Schwartz's Theory of Human Values:

Balancing Homogeneity of Reflective Items and Theoretical Coverage

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Abstract

Schwartz's theory of human values, as operationalized using different instruments such as the Portrait Values Questionnaire and the European Social Survey, was confirmed by multiple studies using Smallest Space Analysis (SSA). However, initial tests based on Confirmatory Factor Analysis (CFA) pointed to low discriminant validity of the 10 basic values. Our hypothesis is that this is not an intrinsic characteristic of the values studied, but rather the result of the selection strategy of items that maximizes theoretical coverage but pays less attention to the homogeneity of items. This hypothesis is confirmed for the Portrait Values Questionnaire in multiple tests with data from two samples. Consequently, we propose an alternative structure that consists of 15 more specific values: Tradition, Humility, Self-restraint, Norm-following, Societal security, Power, Achieving goals, Achieving recognition, Hedonism, Autonomy of action, Autonomy of thought, Stimulation, Social equality, Preservation of nature, and Benevolence. The proposal respects the conceptual complexity of the values theory and the circular structure that orders the values, but avoids contamination of composite scores and increases their predictive power. Implications for further development of the scale are drawn.

Keywords: Human values, Portrait Values Questionnaire, composite scores, validity, CFA

Introduction

The values theory developed by Shalom Schwartz has been omnipresent in the social sciences since the first publication on the topic in 1992. Individual values i.e. "*desirable, trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity*", (Schwartz, 1994: p. 21) from the theory were used to characterize individuals and social groupings (e.g., Schwartz & Rubel, 2005), to explore the interrelation between values and background variables (e.g., Schwartz & Rubel-Lifschitz, 2009), and to predict attitudes (e.g., Sagiv & Schwartz, 1995) or actual behavior (e.g., Schwartz, 2007). Schwartz's theory of values goes beyond presenting a list of individual values, and includes a structure that explains the relations of conflict and congruence between individual values. The theory has therefore also been used to analyze how an integrated system of values, rather than single values, relates to other variables (e.g. Bilsky, Janik & Schwartz, 2009).

The comprehensiveness and widespread validation of Schwartz's theory of human values also led to its inclusion in the European Social Survey (ESS[1]), which aims to develop and conduct a systematic study of changing values, attitudes, attributes and behavior patterns within Europe (Jowell, Kaase, Fitzgerald & Eva, 2007). Due to space restrictions, a shorter version of the original instrument – called the Portrait Values Questionnaire (PVQ) - was developed for the ESS. However, extensive empirical testing of the ESS instrument showed evidence of low discriminant validity (i.e. the possibility of discriminating between dissimilar values, Campbell & Fiske, 1959) for six out of the 10 values of the structure (Davidov, 2008; Davidov & Schmidt, 2007; Davidov, Schmidt & Schwartz, 2008). Only four of the original values (Hedonism, Stimulation, Self-direction, and Security) can thus be studied as such. The three studies by Davidov and his colleagues suggested grouping the remaining six values in three pairs in order to solve the problem of a lack of discriminant validity.

Meanwhile, Knoppen and Saris (2009) pointed out that the low discriminant validity observed for the same data set is not an intrinsic characteristic of the values studied, but rather the result of the selection strategy of items that maximizes theoretical coverage but pays less attention to the homogeneity of items.

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[1] http://www.europeansocialsurvey.org

The lack of homogeneity between the chosen items means that some items correlate more with items from other values than with items from the same value. Consequently, the estimated correlations between the latent variables (i.e. the values) may become close to one or even greater than one. They suggested that an alternative choice strategy, which balances theoretical coverage and homogeneity of items, would avoid the problem of low discriminant validity.

Heterogeneity within a *reflective* (rather than *formative*, Edwards & Bagozzi, 2000) set of items becomes especially problematic when researchers calculate composite scores, given that a composite score obscures which item of the value is contributing to a measured effect size (Saris & Gallhofer, 2007). Re-testing of the ESS instrument by Knoppen and Saris (2009) showed that an alternative choice strategy, targeted towards a more homogeneous set of reflective items for each individual value – while respecting theoretical coverage - would avoid contamination of composite scores and lead to better predictions.

An initial evaluation of the face validity of the original PVQ also points to several values that are reflected by items from a broad range of meanings. For example, the Power value is measured by three items:

- It is important to him to be rich. He wants to have a lot of money and expensive things.

- It is important to him to be in charge and tell others what to do. He wants people to do what he says.

- He always wants to be the one who makes the decisions. He likes to be the leader.

The first item refers to being rich, which may be a source of power but is not power itself. It could also be interpreted as one of the goals a person would like to achieve, and therefore reflects the Achievement value. The last two items, on the other hand, refer to having control over other people. The question thus arises as to whether the choice strategy of the items from the PVQ actually did involve the condition of a sufficient degree of homogeneity. However, to our knowledge, re-testing of the original PVQ has been limited, despite the numerous studies that use the PVQ to estimate relationships between values and other variables. There is thus a risk that contaminated composite scores were used within these analyses. This paper therefore aims to re-test the PVQ and evaluate the validity of each individual value.

First, we review Shalom Schwartz's theory of human values as well as their operationalization by means of the PVQ. We then suggest an alternative model for the measures of the PVQ and the method employed in our empirical study. The method builds upon Confirmatory Factor Analysis (CFA) in contrast to Smallest Space Analysis (SSA), which was the basis of previous development of the theory. Afterwards, we present the empirical results for each of the 10 basic values. Finally, we draw conclusions and mention the strengths and limitations of this study. The paper concludes with methodological issues and implications for further development of the measurement instrument.

The Values Theory of Shalom Schwartz

This section first reviews the theory of values developed by Shalom Schwartz, and concludes with the operationalization of the theory through the Portrait Values Questionnaire.

Theoretical Model

Before he produced his own values structure, Shalom Schwartz studied the structure behind 36 Rokeach values (Schwartz & Bilsky, 1987). A first organizing principle of this structure was the goal type (*terminal* values (desirable end-states of existence, such as happiness, wisdom) versus *instrumental* values (desirable modes of behaviour, such as acting honestly, earning lots of money), according to Rokeach, 1973). A second organizing principle was the distinction between seven motivational domains, which were, in mapping sequence: enjoyment, achievement, restrictive conformity, security, pro-social, maturity, and self-direction. A third organizing principle was interests served: individualistic, collectivistic and mixed interests. The 1987 study concluded by pointing out that the conceptual importance of the distinction between terminal and instrumental values seems limited (although empirical discrimination is clearly present), and that several motivational domains warrant further refinement (e.g. security) or inclusion (social power, tradition maintenance).

