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Are Individual-Level and Country-Level Value Structures Different? Testing Hofstede's Legacy With the Schwartz Value Survey

Ronald Fischer,[1] C.-Melanie Vauclair,[1] Johnny R. J. Fontaine,[2] and Shalom H. Schwartz[3]

Abstract

Hofstede identified four value dimensions at the country level but did not find matching dimensions at the individual level. Schwartz discriminated different sets of value constructs at individual and country-levels, based on separate analyses per level. In this article, the authors directly examine the degree of similarity or isomorphism between the structure of values in individual- and country-level analyses, using multidimensional scaling followed by generalized Procrustes analysis. Using data from the Schwartz Value Survey from 53 and 66 countries, the authors find substantial similarity in structure across levels, but indices fall somewhat short of structural isomorphism. The authors then test hypotheses regarding possible causes of the less than perfect isomorphism between the levels. Number of countries (sample size at country level) and structural shifts in individual items account for some of the lack of isomorphism. Implications for future cross-cultural research are discussed.

Keywords

values, isomorphism, multi-level, sampling, Hofstede, Schwartz

One of the challenges for cross-cultural psychology is to identify structures of psychological constructs at the individual and country level. In 1980, Hofstede published his well-known four-dimensional model of cultural values that was derived from individual scores aggregated at the country level. The identification of psychological dimensions of cultural variability opened exciting possibilities for "unpackaging of culture" (e.g., Bond & Van de Vijver, in press; Fischer, 2009; Singelis, Bond, Sharkey, & Lai, 1999; Smith & Bond, 1998). The availability of a map of cultures greatly facilitated cross-cultural research.

Hofstede was explicit that his dimensions apply only to countries, not to individuals; the factors that he found did not replicate at the individual level. This is possible because individual- and

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country-level structures are based on statistically independent information (Dansereau, Alutto, & Yammarino, 1984). Nonetheless, this finding remains puzzling if we think of values as psychological attributes of individuals as well as of the populations to which individuals belong. From a practical perspective, Hofstede's claim means that his country-level dimensions cannot be applied to individuals and cannot be used for interindividual comparisons.

In a seminal study at the individual level, Schwartz (1992) found a near-universal structure of human values with 10 value types. Subsequently, Schwartz (1994, 2004, in press) postulated that the value constructs appropriate for comparing the cultures of societies differ from those appropriate for comparing individuals. Based on theorizing about societies, he proposed a set of 7 cultural value constructs and a structure of relations between them. An analysis at the societal level, based on sample means obtained by aggregating the individual scores within each society, showed support for these 7 cultural value constructs (Schwartz, 2004, 2006). The empirical structure of value items in this country-level analysis overlapped considerably with the individual-level structure, but the match was far from perfect.

The primary aim of the current research is to address the question of construct isomorphism between psychological dimensions of values at the country level and individual level with methods that allow direct comparisons of dimensional structures across these two levels. This question is addressed using multilevel analysis with the Schwartz Value Survey (SVS). A second objective is to identify sources of the observed lack of isomorphism in value structures.

Two kinds of relationships between levels can be distinguished, isomorphic and nonisomorphic relationships (Van de Vijver, Van Hemert, & Poortinga, 2008). Isomorphism in the broadest sense can be defined as similarity or one-to-one correspondence between a set of elements (Bliese, Chan, and Ployhart, 2007). Here we take a narrower definition by postulating that variables at two levels show an "isomorphic" relationship if there is a monotonic (typically linear) function describing the relationship between them. Isomorphism points to structural identity at the different levels; that is, differences between individuals and differences between countries on psychological values can be explained in terms of the same concepts or dimensions. In other words, the psychological nature of human individuals determines the structure of conflicts and compatibilities among values. Aspects of societies can have an indirect impact on these individual-level factors, but these country-level factors do not influence the value structure.

Van de Vijver et al. (2008) call the second kind of relationship, with any nonmonotonic relationship between the two levels, "nonisomorphic." This means that structures at individual and country level are different (nonisomorph). This would arise if the individual-level value structure is primarily determined by individual-level variables (human nature, requirements of interaction, etc.) and the country-level value structure is primarily determined by factors that apply at the country level (institutional characteristics, economic system, etc.). If variables at each level have no impact on the value structure at the other level, the compatibilities and conflicts among values at the two levels would be completely different.

Nonisomorphism in this terminology does not mean total absence of any structural similarity between levels. The degree of structural similarity may span a continuum from complete nonisomorphism to perfect isomorphism. An intermediate position on this continuum implies that both individual- and country-level factors may play a role at both levels. Characteristics of human nature may influence or constrain the way societal institutions function and thereby affect the structure of values at the country level. In turn, institutional characteristics of societies may influence and constrain the types of conflict that emerge among individual values and thereby affect the structure of values at the individual level. By applying multilevel analyses, we assess the degree of isomorphism between the individual and country levels. We also adapt statistical techniques used to assess equivalence[1] at the same level of analysis to assess whether the degree of isomorphism we identify is sufficiently high to justify accepting the structures at the two levels as isomorphic (i.e., as differing only trivially).

