Multilevel Analysis *of* Individuals *and* Cultures

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Multilevel Structure Analysis for Family-Related Constructs

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This chapter is based on a project which studied similarities and differences in families across cultures (Georgas, Berry, Van de Vijver, Kagitcibasi, & Poortinga, 2006). The goal of the project was to study family networks, family roles, and psychological variables in different ecological and sociopolitical systems across 30 countries. The present chapter focuses on the issue of structural equivalence of the above measures at the individual and country level. Structural equivalence implies that the same psychological constructs are measured cross-culturally (Van de Vijver & Leung, 1997); cross-level equivalence implies that the same constructs can serve to explain differences at each of the two levels without committing an ecological fallacy (Hox, 2002). The need to compare variables at different levels of aggregation is an important aspect of multilevel analysis in cross-cultural research (Van de Vijver & Poortinga, 2002).

The purpose of the present chapter is to explore structural equivalence of the scales employed in the 30-country family study and to compare the underlying constructs at the individual and country levels of aggregation; these scales involve family constructs, such as family hierarchy, family values and roles, and presumably related variables, such as values and personality.

Family systems and family change have been studied during the past two centuries by family sociology, cultural anthropology, psychology, education, psychiatry, economics, and historical demography, among other disciplines. Theories of family change have centered on the effects of social changes, such as economic development, education, political systems, and more recently, the global influence of television, of communication through telephones, e-mail, and the Internet. Changes in family types during the past two centuries, as a result of industrialization and urbanization, have been described as transitions from extended types of

family systems to the nuclear family, and more recently, to the one-parent family.

For some family researchers, these social changes are considered to lead to an inevitable convergence of family systems across the globe. Extended family in non-Western societies is thought to give way to the nuclear family and ultimately the one-person family of Western societies in North America and Northern Europe. However, other studies have shown that the extended family did not become extinct in modern cities; rather, it has changed into a "modified extended family system," in which contact and psychological bonds of nuclear family members with kin are maintained (see also Georgas et al., 2006, for detailed discussion).

The theoretical approach of the overall project was derived from cross-cultural and indigenous psychology. The formulation of research hypotheses was guided by the ecocultural framework of Berry (1976, 1979) and the model of family change of Kagitcibasi (1990, 1996). The cross-cultural analyses were based on data from variables at four hierarchically related sets of variables: Country-level ecological and sociopolitical variables; family roles; family networks; and an array of psychological variables, including emotional bonds with members of the nuclear family and kin, personality traits, self-construal, family values, and personal values (Figure 13.1). The main analyses for this project were directed toward determining similarities and differences in mean scores at country level (Georgas et al., 2006). In addition, the findings were interpreted not only across all countries, but also for clusters of countries, or "cultural zones," based on ecological and sociopolitical variables. The indigenous approach was reflected

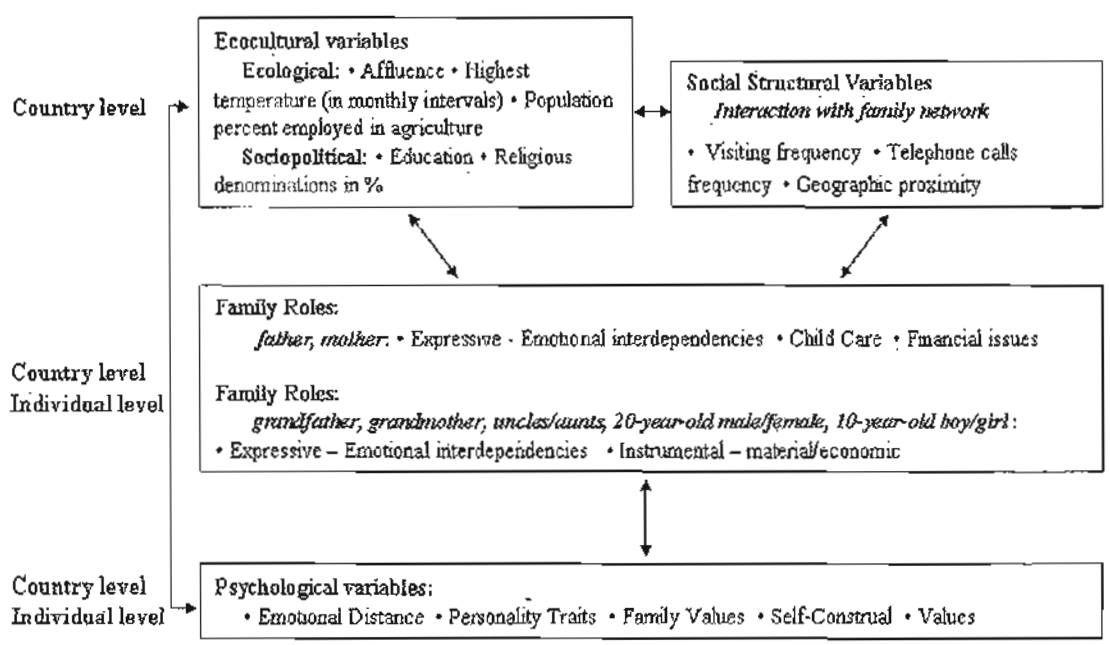

FIGURE 13.1 Overview of the levels of analyses and the variables employed based on the Ecocultural Framework. (Adapted from Georgas, Berry, Van de Vijver, Kagitcibasi, & Poortinga, 2006)

in a qualitative analysis of the relationships between cultural, family, and psychological variables in "family portraits" written by authors from each of the 30 countries. The quantitative analyses reported in this chapter are based on data from 27 of these 30 countries.

Indigenous patterns of family functions may or may not be the same across countries, which raises the issue about the similarity or dissimilarity of the underlying structure and functions across cultures. That is, to what extent can we describe the similarities and differences in the underlying psychological structure of families across cultures in terms of common variables? Such a procedure would require testing of the equivalence of central family constructs across countries (Van de Vijver & Leung, 1997). One central family construct is family values; it is of obvious importance to compare family values across countries with respect to their degree of acceptance or rejection. To be able to compare the respective constructs in a meaningful way requires at least an acceptable degree of certainty that they are invariant across the countries involved in the comparison. If such equivalence is not shown, then the family values under consideration may have a different functional meaning for some of the countries involved than they do for other countries. Several other constructs of interest (such as the ones in the four hierarchically related sets of variables as shown in Figure 13.1) can and should be explored with the same rationale of cross-level comparison, since family is well established as an important contextual agent in shaping individual behavior. This is evident in theoretical conceptualizations such as the ecological framework (Bronfenbrenner, 1979) or the ecological-social model (Georgas, 1993).

Cross-cultural studies in which individual-level family-related constructs are studied have to deal with equivalence issues in two ways. The first addresses the individual-level equivalence of the scales: Do scales measure the same psychological constructs in each culture examined? Identity of constructs is a prerequisite for comparing scores of individuals from different countries. This equivalence would be challenged if, say, obedience to the parents would be unidimensional in one culture and domain specific in another culture (e.g., parents are more focused on obedience in some domains than in others). Such a finding would imply that the global concept of obedience cannot be used to describe the behavior of children in all cultures of the study. The second type of equivalence that is relevant in cross-cultural family studies involves the comparability of constructs at individual and cultural level: Can the same constructs be used to describe individual- and culture-level constructs? Again, identity of factors is a prerequisite to make meaningful comparisons of constructs at individual and cultural level. If obedience would be unidimensional at individual level and multidimensional at cultural level, we would need to use different concepts to describe differences at the two levels. The global concept of obedience could then not be used to describe country-level differences. Analyses of individual-level and cross-level equivalence do not

necessarily yield the same results. For example, an instrument that shows the same factor structure in all cultures of the study may show a different factor structure at country level.

A number of cross-cultural studies have addressed psychological aspects of family functioning at the individual level. Examples include family values in terms of acculturation effects across generations (Georgas, Berry, Shaw, Christakopoulou, & Mylonas, 1996) and family values across Europe (Georgas, Mylonas, Gari, & Panagiotopoulou, 2004). Other examples are studies of family functions and structure along with roles of family members (Georgas et al., 2001); of socialization and social skills formation through the family (Keller, Zach, & Abels, 2005); of parenting style in relation to individualism and mental health within Arab nations (Dwairy & Achoui, 2006); of perceived parental rearing (Deković et al., 2006), to name a few. Although there have been various examples of studies that test individual-level equivalence, there is little to be found on the cross-level testing of equivalence. The latter is what the present chapter focuses on. The paucity of studies dealing with cross-level equivalence could be due to the fact that the methodological and statistical tools required to fully test such multilevel hypotheses have only recently been developed. Another reason may have to do with difficulties in defining the appropriate context. Ideally, all individuals sharing a context should be subject to the same contextual conditions (Teachman & Crowder, 2002). If culture can be conceptualized as an abstract, higher level context, the definition of family may vary across cultures. This conceptual problem may challenge even the use of the concept of family in a cross-cultural context.