Following on from conclusions above, the novel 1992 structure increased the range of comprehensiveness and included 10 individual values instead of the original 7. These 10 values, like

those on Rokeach's list, were argued to stem from three sources or universal requirements: (1) the needs

of individuals as biological organisms (abbreviated as "*organism*"); (2) the requisites of coordinated

social interaction (abbreviated as "*interaction*"); and, (3) the requirements for the smooth functioning and

survival of groups (abbreviated as "*group*") (1994: p. 21). A value type can originate from one or more of

these three universal requirements, as shown in Table 1 below. Schwartz claimed this set of 10 basic

value types was exhaustive; "*It is possible to classify virtually all the items found in lists of specific values*

from different cultures […] into one of these ten motivational types of values" (1994: pp. 22-23). The last

column in Table 1 shows the single values from the initial 56-item instrument (1992).

The fact that multiple universal requirements may underlie one specific value does not facilitate the

development of a precise definition of a value; i.e. it impedes a clear demarcation of the construct. It is

therefore not surprising that to the best of our knowledge, no studies have been published that empirically

confirm this "source-structure". However, it is interesting to compare the three basic requirements with

the three motivational layers of the Maslow pyramid (1963): (1) basic needs, stemming from

physiological, safety, love and belonging, esteem, and self-realisation needs; (2) knowledge and

comprehension; (3) aesthetic needs. These three motivational layers seem to have less overlap than the

three universal requirements of Schwartz & Bilsky (1987).

Insert Table 1 about here

The ten values were presented in an – empirically derived – circular structure as shown in Figure 1.

In line with the conclusions from the 1987 study, the new structure is no longer based on the organizing

principle of goal type (terminal versus instrumental), but rather on self-enhancement versus self-

transcendence; and openness to change versus conservatism. The two orthogonal axes thus illustrate the

conflicting or enhancing relationships between the 10 basic values: the closer the two values are in either

direction around the circle, the more positive the relationship between them; the more distant they are, the

more negative their interrelationship. When a specific value is theorized to relate positively to some

phenomenon, its adjacent values will also have a positive relationship. The opposing values will meanwhile have a negative relationship with the phenomenon analyzed (Schwartz, 2002; 2004; 2007; 2009).

Insert Figure 1 about here

In order to understand the proposed circular structure in more depth, it is necessary to mention the method for arriving at the structure. Smallest Space Analysis (SSA) is a non-metric technique for the mapping of items as points in a multi-dimensional space, such that the distance between points reflects the interrelations between items. The greater the conceptual similarity between items, the more related they should be empirically, and hence the closer their locations should be in the multi-dimensional space (Guttman, 1968). Schwartz reported the following on the implications of the use of SSA: "*Because values form a motivational continuum, the decisions about exact boundaries are arbitrary. Items near the boundaries of adjacent values inevitably overlap somewhat in meaning. Consequently, in analyses in many samples, value items from adjacent types of values intermix rather then emerge in clearly distinct regions*" (Schwartz, 2009: p. 11). Furthermore, "*It is reasonable to partition the domain of value items into more or less fine-tuned distinct values according to the needs and objectives of one's analysis*" (Schwartz, 2009: p. 8). We will return to these implications later.

The Portrait Values Questionnaire

The values model of Schwartz has been operationalized in various ways over the years. The first instrument is now known as the Schwartz Value Survey (SVS) and consisted of 56 items (Schwartz, 1992). The Portrait Values Questionnaire (PVQ) is a more recent instrument that aims to reduce the cognitive complexity of the SVS, by presenting respondents with short verbal portraits of different people: the person's goals, aspirations, or wishes that point implicitly to the importance of a single value (Schwartz, Melech, Lehmann, Burgess, Harris & Owens, 2001). The portrait is drawn in two sentences.

One sentence uses wordings like: it is (very) important to him/her. The other sentence uses the words he/she thinks; he/she likes, he/she believes. For each portrait, respondents have to answer: "How much like you is this person?". Answers are given on a 6 point categorical scale (very much like me, like me, somewhat like me, a little like me, not like me, not like me at all). People are thus asked to compare the portrait to themselves, rather than themselves to the portrait, and according to Schwartz, therefore focus on the similarities rather than differences between the portrait and themselves (Schwartz, 2007). The original PVQ contains 40 items and is provided in Appendix 1.

For both the PVQ and the shorter ESS instrument, Schwartz argued that the criterion for including items was to maximize coverage of the diverse substantive components in the definition of that broad value. In other words, the greater the distance between two points in the two-dimensional space representing a specific motivational domain, the greater their theoretical coverage of that same value. For example, the universalism value was intended to include the three sub-domains of tolerance, social concern and concern for nature (Schwartz, 2009). Returning to the example of the Power value as mentioned in the Introduction, this approach may have led to situations where the subjective decision about where to draw the boundaries between the values was difficult. In that regard, Figure 2 shows that one of the two Power items is much closer to Achievement items than to the other Power item.

Insert Figure 2 about here

An Alternative Model for the Measures of the PVQ

Instead of the geometric representation of the values in a two-dimensional space using SSA, it can also be argued that the theory specifies a factor model where the theory indicates which items belong to which factor (i.e. value). In this formulation, there are therefore three items for the factor Power and four items for the factor Achievement (see appendix 1 for the specific items). For these two values, the factor model would be the simple factor structure presented in Figure 3.

Insert Figure 3 about here

This model could be extended to a ten-factor model in which the factors are the values specified in the Schwartz's theory and the indicators for each value (factor) are the items specified by the same theory (see appendix 1).

If our hypothesis that the selection strategy of items maximized the theoretical coverage but paid less attention to the homogeneity of the items is correct, then the lack of homogeneity between the chosen items leads some items to correlate more with items from other values than with items from the same value. These items would consequently better fit in the other value set than in their own set. We suggest, for example, that the "being rich"-item mentioned above would be in this situation. This means that the item would load higher on the factor Achievement than on the factor Power. This would mean that the original simple structure factor model would be misspecified, and an extra cross loading from Achievement to the "being rich"-item is required.

Another misspecification which can be anticipated is that within the set of items for one value, the lack of homogeneity is so large that the factor falls apart in two or more sub-factors; i.e. the correlation matrix of the items can be better described by a two-factor structure than by a one-factor structure. This will occur if at least two sets of items are selected for a value which are quite far away from each other in the space specified by Schwartz. In this case, one would expect to have misspecifications in the simple structure factor model because in a one-factor model this would lead to correlated errors between items which are more similar to each other than they are to the other items for that value. For example, this is the case with the Achievement value because two items, s4 and s13, seem to emphasize obtaining recognition while items s24 and s32 seem instead to suggest that a person tries to achieve his goals. If these hypotheses are correct, one would expect correlated errors for the two sets of items.

In the next sections, we will first show that the simple structure factor model does not fit the data and then we will try to detect the possible misspecifications mentioned above and discuss what this means for Schwartz's original theory. However, before we do so we will discuss how the original model can be tested and how we will go about detecting the possible misspecifications in the model.