In terms of isomorphism, Hofstede (1980, 2001) holds that there is a low level of isomorphism, if any, between the country- and individual-level structures for his value dimensions. He claims that the structures at the individual and country levels are qualitatively different so that different factors/dimensions are required at each level. Schwartz (1994) takes a different stance, suggesting that the structures are likely to show considerable similarity at the two levels but not isomorphism. He proposes a theory for interpreting the country-level structure that he holds to be more appropriate for comparing cultures than his individual-level theory (Schwartz, 2006, in press).

Both Hofstede and Schwartz analyzed their data separately at each level so the extent of empirical similarity between value structures could not be tested directly. Thus, the extent to which value constructs shift their functions or meanings, as reflected in their relations with other values, when individual responses are aggregated to the country level has yet to be assessed.

For a set of variables such as items in a test or scales in an inventory, isomorphism is usually examined with multivariate techniques. If it cannot be reasonably demonstrated, this preempts using identical concepts or dimensions to explain the variance at each of the two levels; any such comparisons would be biased.

Hofstede's Derivation of Cultural Dimensions

We present Hofstede's groundbreaking analysis in some detail to clarify his conclusion that the individual and country levels are not isomorphic. Hofstede (1980, 2001) derived each of the four dimensions in his four-dimensional, country-level structure in various ways from a data set originally consisting of 63 items administered to more than 116,000 employees from seven occupational groups at subsidiaries of IBM in a set of 40 countries.

The Uncertainty Avoidance (UA) and Power Distance (PD) indices were obtained through "eclectic analysis" (Hofstede, 1980, pp. 76-77). For PD, one item at the country level was chosen as the key question for measuring this dimension ("How frequently are employees afraid to express disagreement with their managers?"), and this item was then correlated with other conceptually related items at the country level. Two more items that were highly correlated at the country level were then selected, and this three-item index became the PD dimension. The correlation of these items at the individual level was close to zero.

For UA, Hofstede made an educated guess concerning cross-cultural differences on a stress-related item that led him to search for other items that varied substantially between countries in his data set and were conceptually related to societal differences in "structuring of activities" (which he believed to underlie differences in observed stress). Hofstede selected two such items ("Company rules should not be broken"; "How long do you think you will continue working for this company?") that correlated highly with the stress item and computed a UA index. He pointed out that at the individual level these three questions relate differently: Although people who endorse rule orientation are also more likely to stay within a company (a positive correlation), the relationship between stress and intention to stay is negative at the individual level (the more stressed you are, the less likely you consider staying). His explanation for the positive correlation at the country level was that these two items are both societal responses to deal with stress.

Individualism-Collectivism (IC) and Masculinity-Femininity (MF) were based on 22 (later reduced to 14) "work goal importance" questions. At the individual level, six factors had been found that reflected Maslow's (1954) need hierarchy. For the country-level analysis, Hofstede first ipsatized individual scores, controlling for the mean importance rating across all work goals. A factor analysis on the aggregated country-level scores yielded two orthogonal factors (originally labeled Individual-Collective and Ego-Social).

Finally, Hofstede computed a factor analysis on the full set of all the standardized work importance goal items and the eclectically selected UA and PD items. Four factors emerged, of

which three were clearly interpretable. The first factor combined IC and PD items (the latter with negative loadings), the second factor included the UA items, and the third factor included the MF items. Hofstede decided to split the first factor for conceptual reasons and because the two constructs were less highly correlated in less affluent nations.

We have presented Hofstede's pioneering analysis in some detail to underline two points. First, the outcome capitalized on between-country variance in means and relied exclusively on between-country correlations. Hofstede (1980) argued that factor analyses using all indicators at the individual-level data did not result in interpretable solutions. Subsequently, Hofstede, Bond, and Luk (1993) demonstrated that the individual-level structure among these value indicators in samples of Dutch and Danish employees did not replicate the country-level structure. This forms only a weak argument for differences in structures between the two levels. A more convincing argument would be to present a well-defined structure at the individual level across all samples included in the original analysis that is different from the country-level structure.

Second, the various steps in the analysis, even if each was plausible by itself, amount to a lengthy sequence of probabilities clearly in need of cross-validation. This second argument is corroborated by poor replication results for two of the factors (UA and MF; see Merritt, 2000; Spector et al., 2001). These failures to recover the dimensions in independent samples call into question the stability of the country-level dimensions.

Hofstede's analyses were revolutionary in their time but do not quite meet today's standards. Subsequent research has still not tested the similarity of value structures across levels directly. Because the original data of the IBM survey are not available, we sought another way to examine this issue empirically.

An Alternative Approach to Measuring Values: The Schwartz Value Survey (SVS)

Schwartz (1992, 1994) developed two different value theories, one about individual differences in values and the other about cultural differences. Based on theorizing about the sources of values in human nature and his previous empirical work (Schwartz & Bilsky, 1987, 1990), he postulated that the *psychological* universe of values could be partitioned into 10 motivationally distinguishable, basic individual–level values. He hypothesized that these 10 values are ordered in a two-dimensional space based on the conflicts and compatibility among the motivations the values express.

