View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by Erasmus University Digital Repository

Embedding the organizational culture profile into Schwartz's theory of universals in values

Ingwer Borg (GESIS, Germany)

Patrick J.F. Groenen (Erasmus University Rotterdam, The Netherlands)

Karen A. Jehn (The University of Melbourne, Australia)

Wolfgang Bilsky (University of Münster, Germany)

Shalom H. Schwartz (The Hebrew University of Jerusalem, Israel)

Version 15-12-2010

Abstract

Person-organization fit (P-O fit) is often measured by the congruence of a person's values and the values that he or she ascribes to the organization. A popular instrument used in this context is the Organizational Culture Profile (O'Reilly, Chatman, & Caldwell, 1991). The OCP scales use 54 items that form eight factors in exploratory factor analysis. We investigate the extent to which the OCP can be embedded into Schwartz's Theory of Universals in Values (TUV) that is formulated in terms of a circumplex in a 2-dimensional plane. To address this question, we develop a non-standard multidimensional scaling (MDS) method that enforces a TUV-based axial regionality onto the solution space together with a permutation test that assesses the consistency of the side constraints with the MDS representation. We find that the OCP can indeed be embedded into the TUV. The practical implication is that P-O fit can be assessed more simply by the congruence of the person's and the organization's positions on two value dimensions: risk vs. rules and results vs. relations.

Embedding the organizational culture profile

into Schwartz's theory of universals in values

An important problem of organizational psychology is to assess how well a particular person fits into a particular organization, which is called person-organization (P-O) fit. Kristof (1996) defines P-O fit as "the compatibility between people and organizations that occurs when (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both" (pp. 4-5). A high level of P-O fit is positively correlated with many important outcome variables such as job satisfaction and organizational commitment (Boxx, Odom, & Dunn, 1991; Bretz & Judge, 1994), intention to quit and turnover (McCulloch & Turban, 2007; Vancouver & Schmidt, 1991), contextual performance (Goodman & Svyantek, 1999), and organizational identification (Cable & Edwards, 2004).

The most popular approach to assess P-O fit is to assess the congruence of individual and organizational values (Sekiguchi, 2004). Values are usually defined as conditions that a person or organization finds desirable (Locke, 1976), either as end goals or as instrumental goals. Values serve as principles of orientation that transcend particular situations both in scope and time (Rokeach, 1973; Schwartz, 1992). In organizational surveys, value items are typically phrased in a form similar to "How important is [X] to you?" (Borg, 1991; Borg & Mastrangelo, 2008; Elizur, 1984; Jurgensen, 1978). In the social sciences, one often finds more emphasis on values as ideal goals or normative guides. The corresponding value items are then phrased as "How important is [X] to you as a guiding principle in your life" (Rokeach, 1973) or, for example, as "How important is [X] for you and your future?" (Wohlfahrtssurvey, 1998).

A prominent valued-based instrument for assessing P-O fit is the Organizational Culture Profile (OCP, see Chatman, 1991; O'Reilly et al., 1991). The OCP consists of 54 items, each focusing on a different value such as 'risk taking', 'being innovative', 'being precise', 'being aggressive', 'low level of conflict', or 'informality'. The respondent is asked to rate these values on a 9-point answer scale ranging from "most important" to "most unimportant," with the constraint of distributing the ratings over the nine scale categories with frequencies that approximate a normal distribution (Q-sort). The OCP asks the respondent to Q-sort the items twice: once in terms of how important he or she considers the various values in an ideal organization, and once in terms of how important these values actually are in the particular organization under study.

O'Reilly et al. (1991) report that eight factors emerge from the correlations of OCP items. These factors are labeled (1) innovation and risk taking, (2) attention to detail, (3) orientation toward outcomes or results, (4) aggressiveness and competitiveness, (5) supportiveness, (6) emphasis on growth and rewards, (7) collaboration and team orientation, and (8) decisiveness. Further studies on the OCP come to similar conclusions (Chatman & Jehn, 1994; Howard, 1998). Thus, the OCP appears to measure the extent to which individuals value organizational behaviors such as 'innovation and risk taking' or 'attention to detail' in an organization. The resulting eight scores are the respondent's value profile. Comparing an individual's OCP profile for an ideal organization with his or her perception of organization X's profile yields the individual's P-O fit with X.

The statistical analyses of the OCP items are based on exploratory factor analysis and the interpretations remain unrelated to more general theorizing in value research. Nevertheless, an analysis of OCP ratings of an "ideal" company that leads to similar factors suggests that the findings are fairly robust and replicable (Jehn, Chatwick, & Thatcher, 1997). We use these data below and show the factor analysis results in Table 1. This table reveals that some of the observed factors are bipolar. For example, on the first factor the items 'flexibility', 'adaptability', 'being easy going', 'being calm', and 'low level of conflict' have high positive loadings, whereas the items 'being aggressive', 'being demanding', and 'working long hours' have high negative loadings. The negative pole of this factor clearly matches the O'Reilly et al. (1991) factor 3 ('orientation toward results').

The presence of such bipolarities indicate that the respondents felt that some of the values compete with one another. Indeed, some items such as 'being easy going' and 'being demanding' are almost logical opposites; it is hard to see how an individual or an organization can satisfy both values simultaneously. Other oppositions are not necessarily logical ones (e.g. 'being calm' and 'being demanding'), but depending on how one interprets these notions, they may be incompatible psychologically.

The idea that relations among values are structured by practical and psychological oppositions and compatibilities is a central feature of the Schwartz theory of universals in the content and structure of values (TUV; Schwartz, 1992; Schwartz & Bilsky, 1987, 1990). Figure 1 shows the structure of the TUV in a diagram that represents how value items that assess different types of values are related to one another empirically in two-dimensional multidimensional scaling (MDS) space. This pattern, established in numerous studies by Schwartz and his collaborators (e.g., Schwartz & Boehnke, 2004, Schwartz, 2006) is a quasi-circumplex. Items that express each broad value form different regions in space that are arranged like sectors of a disk. For example, the items, 'helpful', honest', and 'forgiving' fall into the sector of 'benevolence' values, and the items 'authority', 'wealth', and 'social power' fall into the sector of 'power' values.

Reflecting the incompatibility of simultaneously pursuing benevolence and power, the benevolence and power sectors are situated in opposing positions in the circumplex (Figure 1). Empirically, people who rate one of these values as very important tend to attribute little importance to the other. Similarly, security-related values are found to be psychologically incompatible with self-direction and stimulation values because "to strive for success by using one's skills usually entails both causing some change in the social or physical environment and taking some risks that may be personally or socially unsettling. This contradicts the concern for preserving the status quo and for remaining psychologically and physically secure that is inherent in placing high priority on security values" (Schwartz & Bilsky, 1987, p. 554).

Data collected in many contexts and countries, using different instruments (e.g., Bilsky, Janik, & Schwartz, in press; Schwartz, 1992, 2006, 2007), support the theory of this structure of value relations. Yet, the data analysis method used in this context was almost always exploratory MDS (for exceptions using structural equation modeling, see Davidov, Schmidt, & Schwartz, 2008; Schwartz & Boehnke, 2004). This method maps the item intercorrelations optimally into distances among points in a geometric space, but it imposes no theory-generated side constraints onto the MDS configuration. Hence, such solutions are optimal in minimizing a general loss function (Stress), but they remain blind to content, because they do not incorporate particular regional predictions into the optimization algorithm. Moreover, an exploratory MDS solution always leaves considerable leeway when partitioning the configuration in the sense of a circumplex pattern as in Figure 1. Consequently, what one often finds in the literature are somewhat arbitrary curvilinear partitioning lines and/or overlapping regions (see, e.g., Borg & Shye, 1995; Elizur, 1984).

For such technical reasons and in an attempt to simplify the presentation of the value theory, Schwartz (1992) also described it as postulating a two-dimensional bipolar value structure (Figure 1). The dimension 'openness to change vs. conservation' "arrays values in terms of the extent to which they motivate people to follow their own intellectual and emotional interests in unpredictable and uncertain directions versus to preserve the status quo and the certainty it provides in relationships with close others, institutions, and traditions" (Schwartz, 1992, p. 43). The second dimension, 'self-enhancement vs. self-transcendence', scales the values "in terms of the extent to which they motivate people to enhance their own personal interests … versus the extent to which they motivate people to transcend selfish concerns and promote the welfare of others … " (p. 42f.). Cable and Edwards (2004) recently used this two-dimensional model, with eight core values (altruism, relationships, pay, security, authority, prestige, variety, and autonomy) to identify the dimensions, and three items from existing measures of work values to measure each of the core values.