Method

Structural Equations Modeling

The alternative model for Schwartz's Values theory is clearly a specific case of a Structural Equation Model (SEM), especially a confirmatory factor analysis model (Bollen 1989). These models can be estimated and tested using SEM software (Jöreskog, 1969). It has been common practice to base the accept/reject decision on a range of test statistics (e.g., CHI2, AGFI, GFI, SRMR, NFI, CFI, RMSEA) that all have the common shortcoming of being highly dependent upon the power of the test. To out it more precisely, the standard test can only detect misspecifications for which the test is sensitive (high power). Rejection of the model may consequently be due to very small misspecifications, and acceptance of the model does not necessarily mean that the model is correct.

In response to the increasingly widespread criticism of the (mis)use of test statistics of SEM, Saris, Satorra and Van der Veld (2009) have developed an alternative procedure that iterates between the test of misspecifications (i.e. relevant parameters that have been omitted from the model, or modeled parameters that are not present in the data) and subsequent partial modifications of the model. The misspecifications test combines knowledge of: (a) the size of the misspecification (Expected Parameter Change, EPC); (b) the impact on the fit if the parameter were included (Modification Index, MI); and (c) the sensitivity of the model in detecting the misspecification (power of the test). Both (a) and (b) are present in the output files of SEM software, while (c) is calculated based on the noncentrality parameter. The program JRULE (Judgment Rule), developed by van der Veld, Saris and Satorra (2009) facilitates the procedure. Although

we mention some of the commonly used fit measures, we will rely mainly on the program Jrule to

determine if there are misspecifications in the models and, if so, which corrections have to be made.

Samples

 We used two samples, which were previously also the basis of the Schmidt, Bamberg, Davidov,

Hermann, and Schwartz (2007) test of the PVQ instrument. Both samples consist of students from the

University of Gießen, Germany. Sample one[2] consists of 395 students and sample two[3] of 321 German

students.

Test of the Full Model

 As a preparatory analysis and for sample 1, the simple structure for the full model of 10 values was

estimated using the ML-estimator of LISREL. The test statistics indicate that the model had to be

rejected: the model with 695 degrees of freedom had a chi-square value of 2111 (RMSEA=0.072;

NFI=0.77; CFI=0.83; AGFI=0.75; RMR=0.085). The JRULE program indicated 78 possible

misspecifications in the model, which is much more than one would expect by chance if the model is

correct and for testing at .05 level. Because all tests indicate that the model has to be rejected and we had

to conclude that the model was misspecified, we continued to look at the sub-models in order to get a

picture of the misspecifications in the model.

Test of Sub-Models

 The sub-models were tested in two steps. The first step consisted of testing the factor model for each

of the values as far as that was possible. Such a test is only possible if there are more than three items

specified for a value. Only in that case is there enough information to test if the items represent one value

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[2] The data from sample 1 is in the file WERTE5A.SAV provided to us by Eldad Davidov, and collected by
Sebastian Bamberg and Peter Schmidt, University of Gießen, Germany.
[3] The data from sample 2 is in the file : 2INSTRUM.SAV provided to us by Eldad Davidov and collected by
Sebastian Bamberg and Peter Schmidt, University of Gießen, Germany.

or if more sub-factors are present in the items. In the second step, we tested each value twice; i.e. together with (a) the immediate preceding value and (b) the immediate succeeding value in the circular structure defined by Schwartz. We thus looked at the fit of the factor models for pairs of values of the PVQ. The fit, or more precisely, potential improvements of the fit were again studied using the JRULE program. Improvements in the fit stemmed from the presence of cross-loadings, which would suggest that an item reflected more than one value, and, from the presence of correlated errors between the items of the same value, which would suggest the presence of a sub-factor consisting of those items. The suggestions from JRULE were complemented with an evaluation whether the correction suggested for the model made theoretical sense. If so, we introduced the corrections into the model one by one. In order to clarify our procedure, we will illustrate it with the Power and Achievement pair of values, and data from sample 1.

In step one, we tested the one-factor model for the value Achievement only, because the value Power only had three indicators, while Achievement had four indicators. When the one-factor model was tested for Achievement, the chi-square = 19.8 with df = 2 and the program JRULE indeed suggested a sub-factor for items s4 and s13 and one for items s24 and s32. The first two emphasized "achieving recognition"; i.e. obtaining recognition from other people for one's achievement. The second two emphasize "achieving goals"; i.e. realizing one's goals even at the expense of a lot of work or effort. If these two correlated errors are introduced, the model fits the data but there is no degree of freedom left. However, one can also specify the same model as a two-factor model without correlated errors, with the advantage of having one degree of freedom left for testing. The alternative structures are illustrated in Figure 4, where (a) and (c) are one-factor models and (b) and (d) are two-factor models. Models (a) and (b) are equivalent if in model b it is assumed that the correlation between the factors is 1, and models (c) and (d) are similar for our purpose (although not equivalent in the strict statistical sense). If the correlation between the factors is very high we will use model c in the analyses; if the correlation is rather low we will use model d and in general continue with one of the two sub-factors.

Insert Figure 4 about here

The two factor model for Achievement fits well (chi-square =.19 and df=1) and JRULE no longer indicates any misspecifications. The correlation between the two factors is .8 which is high but far from 1. The two factors are different although they are related.

In the second step, the two-factor model for the values Power and Achievement is tested. Since we already know from the first step that the Achievement indicators represent two different sub-factors, we start the second step by acknowledging their presence. We chose to do this through two correlated errors in the SEM model; this is feasible because due to the combination of values, the degree of freedom is not zero (see Figure 5).

Insert Figure 5 about here

The results in Figure 5 clearly show the strength of the two correlated errors which are both significant. This shows that there are indeed two sub-factors and one may wonder whether the value Achievement should represent "Achieving recognition" or "Achieving goals". Based on the estimates in Figure 5, JRULE indicates that the fit of the model could be further improved by allowing a cross-loading of s2 on Achievement (MI=56.43; EPC=.65; Power=.99). This suggestion does not come as a surprise because this "being rich" item is too different from the other two power items that cover aspects related to "leadership". The correlation matrix also shows that s2 has a higher correlation with items from the adjacent value than with items from its own value. We therefore follow the modification suggestion from JRULE, and the Lisrel model is modified (see Figure 6).

Insert Figure 6 about here

After this correction of the model JRULE has no further suggestions for improvement of the fit. Figure 6 shows that with the introduction of the cross loading of s2, the loading of this item on the

original factor (Power) disappears. This indicates that this item is perceived more as an Achievement item than as a Power item. Comparing Figure 5 with Figure 6 also shows a decrease in the strength of the correlation between the two factors. This is due to the fact that the model is corrected for the misspecification of item s2. Such items should be avoided because they would create contamination between the composite scores of the different values.

In the analysis for the different values, we follow the same two step procedure if possible, and additionally, for each value we test two models with items of two values. For example, for Achievement, not only the pair Power and Achievement but also the pair Achievement and Hedonism is tested because they are neighboring values in the Schwartz's circular structure.