Schwartz (1992, 2006) administered a list of 56 (later 57) value items to student, teacher, adult, and adolescent samples in more than 70 countries. He tested the hypothesized typology and structural relations in each sample using smallest space analysis and a configurational verification approach (a type of MDS [multidimensional scaling] intended for hypothesis testing; Borg & Groenen, 1997). For this purpose, he partitioned the value space into conceptually coherent regions of value items. The analyses demonstrated that the two-dimensional array of value items (a) can be partitioned into regions that represent ten motivationally distinct types of values, (b) that the regions of the values are ordered around a circle in a manner that reflects their mutual compatibilities and conflicts, and that (c) 45 (later 46) of the value items emerge in the spatial region of their predicted motivational type of value in at least 75% of more than 200 samples (Schwartz, 2006). Two dimensions, labeled "openness to change versus conservation" and "self-enhancement versus self-transcendence," summarize the relations between the values in the space. This value theory is discussed in detail in Schwartz (1992, 2006).

Schwartz (1994, 2006) postulated that the *cultural* universe of values can be captured by seven cultural value orientations. He based this on theorizing about the value emphases that underlie ideal normative responses to basic problems all societies must confront. The first

problem is to regulate relations between the individual and the group. Cultural orientations representing one normative response to this problem call for cultivating the "autonomy" (intellectual or affective) of the individual. The opposing cultural orientation emphasizes the "embeddedness" of the person in the group. The second societal problem is to regulate relations of people to the natural and social world. The opposing cultural value orientations emphasize "mastery" through assertive action versus "harmony" through fitting in and avoiding assertive change. The third societal problem is to regulate human interdependence and elicit productive behavior. Opposing cultural value orientations specify the preferred, legitimate ways to manage interdependence. One is though "hierarchy" (relying on role obligations), the other through "egalitarianism" (relying on voluntary cooperation).

Schwartz (1994, 2008) aggregated the individual scores of those 45 or 46 value items that had been found to exhibit relatively stable meanings across cultures to obtain country means for a set of 38 (later 72) countries. He then applied SSA (smallest space analysis) with a configurational verification approach to the country means, as done with individual responses at the individual level. The observed, structural array of items at the country level was partitionable into the seven postulated cultural value orientations, and the latter were ordered according to their theorized cultural oppositions.

Empirically, the spatial arrays of value items at both the individual and the country level could be represented in a two-dimensional Euclidean space (i.e., defined by two orthogonal dimensions). Thus, the positions in the Euclidean spaces at both levels of all value items could be specified statistically in terms of two orthogonal dimensions. Schwartz (1992, 2006) suggests that it is most informative to rotate the orthogonal dimensions at the individual level so that they represent the conceptual dimensions of "openness to change" versus "conservation" and "self-enhancement" versus "self-transcendence." These dimensions capture the psychological nature of basic human values.

Schwartz noted that, in the statistical analyses, the "culture-level values are organized into the same two basic dimensions that organize individual-level values" (1994, p. 101). He suggested, however, that for comparing the cultures of societies rather than the values of individuals, it is more meaningful to partition the value items in this same space into regions that represent the seven cultural value orientations (Schwartz, 1994, 2006). Because the spatial relations between these regions reflect the oppositions between ideal cultural responses to each of the three societal problems, they capture the societal grounding of cultural values. Three (nonorthogonal) linear functions in the space represent the three conceptual oppositions.

Schwartz's theorizing at the individual and culture levels emphasizes functional nonisomorphism. He argues that the structures at the two levels should be interpreted differently because he postulates that the characteristics that discriminate among individuals and those that discriminate among societies are unlikely to be the same. Further studies lend support to the structures at both levels.

Reanalyses of the individual-level data using confirmatory factor analysis (Schwartz & Boehnke, 2004) and multidimensional scaling (Fontaine, Poortinga, Delbeke, & Schwartz, 2008) support the theorized structure of 10 value types positioned along the two orthogonal dimensions. Analyses with independent data sets also replicate the individual-level structure (e.g., Perrinjaquet, Furrer, Usunier, Cestre, & Valette-Florence, 2007).

The country-level structure based on 38 countries was virtually unchanged when 34 additional countries were included in the analysis (Schwartz, 2006). This increases our confidence in the structure, but it is not a strict replication. Data from an abbreviated 21-item version of a different method to measure values, the Portrait Value Questionnaire (PVQ21; Schwartz, 2005), also shed light on the stability of the country-level structure. This instrument presents short descriptions of target people in terms of their values, aspirations, and wishes and asks respondents to rate how similar each person is to themselves. MDS analyses of country means of representative national

samples in 20 countries on the 21 items yielded a country-level structure partitionable into ordered regions for the seven cultural value orientations. Correlations between the SVS country scores based on teachers and students from these countries and the PVQ21 scores averaged .63 (Schwartz, 2006). Given the different methods, samples, and time frames, this implies reasonable similarity.

