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Testing a New Operationalization of the Basic Values in Estonia on two subpopulations: A Estonian and a Russian speaking subpopulation

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Abstract

The Theory of Basic Human Value developed by Shalom Schwartz has held a dominant place on the field of value studies for at least two decades. It has been used widely across countries and different disciplines worldwide. Despite some modest adaptations, the theory has maintained its original form.

Still, an increasing number of critical discussions have recently been published throwing doubt upon universality of its inner structure (ex. Mohler and Wohn 2005, Clercq 2006, Perrinjaquet et al. 2007, Davidov and Schmidt 2007, Davidov, Schmidt and Schwartz 2008, Davidov 2008, Knoppen and Saris 2009a, Fischer et al. 2010, Knoppen and Saris 2009b), which in turn have amplified the amount of research on methodological issues[3].

Most of these studies have proposed ways to improve raised model shortages, mainly through unification of some adjacent value types. For example several studies lead by Eldad Davidov (Davidov and Schmidt 2007, Davidov, Schmidt and Schwartz 2008, Davidov 2008), which were all based on ESS data (PVQ21), referred to the need to join 3 sets of values, which showed low discriminant validity.

In reflection to these studies Knoppen and Saris (2009a and b) showed that the given grouping of factors was a consequence of misspecifications in the model. They proved that the chosen items for the different problematic values had cross loadings on each other and when these cross loadings were ignored the correlations between the factors became very high sometimes even higher than 1.0. They also showed that an alternative model for the items of same PVQ resolved the problem of high correlations. Their results have been confirmed largely in several recent papers (Cieciuch and Schwartz 2012, Beierlein et al 2012)

Schwartz has referred to the Estonian population as one of the most deviating ones (Schwartz 1992: p 21). That fact might have been related with the existence of relatively large ethnic minority in this society, whose value structure could have been varying compared with the one of ethnic majority. Therefore, this paper will test the new model on a representative sample of the Estonia population, collected in late 2008. In doing so the equivalence of the measurement in the two subpopulations will be tested as well.

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[3] For example The Fourth Conference of the European Survey Research Association (July 2011) had 5 special sessions dedicated to human values and most of the presentations were related with methodological basis of Schwartz theory.

The Theory of Human Values of Schwartz

Schwartz (1992) has defined values as desirable, trans-situational goals, varying in importance that serve as guiding principles in people's lives. According to the Human Value Theory of Schwartz, every individual value in any culture is locatable under 10 universal, motivationally distinct basic values - *hedonism, stimulation, self- direction, security, universalism, benevolence, conformity, tradition, power and achievement* (Schwartz 1992).

There exists also a universal structure of dynamic relations among those basic values. Because pursuing one type of value, will always conflict with other types of values. Based on this kind of relations, Schwartz has outlined the circular structure of basic values as seen in Figure 1. More similar value types are close to each other and conflicting value types appear on opposite sides. Based on this opposition, value types form also two bi-polar contrasting higher-order dimensions: *self-enhancement* vs. *self- transcendence* and *openness to change* vs. *conservation* value types (Schwartz 1992, 1994).

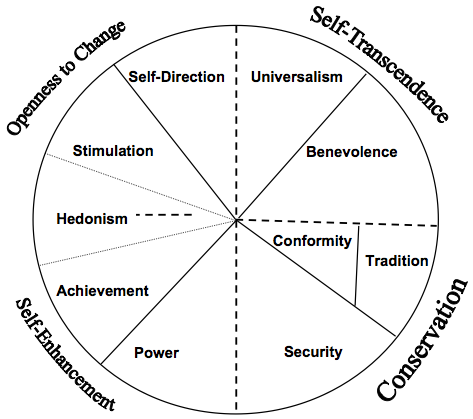

Figure 1. Circular structure of the basic values theory of Schwartz.

For the data collection, Schwartz first used a 57-item questionnaire (SVS) with abstract value labels, which he later replaced with 40-item Portrait Value Questionnaire (PVQ).