Results

This section describes the results for each of the 10 basic human values. The sub-factors that emerge from the tests are labeled and defined according to discussions with Shalom Schwartz[4].

Results for Tradition

In the first step, the items for Tradition were found to contain two sub-factors. Item s25 clearly measures Tradition and correlates most strongly with the item s20 which asked about the importance of religion. Meanwhile, there are two items measuring "humility" (i.e. recognizing and accepting one's insignificance in the universe): s9 and s38. The correlation of the two sub-factors was only .29/.31 in the two different samples. This suggests that there is not one factor behind these items, but in fact two. The correlation between both sub-factors is so low that the analysis with all four items in the second step led to serious problems. We therefore decided to continue with the first sub-factor alone.

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[4] We thank Shalom Schwartz for his open discussion with us of these results and his suggestions for interpretations of the newly specified values for the sub-factors.

With this restriction of the set of items for Tradition, the simple structure model with Conformity was tested in the second step. This model fitted the data, allowing for a correlated error between two items (s16 and s36) for Conformity.

We then tested the model in combination with Benevolence with the limited set of items for Tradition. In this case, a cross loading of the religion item (s20) on the Benevolence factor was needed. Afterwards, this model also fitted to the data.

This leads us to the following conclusions with regard to the items for Tradition: the items s9 and s38 measure a different concept - "humility" which is only minimally related with Tradition. The item s25 is a direct measure of Tradition. The religion item (s20) is a less attractive item for Tradition as it also has a cross-loading with another factor and a relative low correlation with item s25. For the value Tradition we therefore in fact see only one acceptable item, which is item s25.

Results for Conformity

For Conformity, we also had to adjust the one-factor model to a two-factor model to obtain a good fit. Items s16 and s36 measure a factor which we call "conformity through self-restraint" (i.e. avoiding to upset others) while items s7 and s28 instead measure "conformity through norm-following" (i.e. doing what is explicitly expected of you). However, in contrast to the previous topic, the correlation between the two factors was .69/.95 in the two different samples, which was still high enough to continue with a one-factor model with two correlated errors.

In the second step, Conformity was first tested in the Conformity-Tradition pair. We restricted the number of the tradition items to the two mentioned above (s25 and s20) and obtained a fitting model.

Conformity was then tested in the Conformity-Security pair. After the adjustments specified above, the model fitted the data.

We conclude that the items "avoid wrong" (s16) and "never irritate" (s36) form a sub-factor called "conformity through self-restraint". The remaining two items are another sub-factor called "conformity through norm-following". The two separated values have higher face validity than one value Conformity.

Results for Security

In the first step, a two-factor model representing Security again had to be accepted. The items s5, s21 and s31 belong to one factor and s14 and s35 to the other. The latter factor has a clear interpretation because both items indicate "societal security" (i.e. living in a society that is safe and secure). The former factor is unclear because the items are rather diverse. The correlation between the two factors is only .44/.65 for the different samples.

In the second step, Security was tested in the Conformity-Security pair. JRULE suggests cross-loadings from both "safety" (s5) and "organized and clean" (s21) on Conformity. When this change is introduced into the model, the original loadings disappear and the cross-loadings become .34/.54 (for s5) and .45/.39 (for s21). Finally, a "societal security" sub-factor consisting of the items "safe country" (s14) and "social order" (s35) seems to exist in both samples[5] (the correlation between the error terms is .33/.25 for sample 1/ 2).

Security was also tested in the Security-Power pair. This test confirms that a "societal security" sub-factor consisting of the items "safe country" (s14) and "social order" (s35) exists in both samples (correlation between error terms is .33/.30 for sample 1/ 2).

Overall, the items "safety" (s5) and "organized and clean" (s21) belong to Conformity and not to Security. The item "safe country" (s14) forms a sub-factor with the item "social order" (s35), measuring the safety of the society which seems not to be a value of people (i.e. the vast majority of people cannot influence the safety of the society). This suggests that only the item "healthy" (s31) remains an indicator for Security. However, this item does not seem to have much face validity for this value.

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[5] Please note that the second sentence in both items is the same, which also explains the correlated error.

Results for Power

The face validity of the "being rich" item (s2) is low given that it points to wealth rather than to Power. SEM testing of the one-factor model for Power was not possible because there were only three indicators used. The tests therefore started with the second step.

Power was first tested in the Power-Achievement pair of values. The "being rich" item is too different from the other two power items, which can be seen by the fact that the correlations of s2 with items from Achievement (average of .37/.44 for sample 1/ 2) are higher than with items from the same value (average of .25 in both samples). Moreover, there is a significant cross-loading from "being rich" on Achievement (.51/.52), which makes the original loading disappear (.05/.12) and the correlation between values decrease (from .64 to .58 in sample 1, and from .57 to .51 in sample 2).

Power was then tested in the Security-Power pair. Due to the unequivocal results of the previous test, the "being rich" item (s2) was excluded from the model. The correlation between the values consequently decreases (from .31 to .29 in sample 1 and from .19 to .17 in sample 2). The loadings on the remaining items remain approximately the same (0.80).

Overall, the "being rich" item (s2) does not belong to Power, but instead to Achievement. The other items seem to be correct.

Results for Achievement

For Achievement, two sub-factors were detected in the first step. The items "show abilities" (s4) and "impress people" (s13) represent "achieving recognition" (i.e. obtaining recognition from other people for one's achievement), whereas "ambitious" (s24) and "getting ahead" (s32) represent "achieving goals" (i.e. achieving one's goals even at the expense of a lot of work or effort). These two factors, however, correlated quite highly (.77/.86 in the different samples) so we continued with a model with one factor and two correlated errors.

In the second step, Achievement was first tested in the Power-Achievement pair. After these correlated errors were introduced into the model, the model fitted the data and no further corrections were necessary.

Achievement was then tested in the Hedonism-Achievement pair. This model functions correctly: the loadings of the four Achievement items are .66/.85/.56/.66 in sample 1, and .64/.87/.80/.79 in sample 2; and the correlation between both values is .18 in sample 1 and .15 in sample 2.

In overall terms, we would argue that it is possible to distinguish two different sub-factors: "achieving goals" and "achieving recognition". The former seems to be a better candidate for measuring Achievement.

Results for Hedonism

The one-factor model cannot be tested for Hedonism because of the limited number of items involved. The tests for the second step are therefore performed immediately.

In the second step, Hedonism was first tested in the Hedonism-Achievement pair. This model functions well, as seen above.

Hedonism was then tested in the Hedonism-Stimulation pair. This model functions correctly: the loadings of the three Hedonism items are .74/.43/.93 in sample 1 and .83/.71/.78 in sample 2; and, the correlation between both values is .67 in sample 1 and .68 in sample 2.

In overall terms, the Hedonism items function well.