Based on the characteristics of organizations, Quinn and Rohrbaugh (1983) suggested a similar two-dimensional model of "competing values," in their case from flexibility to control, and from an internal to an external focus. Patterson, West, Shackleton, Dawson, Lawthom, Maitlis, Robinson, and Wallace (2005) used this framework as a foundation for constructing an organizational climate inventory with 17 scales. They argue that organizational climate is a "surface manifestation of culture" (p. 381) which is, in turn, anchored in shared values. Yet, they did not study how the resulting 17 scales relate back to the competing value model from which they started.

The OCP tradition, with its factor-analytic structure and specific theorizing on the one hand, and the TUV circumplex (or its two-dimensional simplification) on the other hand, represent two parallel developments. The potential relationships between the two remained unexamined until it was recently addressed by DeClercq, Fontaine, and Anseel (2008). These authors sought a comprehensive and parsimonious value model for assessing person-organization fit. They studied the extent to which 42 different multi-item scales for assessing P-O fit could be explained by one common framework (i.e. the Schwartz TUV). For this purpose, they asked TUV experts to code the items of the various instruments into the 10 domains of the TUV. For the OCP, they found that for 37 of its 54 items there was "substantial" agreement among the experts' codings, while 7 items remained "not categorizable" and for 11 there was no substantial agreement. Not surprisingly, agreement indices for the simplified (higher-order) TUV were higher. This led to the conclusion that "future researchers should be cautious in interpreting results in terms of the 10 value types because the higher order factors may offer a more robust avenue for drawing conclusions about P-O fit" (p. 293). Moreover, the agreement data provided "some preliminary evidence for the circular and higher order structure of the Schwartz value model" (p. 293).

Bilsky and Jehn (2002) pursued similar questions in an earlier but rather inaccessible paper overlooked by DeClercq et al. (2008). They (together with Schwartz) coded the items of the OCP into the four categories of the simplified TUV. They reached inter-rater agreement on 41 of the 54 items; the rest of the items remained uncoded (see Table 1). However, rather than studying this expert coding itself (as in DeClercq et al., 2008), they went on to test to what extent their codes explained the structure of OCP item ratings of respondents who know nothing about the TUV. In particular they predicted that an MDS representation of the intercorrelations of empirical OCP item ratings could be partitioned into four regions by two axes, one representing self-enhancement vs. self-transcendence and the other conservation vs. openness. It was found that "only three of the 54 items … resulted as misfits with respect to our regional hypotheses…" (p. 219). To achieve this fit, however, they had to draw the lines that partition the MDS space into regions in a way that only roughly matches the postulated two-axes or four-quadrants structure indicated in Figure 1. This makes it difficult to maintain the theoretical notion of competing values. Hence, the TUV seems to be able to only roughly explain the structure of the OCP items.

This conclusion is not very appealing because the TUV has been shown to reliably emerge in a large variety of studies and also because most of the OCP items seem to fit conceptually into the TUV's conceptual framework. However, the usual MDS methods for analyzing the intercorrelations of the OCP items are not optimal for testing the scalability of these items in accord with the four-sectors theory. What one really needs is a confirmatory MDS method that constrains the data representation to fit the theoretical expectations perfectly. The theory would be rejected if this shows that the optimal theory-compatible representation produces a marked increase in misfit. If, however, the side constraints enforced on the MDS representation to obtain this representation produce almost no additional misfit, there would be no reason to reject the theory. However, if the theory is to promote a deeper and theoretically insightful understanding of the OCP and of work values in general, the restrictions it imposes on the MDS solution must not be so weak that they are trivial to satisfy by any random partitioning of the MDS space. Therefore, we also want to show that the TUV-induced constraints are significantly different from such random partitionings. Thus, our hypotheses are:

H_1: The intercorrelations of the OCP items can be represented in a 2-dimensional MDS representation that *strictly* satisfies the TUV; the fit of this representation is only *marginally* worse than the fit for an exploratory MDS representation of these data.

H_2: The confirmatory MDS representation is *strongly* consistent with the theory-based constraints in the sense that random assignments of the OCP items to the TUV categories lead to MDS solutions with *significantly* lower fit to the data.

Most MDS programs available today do not offer the possibility of enforcing such side constraints, and no program works with side constraints that contain missing values. We therefore undertake to demonstrate how to find such a confirmatory solution with nonstandard methods.

We analyze the effects of enforcing the side constraints of the TUV onto the two-dimensional MDS representation of the OCP items both on the overall fit of the model and on the fit of each item, because not all items may fit equally well into the MDS representation of the OCP items. Indeed, some items may even resist being forced into the TUV structure. Such items may be of particular interest for further refinements of the TUV and for developing better P-O fit measures.

Finally, we also embed the OCP dimensions extracted by exploratory factor analysis into the theory-compatible MDS solution. No strong predictions can be derived to what extent this will be possible. However, some of the factors appear to be fairly similar in their loading patterns (Table 1), and experience shows that some of the loading vectors derived by factor analysis from the item intercorrelations represented in an MDS space can sometimes be fitted quite well into this MDS space. If so, one can use this as an additional springboard for interpreting the data structure.

Method

Sample. The data in this study are taken from Jehn et al. (1997). Their study was a quasi-experimental field study investigating the effects of value congruence and demographic dissimilarity for 440 participants working in 88 teams. The participants were primarily full-time employees, enrolled as part-time students at two business schools, and full-time MBA students at a third. The average age was 27.5, and 57% were male. Participants were assigned to teams of five. Each team worked as consultants to various organizations over a fourteen-week period. The values of the participants were assessed before the teams were formed. Value congruence among participants was assessed using the OCP.

Coding the OCP items in terms of the TUV. The first step in assessing the TUV predictions is to classify the OCP items, based on their content, into the categories ‘openness’, ‘conservation’, ‘self-transcendence’, and ‘self-enhancement’. We use the codings from Bilsky and Jehn (2002), displayed in “Type” column in Table 1. Note that some items could not be coded by these authors. For these items no predictions could be derived from the TUV.

Enforcing an axial partitioning onto an ordinal MDS solution. We assess the structure of the 54 OCP items by first representing their intercorrelations as distances in a 2-dimensional ordinal MDS space (Figure 2). We then partition this space so that four regions emerge, each one containing only points with the same "Type" code in Table 1, plus possibly uncoded points. Obviously, the resulting pattern does not perfectly support the TUV predictions with opposite quadrants. However, close examination of the configuration reveals that a more theory-compatible partitioning of the plane is achievable if some points were located differently. Specifically, if points 10, 35, and 36 are moved upwards on the plot by about one third of the length of the vertical coordinate axis, a partitioning that represents the two-dimensional bipolar theory almost perfectly becomes possible.

Such shifts would, of course, negatively affect the data fit. We therefore seek a solution that optimally positions all points such that the MDS solution satisfies the theoretical side constraints. To enforce such additional constraints onto the MDS configuration, we utilize an approach described in Borg and Groenen (2005) and Borg, Groenen and Mair (2010). We seek an optimal mapping of the correlations into distances of an MDS space that can be partitioned by two straight lines such that the 'openness' region (O) emerges opposite to the 'conservation' region (C), and the 'self-transcendence' region (T) emerges opposite to the 'self-enhancement' region (E).

To impose the theory-based regional side constraints onto the MDS solution, we combine the theory of constrained MDS through majorization by De Leeuw and Heiser (1980) (see also Borg & Groenen, 2005) and that of optimal scaling (see, for example, Gifi, 1990). The basic idea is to constrain the MDS solution to locate the points such that they are separated by two lines into an O-vs.-C region and an E-vs.-T region, respectively, resulting in four quadrants. These two separation lines span the 2-dimensional MDS space. They do not necessarily have to be orthogonal, nor do they have to go through the origin, although the latter might also be imposed as distances do not change under translation. To explain how this quadrant structure can be imposed in the context of MDS, we first discuss the restriction that enforces points to lie in the same quadrant and then show how this is implemented in the Stress function.

For each of the (TUV-coded) points, we know the quadrant in which it should be located. This enables us to code two new variables, y_1 and y_2, that indicate the point's quadrant in 2D (see Table 2 for the four combinations of y_1 and y_2 and the respective columns in Table 3 for this coding per variable). Instead of using y_1 and y_2 directly as MDS coordinates, we use optimal scaling and estimate the n×1 vectors $\hat{\mathbf{y}}_1$ and $\hat{\mathbf{y}}_2$. Let us focus on $\hat{\mathbf{y}}_1$. We restrict $\hat{\mathbf{y}}_1$ such that all points i with $y_{i1} = 1$ have a smaller or equal $\hat{y}_{i1}$ value than those that have $y_{i1} = 2$. Thus,

$$\hat{y}_{i1} \leq \hat{y}_{i'1} \text{ with } i \text{ those points having } y_{i1} = 1 \text{ and } i' \text{ those points having } y_{i'1} = 2. \quad (1)$$

Note that every (TUV-coded) point i has to satisfy restriction (1) with every (TUV-coded) point i', yielding a total of $n_{11}n_{12}/2$ inequality constraints, where n_{11} and n_{12} are the numbers of points having $y_{i1} = 1$ and $y_{i'1} = 2$, respectively. Usually, only some of these constraints are active. That is, for some combinations of i and i', we have $\hat{y}_{i1} = \hat{y}_{i'1}$, and the value at which this occurs is the same for all these active constraints. The restrictions on $\hat{\mathbf{y}}_2$ are defined analogously. In the optimal scaling literature, these restrictions are the same as doing an ordinal transformation with the primary approach to ties, that is, to untie the ties, albeit that in this case we have an (external) variable with only two ties each.