In the country-level analysis where the country indicators are estimated from individual-level information, the population characteristics are considered to be the basic information pool when testing for equivalence of structures across countries. Intervening factors (mediating or moderating variables) may regulate the relationships between the constructs. The role of such intervening factors which lie in between the country-population level characteristics and the individual-level manifest behaviors should necessarily be tested in a multilevel model. A cross-cultural study of the family requires the collection of data at three levels: individual, family, and culture. The higher levels, family and culture, could involve both intrinsic and derived variables. An example of an intrinsic family variable would be size and income; derived variables could be scores on family-related constructs, such as perceived hierarchy and family, which are aggregated from individual-level scores. Analogously, intrinsic and derived culture-level variables could be studied. Derived variables could be aggregated individual and family scores. The study of these complex multilevel structures requires a full understanding of the meaning of variables at each level. If we assume isomorphism between individual and cultural levels (see the introduction chapter of this volume), we can analyze how the

functional ways of the family are projected on the population level, and the other way round. This requires a simultaneous analysis of the individual-level and the culture-level structure.

The present chapter addresses the question of identity of meaning of family and presumably related constructs at the individual and cultural level. Six main types of constructs are addressed: family values, emotional distance with members of the family and nonfamily community members, personal values, family roles for nine family positions/persons, personality traits, and self-construal. These sets are separately presented in the next sections in respect of their characteristics and assessment procedures; their structures are then presented—separately for each scale, and for subscales when applicable—both at the individual level and the country level. A comparison is presented between the structures found at individual and country level to test for the multilevel equivalence of the constructs.

METHOD

Participants

To test for factor equivalence of family functions at the two levels of analysis, the individual level and the country level, we employed the data available from the psychological study of families across cultures (Georgas et al., 2006). Data on the family and psychological variables were gathered from the 30 countries as follows: Algeria (N = 107), Brazil (N = 159), Bulgaria (N = 195), Canada (N = 215), Chile (N = 207), Cyprus (N = 132), France (N = 97), Georgia (N = 200), Germany (N = 153), Ghana (N = 70), Greece (N = 350), Hong Kong (N = 423), India (N = 220), Indonesia (N = 239), Iran (N = 189), Japan (N = 185), Mexico (N = 227), Nigeria (N = 337), Pakistan (N = 450), Saudi Arabia (N = 198), South Korea (N = 199), Spain (N = 111), the Netherlands (N=165), Turkey (N = 211), United Kingdom (N = 115), Ukraine (N = 65), and the United States (N = 263). The South African, Botswana, and Mongolian data were excluded for technical reasons. The total number of cases in the study was 5,482. All participants were university students aged 19 to 24; 39.5% of the overall sample were males and 60.5% were females.

Instruments

The psychological and structural family measures employed were: Family Roles, developed by Georgas, Giotsa, Mylonas, and Bafiti for the 30-nation project; Emotional Distance (Georgas et al., 2001); Personality

Traits (Williams, Satterwhite, & Saiz, 1998); Self-Construal (Singelis, 1994); Family Values (Georgas, 1989, 1991); and Values (Schwartz, 1992, 1994). Short forms of the measures for Personality Traits, Self-Construal, and Values were employed since the use of the full versions of the questionnaires would have been too lengthy for participants to respond to in a single session.

The Family Roles items were constructed in cooperation with each local research team, which generated its own suggestions for the addition, adaptation, or elimination of roles. The items and instructions of each questionnaire were translated from English into the target language by an indigenous member of each research team. They were then back translated into English and compared with the original English version for equivalence in connotation. Problematic items, in terms of equivalence of meaning were discussed with the project leader (third author) and rephrased until linguistic equivalence was satisfactory. Items were adapted when a close translation proved to be problematic (Van de Vijver & Leung, 1997).

Data collection was carried out by the local research teams. The questionnaires were administered to university students and were completed in the classroom in all countries. The time required ranged from one to two hours.

Family Values

This questionnaire (Georgas, 1999) consists of 18 questions and its theoretical structure refers to the traditional family values of agricultural societies. There are two dimensions, the *Hierarchical roles of father and mother* dimension and the *Relationships within the family and with kin* dimension. Responses were collected on a 7-point Likert scale from (7) *strongly agree* (traditional end) to (1) *strongly disagree*. Item examples of the *Hierarchical roles of father and mother* are "Father should handle the money in the house," "Mother's place is at home"; examples of the *Relationships within the family and with kin* are "Children should obey parents," and "Parents should teach behavior to children."

Emotional Distance

This questionnaire (Georgas et al., 2001) is based on Bogardus's (1925) concepts of social distance and personal space, and refers to bonds with relatives (father, mother, siblings, spouse, etc.) and members of the immediate community (friends, neighbors, fellow students, etc.). Respondents rated the perceived emotional distance for each of these social categories as emotionally distant or close. The items were scored on a 7-point scale from *very far* (1) to *very close* (7) in the form of concentric circles (the closer the circle assigned to a person to the centre, the stronger the bond).

Values

We employed the Schwartz Values scale (Schwartz, 1994) using a short form (21 items out of the original 56); the respondents used a 7-point Likert scale from *very important* (7) to *not important at all* (1) to rate value types regarding the *Hierarchy, Mastery, Embeddedness, Intellectual Autonomy, Affective Autonomy,* and *Harmony* dimensions. Examples of items for this scale are "family security," "social order," "creativity," and "wealth." Items were scored on the extent to which they are seen as guiding principles in the respondents' lives. Because of communication problems with certain research teams, *Egalitarian Commitment* was not included in all participating countries. Thus, it was decided to proceed with six scales, instead of seven, rather than not employing the questionnaire at all.

Family Roles

The items asked to which extent members of the family undertake various family roles. The family positions were: father, mother, grandfather, grandmother, uncle/aunt, 20-year-old male, 20-year-old female, 10-year-old boy, and 10-year-old girl (Georgas et al., 2006). These family positions were seen as representative of: (1) nuclear family members, namely mother, father, and children (the latter at two age levels; the approximate age of participants, 20 years old, and preadolescents, 10-year-olds); (2) three-generation family members (grandmother, grandfather); and (3) collateral relatives (aunts/uncles). It should be noted that these positions are not considered to be entirely satisfactory since they do not represent all the different types of kinship relationships in extended families throughout the world. For example, the distinction between maternal and paternal aunts and uncles, or between matrilineal and patrilineal grandparents, is not included. The questionnaire was devised by Georgas, Giotsa, Mylonas, and Bafiti on the basis of family literature and questionnaires from countries throughout the world, and the 22 items of the scale were modified in the respective countries by the indigenous members of the project. The respondents answered on a 6-point Likert scale from *almost always* (6) to *never* (1) to items such as "Father protects the family," "Grandmother plays with children," and "20-year-old daughter takes siblings to school." Of the 22 items, 11 were assigned to all family positions; these referred to emotional support, maintenance of a pleasant environment, sense of unity and family relations, conveyance of traditions and religion, financial contribution, and everyday tasks such as housework or shopping. Nine family roles were related to parents, grandparents, and uncles/aunts (not to children) since they referred to adult responsibilities (e.g., daily care and support to grandparents and children). Finally, two roles were not assigned to father and mother because they referred to situations where parents are not present.

Personality Traits

The Personality Traits scale (Williams et al., 1998) was employed in a short version (30 questions out of the 300). The items were in the form of adjectives, such as "moody," "shy," "responsible," and "adventurous." The short version was constructed so as to contain markers of the five-factor personality structure: *Extraversion, Agreeableness, Conscientiousness, Emotional Stability,* and *Openness to Experience.* Items were rated by the respondents on a 7-point Likert scale from *not like me at all* (1) to *very much like me* (7).

