli version is composed of the 16 best-representative of the 44 items given in the four adult forms, and administered separately.

## PROCEDURE

Scores of individuals on the primary factors were separately correlated for each sex and culture.<sup>2</sup> Each matrix was first assessed for its psychometric adequacy by three methods: a) Bartlett's test of sphericity, b) the percentage of the off-diagonal elements of the anti-image covariance matrix, and c) computation of the Kaiser-Meyer-Olkin measure of sampling adequacy (for an overview and references, see Dziuban & Shirkey, 1974). The findings of the Bartlett's test suggested that each of the four correlation matrices came from a multivariate normal population (with  $p$ 's < .0001) in which the variables of interest are independent. This was confirmed by the results of the second test when on the average only 12.3% of the off-diagonal elements in the anti-image covariance matrices were greater than zero (ranging from 10.5% to 14.3%). The overall measures of sampling adequacy (i.e., the extent to which the variables belong together psychometrically) for the samples were in the .80s, which, according to the Kaiser and Rice (1974) calibration of this index, indicates a *meritorious* range of adequacy (the index ranges from 0 to 1.00). In this case, the results of each procedure for each of the four matrices gave evidence that they were generally adequate for factor analyses.

Each correlation matrix was subjected to exploratory factor analysis, using the maximum likelihood solution. Initial estimates of communalities were Guttman's multiple correlations with iterations.

In order to determine the number of factors, the assessment of goodness-of-fit of the data to the model was checked by the difference of the  $\chi^2$  measure of overall goodness-of-fit (Joreskog & Sorbom, 1977). This measure can be regarded as a test of the specified model against any other general models by estimating each of them separately and comparing their  $\chi^2$  goodness-of-fit values. The difference in  $\chi^2$  is asymptotically a  $\chi^2$  with degrees of freedom equal to the corresponding differences in degrees of freedom. A sequence of hypotheses such that each one is the special case of the preceding one (such as in testing a 2-factor model against 1, 3 against 2 factors, etc.) tested with the  $\chi^2$  difference, provides evidence to the best statistical solution for the number of factors. One stops fitting when the  $\chi^2$  difference is not significant at a pre-specified level, since adding a parameter (i.e., another factor) may not have real significance and meaning, and the improvement in fit is obtained by "capitalizing on chance." An oblique rotation (i.e., direct oblimin, with  $\delta = 0$ ) of the best factor-solution for each sample was done. The congruences between the factor patterns of the samples were compared by Burt's coefficients of congruence (Harman, 1967), and a factor analysis of the total sample was then conducted following the above procedure.

## RESULTS AND INTERPRETATIONS

The sequential tests for the number of factors are presented in Table 2. As can be seen in the table, the best fit for the Arab sample suggested a three-factor solution, while in the other samples, four factors provided the best statistical goodness-of-fit values. Accordingly, three- and four-factor solutions were computed and obliquely rotated to reach a simple structure.

In Table 3, the second-order factor of the four interdivisions of sample groups, i.e., J(ewish), A(rab), F(eminine), and M(asculine) is presented. It should be noted that for the A-group the solution for the first three factors is presented according to its three-factor solution, while for the other groups, the four-factor solution was consulted. The fourth factor in the A-group was achieved by an overfactorization of the matrix. This solution provided the fourth second-order factor as shown in the table, but blurred the original and usual meanings of the *exvia* and the toughness factors.

As can be seen from Table 3, the first factor can be referred to as *invia-exvia* second-order factor. It is similar in its loading pattern in all groups and supported by findings of other studies as well (Cattell & Cattell, 1975). The usual loadings of A, F, H, J—, and Q2— were not contaminated by any significant loading of other primaries. The *anxiety* factor is the second one, but it exhibits some peculiarities: The M-group contributed all the variance of Q3 (self-sentiment) to the fourth factor, while in the F-group), Factor *D* (excitability) was moved to the fourth factor. When the national samples are checked, in the J-group, G (superego) was moved entirely to the fourth factor, while in the A-group it was not. Nevertheless, the agreement between samples on these two second-order factors was high enough to be considered similar.

Table 2

## ASSESSMENT OF GOODNESS-OF-FIT FOR DIFFERENT GROUPS

Groups	No. of Factors (k)	$\chi^2_k$	$df_k$	$\chi^2_{k-1}$	$\chi^2_k - \chi^2_{k-1}$	$df_{k-1} - df_k$	Significance of the Differences
Jews	3	74.91	52				
	4	50.81	41	24.10		11	.02
	5	36.21	31	14.40		10	n.s.
Arabs	2	75.46	64				
	3	45.65	52	29.81		12	.01
	4	28.03	41	17.62		11	.10
	5	14.10	31	13.93		10	n.s.
Boys	3	57.86	52				
	4	38.33	41	19.53		11	.05
	5	22.25	31	16.08		10	n.s.
Girls	3	62.10	52				
	4	42.33	41	19.77		11	.05
	5	30.35	31	11.98		10	n.s.