Results for Self-direction

Testing the one-factor model for Self-direction showed that a two-factor solution is better, where s1 and s22 form one factor and s11 and s34 another. The former factor measures "autonomy of thought" (i.e. developing and cultivating one's own ideas independently) while the latter measures "autonomy of action" (i.e. making one's own decisions in life independently). The correlation between the two factors is again rather low (.41/.53 for the different samples). It is therefore impossible to speak of one factor

behind these items, and we believe that the items s11 and s34 are the best candidates for measuring Self-direction.

In the second step, Self-direction was initially tested in the Self-direction – Universalism pair. The loadings of Self-direction are low (only 2 of the 4 items >.4) in both samples. The items "own decisions" (s11) and "independent" (s34) seem to form a sub-factor which could be labeled "autonomy of action" (the correlation between error terms is .29/.36 for sample 1/ 2).

Self-direction was then tested in the Stimulation – Self direction pair. The loading of "creative" (s1) is low (.34/.49 for sample 1/ 2), which is not surprising as people who consider Self-direction important are not necessarily creative. Being creative seems more related to the Stimulation value.

In overall terms, there is not a high correlation between the items (an average of .20/.26 in sample 1/ 2). Item 1 measures creativity, and not Self-direction. The items s11 and s34 measure "autonomy of thought" and are better in that respect.

Results for Stimulation

The one-factor model cannot be tested for Stimulation because of the limited number of items. The tests in the second step are therefore performed immediately.

In the second step, Stimulation was first tested in the Hedonism - Stimulation pair. This model functions correctly, as we saw with Hedonism.

Stimulation was then tested in the Stimulation - Self-direction pair. JRULE suggests a cross-loading on "try new things" (s6) from Self-direction in sample 1. When this cross-loading is allowed, it becomes .33, while the original loading falls from .63 to .25 and the correlation between the values decreases from .55 to .27. This is weakly confirmed by sample 2 (cross loading of .29 and a decrease in correlation between values of .06).

In overall terms, when the item s6 that has cross-loadings is dropped, the remaining two items function correctly.

Results for Universalism

In the first step, the one-factor model was tested for Universalism, and this showed that a two-factor model had to be used. Items s3 and s29 correlated higher with each other than the other items and the same is true for the items s19 and s40. The remaining items, s8 and s23, were more closely related with the former items than the latter and also fitted in the first factor, albeit with rather low loadings. The first factor seems to represent a "social equality" value (i.e. living in a world in which everyone is treated equally) while the second could be interpreted as "preservation of nature" (i.e. protecting the quality of the natural environment). The correlation between the factors was .60/.67 in the different samples, which is some distance from 1. The two factors therefore in fact measure different aspects.

In the second step, Universalism was initially tested in the Universalism – Benevolence pair. JRULE suggests a cross-loading from "listening to people" (s8) on Benevolence for both samples. This suggestion makes sense, and the model was therefore adapted to allow for the cross-loading. The resulting cross-loadings are .43/.50 (for the first and second sample respectively), while at the same time the original loadings disappear (.17/.08). JRULE also suggests a cross-loading from "protect the weak" (s29) on Benevolence. This suggestion makes sense, and the model was therefore adapted to allow for the cross-loading. The resulting cross-loading is .33/.36, while at the same time the original loading decreases from .73/.74 to .53/.50.

Universalism was then tested in the Self-direction – Universalism pair. After the changes mentioned above, the model fits to the data.

In overall terms, items s3 and s29 measure "social equality". Item s19 measures "preservation of nature" and loads rather low on Universalism, but forms a sub-factor with s40. Item s8 loads more on Benevolence than on Universalism. Item s29 also loads on Benevolence, though with a lower loading then on its own value. The six items therefore cannot be used in one factor. In other words, the definition of Universalism is too wide.

Results for Benevolence

Two factors were also found for Benevolence in the first step. The item s12 and s33 form the first

factor and the items s27 and s18 the second. The second factor may represent "loyalty" (i.e. devoting

oneself to one's in-group and fulfilling implicit obligations to them out of an interest in their welfare),

while the other is less clear, and the item s33 even has a very low loading on that factor. The correlation

between the two factors is rather high (.77/.74 for the different samples). So we can proceed with a one-

factor model with correlated errors.

In the second step, the Benevolence value was initially tested in the Benevolence-Tradition pair. The

model fitted the data, after restricting the set of Tradition items and introducing a cross-loading from the

religion item (s20) to Benevolence, as explained for Tradition.

The Benevolence value was then tested in the Universalism-Benevolence pair. After allowing several

cross-loadings from Universalism items on Benevolence, the model fitted.

In overall terms, the items for the Benevolence value function well. The problems stem from the other

items rather than the Benevolence items.

Conclusions

Schwartz proposed the PVQ to measure 10 different basic values that form four higher-order values.

The scale consists of 40 items, with three to six items for each value. Prior studies used SSA to evaluate

the instrument and found for many samples across the globe that the values had the same position in the

circular structure as posited theoretically. That means that the items that are supposed to represent each

value are ordered around a circle in the two-dimensional space used to represent the values in their

hypothesized order of 10 spatial regions. This paper has evaluated the same items with SEM. More

specifically, for each value and each of two samples, we tested: (a) the one-factor structure (only for

values with more than three items); (b1) the two-factor structure with the preceding value along the

circular structure; and (b2) the two-factor structure with the succeeding value along the circular structure.

The advantage of performing multiple tests for the same value is that conclusions are based on confirmed

and compared results. The results are summarized in Table 2; the sub-values and loose items, if any, are indicated for each of the 10 broad values. Loose items have either higher cross-loadings with other values than with their own value, or low correlations with other items from the same value. We found that the items of the 10 values are rather heterogeneous, leading to the presence of multiple sub-factors and cross-loadings. This confirms the hypothesis that the items selected to measure each value when constructing the PVQ were intended to maximize coverage of the diverse substantive components in the definition of that broad value. This led to relatively low correlations between the items measuring the same value. If this occurs together with relatively high correlations with items of adjacent values, then high correlations between the values will be obtained. The same happened with data based on the ESS instrument (Knoppen & Saris, 2009).

Insert Table 2 about here

On the other hand, the problems observed can be avoided when distinguishing 15 narrower values rather than the 10 original broad values, and when avoiding loose items as shown in table 2. The narrower values are: Tradition, Humility, Self-restraint, Norm-following, Societal security, Power, Achieving goals, Achieving recognition, Hedonism, Autonomy of action, Autonomy of thought, Stimulation, Social equality, Preservation of nature, and Benevolence. The loose items that can be omitted from the instrument are: s2, s5, s6, s8, s20, s21, and s31. The proposed structure respects the conceptual complexity of the values theory and the initial intention of Shalom Schwartz to maximize theoretical coverage by the selection of heterogeneous items, because a broader range of values may be used in subsequent predictions. The proposed structure has several advantages. First, it avoids correlations that are near one and higher than one between latent variables, and therefore increases discriminant validity. Second, it avoids cross-loadings and contamination of composite scores and therefore has a higher predictive power. When the sub-factor "preserving nature" is isolated from the broader Universalism value, for example, the prediction of behavior related to preserving nature improves. This is illustrated by

comparing the correlations between the composite scores of the Universalism value and the Preserving Nature value on the one hand, and 10 items that constitute direct questions on environmental-friendly behavior on the other hand, in Table 3. The Table shows that the predictive power of the narrower Preserving Nature value is significantly higher than the broader Universalism value for every question on environmental-friendly behavior.