Self-Construal

Singelis's Self-Construal scale (Singelis, 1994) was employed using 18 questions out of the 31. The *Independent Self* dimension is assessed by nine items (e.g., "I act the same way no matter who I am with") and the other nine refer to the *Interdependent Self* dimension (e.g., "I feel good when I cooperate with others"). Responses were given on a 7-point Likert scale from *strongly agree* (7) to *strongly disagree* (1).

Statistical Analyses

The aim of the statistical analyses of the family data is to describe the factor structure of all six scales employed in this study at the individual level and at the country level. Van de Vijver and Poortinga (2002) adapted a method to examine cross-level equivalence, using exploratory factor analysis, from a method, in the context of confirmatory factor analysis, proposed by Muthén (1994). The method is particularly useful for comparing data from multiple countries.

In a previous analysis of the family data (Van de Vijver, Mylonas, Pavlopoulos, & Georgas, 2006), the focus was on individual-level factor equivalence across cultures: Do scales have the same psychological meaning in each country involved? The main strategy was to compare the factor structure obtained in each country to a pooled ("average") factor structure. The latter is based on an analysis of the pooled dataset; more specifically, an exploratory factor analysis is conducted on the average covariance matrix of the countries, weighted by sample size. The factor structure found in such an analysis provides information about the pooled individual-level structure. The question of structural equivalence at the individual level (i.e., the question of whether the same factors are found in each country) is addressed by examining the similarity of the factor structure found in each country to the pooled individual-level factors. More specifically, the pooled-within and the between-groups correlation matrices for the set of countries involved in the analysis are calculated and then factor analyzed. A target rotation follows for the two solutions (i.e., the factors found in a

country are rotated toward the factors of the global solution). The similarity of the factors of the two solutions is evaluated by means of Tucker's ϕ (Tucker, 1951). If this coefficient is larger than .90, this is taken to mean that factor equivalence exists across countries and that the overall pooled structure can be described through the target-rotated solution. Such a method can be used for all factor solutions based on similar correlation matrices, for any given number of factors or even unifactorial solutions (one principal component).

The current chapter and analysis focus on the multilevel aspect of the family data. Country-level factor structures may or may not be similar to the factors found in the individual-level analyses. This question can be addressed in different ways. A first approach would be to compare the country-level factors to the factors that are found in each country; the individual-level factors in each country separately would then be compared to the country-level factors on a one-to-one basis. A second approach, which is adopted here, addresses the question to what extent the factors of the pooled solution, which represents the global individual-level factors, are similar to the factors found at country level. Preference for the second approach is based on our findings regarding the structural equivalence at individual level (Georgas et al., 2006); we found a remarkably good similarity between the factors of the pooled individual-level solution and the factor solution in each of the separate countries (Van de Vijver et al., 2006). These findings strongly suggest that there is no need to compare the factors of each of the 27 countries separately to the country-level factor structure if we are interested in cross-level equivalence. Rather, the more parsimonious approach can be followed, in which the pooled individual-level solution is compared to the country-level solution. In operational terms, the latter is computed on the basis of the correlation matrix produced by the respondents' mean scores for each variable for each country. These means were inserted into a rectangular matrix (items×countries) and the interitem correlation matrix for each of the measures was used to calculate the factor solutions.

Poortinga and Van de Vijver (2004) have summarized the three levels of equivalence for cross-cultural comparisons as (1) structural or functional equivalence which lacks quantification compatibility; (2) metric or measurement unit equivalence, which lacks a common anchor point; and (3) scale equivalence or full score comparability. The latter is an ideal level of cross-country similarity and it implies that the same constructs are measured at both levels and that scores can be compared across individuals and levels. Having ascertained equivalence at the individual level for the various constructs in the study (Georgas et al., 2006), the current analyses mainly aimed at exploring structural equivalence of factors found at individual and country level, in order to gain a deeper insight in the construct compatibility across countries. However, it should be noted that

to examine full-score equivalence, other statistical tests would be needed such as confirmatory factor analysis. Factor equivalence testing for the two levels of analysis as conducted in the present analyses can exhibit similarities or differences in meaning for family-related constructs and fully (or partially) justify the aggregation methods frequently used for country means to be compared; a secondary aim of the present analysis was to compare the outcomes to the ones present at the individual level for the same measures.

RESULTS

Family Values

The 18 items of the scale were factor analyzed. In line with theory (Georgas, 1999), two factors were extracted with substantial loadings on 14 items. This analysis was carried out on the overall pooled-within correlation matrix for the 27 countries. The resulting factor structure was then compared with the global average (the 27×14 matrix of item country means). The principal components extraction method, followed by a varimax rotation of the factors, was used in both analyses and the loadings for each of the two respective factors were then compared (after target rotating the individual-level loadings toward the country-level solution). The loadings for this multilevel factor analysis are shown in Table 13.1. The Tucker ϕ congruence coefficients reached values of .97 for the first and .98 for the second factor, showing factor equivalence for individual and country levels.

The analysis of the data at only the individual level (Van de Vijver et al., 2006) showed similar outcomes in respect of cross-countries equivalence. The present finding supports the existence of the same constructs at the country level. It seems that the *Hierarchical roles of father and mother within the family* (first factor) and the *Relationships within the family and with kin* (second factor) are basic family value concepts or constructs not only at individual level, but also at country level. The main conclusion of the overall analysis is that the two constructs of family values are isomorphic at the country and individual level. Thus, *Hierarchical roles of father and mother* and *Relationships within the family and with kin* are constructs that are relevant to understand individual differences as well as country differences.

A close examination of the loadings of Table 13.1 suggests some further results. The factor loadings were higher at country level than at individual level. The background of this difference may be methodological-statistical. Aggregation of scores from individual to country level tends to reduce

TABLE 13.1

Rotated Component Matrices for the Family Values Scale of the Individual- and Country-Level Factor Analysis Solutions[a]

Family Values Scale items	Individual level		Country level	
	Factor 1	Factor 2	Factor 1	Factor 2
Father is the head of family	.78	.30	.86	.44
Good relationships with relatives should be maintained	.16	.61	.24	.85
Mother's place is at home	.77	.03	.94	.03
Mother is the go-between between father & children	.74	.15	.89	.19
Parents should teach behavior to children	.12	.61	.49	.69
Father should handle money in the house	.82	.14	.90	.31
Children should take care of parents when they get old	.33	.55	.80	.49
Children should help with chores at home	−.08	.64	.04	.88
Problems are solved within the family	.18	.61	.52	.62
Children should obey parents	.35	.66	.31	.87
Family's reputation should be honored and protected	.41	.64	.61	.68
Children should respect grandparents	.09	.74	.26	.92
Mother should accept father's decisions	.76	.25	.82	.50
Father is the breadwinner	.82	.18	.91	.27

Note. Out of the 18 items in the scale, 14 are a part of the 2-factor solution.
[a]The loadings reported for the individual level structure are the ones before target rotation toward the country level solution.

the size of random error in scores. As a consequence, eigenvalues of factors and reliabilities of scales based on these factors tend to be higher for aggregated than nonaggregated scores. In addition, some of the minor discrepancies between the individual and country level are of interest. The three items that show differences (after target rotation) in absolute values of at least .30 across the two levels are "Parents should teach behavior to children," "Children should take care of parents when they get old," and "Problems are solved within the family." Each of these items shows a relatively strong loading on both factors in the country-level solution. Therefore, it seems that the two factors show somewhat less differentiation in the country-level solution. This might initially suggest (although to be tested further) that both factors measure to some extent a single underlying dimension which could be related to a focus on traditions. This "traditionality" aspect might act as a homogenizing construct (second-order factor) of family values at country level.

Emotional Distance

The individual-level analysis of the Emotional Distance scale (Georgas et al., 2001), which measures emotional distance to family members and nonkin, showed agreement of the pooled solution with the factors in all countries except Germany (Van de Vijver et al., 2006). Therefore, it was expected that the country-level analysis would also show a high level of agreement. The analysis resulted in one dimension at both individual and country levels (Table 13.2). However, a number of discrepancies appeared among the items at these two levels. The pooled individual level comprised a strong component for all items, but there was a minor loading of *spouse/date.* This difference could indicate a possible relation of the item to some other underlying construct. For the country-level solution many negative or low correlations of items were found; that is, *friends, siblings, father, grandparents, spouse/date, cousins,* and *uncles/aunts.* These differences challenged the equivalence of individual and country levels. The Tucker ϕ coefficient of .82 that we found is lower than the criterion value of 0.90 for construct equivalence. In addition, the factor loadings at the pooled

TABLE 13.2

Component Matrices for Emotional Distance of the Individual- and Country-Level Factor Analysis Solutions

Emotional distance from...	Individual level	Country level
Mother	.38	.36
Neighbors	.54	.89
Friends	.36	−.29
Siblings	.43	.27
Newspaper journalists	.49	.84
Colleagues	.57	.56
Acquaintances	.57	.54
Priest	.49	.69
Father	.38	.19
Primary school teachers	.62	.64
Prime Minister	.48	.46
Grandparents	.48	−.02
Shopkeepers	.59	.88
Writers	.44	.40
Spouse/date	.26	−.39
Fellow students	.56	.67
Members of parliament	.46	.60
Cousins	.41	−.12
High school teachers	.62	.72
Uncles/aunts	.56	.03
Newscasters	.53	.63

individual level were higher than at the country level, unlike to what we found for family values.