As mentioned above, the empirical relationship between the two structural configurations has never been examined because past studies dealt only with either the individual or cultural level, never comparing them in a single analysis. We address this significant gap in the literature by assessing the structure at each of the two levels simultaneously and comparing them statistically. Suitable procedures for such analyses were not readily available at the time of the original publications (Hofstede, 1980; Schwartz, 1994) that distinguished levels. The analytical methods we employ can directly assess the empirical overlap between the structures at the two levels.

Our MDS analysis derives individual- and country-level structures and rotates them using Procrustean rotation so that the dimensions can be directly compared. The Pearson correlation between item coordinates across levels is then calculated for each dimension. Because MDS dimensions are orthogonal (independent of each other), it is appropriate to examine the similarity separately for each dimension.

We know of no formal statistical procedure or rule to decide how high the correlation between two levels should be to accept them as isomorphic. For structural equivalence of data sets at the individual level, it is customary to calculate Tucker's φ as a measure of the relationship between the loadings on a corresponding factor in two groups (Van de Vijver & Leung, 1997). This practice has also been adopted to test isomorphism in multilevel work (e.g., Mylonas, Pavlopoulos, & Georgas, 2008; Van de Vijver & Poortinga, 2002). There is some disagreement, however, regarding the lower bound for equivalence (e.g., Ten Berge, 1986; Van de Vijver & Poortinga, 1994). Recommended levels range from φ = .80 (Barrett, 1986), to φ = .85 (Ten Berge, 1986), to φ equal or larger than .90 (Van de Vijver & Poortinga, 1994). Choosing an acceptable level is further complicated by the effects of sample size, number of items, extracted dimensions, and salient pattern values (e.g., Fontaine et al., 2008; Paunonen, 1997). We will adopt a level of φ = .90 because this seems to be the most common standard in the literature (e.g., Van de Vijver & Leung, 1997). If the data meet this criterion, we will view structures at the two levels as isomorphic.

What criterion can be used to infer the total absence of isomorphism? If observed levels of similarity fall within the range of what could be expected by chance fluctuations, we will accept nonisomorphism. To this end, we conducted statistical simulations with randomly altered structures to generate indices of structural similarity that reflect chance distributions (see Mc Crae, Zonderman, Costa, Bond, & Paunonen [1996] for a similar approach). These indices can be used to judge nonisomorphism. We will consider the structures at the two levels to be partially isomorphic if observed levels of isomorphism are above the levels expected by chance but below the criterion of similarity for inferring full isomorphism.

Study 1

The purpose of our primary study is to assess the degree of similarity between individual- and country-level dimensions using the SVS. We also report simulations to provide background for interpreting observed levels of similarity.

Method

Samples. We used archival data sets collected by Schwartz (1992, 2005) between 1988 and 2002, including samples of both students and teachers. We only included a sample if the number of respondents was larger than the number of value items in the scale ($N > 55$). Teacher data were

available from 53 countries ($N = 15{,}757$) and student data from 66 countries ($N = 26{,}024$). These countries come from all inhabited continents, and the data set includes highly diverse geographic, cultural, linguistic, and religious groups. Further information on the samples is available in Schwartz (2005).

Measures. The SVS consists of 56 or 57 items representing 10 basic values. In our analysis, we only used those 55 value items that were included in all versions of the survey (excluding "detachment," "privacy," and "self-indulgent"). We used 55 items instead of the 45 identified in Schwartz (1992) because the reanalysis by Fontaine et al. (2008) showed that the average structure using all 55 values was relatively stable at the individual level.

Respondents rated the importance of each value as a guiding principle in their life on a 9-point scale ranging from –1 (*opposed to my values*), 0 (*not important*), 3 (*important*), 6 (*very important*), to 7 (*of supreme importance*). Schwartz (1992) explains this response format.

Analysis. We derived the individual-level structure for the SVS from the pooled within-country matrix (Fontaine & Fischer, in press; Muthén, 1994), the same procedure used by Schwartz (1992). This is the averaged correlation matrix across the individual correlation matrices of each sample. This average matrix reveals the average individual-level structure. Fontaine et al. (2008) demonstrate that this structure is approximately replicated in those samples originally available, thus justifying pooling across all current samples. This matrix was analyzed with the Proxscal routine in SPSS 14, using the correlations as similarity indicators and specifying interval data. The two-dimensional structure was derived, in line with previous findings (Fontaine et al., 2008; Schwartz, 1992, 2005). Analyses were separately conducted for the student and teacher samples.

The country-level structure was based on the aggregated arithmetic item means per country of responses of the student, teacher, and combined samples, respectively. Euclidean distances were derived based on *z*-transformed mean scores. Using Proxscal in SPSS 14, an interval-level MDS was run. The average intraclass correlation coefficient across all value items was .12 for the teacher samples and .11 for the student samples (see Fischer & Schwartz [accepted for publication] for more details). This justifies aggregation.