The coefficient of congruence between boys and girls on exvia was .86, and on anxiety it was .78. The congruencies between these factors for the Jewish and Arab groups were .84 and .87 for exvia and anxiety, respectively, all of which are significant beyond the .01 level.<sup>3</sup>

According to the solution for boys and girls, we preferred to call the third factor *tenderness vs. toughness*. It contains E and I in opposite signs, that is, dominance and toughness vs. submissiveness with tendermindedness and seems to reflect best the notion of aggressiveness or toughness, or the feminine vs. masculine type. The coefficient of congruence between sexes on this factor is .89. Almost the same pattern appeared in the A-group, with additional loading of Q<sub>2</sub> (group-dependency vs. self-sufficiency). In the J-group, however, E and I were coupled with F and H. That is, in addition to dominance and toughness, this factor is composed in the J-group also of enthusiastic and venturesome behaviors, but not with self-sufficiency. These differences resulted in a coefficient of congruence for the two national groups of .56 (still significant in the .05 level).

Factor 4 seems to reflect a unique pattern for each sex. In the M-group it is composed mainly of Q<sub>3</sub> (self-sufficiency or the ability to bind anxiety) and a portion of G (superego), while in the F-group it contains the primaries D (excitability) and Q<sub>4</sub> (ergic tension). Both factors emerged from the anxiety second-order factor reflecting certain primaries which shifted their place to this sex-related factor. Thus, the agreement (congruence) of this factor in both sexes was stronger with the anxiety factor of the other sex (in the .60s) than between the two fourth factors themselves (coefficients of .25).

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Table 3

HSPQ SECOND-ORDER FACTOR PATTERNS IN VARIOUS GROUPS

Traits	Boys	Girls	Jews	Arabs
<b>Factor I: Invia vs. Exvia</b>				
A	496	550	647	231
F	448	282	415	431
H	389	351	311	314
J	-497	-415	-446	-253
Q <sub>2</sub>	-558	-604	-725	-371
<b>Factor II: Adjustment vs. Anxiety</b>				
C	-832	-635	-505	-632
D	461		650	551
G	-490	-574		-583
H	-353	-267	-396	-463
O	483	416	658	633
Q <sub>3</sub>		-549	-508	-502
Q <sub>4</sub>	344	224	658	506
<b>Factor III: Tenderness vs. Toughness</b>				
E	583	576	561	226
F			401	
H			370	
I	-452	-709	-655	-618
Q <sub>2</sub>				394
<b>Factor IV</b>				
D		870		
F				-410
G	200		910	469
Q <sub>3</sub>	798		205	347
Q <sub>4</sub>		390		

Note: All values less than + 200 have been deleted. Decimals are omitted.

The J-group shows a fourth-factor pattern similar to that of the boys, though with a greater emphasis on G than on Q<sub>3</sub>. In the A-group, the attempt to calculate a fourth factor (with the risk of capitalization on chance) resulted in a pattern similar to the Jewish one, with F (desurgency) added to it. The coefficient of congruency between the national groups on this factor was .72.

From the above analyses it seems that there are common as well as unique patterns of second-order personality traits. In the sex-related analysis, at least two second-order factors (*exvia* and *toughness*) were very similar, one (i.e., *anxiety*) had some unique features, and the fourth was entirely a unique sex-related factor. For the national-related analysis, the congruences of the first two factors were very high indeed, while the third one (*toughness*) showed some unique national contributions.

In order to assess the common personality space, and to evaluate the unique constructs which may have carry-over effect to the common space, a

total sample factor analysis was conducted. The assessment of goodness-of-fit which is presented in Table 4 suggested a four-factor solution. Consequently, the four-factor solution was subjected to an oblique rotation.

Table 4

## ASSESSMENT OF GOODNESS-OF-FIT FOR THE COMBINED SAMPLE

K	$\chi^2_k$	$df_k$	$\chi^2_{k-1} - \chi^2_k$	$df_{k-1} - df_k$	Sig. of Diff.
3	70.27	52			
4	40.79	41	29.48	11	.01
5	26.70	31	14.08	10	.15
6	13.91	22	12.79	9	n.s.