Note that in Table 3 there are also points i'' that are not allocated to any of the quadrants. These are the points that could not be coded into the four TUV types. For these points i'', no side restriction is imposed on their location.

The second step is to make sure that the MDS solution satisfies the four-quadrant constraints. This objective is imposed easily by the restriction that **X** has to be a linear combination of $\hat{\mathbf{y}}_1$ and $\hat{\mathbf{y}}_2$. Let $\mathbf{Y} = [\hat{\mathbf{y}}_1\ \hat{\mathbf{y}}_2]$, then we restrict **X** = **YC**. If **C** would be the identity matrix, then **X** = **Y** and the points clearly satisfy restriction (1) and this still holds for **X** = **YC** with **C** any 2×2 matrix. This combination of restrictions implies that there is a direction in the MDS space that represents $\hat{\mathbf{y}}_1$, and all projections of the points onto this line satisfy Schwartz's first dimension restriction. Hence, there exists a straight line separating the space into two half spaces, each with equal values of y_{i1}. The same holds for $\hat{\mathbf{y}}_2$ and thus for Schwartz's second dimension. Because **C** is generally not orthogonal, it is not necessary for the directions of $\hat{\mathbf{y}}_1$ and $\hat{\mathbf{y}}_2$ to be orthogonal. Thus the corresponding separation lines can also be nonorthogonal.

Now, the optimization problem to be solved is minimizing normalized raw Stress,

$$\sigma_n^2(\mathbf{Y},\mathbf{C}) = \frac{\sum_{i<j}\left(\delta_{ij} - d_{ij}(\mathbf{YC})\right)^2}{\sum_{i<j}\delta_{ij}^2} ,$$

subject to the inequality constraints in (1), where δ_{ij} is the dissimilarity between objects i and j and $d_{ij}(\mathbf{X})$ is the Euclidean distance between rows i and j of the coordinate matrix **X=YC**. For minimization, we use the iterative majorization (SMACOF) approach that allows for linear constraints (see, for example, De Leeuw & Heiser, 1980). An important feature of majorization is that $\sigma_n^2(\mathbf{Y}, \mathbf{C})$ is reduced in each iteration until convergence is reached. In almost all practical cases, this yields a local minimum (that may be the global minimum). A second advantage is that majorization can handle restrictions that have an easy solution when applied to a quadratic loss function such as ours. We implemented this algorithm in a prototype in the MatLab language.

The overall Stress of the theory-compatible solution, σ_n^2, can be decomposed into two parts (Borg & Groenen, 2005). One part is due to mismatching between the distances and the *d*-hats (Stress: lack of model fit). The other part is due to the constraints imposed on the configuration (Stress: lack of confirmation fit). This allows a more fine-grained analysis of the reasons for the increment in Stress expected as a consequence of imposing additional theoretical side constraints.

Embedding the OCP scales into the MDS solution. Another question was how the OCP scales (i.e., the factors F_i in Table 1) fit into a TUV-compatible MDS representation of the OCP items. We addressed this question by embedding these scales, one by one, as straight directed lines into the MDS space. Each such line is a linear combination of the coordinate vectors. Hence, the desired optimal embedding of the external scales can be accomplished by multiple regression, where the MDS dimensions (D_1 and D_2 of Table 3) are the predictors of each dependent variable F_i. That is, in general, $\hat{F}_i \approx a + b_1 \cdot D_1 + b_2 \cdot D_2$, for $i = 1,\ldots,8$, where "$\approx$" indicates that the unknown weights should solve the fitting in a least-squares sense. As shown in Borg and Groenen (2005), the embedded scales are most easily found by running these lines through the origin and through a second point that has as its coordinates the raw weights obtained from regressing the external scales onto D_1 and D_2, b_1 and b_2. The fit of the embedded scale $\hat{F}_i$ and the scale shown in Table 4, F_i (i = 1, ... ,8) can be assessed by correlating the corresponding scale values.

Results

The intercorrelations of the 54 items can be scaled using ordinal MDS (Figure 2). An acceptable fit was accomplished in two dimensions with σ_n^2 = .0543, which corresponds to the familiar Stress-1 = $\sqrt{\sigma_n^2}$ = 0.233. Enforcing a strictly TUV-compatible MDS solution by imposing additional side constraints led to Figure 3. This figure satisfies the requirement that the type assignments shown in Table 1 induce regions in MDS space that contain only points of one particular TUV type—or points not coded in terms of the TUV. Moreover, the solution also satisfies the regional oppositions required by the TUV, i.e., that the self-transcendence region lies opposite the self-enhancement region and conservation lies opposite openness.

The Stress-1 values of both the normal MDS solution in Figure 2 (.233) and the confirmatory solution in Figure 3 (.242) are quite high. However, the number of points, *n*, is also quite large and the correlations can be assumed to contain a certain amount of noise. This drives up the Stress values. The Shepard plot (Figure 5) provides a better sense of the fit of the confirmatory solution. It shows the ordinal transformation (the line) and the residuals (vertical distances from gray points to the line). We see that the transformation is almost linear and that most residuals are not far away from the line. Overall, this Shepard plot shows a reasonable fit. Hence, H_1 is supported.

Table 5 presents the decomposition of the overall Stress into model-related Stress and Stress due to the TUV side constraints. It reveals that almost the entire overall Stress is generated by the usual MDS representation of mapping correlations into distances (99.199%). Hardly any of the overall Stress is due to the regional side constraints imposed onto the configuration (0.801%). Thus, imposing these theory-based regional side constraints has almost no influence on the fit of the solution, even though the unconstrained configuration (Figure 1) differs somewhat from the theory-consistent configuration (Figure 3).

To see how well the individual points are represented in the theory-consistent solution (Figure 3), we consider the average Stress per point in the 'Fit' columns of Table 3. Points with a Stress-per-point of .08 or higher are shown in bold. There are two sorts of points that do not fit well: those points whose fit is clearly worse due to the theory-based regional constraints (points 10, 15, 36, 43, and 44) and those points that simply do not fit well in this MDS solution (points 12, 35, 46, 48, 49, 52, and 54). These points can be identified by comparing their fit (Stress-per-point, see Table 3) and their position in the regionally constrained solution: Points with high Stress-per-point in the constrained solution and that lie on a boundary most likely suffer from high Stress due to the constraints. Comparing the unconstrained solution Figure 2 with the theory-consistent solution in Figure 3 shows indeed that points 10, 43, 44, and 46 are in different locations.

Figure 4 portrays the OCP scales embedded into the confirmatory MDS solution. It shows that seven of eight factors fit quite well into the TUV framework. The fit of the embedded scale $\hat{F}_i$ and the scale shown in Table 4, F_i ($i = 1, \ldots, 8$), is assessed by correlating the corresponding scale values. Figure 4 shows the results graphically. Substantively, we notice two bundles of scales — F_1, F_2, F_5, and F_7 on the one hand and F_3, F_4, F_6, and F_8 on the other — that approximate the partitioning lines separating the regions induced by Schwartz's theory.

Finally, we test the statistical significance of the TUV-based quadrant assignments of the items. We do this by applying a permutation test on the quadrant assignments y_1 and y_2 of Table 3. Specifically, the permutation test compares the Stress value of the theory-consistent solution (Figure 3) with the Stress values obtained from solutions where the quadrant assignments are randomly permuted over the items. This permutation test evaluates the following hypothesis:

H_0: The MDS representation is either *not* consistent *or trivially* consistent with the theory-based side constraints, y_1 and y_2;

H_a: The MDS representation is strongly consistent with the theory-based side constraints, y_1 and y_2.