The coordinates of the value items in the individual- and country-level configurations cannot be directly compared. This is because rotation, reflection, translation, and dilatation of the coordinate system affect the coordinates, even though they have no effect on the relative distances among points. Hence, at first sight the coordinates may differ even when the value structures are in fact much the same. To derive comparable coordinates, we subjected the two configurations to generalized Procrustes analysis (GPA; Borg & Groenen, 1997; Commandeur, 1991). GPA calculates the configurations in such a way that they correspond as closely as possible, without affecting the relative distances between points within each configuration. Following GPA, the spatial coordinates of individual value items are directly comparable between the two levels of analysis. The correlations between the coordinates are an index of the structural similarity at the two levels.

Results

Similarity of Individual- and Country-Level Structures. The correlations between individual- and country-level coordinates after GPA are shown in Table 1. All correlations are significant ($p < .001$). Most important for our purposes, the correlations for Dimension 1 were .79 and .65 for student and teacher samples, respectively. The correlations between levels for Dimension 2 were .76 and .68 for student and teacher samples, respectively. These correlations point to substantial similarity of structure across levels, especially for Dimension 1, although they fall short of the criterion of .90 we suggested for structural isomorphism.

Multilevel Similarity Simulation. To assess the chance level of structural similarity, we converted the correlations in the country-level correlation matrix to Euclidean distances stacked in

Table 1. Pearson Correlations of Schwartz Value Survey (SVS) Culture Level and Individual-Level Data Following Generalized Procrustes Analysis

	Individual Level		Country-Level	
	Student	Teacher	Student	Teacher
Individual level				
Student	—	*.98*	**.76**	.66
Teacher	*.98*	—	.77	**.68**
Country level				
Student	**.79**	.74	—	*.88*
Teacher	.71	**.65**	*.92*	—

Dimension 1 is listed below the diagonal; Dimension 2 is listed above the diagonal. All correlations are significant at $p < .001$. Bold entries show cross-level similarity, italic values show similarity within-levels.

a single column. Each entry was assigned a random number, and the distances were reordered using those random numbers. This random country-level distance matrix was then individually analyzed using the same MDS procedure outlined above. The resulting dimensions were rotated to maximal similarity with the individual-level dimensions (based on the pooled-within structure). After repeating this procedure 100 times, the mean correlation across levels between the pooled-within structure at the individual level and the randomly generated country-level structure can be taken as an estimate of the chance level of structural similarity (for a similar approach, see Mc Crae et al., 1996). The mean for Dimension 1 was .230 (SD = .099, SE = .010, 95th percentile = .385, highest value = .50). The mean for dimension 2 was .095 (SD = .056, SE = .006, 95th percentile = .209, highest value = .26). These chance levels are far lower than the levels of similarity with the actual SVS data. Thus, the observed levels of similarity cannot be ascribed to chance fluctuations. We can reject the claim that the value structures are nonisomorphic across levels.

Discussion

The findings point to substantial structural similarity, so there is some isomorphism of values across levels. Between 42% and 62% of the variance is shared between levels for Dimension 1 and between 46% and 58% of the variance is shared between levels for Dimension 2. With up to 62% common variance, it clearly does not make sense to view relations between value items at the two levels as independent. At the same time, the degree of similarity falls well short of the 80% common variance that we set as the criterion for (perfect) isomorphism. Therefore, we have to reject the claim for isomorphism in the value domain. As with equivalence, we assume that isomorphism is a continuum and that sources of nonisomorphism can be identified empirically. Our second study explores variables that might account for some of the unexplained variance in structures across levels.

Study 2: Exploring Lack of Isomorphism in the SVS Data

Study 1 sought to estimate the degree of structural isomorphism between dimensions at the country level and the individual level. Study 2 seeks explanations for why the indices of structural similarity reported in Study 1 fell short of the proposed .90 level similarity. We consider two potential explanations of the unshared variance. First, we take as a working hypothesis that the

observed lack of isomorphism may be due to random fluctuations associated with the sampling of countries (a method explanation). Second, we examine whether differences in structures between levels might be caused by systematic shifts in the positions (coordinates) of specific value items. That would imply method and/or substantive sources for the lack of isomorphism.

Regarding sampling, Fontaine et al. (2008; Fontaine, 1999) demonstrated with a bootstrapping procedure that sampling variability at the individual level accounted for more than half of the observed shifts in the individual-level structures of 38 countries. Analogously, sampling at the country level could have affected estimates of isomorphism (e.g., Maas & Hox, 2004). Guidelines vary as to how many samples are needed at the country level to reach stable estimates. A fairly common rule is that multilevel regression analysis can be attempted only if researchers have data from at least 20 countries (Selig, Card, & Little, 2008). Therefore, it is informative to examine the effect of sampling at the country level on observed structural similarity.

A second possibility is that individual value items have different positions in the two-dimensional structures at the two levels. Fontaine et al. (2008) found that all 55 values of the SVS could be used across cultures in establishing the structure of values at the individual level. At the same time, systematic shifts in the positions of some items occurred. Such shifts may be due to bias (such as overrepresentation of certain language groups) but may also be due to meaning shifts in individual items. Therefore, we also examined the extent to which specific value items had an impact on indices of isomorphism by shifting position between the individual- and the country-level structure.

In summary, we tested two hypotheses about factors influencing isomorphism. The first hypothesis is that variation in structure between levels is partly due to sampling error related to the number of samples. The second hypothesis is that variation is due to shifts in the positions of a limited set of items.