Insert Table 3 about here

Strengths and Limitations

The major strength of this study is that its results and conclusions are based on a combination of different methodological approaches. SEM is complemented with a novel procedure based on iterative testing of parts of the model (Saris & Gallhofer, 2008; Saris et al., 2009; van der Veld et al., 2009). Moreover, the proposal of narrower sub-factors fully respects the two-dimensional circular structure developed using SSA. In other words, the narrower values are ordered along the circular structure in line with the theoretical argument on self-enhancement versus self-transcendence; and openness to change versus conservatism. To the best of our knowledge, only one previous study has combined insights from SSA and CFA in the analysis of Schwartz's values theory (Schwartz & Boehnke, 2004), but that study did not resolve the problem of the ambiguous location of certain items.

A potential limitation may be that both samples used were from student populations. Nonetheless, this is consistent with most other tests of the PVQ. On the other hand, tests similar to those carried out in this paper have been performed with ESS data, based on probability sampling from eligible residential populations aged 15+, and confirm these findings (Knoppen & Saris, 2009).

Methodological Issues and Implications

This study highlights the necessity to combine and contrast different methodological approaches when developing a theory and its operationalization. The appeal of SSA lies in its visual power to organize values and to describe their conflicting and enhancing relationships. The consequence of following this method is that items are selected that cover the two-dimensional space as much as possible; i.e. within each region that represents a value, items that are as distant from each other as possible in the value region are selected. Meanwhile, the appeal of SEM lies in the ability to simultaneously test the operationalization of a value (i.e. its measurement model) and its external relationships with other variables (in this paper: other values and behavior), while correcting for measurement errors. As a consequence, for every value, items are suggested that are as homogeneous as possible; i.e. within each region that represents a value, items are suggested that are as near as possible. SSA and SEM thus apparently seem to foster contradictory selection principles, but this study has demonstrated that finding a balance between both the theoretical coverage and the homogeneity of items is feasible.

The results of this paper imply that composite scores based on already existing datasets must be re-considered for the narrower 15 values, as presented here, in order to avoid contamination and to improve their predictive power. The implication for future research is that a new proposal for the PVQ may be developed which guarantees maximal continuity with the original scale but covers the larger number of more narrowly defined values that may be distinguishable. Moreover, the improved scale may omit the 7 loose items that do not contribute to the calculation of composite scores, and consider the need to include additional items for those values that are reflected by less than 3 items. Overall, we hope to have provided inspiring additional thoughts for the further development of Schwartz's human values scale.

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Appendix 1: PVQ items

The codes s1-s40 in the list of items below refer to the location in the questionnaire.

<u>Benevolence</u>

s12. It's very important to him to help the people around him. He wants to care for other people.

s18. It is important to him to be loyal to his friends. He wants to devote himself to people close to him.

s27. It is important to him to respond to the needs of others. He tries to support those he knows.

s33. Forgiving people who might have wronged him is important to him. He tries to see what is good in them and not to hold a grudge.

<u>Universalism</u>

s3. He thinks it is important that every person in the world be treated equally. He wants justice for everybody, even for people he doesn't know.

s8. It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them.

s19. He strongly believes that people should care for nature. Looking after the environment is important to him.

s23.He believes all the worlds' people should live in harmony. Promoting peace among all groups in the world is important to him.

s29. He wants everyone to be treated justly, even people he doesn't know. It is important to him to protect the weak in society.

s40. It is important to him to adapt to nature and to fit into it. He believes that people should not change nature.

<u>Self-direction</u>

s1. Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.

s11. It is important to him to make his own decisions about what he does. He likes to be free to plan and to choose his activities for himself.

s22. He thinks it's important to be interested in things. He likes to be curious and to try to understand all sorts of things.

s34. It is important to him to be independent. He likes to rely on himself.

Stimulation

s6. He thinks it is important to do lots of different things in life. He always looks for new things to try.

s15. He likes to take risks. He is always looking for adventures.

s30. He likes surprises. It is important to him to have an exciting life.

Hedonism

s10. He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.

s26. Enjoying life's pleasures is important to him. He likes to 'spoil' himself.

s37. He really wants to enjoy life. Having a good time is very important to him.

Achievement

s4. It's very important to him to show his abilities. He wants people to admire what he does.

s13. Being very successful is important to him. He likes to impress other people.

s24. He thinks it is important to be ambitious. He wants to show how capable he is.

s32. Getting ahead in life is important to him. He strives to do better than others.

Power

s2. It is important to him to be rich. He wants to have a lot of money and expensive things.

s17. It is important to him to be in charge and tell others what to do. He wants people to do what he says.

s39. He always wants to be the one who makes the decisions. He likes to be the leader.

Security

s5. It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.

s14. It is very important to him that his country be safe from threats from within and without. He is concerned that social order be protected.

s21. It is important to him that things be organized and clean. He **doesn't** want things to be a mess.

s31. He tries hard to avoid getting sick. Staying healthy is very important to him.

s35. Having a stable government is important to him. He is concerned that the social order be protected.

Conformity

s7. He believes that people should do what they're told. He thinks people should follow rules at all times, even when no-one is watching.

s16. It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.

s28. It is important to him to be obedient. He believes he should always show respect to his parents and to older people.

s36. It is important to him to be polite to other people all the time. He tries never to disturb or irritate others.

Tradition

s9. He thinks it's important **not** to ask for more than what you have. He believes that people should be satisfied with what they have.

s20. Religious belief is important to him. He tries hard to do what his religion requires.

s25. He believes it is best to do things in traditional ways. It is important to him to follow the customs he has learned.

s38. It is important to him to be humble and modest. He tries not to draw attention to himself.