The permutation test first computes the distribution of the Stress values for 1000 MDS solutions for the given data but with different side constraints in each case. The side constraints result from randomly permuting y_1 and y_2 over the items. If H_0 is true, then the confirmatory ("unpermuted") Stress value lies somewhere in the distribution of the permuted Stress values. If H_0 is not true (hence H_a is more plausible), then the TUV-based Stress value is lower than the Stress values for permuted side constraints. Thus, this permutation test is a one-sided test (left-sided). Figure 6 presents the histogram of these Stress values for the present data. To test the hypothesis at a significance level of 1%, the 1st percentile of this permutation distribution is established (the dotted line in Figure 6) for one-sided hypothesis testing. The test statistic (p-value) is the percentile of the confirmatory MDS Stress value (the solid line in Figure 6). As can be seen, this statistic is smaller than .001; there are no permuted Stress values smaller than this value. Hence, we reject H_0 and conclude that H_a is more plausible. As it is true in any confirmatory modeling approach (e.g., in SEM fit tests), this does not prove that our model is true: It merely states that the data are significantly consistent with the TUV model.

Discussion

From a content perspective, our analyses show that the Schwartz theory (TUV) can indeed be used to structure the OCP items, at least in the sense of a coarse two-dimensional typology. Enforcing a perfect theory-compatible structure onto the MDS representation of the items pushed the Stress-1 up from 0.233 to 0.242, a quite small increment. Moreover, the solution is not only much more pleasing theoretically; it also promises to be more robust over replications because it relates to a stable law of formation rather than fitting (or over-fitting) the given data in a purely formal sense (i.e., minimizing Stress). Note too that the OCP items were constructed without reference in any way to the TUV. Hence, being able to explain the structure of these items to a substantial extent by the TUV shows the generalizability of this value theory and thereby strengthens the claim that it may identify a universal structure of values.

As noted, Bilsky and Jehn (2002) could not relate each OCP item unambiguously to the dimensions of the TUV. Table 1 lists 12 items that were unclassified. The MDS solutions can be used as an empirical foundation for speculating how the respondents perceived these items. For example, item 1 asks individuals to assess the importance of ‘flexibility’ in an ideal organization. This item emerged in the ‘self-transcendence’ region. This suggests that the respondents in our sample understood flexibility as referring primarily to promoting positive social interaction.

Other items of particular interest are those that do not fit well into the exploratory MDS plane in Figure 2 (items 15, 46, 49, 52, and 54). Bilsky and Jehn (2002) either classified them into different categories of the TUV typology (15=T, 46=O, 52=C) or did not classify them (49, 54). The classified items do indeed come out in the predicted neighborhoods, but they may address issues additional to those captured by the TUV dimensions. Different respondents may also understand them as expressing different poles of the TUV dimensions. For example, some respondents may have understood ‘having a clear guiding philosophy’ as signifying knowing what they want for themselves in the organization (related to E), whereas others may have understood it as signifying trying to place what goes on in a meaningful broad context (related to T). Another example is ‘having a good reputation’ that is located near the border of C and E implying that it expresses elements of both. One may value a good reputation both because it serves to avoid or reduce social sources of threat (C) and because it facilitates gaining or maintaining control over resources (E). Like this item, the item most similar to this one in the Schwartz Value Survey (SVS; Schwartz, 1992) , ‘preserving public image’, typically emerges on the border of ‘power’ (E) and ‘security’ (C) values. By studying the items that did not fit well into the exploratory MDS plane with methods such as cognitive pretesting (Willis, 2005), it will be possible to check the validity of the classifications and the usefulness of the particular items for measurement purposes.

Items that also deserve further attention are those that most resist being forced into the TUV constraints by generating the largest Stress-per-point values in the confirmatory MDS configuration (items 10, 43, 44, and 48). The first three of these load highly on factor F_8, the one factor that is poorly explained by the TUV dimensions (see Figure 4, $r = .31$). One possibility is that this factor picks up a value dimension that the Schwartz value theory does not include, perhaps one that is specifically work-related. Another possibility is that this factor is a methodological artifact resulting from the formal constraints of factor analysis: it is the only factor that does not correspond to any of the O'Reilly et al. (1991) factors and it collects items whose shared components are especially unclear (e.g., positive loadings of 'autonomy' as well as of 'being careful' and 'being rule oriented').

Non-fitting points can be interpreted in two ways. Either they can be taken as indicators that the theory is deficient or that it requires refinements. DeClercq et al. (2008) suggested a number of refinements of the TUV based on disagreement among experts regarding how to code OCP items into the TUV framework. In particular, they proposed adding a value type termed 'goal orientedness' to the TUV categories. They also proposed splitting 'universalism' into two subtypes, i.e. 'social commitment' and 'universalism'. These proposed refinements may reflect the need to cover all of the very broad set of values included in the 42 different instruments that DeClercq et al. (2008) examined. Note, however, that their data were codings by five TUV experts rather than the responses of managers or employees to the value measurement instruments. It would be interesting consider possible refinements of the TUV suggested by analyses of responses to multiple instruments by employees and managers.

Introducing refinements to the TUV based on responses to work value instruments should, however, be done cautiously and carefully, because they can undermine the applicability of the TUV as a universal system across life domains. Work is a particular life domain and particular worker samples respond in specific contexts. Studying assembly-line workers or marketing managers in the IT industry, for example, introduces different specific contexts, types of industries or cultures with distinctive types of values that are not universal. The data-based allocation of a work value such as ‘being reflective’ to the TUV region ‘conservation’ in our sample of part-time MBA students, for example may be specific for the (turbulent?) work context that these respondents have in mind.

At this point, a comment on the notion of “universality” in the TUV seems in order. The claim of the TUV is that the ten basic values are recognized in virtually every culture—they are basic in the sense that human beings must deal with the motivations which they express in order to function as biological and social beings embedded in groups. The claim is not that every value recognized in every culture or applicable in every setting is somehow expressed in these ten. There may well be less basic values that are unique to particular groups, cultural settings, or situations. Apparently, however, based on the research of DeClercq et al. (2008), Schwartz (1992, 2006, 2007) and others, the vast majority of value expressions found in studies of values seem to express one or more of these ten values. Our findings and those of DeClercq et al. (2008) suggest that the basic values apply well in the workplace but do not necessarily cover everything there. It may also be true that some of the OCP items are related by the respondents not to just one basic TUV value type but rather to two or more at the same time. This can make it difficult to interpret how they should be related to the TUV pattern.

Having shown that the TUV is useful for understanding the structure of the OCP data, it is nevertheless desirable to reconsider its labels. For organizational psychology at least, self-transcendence vs. self-enhancement and openness vs. conservation need some explication. These labels are therefore less than optimal for the field. In the context of organizational culture, it is desirable to relate these notions to a more gripping terminology. We suggest the labels *results vs. relations* and *risks vs. rules* as a terminology that will be more accessible to HR practitioners. The person-organization fit problem then presents itself, in a nutshell, as a two-fold dichotomy: Does the organization emphasize results or relations and does it stress risks or rules? And then, what are the individual's personal preferences in this regard? This could potentially lead to a simple organization-person fit assessment that is useful and economical for a first screening of job applicants, for example. The extent to which the 54 items of the OCP yield a more differentiated and valid assessment of an applicant when conceptualized in terms of the *results vs. relations* and *risks vs. rules* dimensions has to be studied in further research. At this point in time, it seems that most of the information in the OCP items is captured by the two TUV dimensions. Whether it pays to refine this information by using further items from a standard instrument such as the OCP, or by using more organization-specific items instead, is likely dependent on how much the particular organization deviates from a generic strategy (Schiemann, 2010).

From a methodological perspective, it is interesting that the value scales obtained from exploratory factor analysis fit reasonably well into the confirmatory MDS structure. These scales are purely descriptive and not generated by a theoretical rule with a psychological rationale. Indeed, factor analyzing OCP items is somewhat arbitrary because, for example, there is no clear-cut decision rule for the number of factors. Factor analyses reveal that such formal criteria as the eigenvalue-greater-than-one rule or the scree test do not clearly suggest extracting only eight factors. According to these rules, even more factors should be extracted, though it remains unclear exactly how many. Moreover, these factors may simply capture a maximum of whatever remains in terms of formal residual variance. Indeed, factor 8 in Table 1 seems to be such a statistical artifact, with high loadings that have no obvious substantive commonality.

From a practical point-of-view, the findings of this paper suggest that using a 54-item instrument such as the OCP is unnecessarily uneconomical. Rather, a more step-wise assessment seems more efficient. For example, in personnel selection one may first assess a respondent's position on the two TUV super-dimensions. Then, one could proceed with those persons who fit into the organization's general value orientation, and undertake more fine-grained testing. For example, when finding that a person values risks rather than rules, one need not continue if one searches for an engineer to run a nuclear power plant. If, however, the candidate values rules rather than risks, one should continue and collect more fine-grained information on this person by assessing the subdomains of the rules sector (conformity, tradition, security) or by studying his or her position on particular items that load high on F_1, F_7, or F_5. Such a step-wise approach that starts with the basic risks-vs.-rules and results-vs.-relations dimensions may also be useful for guiding qualitative interviews. Future research may concentrate on developing a reliable and valid "adaptive" instrument for this purpose.