Method

Samples and Measures. We used the same SVS data and measures as described in Study 1.

Analysis. To assess effects of sample size on isomorphism, we used the student data set as the basis. We randomly drew 300 subsets of country samples from the 66 countries for which student data were available. For 100 random samples, we selected 80% of the countries (corresponding to the number of teacher samples, $n = 53$); for another 100 samples, we selected 53% of the countries (corresponding to the number of samples in Schwartz's [1994] original country analysis); and in the remaining 100, we selected 30% of the samples (corresponding to the number of 20 samples considered to be the minimum for multilevel regression analysis). This method is an extension of traditional jackknife procedures (Shao & Tu, 1996). The particular numbers of countries to illustrate the effect of sample size were selected because they correspond to standards discussed in the literature or to sample sizes in previous cross-cultural research. For each set of countries, we performed an interval-level MDS and rotated the resulting coordinates to the individual-level coordinates from the pooled-within matrix.

To examine the effect of item shifts on estimates of isomorphism, we iteratively eliminated value items that showed the largest absolute shifts in position across levels (using the sums of the absolute differences). The pooled-within and between-country matrices were recalculated after each iteration. This iterative process was terminated once the criterion correlation of .90 between the Procrustes-rotated dimensions at the two levels was reached. We first investigated the value shifts in the student data and then attempted to cross-validate the findings in the teacher data.

Results

Effects of Country-Level Sample Size. The decrease in estimated similarity on Dimension 1 across sets with fewer samples is small. The mean correlation is .78 with 53 samples, .77 with 38 samples, and .73 with 20 samples. The observed maxima are .83, .83, and .85; and the observed minima are .73, .63, and .49 for the respective sets of samples. Thus, the estimates are somewhat less stable and show larger fluctuations with fewer samples (standard deviations of .02, .04, and .07, respectively).

The second dimension is considerably less stable. The mean correlation drops from .74 to .70 and then to .57. The observed maximum correlations are .81, .83, and .82; whereas the observed smallest correlations are .54, .31, and –.03. This indicates that the variability of the correlation increases with decreasing sample size (standard deviations of .03, .09, and .20 respectively). Thus, sample size at the country level appears to affect the similarity between the second dimensions of the individual-level and country-level structures fairly strongly, as hypothesized.

Influence of Shifts in Positions of Value Items Across Levels. To test the second hypothesis, we iteratively eliminated items that showed the largest absolute shifts in position between the two levels. After removing 15 of the 55 items,[2] we reached correlations of .90 and .92 for Dimensions 1 and 2, respectively, in the student data set. This provides support for Hypothesis 2.

We then tried to cross-validate the findings with the teacher data. The correlations between the two levels with the 40 remaining items were .84 for Dimension 1 and .72 for Dimension 2. Thus, the correlations increased with items removed but did not reach the .90 threshold. Additional analyses eliminating further items did not result in substantial increases in the correlation of levels. With the teacher data we could not find a set of values that satisfied a .90 criterion for isomorphism. We repeated the analysis, taking the teacher data as the starting point. Even after removing as many as one third of the items, the criterion of .90 was not reached. Thus, we found some support for the hypothesis that shifts in the positions of individual items reduced isomorphism. This, however, did not fully account for the absence of isomorphism.

Discussion

Study 1 provided considerable evidence of structural similarity across levels, but it fell short of the .90 criterion level for isomorphism. Study 2 addressed two possible sources of the less than perfect match in structure between the two levels.

The results of the first analysis, in which we varied the number of samples, suggest that it is essential to have a large number of countries (preferably greater than 50) in a test of isomorphism. This is especially so if the dimension of interest explains little variance compared to the first dimension, as was the case with the second SVS dimension (the first dimension explains 81% and 84% of the variance at the country level in the two samples; the second dimensions adds another 11%). Using all 55 values, the level of similarity for Dimension 1 was quite stable in the student data set even when we reduced the number of samples to the recommended minimum ($n = 20$) for multilevel regression analysis (Selig et al., 2008). Thus, there was support for the effects of sample size at the country level in line with Hypothesis 1. The results indicated, however, that sample size is probably not solely responsible for the lack of isomorphism observed in Study 1.

The second analysis tested possible structural bias in the separate items. In line with Hypothesis 2, we found evidence that individual items did influence estimates of isomorphism for student samples. Dropping 15 items, we reached the .90 minimum criterion for accepting strict measurement isomorphism. In the teacher samples, however, item bias did not fully account for the gap between the observed cross-level similarity and the .90 criterion, no matter how many items were dropped.

General Discussion

We can clearly reject Hofstede's original argument that the structure of values at the individual and country levels is not at all the same. Values show substantial structural similarity, well beyond chance levels, across individual and country levels. However, the results also show that conditions for identity of structures or perfect isomorphism are not met. We found that sampling and individual value fluctuations can account for some of the lack of isomorphism. Method factors or real differences between individual and cultural factors must account for the remaining dissimilarity.