The main persons of interest were the members of the nuclear family (father, mother, siblings) and of the extended family (grandparents, aunts/uncles, cousins). Other persons who represent different roles in society were of minor interest. However, the initial factor structure was computed on all categories in the scale, including nonfamily members as well as all family members. It was for this reason that only the members of the nuclear and extended family were employed in the analyses of the relationships between the ecocultural variables and the family and psychological variables in the "Families across cultures" study (Georgas et al., 2006). Additionally, previous research (Georgas et al., 2001) has revealed some robust findings about emotional distance (or closeness) to relatives of the immediate family, the extended family, and nonkin members of the community. These findings suggest that there are similar patterns of emotional bonds with specific members of the nuclear family, such as mother, siblings, and father (in order of closeness) that are prevalent across countries. However, the present analyses seem to suggest that country differences in emotional distance cannot be explained in the same way as individual differences; we have to accept that the same constructs do not apply equally at both levels. A plausible reason for this would be that siblings and father are part of a different underlying construct, possibly due to specific cultural variations in the relative positions these persons hold in the nuclear family.

A final general comment is that although we specifically assumed a unifactorial structure in the analysis, the scale may not represent a unifactorial construct across countries. Further analyses of the scale, employing other methods, are required such as returning to the individual-level construct equivalence testing and searching for congruent patterns that may enhance interpretation of the factors at the country level. A possible analysis strategy to serve this aim would be to employ a "hit" matrix of all possible Tucker's ϕ coefficients among all factor solutions across countries; such an analysis has been applied with promising results to a set of family values by Georgas et al. (2004) in a comparison of 33 European countries. One might also test for possible second-order factors or multifactorial solutions or possible smaller clusters of countries for which the country-level structure might prove to be identical. Such a procedure takes advantage of the number of factor equivalence instances in a "hit" matrix computed, again, at the individual level on a country-by-country basis (Georgas & Mylonas, 2006). Through other multivariate methods (such as multidimensional scaling) this matrix may reveal clusters of countries for which cross-level structural equivalence could be studied separately (a similar method for country clustering has been proposed by Georgas & Berry, 1995).

Values

Factor analysis and multilevel comparisons were conducted for a short form of the Values scale (Schwartz, 1994). Testing all value items in a single factor analysis model would not be appropriate, because it was not our intention to represent the whole value domain of Schwartz's model. Therefore, the procedure followed was a separate component analysis of each of the six subscales. We note that the prerequisite for factor analysis to include at least 10 items in the model, as proposed by Kline (1993), was not met; still, the solutions can provide an estimate of the degree of construct equivalence. The procedure was to factor analyze the items of each subscale at the individual level and then compare each country-level factor analysis with the pooled average individual analysis. The outcomes of these analyses are shown in Table 13.3 along with the respective solutions for the two levels for the Embeddedness, Hierarchy, Harmony, Intellectual Autonomy, Affective Autonomy, and Mastery dimensions.

Tucker ϕ coefficients for all six dimensions indicated satisfactory equivalence between individual and country levels: Embeddedness .99; Hierarchy .99; Harmony .99; Intellectual Autonomy .98; Affective Autonomy .99; Mastery .97. The findings indicate that each of the subscales of the short form of the Schwartz Values scale was structurally equivalent at the individual and country level. Again, factor loadings were generally larger at country level. A social desirability effect possibly may have caused inflation of the loadings at the country level. Although this does not threaten the cross-level equivalence found, it points to potential interference of method factors, especially when values or similar constructs that have to do with *ethos*[1] are studied in multilevel analyses.

Family Roles

Family Roles for the nine family positions (father, mother, grandfather, grandmother, uncle/aunt, 20-year-old male, 20-year-old female, 10-year-old boy, 10-year-old girl) were factor analyzed separately for each position. Some roles occur for all nine family positions, some only for the adults, and some do not pertain to mother and father; for example, mother and father are not included for the item "When the parents are not home [family position specified here] babysits with grandchildren."

For mother and father, three types of family roles were distinguished, labeled *Expressive, Child Care,* and *Finances.* Examples of items are "keeps the family united," "contributes financially," and "helps children with homework," respectively. For grandfather, grandmother, uncle/aunt, 20-year-old male and female, 10-year-old boy and girl, the two factors of family roles are *Expressive* and *Instrumental.* Examples of the items which form the factors are "conveys traditions to grandchildren/nephews-nieces/siblings" and "does the shopping."

TABLE 13.3

Component Matrices for Values of the Individual- and the Country-Level Factor Analysis Solutions

Embeddedness			Hierarchy			Harmony			Intellectual autonomy			Affective autonomy			Mastery		
	I	C		I	C		I	C		I	C		I	C		I	C
Family security	.55	.82	Authority	.82	.90	World of beauty	.72	.82	Broad-minded	.63	.81	Pleasure	.79	.90	Independent	.81	.90
Respect for tradition	.69	.91	Wealth	.70	.84	Unity with nature	.83	.91	Creativity	.77	.59	Exciting life	.67	.58	Daring	.64	.36
Honoring elders	.73	.88	Social power	.82	.92	Protecting environment	.80	.89	Curious	.75	.80	Enjoying life	.79	.88	Choosing own goals	.65	.73
Social order	.63	.84															
National security	.72	.90															
Reciprocation of favors	.47	.78															

Note: I = Individual-level analysis on the pooled-within countries correlation matrix; C = Country-level analysis.

Father's Roles and Mother's Roles

For the 22 *Father's Roles* the initial factor analysis at the individual level and the structural comparisons across countries (Van de Vijver et al., 2006) resulted in three dimensions. These are also found in the present results for the individual-level analysis and are presented in Table 13.4 as I-1, I-2, and I-3; the first factor refers to the Expressive Roles of the father, the second to Child Care, and the third to Financial Roles. All three factors in the solution were found to be correlated (an oblique rotation was applied). Although the selection of the family roles was not based on a particular theory, two of the extracted factors in the factor analyses of the family roles resemble Parsons's (1943, 1949) expressive and instrumental roles, the latter being a combination of Financial and Child Care Roles. They also resemble Durkheim's (1888, 1892/1921) description of the last two stages of family change, in which the paternal family is reduced to the conjugal or nuclear family and in which the relationships between parents and children change from a material or economic basis to a psychological basis in which "personal motives" are dominant. The two factors are also similar to Kagitcibasi's (1990, 1996) emotional interdependencies and material/economic interdependencies roles.

The same factors were found at the individual level of analysis for Mother's Roles, although the order of the factors was different, with Expressive Roles still the first factor (I-1), Financial Roles the second factor (I-2), and Child Care the third factor (I-3). Each of the three factors at the individual level showed the same patterning of high and low loadings as found in the analysis of Father's Roles, with one remarkable exception (see Table 13.4). The item dealing with housework had a loading of .68 on the second individual-level factor in the analysis of the roles of the father, but the loading was only .21 in the analysis of the roles of the mother (first factor). The mean of the mothers across all 5,482 participants was 5.47 (SD = .99) on a 7-point scale, compared to a mean of 2.61 (SD = 1.49) for the fathers. It is very clear that mothers do most of the housework in all countries studied. The three factors showed agreement indices between father and mother of .98, .97, and .87, respectively. The somewhat lower ϕ value of the third factor can be explained by the differential loadings of the item about housework in the two individual-level analyses or as a consequence of the limited variability of the scores of the mothers.