Schwartz used originally Smallest Space Analysis (SSA, a type of multidimensional scaling (MDS)) to map the circular continuum of value types in the 2-dimensional space and according to him a validation of this theoretical structure has been confirmed in more than 67 different cultures (Schwartz 1992, 2005b). Still, several critical discussions have recently been published, which have questioned its legitimacy (ex. Mohler and Wohn 2005, Clercq 2006, Perrinjaquet et al. 2007, Davidov and Schmidt 2007, Davidov, Schmidt and Schwartz 2008, Davidov 2008, Knoppen and Saris 2009a, Fischer et al. 2010, Knoppen and Saris 2009b). Although Schwartz has mentioned that some samples might not 100% fit into the structure (which in general means that some of the basic values have to be unified), cited papers refer to more systematic deviations.

SSA can be very useful in a first stage of this kind of analysis, but also has disadvantages. Important is that there is no clear criterion for determining exact boundaries between value types in a two-dimensional MDS space (Knoppen and Saris 2009a). In order to overcome this strait, many researchers have used Confirmatory Factor Analysis (CFA), which in this case gives a more formal way to separate discrete value types. While mainly confirming the circumplex structure, CFA based approaches have also revealed several deviations (Davidov and Schmidt 2007; Davidov, Schmidt and Schwartz 2008; Davidov 2008).

On the one hand, it was suggested that certain values may consist of weakly related subvalues (Schwartz & Boehnke 2004) and that between some types there might not be enough

discriminant validity (Perrinjaquet et al. 2007; Schmidt et.al. 2007). For example several studies have referred only to 7 independent basic values (Davidov and Schmidt 2007; Davidov, Schmidt and Schwartz 2008; Davidov 2008).

Unfortunately CFA has also its weaknesses, central of which is the determination of model fit. As all widely used criterions (like the chi2 test, RMSEA and CFI) ignore the power of the test, they can only detect misspecifications, for which the test is sensitive (Saris et. al. 2009). That in turn can lead to model rejection due to very small misspecification, for which the test is very sensitive, and acceptance of the wrong model due to lack of power of the test.

Schwartz has criticized CFA approach, because it contradicts the view of values as arrayed on a continuum, as it seeks to confirm relatively pure factors and each item ideally loads on only one factor (Schwartz 2011). The latter remark is not true because cross loadings are in principle allowed in CFA but in that case they have to be specified in the model. If they are ignored this represents a misspecification which lead to improper estimates like correlations larger than 1.0.

In reflection to previous studies, Saris and Knoppen (2009) proposed an alternative approach to overcome usual CFA shortcomings by analyzing the value structure in smaller parts and using different evaluation criterions.

Methodology and results of Saris & Knoppen study

Specific for the approach of Knoppen and Saris (2009a and b) is the fact, that they didn't analyze all values simultaneously, but instead used smaller sets of values to evaluate the operationalization of the different values. In their first paper (Knoppen and Saris 2009a) they analyzed short Portrait Values Questionnaire (PVQ21) included in the ESS and showed that too high correlations between several values were due to the selection process, as there was lack of homogeneity between chosen items. Later they re-analyze the large PVQ40 questionnaire and found out that the same problems appear there as well (Knoppen and Saris 2009b).

If a basic value had more than 3 items, it was tested as one-factor structure. Otherwise the two-factor structure was tested – first with the value itself and the value adjacent on one side, and then the value adjacent to it on the other side in the circular structure. So each and every value was tested either two or three times, which increased the robustness of findings (Saris & Knoppen upcoming). In figure 2 there is an example of a simple structure CFA for *power* and *achievement* value items.

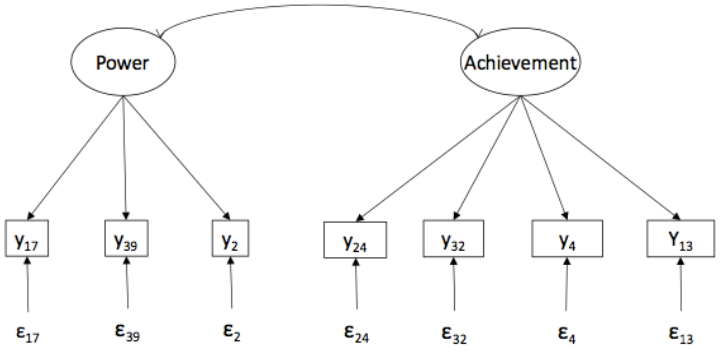

Figure 2. Simple structure factor model for the values *power* and *achievement*.