Because the results are open to different interpretations, we will not try to draw definitive conclusions. We will, instead, use the results to highlight some important issues in the ongoing debate about the nature and function of multilevel structures. We will use a Socratic dialogue type of approach to illuminate the different positions and allow readers to decide which views are more or less convincing. Given the tradition started by Hofstede (1980), we pose arguments in favor of separating the two levels first and then discuss counterarguments.

Position 1: Individual and Country-Level Dimensions Are Empirically Distinct

First Argument in Favor. The similarity is insufficiently high to justify treating the levels as isomorphic. It required dropping 15 of 55 items to reach an acceptable level of isomorphism in the student samples, and removing even more items did not yield isomorphism in the teacher samples. In dropping so many items, it is likely that much of the critical content that distinguishes structurally between the two levels was lost.

Counterargument. The similarities are so high that they could be explained by other method artifacts. The need to drop so many items may reflect methodological problems but not real structural differences. First, it is likely that there is incidental item bias due to the translation of the SVS into more than 40 languages. This form of bias has not been systematically investigated for the SVS data set. Other biases are also possible. Fontaine et al. (2008) found that teacher data did not fit the individual structure as well as the student data. Here it was the teacher samples in which removing items did not reach the threshold for isomorphism. One might speculate that the different findings for teachers and students are due to cultural differences between these two kinds of societal groups or to unmeasured artifacts (e.g., differential effects of a response style).

Second Argument in Favor. Another argument for the divergence of structures is found in the comparatively higher similarity of structures within levels (correlations in italics in Table 1) compared to between-level correlations (bold in Table 1). Although individual samples at the individual level might show less than perfect structures, the average structures at the individual level are remarkably stable (Fontaine et al., 2008). Therefore, there seems to be greater similarity within levels than between levels. The difference in explained variance may reach levels of up to 54% (highest correlation within levels squared minus lowest level of between-level correlations squared: $.98^2 - .65^2 = .96 - .42 = .54$; an important caveat here is that the correlations are assumed to be true population level correlations without measurement errors). Even if we found further methodological artifacts, this would strongly suggest some divergence in structures across levels.

Second Counterargument. This position rests on the fact that the structures at both levels are stable.

Focusing on the individual level first, Fontaine et al. (2008) reported high stability of the *average* structure (which allowed its use here as the base for the individual-level structure). However, they also reported systematic shifts in structure depending on the socioeconomic level of the society from which the sample was drawn as well as sample fluctuations. Indeed, the overall fit between samples at the individual level (.62) was substantially lower than the fit across

levels found here (.84 overall across student and teacher samples, as assessed by the GPA analysis). Furthermore, Schwartz and Sagiv (1995) provided evidence that individual items might shift in specific societies even when the overall individual-level structure is stable. Applying the same logic to country-level structures as to individual-level structures suggests that it makes sense to accept at least some degree of structural isomorphism.

Second, the stability of the country-level structure is not yet well established. No estimate of the degree of stability of this structure is available. Any instability in the country-level structure would reduce the observed isomorphism between levels. This too might account for the failure to reach the .90 criterion of isomorphism.

Position 2: Individual and Country-Level Structures Are Theoretically Different

First Argument in Favor. Hofstede et al. (1993) noted an ideological bias in Western science that privileges individual- over country-level theories and regards the latter with more suspicion. Hofstede (1980) argued that individual- and country-level structures reflect different phenomena. Schwartz (1994, 2006) gave equal weight to theorizing at both levels. He maintained that dimensions appropriate for comparing individual persons should derive from and reflect the psychological characteristics of individuals, whereas those appropriate for comparing societies should derive from and reflect the institutional characteristics of societies. He assumed that there is some degree of isomorphism in structures because of the interdependence between individuals and societies. Hence, the question for Schwartz is not whether there is isomorphism but whether it is desirable and meaningful to partition the obtained value spaces differently when describing individuals and cultures.

The conceptual discrimination of individual and country levels of values can be seen as analogous to levels of scientific disciplines. Each discipline contributes something to our understanding of life, but one discipline cannot be reduced to the other. Sociology and anthropology draw upon psychology, which draws upon biology, which draws upon chemistry, which draws upon physics. All may focus on some aspect of the living organism, but each discipline addresses emergent phenomena at its own level.

The structure of relations that emerges among values assessed at the individual level reflects the logic of the requirements of functioning as psychological beings within social relationships. These functional requirements derive from biological forces, demands of interpersonal coordination, and social constraints. These requirements determine the content of the individual values that emerge and lead to their organization into a set of individual-level dimensions.

The structure that emerges at the country level is an indirect indicator of the cultural orientations on which societies differ. This structure is best interpreted in terms of the value emphases that guide and justify the functioning of societal institutions. Therefore, it is meaningful to partition the value space into regions or vectors that express societal responses to the problems that all societies must confront. From this perspective, the degree of similarity between the value spaces at individual and country levels is not critical. What is paramount are the theoretical interpretations of the value associations in the observed space. These interpretations should identify the different forces that organize value preferences of individuals and value emphases of cultures.