Country-level factor solutions were also computed for Father's Roles and Mother's Roles. Loadings for both solutions are reported in Table 13.4. An inspection of the first factor for Father's Roles reveals "Protective and regulatory" roles a father might undertake within a family. The second resembles the individual-level "Child care" factor, but covers also financial support and conveyance of tradition to children along with more general managing of finances. The third factor reflects father's role in contributing financially along with emotional support and protection of the emotional

TABLE 13.4

Rotated Component Matrices for Father's Roles and for Mother's Roles in the Family of the Individual- and Country-Level Factor Analysis Solutions[a]

	Father						Mother					
Father / Mother ...	I-1	I-2	I-3	C-1	C-2	C-3	I-1	I-2	I-3	C-1	C-2	C-3
Provides emotional support to children	.74	.15	−.04	.06	.15	.81	.68	−.01	−.06	.90	.11	−.11
Provides emotional support to grandparents	.76	−.07	−.18	.23	−.24	.79	.58	.01	.09	.67	.07	−.32
Provides emotional support to wife	.74	.06	−.03	−.09	.17	.89	.66	−.05	.02	.83	−.01	−.02
Keeps the family united	.77	−.06	.15	.41	.06	.67	.79	.04	.07	.92	−.21	.08
Keeps a pleasant environment	.76	.04	.07	.45	.13	.54	.76	.01	.00	.89	−.18	.09
Conveys traditions to children	.56	.28	−.04	.49	.48	.08	.46	−.15	−.38	.74	.45	−.25
Conveys religion to children	.54	.01	.12	.66	.19	.29	.58	−.25	−.13	.80	−.33	.03
Preserves family relations	.70	.01	.11	.54	.06	.51	.68	−.09	−.14	.90	−.12	−.06
Supports grandparents	.59	−.13	.16	.28	−.12	.72	.58	.15	.07	.73	.09	−.06
Takes care of grandparents	.45	.06	−.02	.71	−.33	.25	.43	−.02	.00	.44	−.66	.17
Protects the family	.59	−.14	.35	.43	−.08	.65	.61	.24	.14	.44	−.64	.35
Resolves disputes	.33	−.08	.44	.60	.27	.31	.36	.26	−.05	.62	−.09	.21
Does housework	−.02	.68	−.15	−.92	.05	.13	.21	.11	−.13	.15	.00	.54
Does the shopping	−.07	.21	.60	.56	.14	.12	−.17	.66	−.13	−.46	.48	.55
Takes children to school	−.01	.54	.31	.32	.65	.06	−.23	.14	−.78	−.08	.80	.31
Plays with children	.31	.56	.09	−.09	.81	−.08	.18	.04	−.67	.45	.63	.12
Helps children with homework	.14	.62	.20	−.11	.88	.01	.11	.03	−.72	.46	.57	.17
Teaches manners to children	.43	.12	.39	.35	.54	.31	.53	.06	−.27	.90	.10	.14
Contributes financially	.09	−.13	.68	−.40	.21	.88	.02	.68	−.01	.03	.45	.67
Manages finances	−.04	−.05	.81	.55	.45	.07	.04	.76	.06	−.26	−.08	.89
Gives pocket money to children	.05	.08	.68	.43	.43	.23	.14	.56	−.09	.04	−.01	.73
Supports career of children	.16	.09	.59	.00	.79	.21	.32	.36	−.16	.59	.41	.22

Note: I = Individual-level analysis on the pooled-within countries correlation matrix (three-factor solution); C = Country-level analysis (three-factor solution).

[a]Pattern matrices are reported (oblique rotation solutions). The loadings reported for the individual-level structure are the ones before target rotation toward the country-level solution.

climate within the family. This third factor was named "Expressive/earner roles." At face value, there is clear evidence of nonequivalence across the two levels of analysis; when we rotated the loadings of the pooled individual-level solution toward the country-level solution using Procrustean rotation methods (Van de Vijver & Leung, 1997), the Tucker φ coefficients reached values of .64, .86 and .82 for the "Protective-regulatory roles," the "Child care" and the financial-supportive "Expressive/earner roles" factor, respectively. The main discrepancy in the structures was found for the "Protective and regulatory roles" factor for which congruence with the country-level factor was very low (.64). The inequivalence was caused mainly by the items on emotionally driven "protection" namely *father takes care of grandparents,...conveys tradition to children,...conveys religion to children,* and...*takes children to school* (with a mean absolute difference between individual-level and country-level solution of .52). Both factors, at individual as well as country level, seem to involve financial and emotional roles of the father in the family. This confounding might also reflect the need for an oblique rotation of the factor, rather than an orthogonal solution. The main conclusion for these findings is that although at the individual level of analysis differences can be examined under the three factors resembling Parsonian theory, a description of country differences requires some alternative formulation of constructs that can accommodate the shifts in meaning as observed for the three factors identified in father's roles.

For Mother's Roles, the first factor at the country level is the "Expressive roles" factor and it closely resembles the corresponding individual-level factor. The second factor, in addition to the child care items forming the individual-level "Child care" factor, also involves financial aspects, such as financial support of children's career and general financial contribution. It could be named "Caregiver/financial contribution" to describe more closely the specific loading of mother's roles on the factor. The third factor seems to depict mother's "Regulatory roles," including shopping and housekeeping along with financial contribution and managing finances and pocket-money for children. Like in the case of Father's Roles, for two out of the three factors, factor equivalence between the two levels of analysis was not perfect. The Tucker φ coefficient for the individual-level Expressive factor reached .98, but for the Child Care factor it was just .79, and for the Financial Role factor a borderline value of .88 was found.

Although equivalence levels were generally higher than for Father's roles, the agreement was not perfect. Therefore, we decided to search for the items responsible for the discrepancies in the factor structures of the two levels of analysis. Although we had applied Procrustean rotation of the mother's roles individual-level loadings to the country level loadings, we still could not attribute inequivalence to shifts in loadings of single items. Therefore, another index for each item was computed, namely a

measure of item discrepancy calculated as the square root of the mean squared difference of the target-rotated loadings with the country-level loadings. The index measures the overall fit of the item by combining discrepancies in loadings across all items of a factor. The highest values were found for the Caregiver/financial contribution factor that appeared second in the country level solution. Some of the items with high discrepancy indices were *mother does housework...does the shopping,...contributes financially,...takes care of grandparents*, and...*supports career of children*, along with *emotional support* to both children and grandparents. By comparing the country-level factor of Caregiver/financial contribution to the individual-level loadings on the target-rotated factors, a shift in the meaning of mother's roles became more apparent. Specifically, the country-level factor emphasized the "between-generations" role of mothers, taking care of and supporting the elderly, as well as supporting children in their career, conveying religion to them, and generally protecting the family also by contributing financially. Most of these items appeared in the first target-rotated factor for the individual-level loadings as well, but there the emphasis was mainly on the emotional aspect translated into emotional support to children, husband, and the elderly, and into protecting the family by preserving relations, keeping the environment pleasant, and the family united.

In summary, the same sets of three factors can be used to describe the role of the father and the mother in all 27 countries when the individual level of analysis is of interest. However, discrepancies, especially for Father's Roles, do not allow for using the same constructs for explanation at the country level. This discrepancy was mainly due to the father's Protective and regulatory roles, the mother's Caregiver/financial contribution roles, and for both father and mother the possible interaction of financial and protective roles. This interaction is not entirely absent from the individual-level factor solution but it surfaces more clearly in the country-level structures. A possible explanation might be that financial issues and functions are understood, utilized, and interconnected in a different way within each country's aggregate scores than they do at the individual level of nonaggregated scores. Financial issues such as wealth, money management, unemployment, profit and saving, are possibly conceived in a different way across countries, being a function of the prevailing economic conditions (Furnham, 1988), a difference which does not always appear in traditional cross-cultural comparisons (Furnham & Lewis, 1986) at the individual factor analysis level.

Grandparents and Uncles/Aunts

Factor analyses conducted at the individual and then at the country level for the roles of the Grandfather, the Grandmother, and Uncles/Aunts gener-

ally revealed a two-factorial structure differentiating between Expressive and Instrumental Roles. Procedures similar to those used for analyzing Father's and Mother's Roles were employed for Grandfathers, Grandmothers, and Uncles/Aunts roles in the family. The roles analyzed are the same as for father and mother, except that in the case of grandparents the role functions are directed toward grandchildren and their parents, and in the case of uncles and aunts toward nephews/nieces and their parents. Excellent cross-level structural equivalence was found for these positions in the family (Table 13.5). The respective factors for grandfathers (at both individual and country levels) were an "Expressive functions" first factor and an "Everyday help" second factor (clearly following the instrumental dimension). Tucker φ coefficients (after target rotation of the individual level loadings) for these two factors reached .96 and .94, respectively. For Grandmother's Roles, factors were the same and also nearly identical in meaning. Tucker φ coefficients for these two factors reached .95 and .94, respectively. Finally, for the Uncles' and Aunts' Roles, the factors were again the same, but they appeared in reversed order. Tucke φ r coefficients for these two factors reached .90 and .95, respectively.