In order to test described models, they used the program JRule (Van der Veld, at. el 2009), which determines whether misspecifications are present in the specified model or not taking

into account the power of the test (Saris, at. el. 2009).

The authors revealed different kinds of deviations from the original theory. The main finding concerned the heterogeneity of the basic values. According to Knoppen and Saris, for several values the items seemed to measure different specific values, or they correlated more with items of other values than ones of their own basic values. This phenomenon explains why several studies have referred to very high correlations between adjacent values (Knoppen & Saris 2009aand b). Figure 3 gives an example of the situation, where the analyses of the data for the two values *achievement* and *power* shows two structural anomalies. First, one concerns item y2 ("being rich"), which needs an extra cross loading and correlates more with the adjacent value than with the value Power. And secondly, the broad achievement value type contains two sub-types – *achieving advancement* and *achieving recognition*.

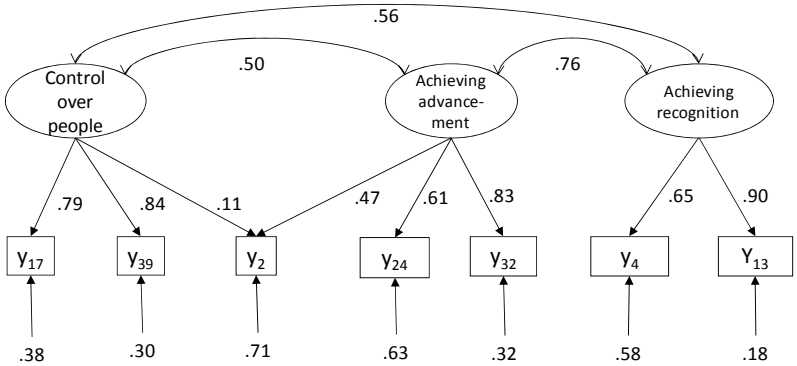

Figure 3. Parameter estimates for the original value *achievement* and *power*.

According to their analysis, Knoppen and Saris (2009a and b) suggest that the set of items of the PVQ can be split into 14 values with multiple indicators and 5 values with only one indicator and 4 items that could not be placed theoretically. This result is presented in Table 1.

Table 1. The new ordering of the items and values of the PVQ as suggested by Saris and Knoppen.

Basic values	**The new specific value**
Benevolence	
12. It's very important to him to help the people around him. He wants to care for other people.	Benevolence
18. It is important to him to be loyal to his friends. He wants to devote himself to people close to him.	Benevolence
27. It is important to him to respond to the needs of others. He tries to support those he knows.	Benevolence
33. 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.	Benevolence
Universalism	
3. 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.	Equality
8. 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.	Tolerance
19. He strongly believes that people should care for nature. Looking after the environment is important to him.	Preserving nature
23.He believes all the worlds' people should live in harmony. Promoting peace among all groups in the world is important to him.	-
29. He wants everyone to be treated justly, even people he doesn't know. It is important to him to protect the weak in society.	Equality
40. It is important to him to adapt to nature and to fit into it. He believes that people should not change nature.	Preserving nature