Counterargument. The usefulness of maintaining two theories, contrary to scientific principles of parsimony, has yet to be assessed. We should use the theoretical partitioning of the value space, presumably reflecting different organizations of value items at each level, as a starting point to test the usefulness of two separate theories. We might assign scores on both the 7 cultural value orientations and the 10 individual-level value types to both individual persons and, aggregated, to countries. We could then examine which set of value constructs relates more strongly to

which kinds of variables. To justify the application of different theories at the two levels, a particular pattern of findings should emerge. Specifically: (a) Hypothesized associations with most country characteristics (e.g., level of democracy, average family size) should be higher if country value scores are based on cultural value orientations rather than on individual value types. (b) Hypothesized associations with individual difference characteristics (e.g., personality variables, personal attitudes) should be higher if individual value scores are based on individual value types rather than on cultural value orientations.

A second test of the usefulness of separate theories might employ hierarchical linear modelling. For example, we might examine the extent to which optimism is related to values at individual and country levels (Fischer & Chalmer [2008] test this at the country level only). Using hierarchical linear models, we could test whether value scores based on the individual- and culture-level theories help to explain differences in mean country levels of optimism and individual differences in levels of optimism. This type of analysis would help to clarify whether there is any gain from postulating two different theories.

Second Argument in Favor. The results of the current analysis suggest that 15 or more individual value items may have different functions at the two levels. Consider as examples "wisdom" and "humble," whose positions shifted substantially between structures. Both have associations in line with their standard dictionary definitions, but the relevant aspects of the definitions shift across levels.

In the country-level structure, wisdom is close to items that emphasize group solidarity and maintaining connections to the past (e.g., devout, honoring elders). Societies high on the embeddedness cultural orientation attribute importance to wisdom. In the individual-level structure, wisdom is close to items that emphasize tolerance and intellectual freedom (e.g., broadmindedness, creativity). Individuals high on the individual-level universalism value, for whom understanding the complexity of reality is important, emphasize wisdom. In the country-level structure, humble is a hierarchy value close to authority and power. An emphasis on humility in a society helps to maintain the smooth functioning of hierarchical systems. It justifies demanding humility from those below in the hierarchy and requiring humility toward those above. In the individual-level structure, humble is close to tradition value items that emphasize submission of self to external expectations (e.g., accepting my portion, devout). For individuals, emphasizing humility is psychologically consistent with valuing tradition and rejecting innovation.

These examples of the different significance of value items in the structures at the two levels make sense in terms of the theories at each level. They reflect the different functions of the same value items as expressions of societal/institutional preferences and as individual/psychological preferences.

Second Counterargument. Post hoc interpretations of positions of individual items are interesting but not definitive. They can serve as good starting points for identifying sets of value items that show functional differences across levels. Close analyses of the different functions of such items might reveal meaningful ways in which the individual and country levels differ and help us to identify the sources of these differences. The specific examples cited are a useful start. However, we should be wary of post hoc interpretations of shifts in the positions of a few individual items, especially considering that the shifts were mainly on the (weak) second dimension. Similarly to partial invariance tests at the individual level, shifts in specific items do not invalidate structures (Steenkamp & Baumgartner, 1998). To make a convincing argument for differences in structure, research with new data is required. Such research would have to demonstrate shifts in the positions of sets of items that change the meaning of the overall structures and that are predicted from explicit theorizing about the different functions of the items at the individual and cultural levels.

Conclusions

Our study contributes to the increasing focus on multilevel analysis (e.g., Fischer, 2009; Fontaine, 2008; Van de Vijver et al., 2008). We extend previous multilevel studies of isomorphism with confirmatory and exploratory factor analysis (Muthén, 1994; Van de Vijver & Poortinga, 2002) to multidimensional scaling and the study of values, a key concept in contemporary cross-cultural psychology. Our findings demonstrate a sufficient level of cross-cultural similarity to make it plausible that we can understand the value concepts of people in other countries; we basically share them. Do the results therefore mean that value scores based on country-level constructs can be used to compare individuals across countries? Doing so would validate a frequent practice with individualism and less frequently with other Hofstede dimensions, despite warnings against it by Hofstede (1980, 2001). For two reasons, the question has to be answered negatively. First, we did not demonstrate the (near-perfect) isomorphism needed to conclude that structures at the two levels are identical and exchangeable. Second, the individual-level structure differs somewhat between countries; not all countries show a high fit to the common structure at individual level. A comparison between individuals (and samples) from two countries should only be undertaken if structural equivalence at the individual level has been demonstrated for those countries.

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Notes

1. Equivalence refers to similarities (or absence of bias) of internal relationships between sets of variables across populations at the individual level, whereas isomorphism refers to similarities of internal relationships between sets of variables across levels. Homology in contrast assumes theoretical (but not measurement) isomorphism and refers to the generalizability of external relationships between constructs across levels (Chen, Bliese, & Mathieu, 2005).
2. The items removed were wisdom, world of beauty, mature love, spiritual life, true friendship, forgiving, honest, humble, devout, family security, healthy, sense of belonging, ambitious, pleasure, and enjoying life. These items varied primarily along the second dimension.

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