An interesting note is that in the individual-level of analysis for grandfather's and uncles/aunts roles, "taking care of the grandchildren/nephews" and "playing with grandchildren/nephews" items showed loadings of about the same size on both factors, but this is not the case for the country-level solutions. This difference may imply a possible minor shift in the factor meanings for the grandfather and uncles/aunts family positions. For grandfathers, the "playing with grandchildren" and "taking care of grandchildren" items remain at the country-level structure in the "Expressive functions" factor only and do not load on the "everyday help" factor. The same holds for uncles and aunts, but only for the "playing with nephews/nieces" item which still shows up as an expressive behavior of uncles/aunts at the country level; the "taking care of nephews/nieces" item loads at the country level only on the "Everyday help" factor. It might be argued that the respondents at the individual level of analysis sense the multiple utility of these roles and register it in their scores but when it comes to the country level, the aggregated scores feature the strongest related construct (mostly "Expressive functions"). On the other hand, for grandmother's roles, both items load on both factors at the country level as well as at the individual level, splitting the two ways in which grandmothers are functioning within the family. In this case, the multiple utility of these two roles remains active at the country level as well, possibly because grandmothers' qualities of practical and at the same time emotional help within the family as caregivers and affectionate partners in play have remained strong traits over the centuries. Still, this minor shift in meaning did not threaten cross-level equivalence for any of the three family positions.

TABLE 13.5

Rotated Component Matrices for Grandfather's Roles, for Grandmother's Roles, and for Uncle's–Aunt's Roles in the Family of the Individual- and the Country-Level Factor Analysis Solutions[a]

Grandfather/Grandmother/ Uncle-Aunt...	Grandfather				Grandmother				Uncle–Aunt			
	I-1	I-2	C-1	C-2	I-1	I-2	C-1	C-2	I-1	I-2	C-1	C-2
Provides emotional support to grandchildren	.73	.01	.89	.01	.75	−.02	.87	.00	.00	−.74	.12	.84
Provides emotional support to parents	.76	−.06	.86	−.02	.74	−.05	.83	−.01	−.12	−.78	−.22	1.02
Keeps the family united	.84	−.06	.92	−.34	.82	−.07	.87	−.32	−.01	−.79	.24	.65
Keeps a pleasant environment	.83	−.02	.90	−.07	.81	−.02	.84	−.03	−.04	−.84	.08	.87
Conveys traditions to grandchildren	.78	−.04	.90	.00	.76	−.01	.86	.20	.01	−.72	.22	.79
Conveys religion to grandchildren	.74	−.08	.92	−.27	.73	−.12	.85	−.09	.08	−.62	.42	.52
Preserves family relations	.80	−.02	.91	−.15	.78	−.03	.81	.03	.00	−.78	−.07	.91
Supports grandchildren	.64	.14	.55	.24	.62	.16	.40	.35	.09	−.69	−.12	.88
Takes care of grandchildren	.30	.43	.55	.26	.36	.39	.42	.39	.44	−.31	.74	.08
Protects the family	.59	.26	.81	.01	.57	.23	.67	−.10	.33	−.49	.43	.52
Resolves disputes	.42	.34	.86	−.07	.39	.33	.81	−.05	.57	−.15	.83	.07
Does housework	−.11	.61	−.32	.72	.07	.57	−.16	.76	.60	−.04	.13	.43
Does the shopping	−.07	.69	−.12	.69	−.13	.69	−.54	.60	.65	.02	−.04	.23
Takes grandchildren to school	−.08	.73	.16	.75	−.13	.71	−.27	.78	.75	.12	.94	−.08
Plays with grandchildren	.43	.35	.52	.21	.39	.38	.40	.45	.40	−.35	.18	.64
Helps grandchildren with homework	.03	.68	.35	.72	.02	.66	.17	.82	.72	−.02	.92	.04
Teaches manners to grandchildren	.67	.15	.90	−.19	.68	.11	.89	−.03	.34	−.48	.53	.53
Contributes financially	.03	.74	.29	.82	.00	.72	.01	.87	.80	.07	.87	.03
Manages finances	−.03	.73	.50	.47	−.04	.70	.33	.51	.83	.16	.81	.02
Gives pocket money to grandchildren	.13	.60	−.14	.76	.12	.61	−.28	.73	.64	−.08	.55	−.02
Supports career of grandchildren	.28	.49	.42	.29	.28	.46	.26	.23	.54	−.20	.54	.22
Babysits grandchildren	.30	.47	.69	.34	.36	.39	.55	.46	.54	−.20	.79	.14
Helps parents with their work	.14	.57	.61	.50	.09	.59	.35	.69	.64	−.03	.93	−.20

Note: I = Individual-level analysis on the pooled-within countries correlation matrix (2 factor solution); C = Country-level analysis (2 factor solution). For Uncles and Aunts, grandchildren is replaced by nephews/nieces in the respective items

[a]Pattern matrices are reported (oblique rotation solutions). The loadings reported for the individual-level structure are the ones before target rotation toward the country-level solution.

Siblings

Factor analyses of the roles of the siblings at the individual level (son of 10, daughter of 10, son of 20, and daughter of 20 years of age) also found the same two-factorial structure. For these analyses, data were available for 14 roles describing the nature of the relationships with grandparents and parents and also with siblings. The first factor (Table 13.6) for all positions of the pooled individual-level solutions clearly refers to "Emotional climate." The same factor is replicated at the country level in all cases (Tucker ϕ indices after target rotation of the individual-level loadings reached .98, .97, .92, and .96, for 10-year-old sons, 10-year-old daughters, 20-year-old sons, and 20-year-old daughters, respectively).

The second factor also appears to be the same in all four individual-level analyses and refers to housework, shopping, taking siblings to school, playing with siblings, baby-sitting siblings, helping parents with their work, and contributing financially. These activities form a list of obligations offspring up to 20 years of age should meet. When analyzed at the country level though, the factor is different for 10-year-old sons and daughters (after target rotation of the individual-level loadings, Tucker ϕ = .76). The country-level factor mainly focuses on children's cooperation with parents in attending to their siblings. This holds for both the 10-year-old son and the 10-year-old daughter (Tucker ϕ = .78). When it comes to 20-year-old offspring, the pattern still changes for the country-level solutions (Tucker ϕ = .74), but there is a gender difference. The role of the 20-year-old daughter still involves sibling attendance and cooperation with parents, but it also involves housekeeping and financial contribution. On the other hand, the 20-year-old son's role involves tradition conveyance to siblings and playing with them, and it also involves housework. Tucker ϕ for this second factor in the country-level structure reached a value of only .12. A close look showed that this second factor for the 20-year-old son is bipolar, with negative loadings for financial contribution and shopping items. The target-rotated loadings of the corresponding individual-level factor also form a bipolar factor; shopping, financial contribution, babysitting, and taking siblings to school have positive signs, whereas keeping the family united, keeping a pleasant environment, and supporting grandparents emotionally have negative signs. A large part of the cross-level inequivalence might be due to this bipolarity in the dimensions, especially since many positively signed items at the individual level have negative signs at the country level and vice versa.