It may also be interesting to study more closely to what extent the other 41 P-O fit instruments discussed by DeClercq et al. (2008) can be embedded into the TUV framework. What these authors show is that at least one necessary condition is satisfied, i.e. some 93% of the items can be coded into the TUV categories—indeed, even into the categories of the 10-category TUV. These codes could be simplified to our two-dimensional TUV version, and then tested as an explanatory framework for the structure of real data on the items.

References

Bilsky, W., Janik, M., & Schwartz, S. H. (in press). The structural organization of human values – Evidence from three rounds of the European Social Survey (ESS). *Journal of Cross-Cultural Psychology*.

Bilsky, W., & Jehn, K. A. (2002). Organisationskultur und individuelle Werte: Belege für eine gemeinsame Struktur. In M. Myrtek (Ed.), Die Person im biologischen und sozialen Kontext (pp. 211-228). Göttingen, Germany: Hogrefe. [Organizational culture and individual values: evidence for a common structure. See "http://Miami.uni-muenster.de/servlets/DerivateServlet/Derivate-1535/Bilsky Jehn.pdf"]

Borg, I. (1991). On the relationship between importance and satisfaction ratings on job facets. *Applied Psychology: An International Review, 40,* 81-92.

Borg, I., & Groenen, P. J. F. (2005). *Modern Multidimensional Scaling: Theory and Applications.* New York: Springer.

Borg, I., Groenen, P. J. F., & Mair, P. (2010). *Multidimensionale Skalierung*. München, Germany: Hampp.

Borg, I., & Mastrangelo, P. (2008). *Employee Surveys in Management.* Cambridge, MA: Hogrefe.

Borg, I., & Shye, S. (1995). *Facet Theory: Form and Content.* Newbury Park, CA: Sage.

Boxx, W. R., Odom, R. Y., & Dunn, M. G. (1991). Organizational values and value congruency and their impact on satisfaction, commitment, and cohesion. *Public Personnel Management, 20,* 195-205.

Bretz, R. D., & Judge, T. A. (1994). The role of human resource systems in job applicant decision processes. *Journal of Management, 20,* 531-551.

Cable, D. M., & Edwards, J. R. (2004). Complementary and supplementary fit: A theoretical and empirical investigation. *Journal of Applied Psychology, 89,* 822-834.

Chatman, J. A. (1991). Matching people and organizations: Selection and socialization in public accounting firms. *Administrative Science Quarterly, 36,* 459-484.

Chatman, J. A., & Jehn, K. A. (1994). Assessing the relationship between industry characteristics and organizational culture: how different can you be? *Academy of Management Journal, 3,* 522-553.

Davidov, E., Schmidt, P., & Schwartz, S. H. (2008). Bringing values back in: The adequacy of the European Social Survey to measure values in 20 countries. *Public Opinion Quarterly, 72,* 420-445.

De Leeuw, J., & Heiser, W. J. (1980). Multidimensional scaling with restrictions on the configuration. In P.R. Krishnaiah (Ed.), *Multivariate Analysis* (Vol. V, pp. 501-522). Amsterdam, The Netherlands: North-Holland.

DeClercq, S., Fontaine, J.R.J., & Anseel, F. (2008). In search of a comprehensive value model for assessing supplementary person-organization fit. *The Journal of Psychology*, *142*, 277-302.

Elizur, D. (1984). Facets of work values. *Journal of Applied Psychology, 69,* 379-389.

Gifi, A. (1990). *Nonlinear Multivariate Analysis.* Chichester: Wiley.

Goodman, S. A., & Svyantek, D. J. (1999). Person-organization fit and contextual performance: Do shared values matter. *Journal of Vocational Behavior, 55,* 254-275.

Howard, L. W. (1998). Validating the competing values model as a representation of organizational cultures. *The International Journal of Organizational Analysis, 6,* 231-250.

Jehn, K. A., Chadwick, C., & Thatcher, S. M. B. (1997). To agree or not to agree: the effects of value congruence, individual demographic dissimilarity, and conflict on workgroup outcome. *The International Journal of Conflict Management, 8,* 287-305.

Jurgensen, C. (1978). Job preferences (What makes a job good or bad?). *Journal of Applied Psychology, 63,* 267-276.

Kristof, A. L. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology, 49,* 1-49.

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology* (pp. 1297-1345). Chicago: Rand-McNally.

McCulloch, M. C., & Turban, D. B. (2007). Using person-organization fit to select employees for high-turnover jobs. *International Journal of Selection and Assessment, 15,* 63-71.

O'Reilly III, C. A., Chatman, J. A., & Caldwell, D. F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal, 34,* 487-516.

Patterson, M. G., West, M. A., Shackleton, V. J., Dawson, J. F., Lawthom, R., Maitlis, S., Robinson, D.L., & Wallace, A. M. (2005). Validating the organizational climate measure: links to managerial practices, productivity and innovation. *Journal of Organizational Behavior*, *26*, 379-408.

Quinn, R. E., & Rohrbaugh, J. (1983). A spatial model of effectiveness criteria: Toward a competing values approach to organizational analysis. *Management Science, 29,* 363-377.

Rokeach, M. (1973). *The Nature of Human Values.* New York: Free Press.

Schiemann, W. A. (2010). People equity: using ACE to measure, predict, and optimize performance. Paper presented at the annual SIOP conference. Atlanta, GA (April).

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology, 25,* 1-65.

Schwartz, S. H. (2006). Les valeurs de base de la personne: Théorie, mesures et applications [Basic human values: Theory, measurement, and applications]. *Revue française de sociologie, 42,* 249-288.

Schwartz, S. H. (2007). Value orientations: Measurement, antecedents and consequences across nations. In Roger Jowell, Caroline Roberts, Rory Fitzgerald & Gillian Eva, Eds. *Measuring attitudes cross-nationally: Lessons from the European Social Survey* (pp. 169-203). London: Sage.

Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology, 53,* 500-562.

Schwartz, S. H., & Bilsky, W. (1990). Toward a universal psychological structure of human values: extensions and cross-cultural replications. *Journal of Personality and Social Psychology, 58,* 878-891.

Schwartz, S. H., & Boehnke, K. (2004). Evaluating the structure of human values with confirmatory factor analysis. *Journal of Research in Personality, 38*, 230-255.

Sekiguchi, T. (2004). Person-organization fit and person-job fit in employee selection: A review of the literature. *Osaka Keidai Ronshu, 54,* 179-196.

Vancouver, J. B., & Schmitt, N. (1991). An exploratory examination of person-organization fit: Organizational goal congruence. *Personnel Psychology*. *44*, 333-352.

Willis, G. B. (2005). *Cognitive interviewing: A tool for improving questionnaire design.* Thousand Oaks, CA: Sage.

Wohlfahrtssurvey (1998). See http://www.gesis.org/dienstleistungen/daten/umfragedaten/ wohlfahrtssurvey/

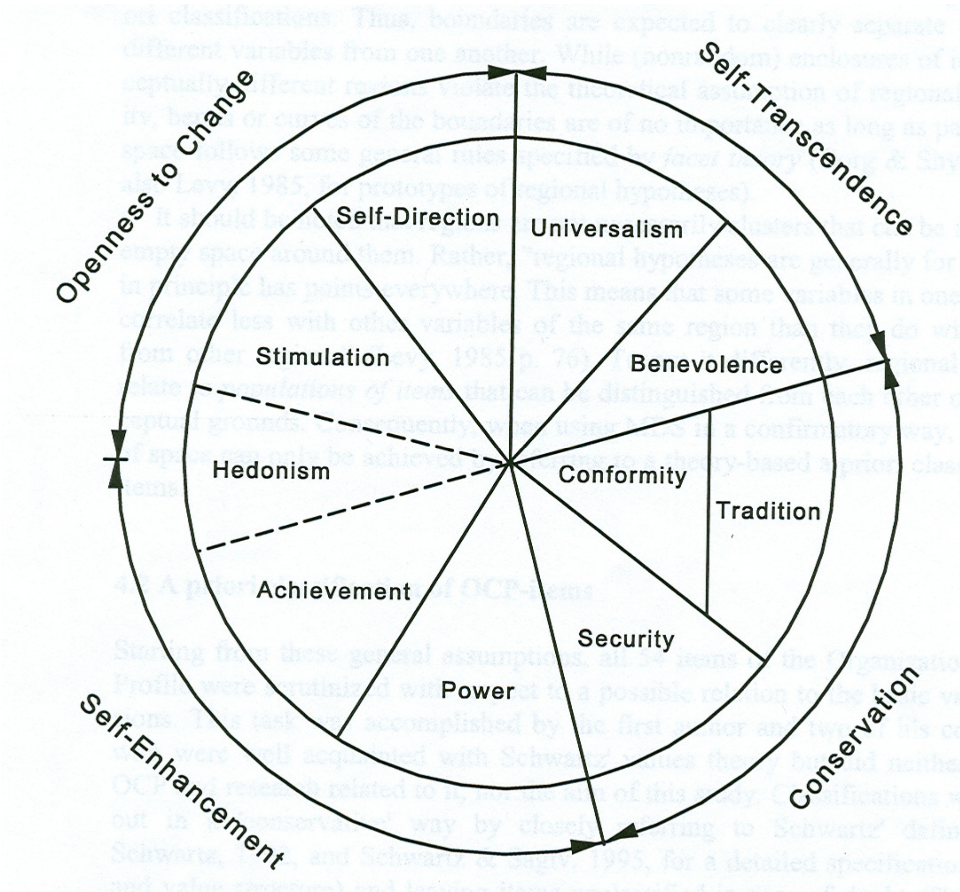

Figure 1. The Schwartz value circle.