Self-direction	
1. Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.	Autonomy of thought
11. 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.	Autonomy of action
22. He thinks it's important to be interested in things. He likes to be curious and to try to understand all sorts of things.	Autonomy of action
34. It is important to him to be independent. He likes to rely on himself.	Autonomy of thought
Stimulation	
6. He thinks it is important to do lots of different things in life. He always looks for new things to try.	-
15. He likes to take risks. He is always looking for adventures.	Stimulation
30. He likes surprises. It is important to him to have an exciting life.	Stimulation
Hedonism	
10. He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.	Hedonism
26. Enjoying life's pleasures is important to him. He likes to 'spoil' himself.	Hedonism
37. He really wants to enjoy life. Having a good time is very important to him.	Hedonism
Achievement	
4. It's very important to him to show his abilities. He wants people to admire what he does.	Achieving recognition
13. Being very successful is important to him. He likes to impress other people.	Achieving recognition
24. He thinks it is important to be ambitious. He wants to show how capable he is.	Achieving advancement
32. Getting ahead in life is important to him. He strives to do better than others.	Achieving advancement
Power	
2. It is important to him to be rich. He wants to have a lot of money and expensive things.	Wealth
17. It is important to him to be in charge and tell others what to do. He wants people to do what he says.	Power
39. He always wants to be the one who makes the decisions. He likes to be the leader.	Power
Security	
5. It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.	Personal security
14. It is very important to him that his country be safe. He thinks the state must be on watch against threats from within and without.	Societal security
21. It is important to him that things be organized and clean. He doesn't want things to be a mess.	-
31. He tries hard to avoid getting sick. Staying healthy is very important to him.	Health
35. Having a stable government is important to him. He is concerned that the social order be protected.	Societal security
Conformity	
7. 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.	Conformity to authority
16. It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.	Conformity to expectations
28. It is important to him to be obedient. He believes he should always show respect to his parents and to older people.	Conformity to authority
36. It is important to him to be polite to other people all the time. He tries never to disturb or irritate others.	Conformity to expectations
Tradition	
9. 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.	Humility
20. Religious belief is important to him. He tries hard to do what his religion requires.	-
25. He believes it is best to do things in traditional ways. It is important to him to follow the customs he has learned.	Maintain traditions
38. It is important to him to be humble and modest. He tries not to draw attention to himself.	Humility

The new study in Estonia

The main limitation of the Knoppen & Saris study (2009b) lies in the fact, that they used two German student samples. The present paper tries to overcome this shortcoming by testing the proposed model on a representative sample of the Estonian population.

Recently Cieciuch and Schwartz (2012) used a population study in Poland to evaluate this model, Beierlein et al (2012) did the same using a German population studies. Both studies detected similar results with minor differences.

A study in Estonia is interesting because in the beginning of the 90s, testing his value model, Schwartz referred to the Estonian sample as one of a most deviating cases (Schwartz 1992: p 21). His methodology has been used in several Estonian value studies (ex. Verkasalo jt. 1994, Niit 2002, Aarelaid-Tart & Tart 2008, Tart 2008 and 2010) and none of them have pointed out structural incompatibilities. Still Aavik and Allik have specially tested validation of Estonian value structure, but they used quite untraditional lexical approach with MDS (Aavik & Allik 2002).

The main reason why Estonian data might have been different is the large Russian-speaking minority, which makes up nearly third of the population. According to the ESS data of Estonia, the difference between minority and majority perceptions are among the largest (Tart 2008), and considering also the cultural background, these two groups should be analyzed separately.

Given the situation of the value studies in the world and in Estonia in particular, there are two main reasons to study the value structure in Estonia. The first reason is that the PVQ has been applied on a representative sample of the population, which can be split up in two language subgroups – Estonian and Russian, which are both large enough to test the new model for the PVQ. The second reason is that the presence of two large subgroups speaking very different languages allows also to test for the equivalence of the measurement instruments for the values across these languages. In doing so we can also see whether the results are indeed very different in Estonia compared with the results in other studies done so far.

The methodology

The dataset used in the analysis consists of a probability sample of the Estonian population with 1240 respondents, of whom 776 (63%) were Estonian-speakers and 464 (37%) Russian-speakers. The survey response rate was over 50%. The sample structure matches rather well with population distributions with respect to some background variables, as can be seen on Table 2. The only significant difference concerns language-based groups, but this might be due fact, that there is no official data about language spoken at home and so for the population the distributions of mother language is used instead. This difference will not harm most of the analyses because they will be performed on the data of the two groups separately.

Table 2. Sample and population distributions based on gender, age group and the mother language.

	Mother language		Gender		Age group		
	Estonian-speakers	Russian-speakers	Male	Female	15-29	30-49	50+
Sample	63%	37%	44.5%	55.5%	25.2%	32.6%	42.3%
Population	69%	31%	46.0%	54.0%	26.2%	32.3%	41.6%

The data was collected in autumn 2008 using translated versions of the original PVQ 40 (Sõmer 2011).