Overall, for all four family positions, it was evident that no single item was causing inequivalence (due to possible method or item bias), but that a number of items were contributing to the discrepancies between the two levels. For the 10-year-old offspring these items were the same for both sons and daughters. Specifically, contributing financially, conveying traditions, playing with siblings, and doing the shopping seem to differ-

TABLE 13.6

Rotated Component Matrices for Offspring's Roles (10-year-olds and 20-year-olds) of the Individual- and Country-Level Factor Analysis Solutions[a]

	10-year-old son				10-year-old daughter				20-year-old son				20-year-daughter			
He/she...	**I-1**	I-2	**C-1**	C-2	I-1	I-2	C-1	C-2	**I-1**	**I-2**	**C-1**	**C-2**	I-1	I-2	C-1	C-2
Provides emotional support to grandparents	.69	−.13	.69	.18	.69	−.12	.71	.12	.66	−.11	.69	−.14	.62	−.07	.82	−.11
Provides emotional support to siblings	.74	−.08	.78	.07	.74	−.08	.80	.04	.70	−.02	.69	.23	.70	−.04	.77	.08
Keeps the family united	.79	−.08	.86	.01	.79	−.08	.87	.00	.82	−.08	.81	−.13	.80	−.09	.89	−.17
Keeps a pleasant environment	.79	−.07	.89	−.03	.79	−.07	.89	.01	.79	−.02	.85	−.25	.79	−.04	.95	−.18
Conveys traditions to siblings	.60	.15	.58	−.59	.61	.12	.55	−.54	.58	.14	.34	.58	.59	.12	.43	.17
Conveys religion to siblings	.54	.22	.63	.08	.55	.19	.61	.15	.53	.19	.87	−.15	.61	.10	.79	.19
Preserves family relations	.66	.10	.72	−.01	.65	.10	.74	−.06	.66	.09	.83	−.22	.71	.02	.92	−.22
Does housework	.12	.57	.04	.31	.18	.57	.14	.61	.06	.42	−.19	.75	.29	.44	.63	.42
Does the shopping	.03	.61	.17	.25	.04	.60	.25	.05	−.04	.63	.03	−.49	−.09	.61	−.36	−.28
Takes siblings to school	.00	.62	.01	.80	.01	.61	.10	.67	−.01	.70	.76	.33	.06	.65	.26	.78
Plays with siblings	.30	.12	.05	.55	.31	.11	.06	.56	.27	.38	.59	.55	.36	.28	.52	.48
Contributes financially	−.10	.64	.18	.26	−.10	.61	.13	.30	−.08	.65	.46	−.53	−.10	.68	−.16	.40
Babysits siblings	.04	.66	.03	.83	.04	.67	.04	.84	.12	.59	.71	.35	.26	.47	.81	.17
Helps parents with their work	−.01	.68	−.08	.74	−.02	.68	−.13	.75	−.03	.70	.68	.04	.00	.70	.19	.74

Note: I = Individual-level analysis on the pooled-within countries correlation matrix (2 factor solution); C = Country-level analysis (2 factor solution).
[a]Pattern matrices are reported (oblique rotation solutions). The loadings reported for the individual-level structure are the ones before target rotation toward the country-level solution.

entiate the structure of the two levels in the analysis. For the 20-year-old daughter just two items are creating discrepancies, namely "babysits siblings" and "does the shopping," but for the 20-year-old son, nine out of the 14 items in the scale showed high root mean squared difference indices resulting in the very low levels of cross-level equivalence. These items are (starting with the item with the highest discrepancy index) "contributes financially," "does the shopping," "conveys traditions to siblings," "helps parents with their work," "does housework," "takes siblings to school," "provides emotional support to siblings," "babysits siblings," and "plays with siblings."

Personality Traits

Five factor analyses were carried out separately, one for each of the five personality dimensions of the Williams et al.scale (1998). Each personality dimension was measured by six items (three positively keyed, three negatively keyed). The results (Table 13.7) indicate a high level of structural equivalence across the two levels of analysis for three scales. Tucker ϕ coefficients reached values of .97 for Agreeableness, .98 for Conscientiousness, and .97 for Openness. However, for the Extraversion and the Emotional Stability personality traits, congruence coefficients were lower (.87 and .89, respectively). A similar comparison of the five dimensions of personality was reported by Rossier, Dahourou, and McCrae (2005). They found fairly acceptable levels of cross-level equivalence for most dimensions comparing factors derived from Swiss and Burkinabé data, and from French, American, Zimbabwean, and South African data. However, for the Extraversion dimension, some of the comparisons did not reach congruence levels of .90 and the same was true to a larger extent for the Openness factor. Other smaller discrepancies were present for Agreeableness and Conscientiousness but not for Neuroticism. In the present multilevel analysis (short questionnaire forms and unifactorial structure testing) the levels of factor equivalence reached are similar.

The multilevel inequivalence found in the present analysis for the Extraversion dimension seems to be mainly produced by one item ("quiet") which has a close to zero loading for the country-level solution. Thus, at the country level "quiet" does not seem to correlate with the other five facets of this dimension, although it does so in the pooled individual-level solution. A common reason for such a finding is small item variance, which seems to be illustrated here in the case of "quiet" at the aggregated country level (the variance was only .29). The small variance resulted in low correlations of this item with the other five (outgoing, sociable, active, withdrawn, and shy) in the Extraversion scale. The substantive interpretation of this finding is that at country-level, "quiet" may be a less pronounced and more positively evaluated expression of introversion than "withdrawn" and "shy."

TABLE 13.7

Component Matrices for the Five Personality Traits of the Individual- and Country-Level Factor Analysis Solutions

Agreeableness			Conscientiousness			Extraversion			Emotional stability			Openness		
	I	C		I	C		I	C		I	C		I	C
Understanding	.66	.89	Organized	.71	.89	Outgoing	.61	.36	Stable	.60	.88	Imaginative	.66	.81
Sympathetic	.61	.89	Reliable	.53	.75	Sociable	.69	.83	Optimistic	.57	.88	Adventurous	.70	.72
Considerate	.63	.91	Responsible	.68	.82	Active	.58	.89	Calm	.49	.73	Spontaneous	.66	.62
(Quarrelsome)	.41	.17	(Careless)	.64	.82	(Withdrawn)	.60	.78	(Moody)	.48	.36	(Rigid)	.09	.38
(Deceitful)	.53	.40	(Lazy)	.66	.81	(Shy)	.65	.57	(Irritable)	.63	.42	(Inhibited)	.30	.34
(Rude)	.64	.83	(Disorderly)	.66	.39	(Quiet)	.61	-.03	(Anxious)	.60	.16	(Conservative)	.29	.36

Note: I = Individual-level analysis on the pooled-within countries correlation matrix; C = Country-level analysis. For parenthesized items, the scores were reversed for the analysis

Although factorial agreement for the Agreeableness dimension is very high, "quarrelsome" has a much higher loading at individual level than at country level. It might be the case that "quarrelsome" is not as negatively evaluated at the country level as the items "rude" and "deceitful." The latter two items contain a moral aspect; this is not the case for "quarrelsome" which can be related to mood or temperament. Emotional Stability showed a borderline value of cross-level equivalence, which is also mainly due to a single item, namely "anxious." Again, "anxious" may be a less negatively evaluated expression of emotional instability at the country level than "moody" and "irritable," thus making it a less adequate indicator of the Emotional Stability dimension at country level.

Comparing individual-level and country-level loadings, another finding is that for half of the items, the loadings are higher at the country-level solution than at the individual-level solution, and for the other half of the items the opposite is found. This difference could be a product of low country means along with low variability at the country level. Such a state of affairs can be consequence of social desirability and aggregation of scores. The Emotional Stability dimension shows a difference between the individual- and culture-level factors in that the loadings of the positively formulated country-level items, which represent the desirable end of the continuum, have on average higher loadings than the negatively formulated items. Thus, the two ends of a continuum reflecting a bipolar factor may be accentuated at the country level due to social desirability. This was also the case in respect of the differences found for the first father's roles factor mentioned earlier.

Self-Construal

The 18 items are given in Table 13.8 in an abbreviated form. In two separate analyses (one for the Independent and one for the Interdependent Self), we computed the unifactorial solutions for each level (individual and country levels) as described before. The individual-level equivalence analyses for the Self-Construal scale, reported by Van de Vijver et al. (2006), provided strong evidence for the poor replicability of the factors across the 27 countries. The first factor "Independent Self" was not found in many countries. The current analysis, addressing the cross-level equivalence, also revealed unsatisfactory results. The Tucker ϕ coefficient of the independence factor reached a value of only .85. The lack of cross-level equivalence is probably a by-product of the lack of equivalence at the individual level.