In addition, a five-factor rotation was also conducted, since B (the intelligence factor), though it had enough variance (i.e., a medium estimated communality) to deserve its proper place, did not emerge in the four-factor solution. Indeed, the only change in the pattern in the five-factor compared to the four-factor solution was the emergence of B as a fifth second-order factor, almost without shifting any other primary from its original position in the four-factor solution. We preferred, then, the psychological meaning of five second-orders over the more rigorous statistical solution of four factors. This solution is presented in full in Table 5. It is rather clear from the table that Factor I, *exviva*, loaded the usual primaries (though H is loaded only .25, instead of .38 as in a four-factor solution, contributing the rest of its variance to Factor V) as in Cattell's works, and the same applies to Factor II, the *anxiety* factor. Even Factor III is composed of E and I as in Cattell's best solution. Nevertheless, we prefer to call it *toughness* rather than *cortertia*, since A and M were not present here, as they usually are in the adult solutions.

Factor IV in the present solution is composed of G (superego, or group conformity), Q<sub>3</sub> (self-sentiment, or ability to bind anxiety), and C (ego-strength) instead of F (desurgency), as in Cattell's solution. We prefer to emphasize here the rigid, moralistic, and compulsive aspects of this factor, as Karson and O'Dell (1976) have done, and thus call it a *conformity* second-order factor. The fifth second-order factor is composed mostly of B, and consequently referred to as *intelligence*. The factor pattern correlation matrix among these factors is presented in Table 6. Except for the medium correlation (-.47) between Factors II and IV (*anxiety* and *conformity*), the correlations are low (sharing in common a variance of between 0 to 9%) and can be considered relatively independent. It seems, then, that moving from relatively homogeneous groups to more heterogeneous ones, we lose sight of unique constructs and gain an overall view of the universal aspects of the personality structure.

The last question posed in this study concerned the congruence of the above solution with the American normative groups. This was accomplished by computing coefficients of congruence between the present five-factor

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Table 5

OBLIQUE FACTOR PATTERN MATRIX (N = 719)  
SECOND-STRATUM FACTORS

Primaries	Secondaries				
	I Exvia	II Anxiety	III Toughness	IV Conformity	V Intelligence
A	45	-12	-12	07	11
B	-02	-02	03	02	40
C	02	-44	13	30	02
D	01	67	11	03	-06
E	-16	-22	43	-15	07
F	32	03	16	-12	24
G	00	00	-06	77	05
H	25	-33	17	17	22
I	03	-11	-73	-01	04
J	-55	07	-08	-05	16
O	08	57	02	-11	09
Q <sub>2</sub>	-56	-01	22	10	-13
Q <sub>3</sub>	07	-34	03	32	-25
Q <sub>4</sub>	06	58	06	03	00

Note: Decimal points are omitted.

Table 6

FACTOR PATTERN CORRELATIONS  
(Total Sample)

Second-Orders	I	II	III	IV	V
Exvia I	1.00				
Anxiety II	-.29	1.00			
Toughness III	-.10	-.21	1.00		
Conformity IV	.09	-.47	-.11	1.00	
Intelligence V	.30	.03	.20	-.29	1.00

solution and the eight-factor solutions given by Burdsal and Cattell (1974, Table 1). These coefficients are presented in Table 7. Since separate male and female solutions were presented in Burdsal and Cattell's table, Table 7 presents the congruence coefficients for each sex in both samples in addition to the five-factor solution of the combined sample.

As can be seen in Table 7, the congruences in the sex-related factors of both countries are very good for exvia in both sexes, and for anxiety in the male comparison, while they are only above average for the other comparisons. It is noteworthy that the independence factor in the American samples is in congruence with the exvia factor of the Israeli samples.

The comparisons of the American samples with the overall Israeli five-factor solution is good for all but the *intelligence* factor. Yet, again, the American independence factor is in congruence with *exvia*, while the American overexcitability factor has no real match in the Israeli sample.

Table 7

COEFFICIENTS OF CONGRUENCE BETWEEN ISRAELI  
AND AMERICAN SAMPLES ON THE HSPQ

Second-Orders	Am. vs. Isr. Females	Am. vs. Isr. Males	Am. Female vs. Isr.	Am. Male vs. Isr.
Exvia	.943	.899	.913	.925
Anxiety	.643	.860	.867	.878
Toughness	.777	.734	.903	.878
Conformity		.708	.797	.807
Intelligence			.532	.703
Overexcitability	.771			
Am. Independence vs. Isr. Exvia	.735	.688	.806	.827

## DISCUSSION

In general, the factor pattern found on a combined sample of Israeli children (of both national groups) tended to be similar to the pattern presented by Burdsal and Cattell (1974) for the American normative group. The best agreements with past research on the HSPQ and of the 16 PF are established for *exvia*, anxiety, *cortertia* (or what has been named toughness in this paper), *superego* strength (or conformity) and to a lesser degree for intelligence. When in the present analysis the more rigorous statistical test for the number of factors was employed, the  $\chi^2$  measure of the goodness-of-fit, four factors resulted. However, taking some leeway in light of the psychological significance of the additional intelligence factor, it was decided that a five-factor solution was the most meaningful.