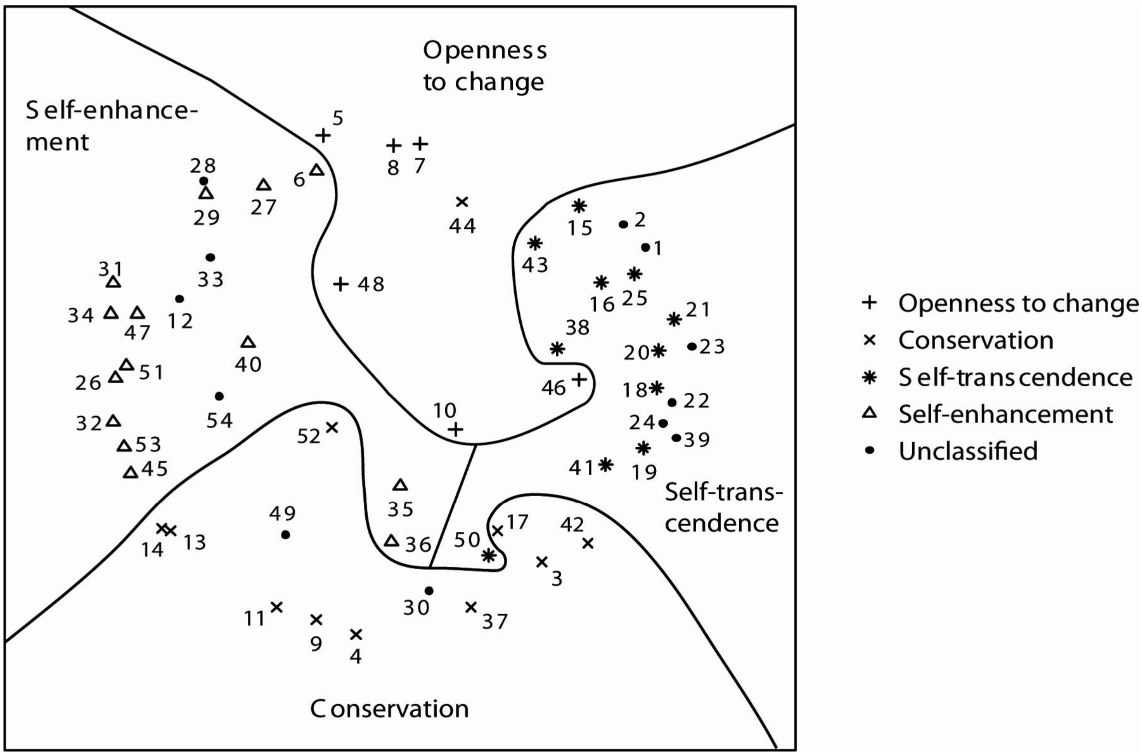

Figure 2. An MDS representation of the 54 OCP items of Table 1 (Stress=0.23) similar to the one reported by Bilsky & Jehn (2002, p. 220).

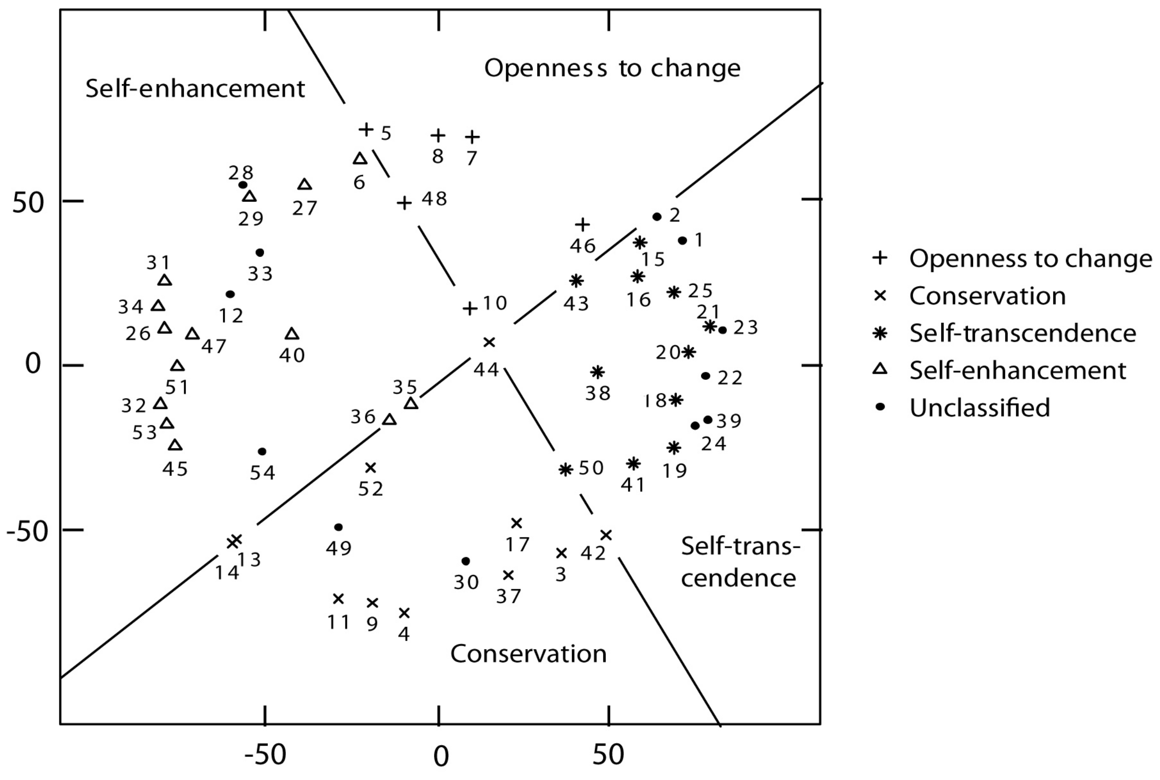

Figure 3. MDS representation for the OCP items of Jehn et al. (1997) perfectly enforcing the TUV regionality.