Figure 1 Schwartz´ Values Structure
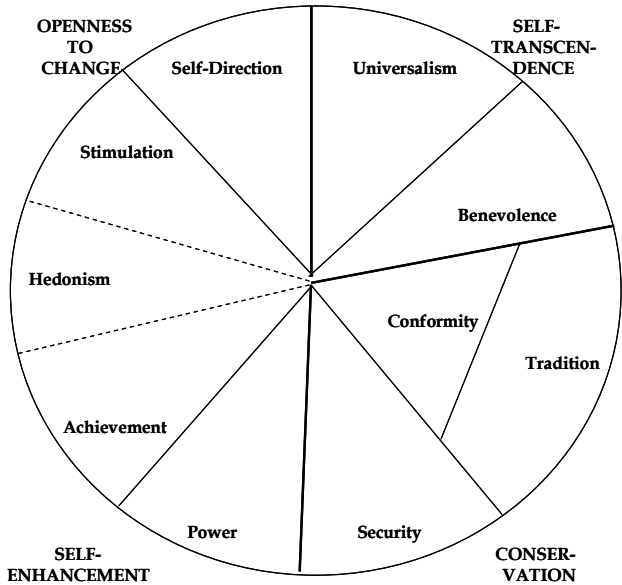
Figure 2 Graphical representation of the location of items of the 28-item PVQ instrument

(Schwartz et al., 1999)
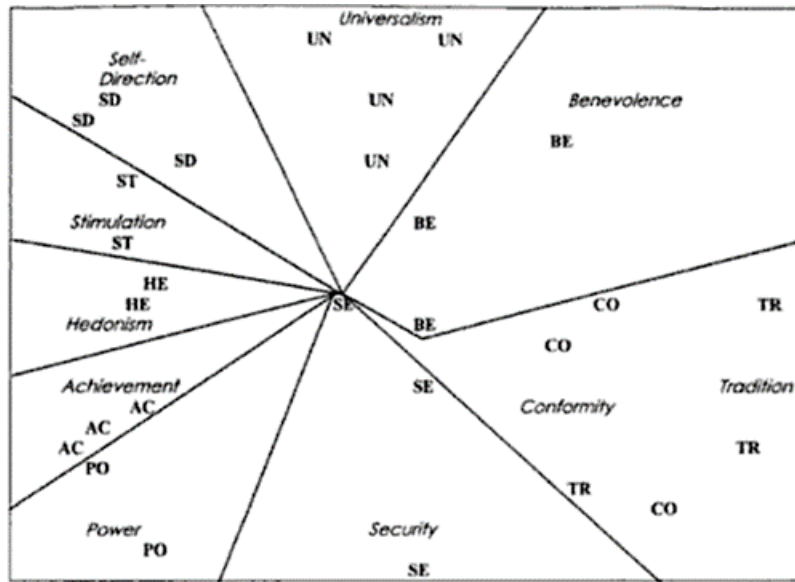
**Figure 3 The simple factor structure of Power and Achievement values**
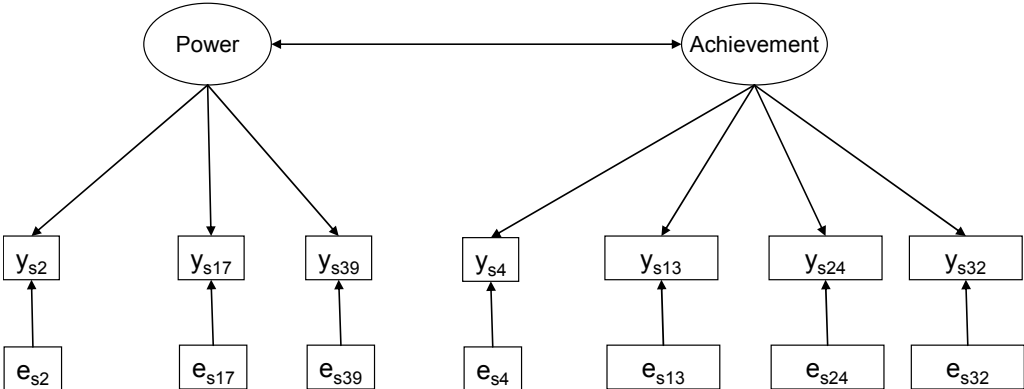
(Note: y refers to observed variables; e refers to measurement error)

Figure 4 Two similar representations of a one-factor and a two-factor model
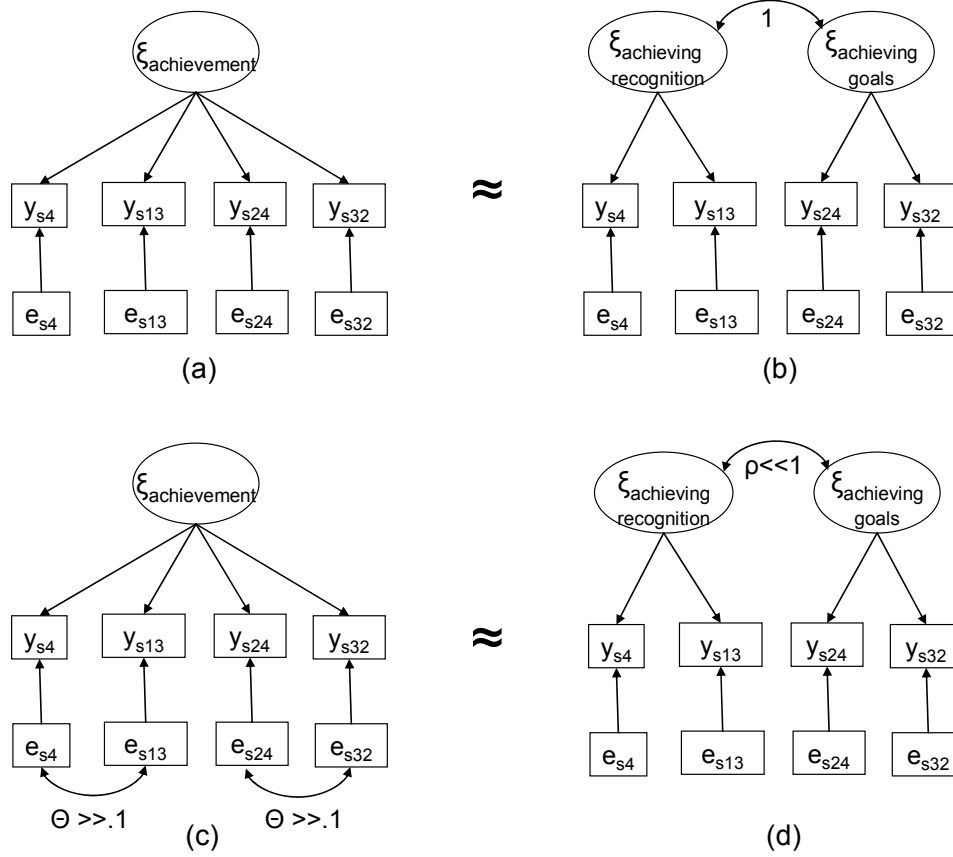
(Note: ξ refers to latent variables; y to observed variables; e to measurement error; θ refers to correlations

between error terms)