One item is again behind the structural inequivalence, namely the item "I try to do what is best for me, regardless of how that might affect others" ("do the best for me" in Table 13.8). What is most striking is the inversion of the item's loading in the country-level solution. For the aggregate scores we would generally encounter low variances and this might affect com-

TABLE 13.8

Component Matrices for the Independent and Interdependent Self-Construal Dimensions for the Individual- and the Country-Level Factor Analysis Solutions

Independent self			Interdependent self		
	I	C		I	C
Enjoy being unique	.52	.79	Respect modest people	.58	.85
Act as independent person	.52	.80	Sacrifice self interest	.59	.75
Direct and forthright	.55	.73	Cooperate	.67	.89
Comfortable when praised	.45	.59	Relationships are important	.48	.67
Speaking up not a problem	.51	.37	Happiness depends on others	.57	.86
Act the same way	.56	.23	Stay in the group	.46	.34
Do the best for me	.23	−.55	Respect group decisions	.73	.91
Take care of myself	.51	.84	Maintain harmony	.75	.91
Act the same way	.53	.61	Go along with others	.36	.24

Note: I = Individual-level analysis on the pooled-within countries correlation matrix; C = Country-level analysis.

munalities for this factor. A methodological explanation of the cross-level inequivalence might be the social desirability of the various items. The specific item ("do the best for me") shows a negative loading at the country level and is the only one with this characteristic. Perhaps the behavior expressed is undesirable because it goes against the interest of others whereas all other items emphasize the expression of independence without harming others. This difference in valence of the item may have triggered social desirability effects for the other items in the Independent self dimension. Georgas et al. (2006) have pointed out that for this set of data "It is a recurrent theme in our findings that interpersonal aspects...behave more in line with expectations than intrapersonal aspects" (pp. 213–214). This is once again the case in the present analysis, with the Interdependent Self dimension being structurally equivalent at both individual and country levels (Tucker ϕ reached a value of .96).

A similar approach to the cross-level equivalence of independent and interdependent self was adopted by Van de Vijver and Watkins (2006). Using a different assessment method, the Adult Sources of Self-Esteem Inventory (Fleming & Elovson, 1988), the authors found very high levels of multilevel equivalence. In addition to this, they found imperfect equivalence in the structural equivalence at the individual level; the two factors were not retrieved in all 19 countries. They pointed out the need for assessing the degree of individual-level and country-level factor structures for other measures of self-construal. An interesting point is that Van de Vijver and Watkins found the independence factor to be made up of

several skills that are desirable. Even the social and interpersonal skills load on the independence factor at the country level, such as the skill to convince others of one's ideas. The same notion of desirable skills could underlie the independence factor of the present study. Thus, in the present analysis we can support cross-level structural equivalence for the interdependent self, but not for the independent self dimension, being unable to support the etic character of this self-construal dimension.

CONCLUSION

It is clear that the overall research project had many more aims beyond testing for multilevel structural equivalence for the family functions and characteristics studied. Additionally, the present analyses did not address metric or full-score equivalence but remained limited to structural equivalence. As stated earlier in the Method section, other statistical models such as confirmatory factor analysis models or hierarchical linear models would be necessary to test for metric equivalence across the individual and country levels. Still, the question of structural equivalence is of extreme importance when one wants to ensure that the same concepts can be used to describe individual- and country-level constructs related to family functioning. The outcomes of a study are easier to interpret, if identity of the meanings found for the individual level (in a comparison of the factors found in all countries of the study) has been demonstrated for the country level as well. An important prerequisite for addressing this question is a sufficiently large number of samples so that an analysis at country level is warranted. In the case of the present analyses, the large number of countries involved in the study was helpful for the testing of equivalence.

The first series of analyses supports cross-level invariance for the Family Values scale. It seems that the two underlying factors, Hierarchical roles and Relationships within the family, have a strong etic character. For the six values dimensions as measured by the short version of the Schwartz Value scale (for each of which we specified a unifactorial structure), a strong etic character was also supported. Structural equivalence across levels was partly supported for Emotional distance, possibly indicating a nonunifactorial structure. Family roles were also partly shown to be equivalent in meaning at the two levels with grandfather's, grandmother's, uncles/aunts' and the Expressive role of mother being clearly equivalent at both levels. The "Emotional climate" factor for the offspring's roles also reached multilevel factor equivalence. For personality traits structural equivalence across levels was supported to a large extent, with small discrepancies. Equivalence was present for only one of the two dimen-

sions in self-construal; the interdependent self appeared to have the same meaning in both individual and country levels.

Overall, it seems that values are quite clearly "transcending" the individual level and form a feature of cultures. Of course, a next question would refer to the nature of this link between the two levels; for example, might similarities in culture structures produce the construct identities at the individual level? For Emotional distance we cannot draw conclusions with such certainty on their "projection" across levels, although we can be more optimistic of cross-level equivalence when only family members will take part in the analysis (Georgas et al., 2006, reported individual-level equivalence when only family members were considered). We found support for the cross-level equivalence in factor meaning for the Expressive roles of the mother (although the factor structure was not completely identical for both factors) and the Emotional and Instrumental family roles of the "extended" family members. This equivalence may be related to the function of the modified version of the extended family observed in many contemporary cultures. In this scheme immediate proximity has been abandoned; that is, the nuclear family is no longer living in the same house with grandparents, grandmothers, uncles, aunts, and uncles/aunts, but the functional relationships of these members within the main core of the nuclear family is being maintained. The strong multilevel equivalence found possibly emphasizes the vitality of the mother's, grandparents', and uncles/aunts' roles in the family, even though living arrangements have changed over time.

A second conclusion refers to factors which, although highly equivalent at the individual level, did not reach the desired degree of equivalence when tested at the level of countries. This refers to father's family roles, two of the dimensions for mother's family roles, the second factor for offspring's family roles, and the emotional distance scale when ratings for nonfamily members are included. Starting with the last one, it is rather obvious in retrospect that equivalence for emotional distance was hindered by the fact that the analysis assumed a unifactorial structure. Recalculation of the factor structure, keeping only the family members in the model and individual-level analysis is needed before more extensive multilevel analysis can be conducted. Such an attempt would also test for another alternative but relevant explanation of the inequivalence observed, namely that low scores for nonfamily members may lead to overrepresentation of small differences.

Initially, we could not think of any apparent reason for the discrepancies (sometimes large) in some family roles. Additionally, the near-perfect equivalence found for members of the "extended" family, computed with the same items for all the different family positions, emphasizes the discrepancies that were found between individual- and culture-level analyses for father's and mother's roles. However, by exploring each item's "contribution" to the inequivalence, we found that even at the individual

level of analysis, the two factors for father's and mother's roles involve both financial and emotional roles. This "interaction" is more apparent at the country-level structure and is possibly leading to inequivalence, especially if we accept that financial issues may be perceived in different ways across cultures. In addition to this, social desirability effects may also alter the items' behavior at the country level, and one might also argue that the current results should be replicated by using more samples from the same or even more countries. Cross-level deviances might be more easily attributed to structure inequivalence if the possibility of method factors can be eliminated.

Our findings, as presented in this chapter, may further guide researchers in selecting appropriate family-related variables in order to form and subsequently test specific hypotheses. Our own further aim in using the data set of the 27 countries is to reexamine equivalence and factor structures, but based on a pairwise comparison of countries. We expect to find in the 27 countries clusters of more homogeneous countries, which should be less prone to aggregation fallacies. It is to be expected that within-clusters tests for equivalence between individual-level and country-level factor structures should show fewer discrepancies than tests based on the entire set of countries. However, it is also possible that discrepancies persist in a homogeneous subset of countries, in which case there is all the more reason to look for variables that can explain these discrepancies.

With the present analyses of the "Families across cultures" data, multilevel analysis has been demonstrated to be a powerful and very useful technique in studying family variables and their correlates. Although structural equivalence was not always supported, it appeared that even small shifts in meaning can be detected, given the method's sensitivity. It takes strong, well-established constructs, firm theorizing and proper sampling and assessment techniques to be able to assume a priori that data meet acceptable levels of multilevel equivalence. The method is stringent but fair with the data; moreover, the method is necessary not only when addressing family issues cross-culturally but in any cross-cultural study that attempts a comparative description of countries. Caution should be exercised though, since this statistical method's fairness is also a function of the researcher's control of method factors and statistical artifacts, which may inflate error and, consequently, lead to inequivalence.

Note

1. The approximate meaning of the Greek word *ethos* ("ήθος"/ˋiθos/) is "moral standards." *Ethos*, also in its Greek sense, does not only refer to values but beyond that represents all "must-demands" one accepts or defies through one's everyday behavior. "Right" or "wrong" is then translated into norms

that should guide human behavior (Bechtel, 1988). Greek dictionaries define "ήθος" as the entirety of human psychological traits. In this sense, *ethos* is the mirror of the characteristics of a society or "community."

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