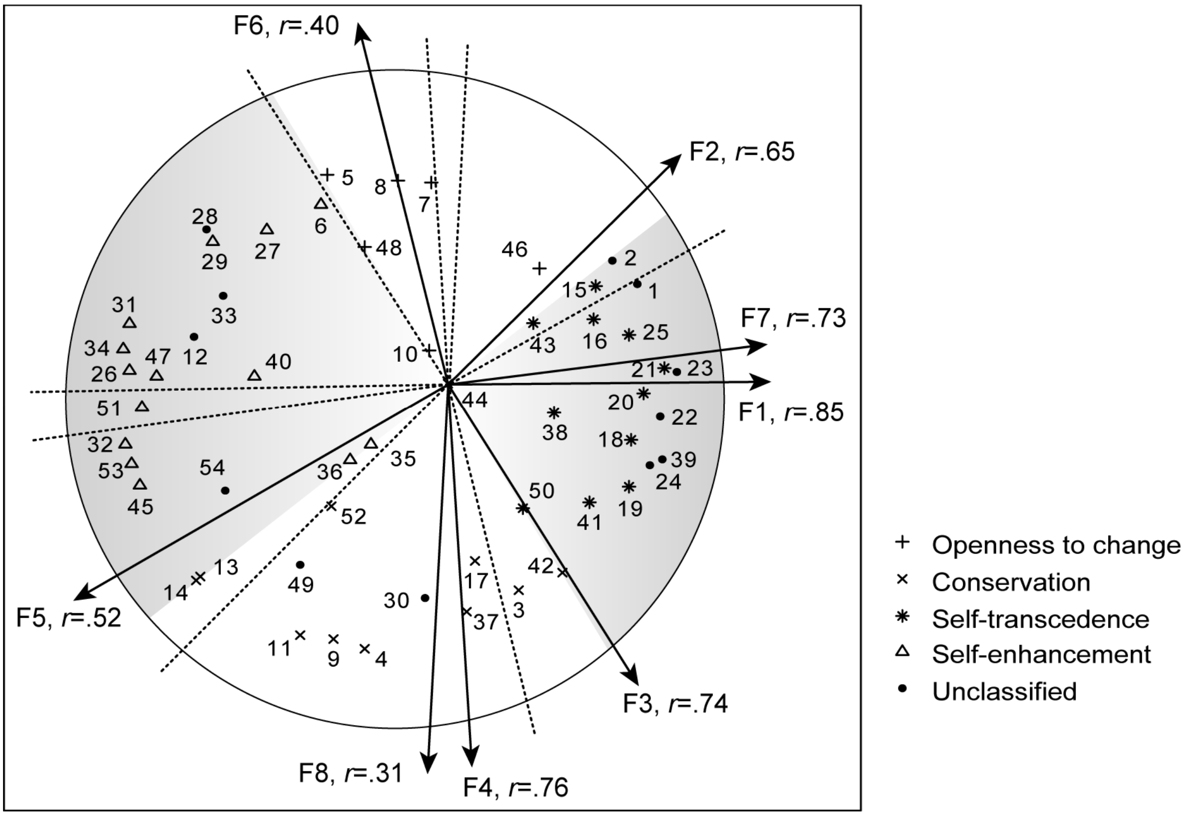

Figure 4. The MDS solution of Figure 3 with optimally embedded values scales F_1, …, F_8 of Table 1

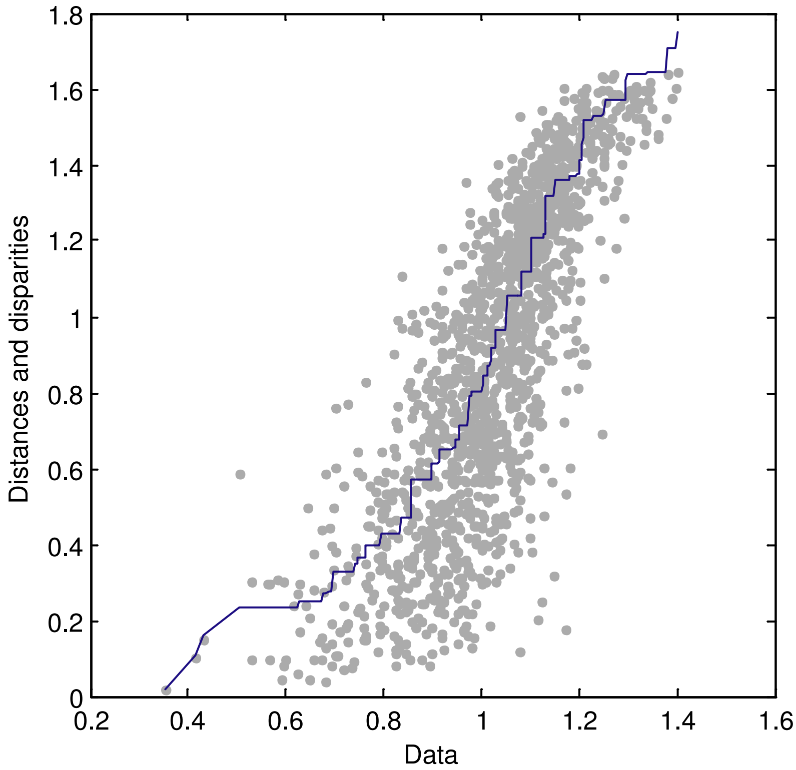

Figure 5. Shepard plot with residuals and ordinal transformation of the theory-consistent solution in Figures 3 and 4.

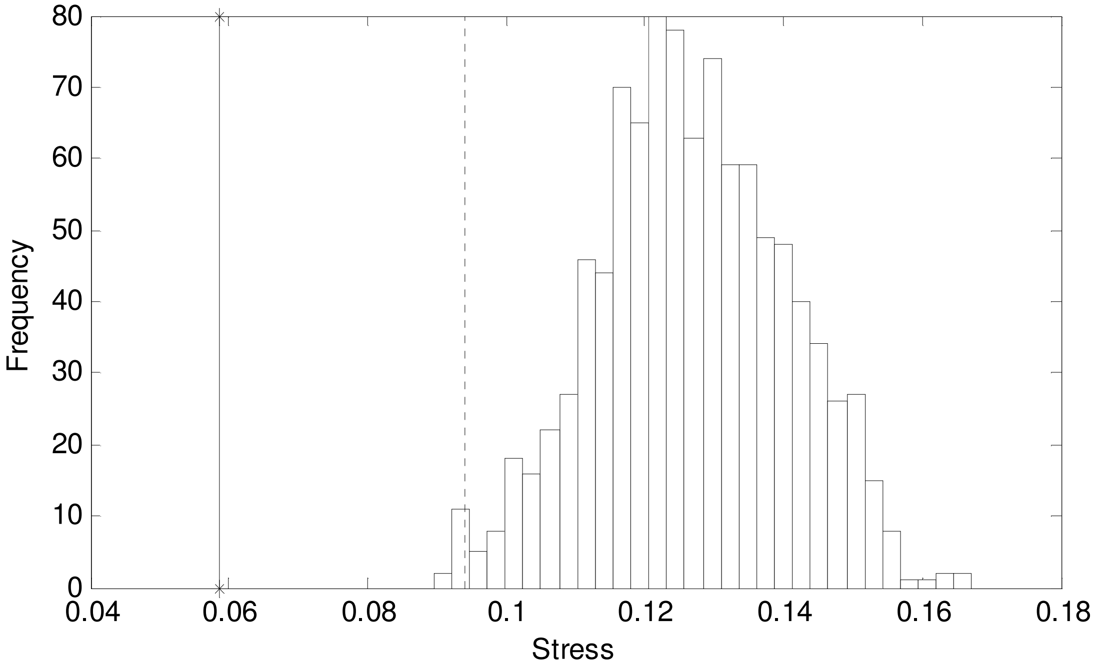

Figure 6. Distribution of (raw) Stress under random permutation of the quadrant assignments of the points; dotted line = first percentile; solid line = Stress value of the theory-based ("unpermuted") quadrant assignment.

.

Table 1. The 54 OCP items, classified as C (conservation), O (openness), T (self-transcendence), and E (self-enhancement) (Bilsky & Jehn, 2002), with the loadings (decimal points omitted) of the Jehn et al. (1997) data on eight varimax-rotated factors (F_1, …, F_8)