In addition, the current five-factor solution is more parsimonious than Burdsal and Cattell's (1974) eight-factor solution. The relative coefficients of parsimony (Ferguson, 1954) were in the .60s for Cattell's solutions, and in the .80s in the current study.

Yet, three of Cattell's second-order factors were not found in this analysis: the independence factor, Factor VII (excitability), and Factor VIII which has been referred to by Cattell (1975) as an error factor rather than a true one. Generally, even in most analyses of the 16 PF, only six second-order factors were consistently replicated across samples and investigations (Winder, et al., 1975), and probably five of them do replicate in the current analysis of the HSPQ.

As it was expected, an overall factor analysis on a heterogeneous sample gave a well-established common personality space. Yet, by virtue of generalization, unique patterns of distinct groups were overlooked.

From the separate analyses on the Jewish and the Arab national groups, three interesting features emerged: 1) the similarity of exvia and anxiety second-orders, 2) the different construction of toughness, where it was found as a more complex phenomenon in the Jewish group compared to the Arab group, and 3) the emergence of only three second-order factors in the Arab group, whereas four factors accounted for the primaries in the Jewish group. The latter two results are subject to at least two interpretations: 1) it could be due to a culturally less diverse society vs. a more diverse one, as was found, for example, in studies on convergent vs. divergent thinking, or 2) it may be an instrumental problem related to inadequacies of the translation. This issue must await more data on correlates of personality with other behaviors in these two cultures.

When the analysis of the data was done according to sex, the fourth second-order factor was a uniquely sex-related one, while the first three were similar in both sexes, though with interesting differences on the anxiety factor. For males, the fourth factor was a conformity second-order with an emphasis on Q3 (the ability to bind anxiety). In the female subsample, this factor greatly resembled Burdsal and Cattell's (1974) Factor VII in their female sample, that is, resemblance to the overexcitability factor. Both factors emerged from the anxiety second-order. The correlations between the fourth factor with anxiety were the highest, namely,  $-.46$  and  $-.38$  for females and males, respectively, which might point to valuable interactions of these broad categories. One might suggest that with males, the conformity factor plays the role of a balance to anxiety-arousing situations, while with females, the fourth factor of overexcitability may act in an opposite manner, i.e., intensifying anxiety when it has already been aroused. Stated differently, some mutual feedback effects in the secondary space might be hypothesized, in addition to the interaction effects between primaries and secondaries proposed by Cattell (1965). This hypothesis should be checked experimentally before a more precise statement is given.

In conclusion, the three most significant results of this study were:

a) The factor pattern was similar to previous studies on the HSPQ even though different methods for determining the number of factors and for factorization were employed.

b) The factor patterns tend to resemble closely the adult second-order factor patterns found in the 16 PF, at least for the five main secondaries. These findings lend support to the contention that the primaries used in the Israeli HSPQ are stable and can be treated similarly in Hebrew and in Arabic translations in developmental and cross-cultural studies.

c) In addition to general personality structures, some unique factors emerged when data were treated separately for sexes or for cultures, thus lending support to the hypothesis of the existence of some particular group characteristics. Consequently, cross-cultural or between-groups comparisons should take into account such differences in their research design. Similar conclusions were reached by Krug and Laughlin (1977) on the Clinical Analysis Questionnaire (CAQ) with relation to sex differences. Moreover, the standard procedure of establishing validity and reliability coefficients in each new setting to which an instrument is transferred should be reemphasized,

especially where there are intentions to derive composite scores for secondaries for clinical use. From our analysis it seems that in the Israeli adolescent population, *exvia* and *anxiety* second-order scores can be estimated by the same equation for both sexes and for both cultures. This is not the case, however, for estimating *toughness*, *conformity*, and *overexcitability*.

### FOOTNOTES

1. The data were collected as a part of the Israeli norms of the HSPQ by the Center of Research and Consultation, the School of Education, Tel-Aviv University. Thanks are due Z. Magen, A. Tal, and A. Shorek for their help in data collection and analyses.
2. That is, four matrices were composed: two matrices for boys and girls over cultures and two matrices for Jews and Arabs over sex differences. One should take into account the partial overlapping of the data when evaluating the results.
3. A table for significance of congruence coefficients has been only recently introduced (see Cattell, 1978, pp. 252-255 and Appendix A.7). According to that table, matched factors which have 10 variables in common require a congruence coefficient of .90 for the .001 level, .77 for .01 level, and .62 for the .05 level of significance. The comparable figures for 14 variables in common are approximately .85, .69, and .56, respectively.

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