Figure 5 Two factor-structure (base model: Power - Achievement)
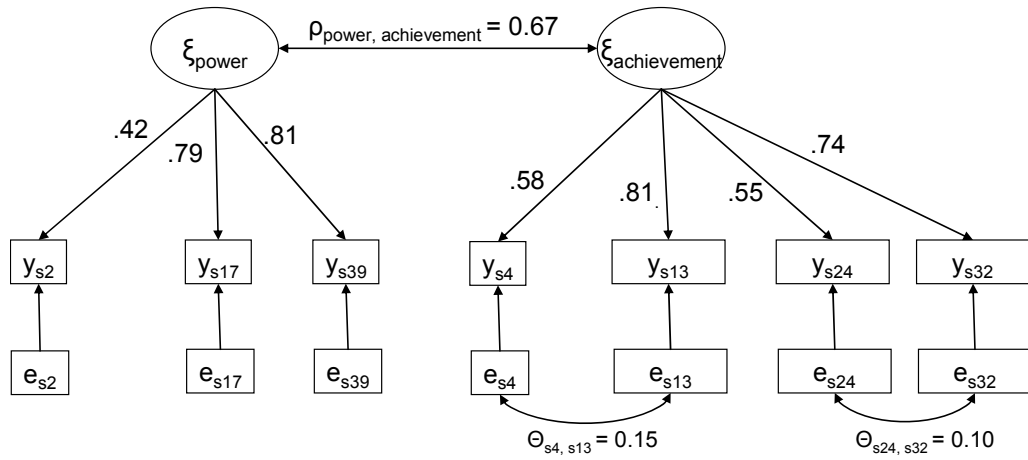
(Note: ξ refers to latent variables; ρ refers to correlation between latent variables; y refers to observed variables; e refers to measurement error; θ refers to correlations between error terms)

Figure 6 Two factor-structure (Power – Achievement, with cross-loading and corr. errors)
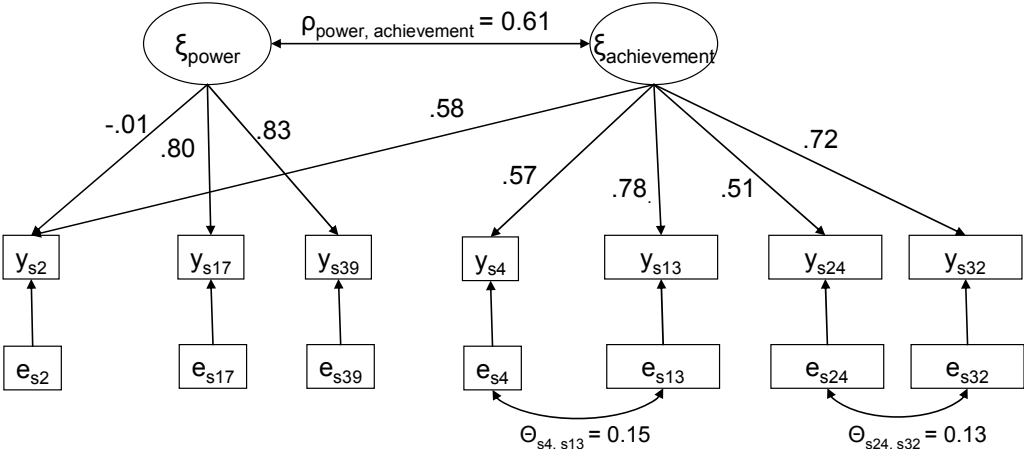
Table 1 Ten basic values and related specific values

Value type and Definition	Source	Specific values from 56-item instrument
Benevolence: Preservation and enhancement of the welfare of people with whom one is in frequent personal contact.	Organism Interaction Group	Honest, forgiving, loyal, spiritual life, helpful, responsible, meaning in life, true friendship, mature love
Universalism: Understanding, appreciation, tolerance and protection for the welfare of *all* people and for nature.	Organism Group	Inner harmony, social justice, world at peace, protect environment, equality, broad minded, unity with nature, world of beauty, wisdom
Self-direction: Independent thought and action-choosing, creating, exploring.	Organism Interaction	Self-respect, choosing own goals, creativity, curious, freedom, independent
Stimulation: Excitement, novelty and challenge in life	Organism	Exciting life, varied life, daring
Hedonism: Pleasure and sensuous gratification for oneself.	Organism	Pleasure, enjoying life
Achievement: Personal success through demonstrating competence according to social standards.	Interaction Group	Ambitious, successful, capable, intelligent, influential
Power: Social status and prestige, control or dominance over people and resources	Interaction Group	Preserving public image, social recognition, authority, wealth, social power
Security: Safety, harmony and stability of society, of relationships and of self.	Organism Interaction Group	National security, sense of belonging, reciprocation of favours, clean, social order, family security, healthy
Conformity: Restraint of actions, inclinations and impulses likely to upset or harm others and violate social expectations or norms.	Interaction Group	Obedient, honour elders, politeness, self discipline
Tradition: Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide.	Group	Accepting my portion in life, moderate, devout, detachment, respect for tradition, humble

Table 2 Overview results (labels of sub-factors in line with discussions held with Shalom Schwartz)

Original values	PVQ items	Sub-factor and items	Sub-factor and items	Loose items
1. Tradition	s9, s20, s25, s38	1. Tradition: s25	2. Humility: s9, s38	s20
2. Conformity	s7, s16, s28, s36	3. Self-restraint: s16, s36	4. Norm-following: s7, s28	
3. Security	s5, s14, s21, s31, s35	5. Societal security: s14, s25		s5, s21, s31
4. Power	s2, s17, s39	6. Power: s17, s39		s2
5. Achievement	s4, s13, s24, s32	7. Achieving goals: s24, s32	8. Achieving recognition: s4, s13	
6. Hedonism	s10, s26, s37	9. Hedonism: s10, s26, s37		
7. Self-direction	s1, s11, s22, s34	10. Autonomy of action: s11, s34	11. Autonomy of thought: s1, s22	
8. Stimulation	s6, s15, s30	12. Stimulation: s15, s30		s6
9. Universalism	s3, s8, s19, s23, s29	13. Social equality: s3, s29	14. Preservation of nature: s19, s40	s8
10. Benevolence	s12, s18, s27, s33	15. Benevolence: s12, s18, s27, s33		

Table 3 Correlations universalism items with behavior related to preservation of nature (sample 2)

Questions on environmental-friendly behavior	Universalism	Preservation of nature
During the last 5 years did you ...		
... sign a petition which required measures to protect the natural environment?	-0.282	-0.322
... donate money to an organization of environmental protection?	-0.185	-0.246
... did you boycott or avoid products of a business being convinced that it damages the environment	-0.319	-0.347
Are you member of a group that aims to conserve and protect the environment?	-0.203	-0.284
Did you read in the last 12 months a newsletter, magazine or another publication of an environmental protection group?	-0.396	-0.426
In the last twelve months how often did you ...		
... buy on purpose fruit and vegetables which were grown without chemical pesticides and fertilizers?	-0.31	-0.372
... buy on purpose paper and plastic products produced by recycled waste material?	-0.283	-0.313
... buy on purpose environmentally friendly detergents and domestic cleansers?	-0.331	-0.343
In order to protect the environment I would be willing to ...		
... pay more.	-0.336	-0.363
... accept lowering my living standard.	-0.338	-0.375

(Note: the signs of the correlations are reversed because the scale of the values is reversed)