	Item	**Type**	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8
1	Flexibility	-	**54**	10	01	-17	-23	19	12	-04
2	Adaptability	-	**51**	11	01	-20	-28	23	05	-06
3	Stability	C	35	-24	22	13	03	-05	-06	02
4	Predictability	C	13	-24	26	31	24	-11	-21	38
5	Being innovative	O	-08	-08	-06	**-71**	-04	18	-05	-20
6	Being quick to take advantage of opportunities	E	08	-12	-09	**-56**	08	-02	-21	-00
7	A willingness to experiment	O	01	09	01	**-70**	00	10	10	11
8	Risk taking	O	-04	15	-09	**-72**	-09	-02	-00	07
9	Being careful	C	-04	-37	28	33	01	-02	-09	36
10	Autonomy	O	02	12	-05	01	04	09	12	**54**
11	Being rule oriented	C	-15	-35	22	37	-05	04	-07	37
12	Being analytical	-	-20	**-46**	-11	-24	07	22	10	10
13	Paying attention to detail	C	-15	**-72**	09	06	06	05	-06	08
14	Being precise	C	-11	**-72**	09	05	12	02	-18	10
15	Being team oriented	T	29	-09	-08	02	**-60**	04	09	-39
16	Sharing information freely	T	08	04	01	-01	**-47**	-00	31	-00
17	Emphasizing a single culture throughout the organization	C	17	-06	12	-03	-11	**-51**	-13	04
18	Being people oriented	T	26	09	15	12	**-58**	-13	07	-04
19	Fairness	T	13	03	14	05	-14	-06	**52**	10
20	Respect for the individual's right	T	14	10	08	08	-06	11	**66**	08
21	Tolerance	T	38	12	12	-03	-11	13	**49**	00
22	Informality	-	38	47	07	11	-14	03	09	33
23	Being easy going	-	**62**	37	10	03	-14	07	07	11
24	Being calm	-	**65**	10	-01	13	05	06	06	17
25	Being supportive	T	16	08	06	-05	-19	-04	**50**	-34
26	Being aggressive	E	**-52**	07	-14	-17	07	-13	**-41**	22
27	Decisiveness	E	07	12	**-63**	-02	21	04	-14	-04
28	Action orientation	-	-15	07	**-67**	-09	-05	09	-17	-13
29	Taking initiative	E	-22	01	**-52**	-15	-11	12	-10	-07
30	Being reflective	-	03	-19	23	12	33	05	28	04
31	Achievement orientation	E	-33	00	-31	08	-08	19	-38	-14
32	Being demanding	E	**-55**	-08	-02	01	25	04	-27	06
33	Taking individual responsibility	-	-30	-01	-42	12	-11	20	07	13
34	Having high expectations for performance	E	-37	-17	-20	-11	11	04	-31	-28
35	Opportunities for profess. Growth	E	-20	04	-02	08	00	**-55**	21	-10
36	High pay for good performance	E	-09	12	03	06	03	**-73**	-07	-06
37	Security of employment	C	-05	07	19	11	03	**-69**	04	23
38	Offers praise for good performance	T	05	20	-03	14	14	-20	**44**	-23
39	Low level of conflict	-	**56**	09	17	10	06	00	14	-09
40	Confronting conflict directly	E	-19	04	-25	01	19	-06	07	13
41	Developing friends at work	T	-06	31	34	19	-19	03	20	-18
42	Fitting in	C	09	34	**47**	32	-03	-01	-13	-02
43	Working in collaboration with others	T	-05	17	14	17	-16	10	23	**-49**
44	Enthusiasm for the job	O	06	16	-11	-02	-01	04	05	**-42**
45	Working long hours	E	**-53**	-09	16	06	-08	15	-21	08
46	Not being constrained by many rules	O	24	**47**	12	-16	28	-14	03	06
47	An emphasis on quality	E	-36	-08	-08	07	17	23	-17	**-45**
48	Being distinctive-different from others	O	-18	34	30	-28	29	17	-15	05
49	Having a good reputation	-	-10	08	25	09	-10	-04	-39	04
50	Being socially responsible	T	-05	14	22	16	01	-18	11	05
51	Being results oriented	E	-35	-03	-24	19	00	08	-31	-14
52	Having a clear guiding philosophy	C	14	-13	-11	17	**47**	-07	03	-31
53	Being competitive	E	-39	-01	02	05	32	05	**-44**	15
54	Being highly organized	-	10	-37	-38	30	26	10	-01	-24

Table 2. Coding of external variables needed for enforcing points to be regionally separated into quadrants.

Quadrant		y_1	y_2
1	Openness to change	1	1
2	Self-enhancement	1	2
3	Conservation	2	1
4	Self-transcendence	2	2

Table 3. OCP items, with TUV codes, coordinates of MDS solutions in Figure 2 (X_1, X_2) and Figure 4 (D_1, D_2), resp.; quadrant constraints y_1, y_2; Stress per point (Fit).

			Exploratory MDS			Confirmatory MDS					
	Item	TUV code	X_1	X_2	Fit	Quad-rant	y_1	y_2	D_1	D_2	Fit
1	Flexibility	-	68	39	.030	-	-	-	70	39	.034
2	Adaptability	-	62	46	.037	-	-	-	63	46	.039
3	Stability	C	40	-54	.070	3	2	1	35	-57	.058
4	Predictability	C	-12	-76	.050	3	2	1	-11	-76	.054
5	Being innovative	O	-22	72	.039	1	1	1	-21	73	.047
6	Being quick to take advtg. of opport'ies	E	-24	62	.062	2	1	2	-23	64	.064
7	A willingness to experiment	O	6	70	.048	1	1	1	9	71	.034
8	Risk taking	O	-2	69	.054	1	1	1	0	71	.042
9	Being careful	C	-23	-72	.039	3	2	1	-20	-73	.044
10	Autonomy	O	15	-15	**.113**	1	1	1	9	18	**.133**
11	Being rule oriented	C	-34	-68	.044	3	2	1	-30	-72	.043
12	Being analytical	-	-61	24	**.082**	-	-	-	-61	23	**.092**
13	Paying attention to detail	C	-64	-45	.044	3	2	1	-59	-54	.045
14	Being precise	C	-66	-45	.036	3	2	1	-60	-55	.040
15	Being team oriented	T	50	51	.073	4	2	2	58	38	**.097**
16	Sharing information freely	T	56	29	.046	4	2	2	57	28	.051
17	Emphasizing a single culture throughout the organization	C	27	-45	.067	3	2	1	22	-48	.068
18	Being people oriented	T	71	-3	.051	4	2	2	68	-10	.042
19	Fairness	T	67	-21	.041	4	2	2	68	-25	.039
20	Respect for the individual's right	T	72	8	.030	4	2	2	72	4	.029
21	Tolerance	T	76	17	.022	4	2	2	78	13	.022
22	Informality	-	76	-7	.037	-	-	-	77	-3	.045
23	Being easy going	-	81	10	.019	-	-	-	82	11	.021
24	Being calm	-	73	-13	.053	-	-	-	74	-18	.055
25	Being supportive	T	65	31	.035	4	2	2	68	23	.040
26	Being aggressive	E	-79	0	.071	2	1	2	-80	12	.065
27	Decisiveness	E	-38	58	.044	2	1	2	-40	56	.052
28	Action orientation	-	-54	59	.024	-	-	-	-57	56	.033
29	Taking initiative	E	-54	55	.023	2	1	2	-55	52	.034
30	Being reflective	-	8	-63	.075	-	-	-	8	-60	.068
31	Achievement orientation	E	-80	28	.030	2	1	2	-80	27	.032
32	Being demanding	E	-80	-13	.025	2	1	2	-81	-11	.026
33	Taking individual responsibility	-	-53	36	.053	-	-	-	-52	36	.056
34	Having high expect. for performance	E	-81	19	.022	2	1	2	-82	19	.023
35	Opportunities for profess. Growth	E	0	-32	**.085**	2	1	2	-8	-11	**.088**
36	High pay for good performance	E	-2	-48	.078	2	1	2	-15	-16	**.101**
37	Security of employment	C	19	-68	.042	3	2	1	19	-64	.067
38	Offers praise for good performance	T	43	9	.056	4	2	2	45	-1	.059
39	Low level of conflict	-	77	-18	.030	-	-	-	78	-17	.034
40	Confronting conflict directly	E	-42	11	.068	2	1	2	-43	10	.067
41	Developing friends at work	T	57	-26	.059	4	2	2	56	-30	.050
42	Fitting in	C	52	-49	.048	3	2	1	48	-52	.050
43	Working in collaboration with others	T	37	40	.078	4	2	2	39	26	**.091**
44	Enthusiasm for the job	O	17	52	.051	1	1	1	14	8	**.103**
45	Working long hours	E	-75	-28	.051	2	1	2	-77	-24	.058
46	Not being constrained by many rules	O	50	0	**.086**	1	1	1	41	44	**.088**
47	An emphasis on quality	E	-73	19	.044	2	1	2	-72	10	.048
48	Being distinctive-different from others	O	-17	28	**.122**	1	1	1	-10	51	**.111**
49	Having a good reputation	-	-32	-47	.077	-	-	-	-29	-49	**.091**
50	Being socially responsible	T	24	-52	.047	4	2	2	36	-31	.054
51	Being results oriented	E	-76	4	.027	2	1	2	-76	0	.025
52	Having a clear guiding philosophy	C	-19	-14	**.106**	3	2	1	-20	-31	**.102**
53	Being competitive	E	-77	-20	.027	2	1	2	-79	-17	.035
54	Being highly organized	-	-50	-5	**.117**	-	-	-	-52	-26	**.111**

Table 4. Fitting the factors of Table 1 into MDS solution of Figure 4.

	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8
Variance explained	8.1	5.7	5.3	5.5	4.2	4.1	5.7	4.5
Regression weight b_1	.45	.23	.20	.03	-.18	-.05	.32	-.01
Regression weight b_2	.01	.23	-.32	-.43	-.10	.19	.04	-.16
r (fit of F_i in confirmatory MDS space)	.85	.65	.74	.76	.52	.40	.73	.31

Note. b_1 and b_2 are regression weights to predict factor F_i as a linear combination of D_1 and D_2 of Table 3; r is multiple correlation of F_i with MDS dimensions.

Table 5. Stress decomposition of the theory-consistent model.

Source of Stress	Stress	Percentage
Lack of model fit	.05804625	99.199%
Lack of confirmation fit	.00046888	0.801%
Normalized raw Stress σ_n^2	.05851513	100.000%