We will first test whether the simple structure factor model based on the theory of Schwartz fits to the data. After that the model specified by Saris and Knoppen is tested for Estonian population as a whole and the two subpopulations. In testing this model we will mention the standard test statistics but we rely more on the information provided by the program Jrule with respect to the number of misspecifications in the model.

After an acceptable model has been found for both groups (configural invariance) we will also test whether the measurement instruments for the different values are equivalent. First we will test for metric invariance by assuming that the loadings are the same in the two groups and if that is so, we continue to test whether the instruments are also scalar invariant by assuming as well that the intercepts in the model are identical. Statistically these test are done in the same way using for estimation the ML estimator of LISREL and using the standard test statistics and the program Jrule to determine whether the equivalence criteria are satisfied.

Results

Testing Schwartz model

For comparisons, the original simple structure model of Schwartz with 10 basic values (and 40 items) is tested first. The ML-estimator of LISREL is used for that. Overview of main outcomes can be found from Table 3.

Table 3. The tests of the original Schwartz model with 10 specific values.

Equivalance	*Sample*	*Chi²*	*DF*	*RMSEA*	*NFI*	*CFI*	*Nr of misspec.*	*Nr of matching misspec.*
Full model	EE	4027	695	0.062	0.93	0.94	42	-
Configural	Est	4840	1390	0.063	0.91	0.94	32	14
	Rus						62	

When analysing the sample as a whole, the model has 695 degrees of freedom, chi-square=4027, RMSEA=0.062, NFI=0.93, CFI=0.94. Looking at correlations between factors, there is a very strong correlation between *hedonism* and *stimulation* (.89), *tradition* and *conformity* (.92), and *achievement* and *power* (.97). Two of them (*tradition-conformity* and *achievement-power*) match also with Davidov findings (Davidov 2008).

When analysing the samples separately and only constraining the factor structures (configural invariance), the model has 1390 degrees of freedom, chi-square=4840, RMSEA=0.063, NFI=0.91, CFI=0.94. For Estonians RMSEA=0.061, NFI=0.92 and CFI=0.94. For Russian-speakers RMSEA=0.067, NFI=0.90 and CFI=0.93. High correlations between factors can be found in both samples. Between *power* and *hedonism* the given coefficient is for Estonians even over 1.

Based on the fact, that all mentioned fit-indexes are below (NFI, CFI) or over (RMSEA) generally recognized cutoff values (Bentler & Bonett 1980; Bentler 1990; Steiger 1990), this model should be rejected. As metric and scalar invariances assume even more restrictions, there is no reason to test them. As already has been mentioned, the fit-indices may not always lead to the right judgments, so we also looked at possible misspecifications in the model.

The JRule program identified 42 possible misspecifications (EPC/D=>1) in the whole Estonian sample. In the two-group analysis of the sample Estonian-speakers had 32 misspecifications and Russian-speakers 62 misspecifications, of which 14 possible misspecifications were the same in both samples. Half of them were indications for error

correlations for items of the same value, which suggests a two-factor structure. This also confirms, that this model should be rejected.

Testing Saris & Knoppen model

Next the new 19-factor (using 36 item) structure proposed by Saris & Knoppen is tested[4]. An overview of main outcomes can be found from Table 4.

Table 4. The test of model proposed by Saris & Knoppen, with 19 specific values.

Model type	*Sample*	*Nr of model modif.*	*Chi²*	*DF*	*RMSEA*	*NFI*	*CFI*	*Nr of misspec.*	*Nr of matching misspec.*
Full model	EE	–	–	1976	0.054	0.96	0.97	29	-
2 group model	Est	0	1470	428	0.056	0.95	0.96	34	13
	Rus	0	1103	428	0.058	0.93	0.96	61	
Configural	Est	0	2575	856	0.057	0.94	0.96	34	13
	Rus							61	
	Est	CO1+CO2	2662	892	0.052	0.95	0.97	32	10
	Rus							63	
	Est	AC1+AC2	2805	926	0.057	0.94	0.96	27	8
	Rus							63	
	Est	6 correlated errors	2454	916	0.052	0.94	0.96	14	0
	Rus							40	
Metric	Est	——	2473	933	0.052	0.94	0.96	10	0
	Rus							35	
Scalar	Est	——	2847	952	0.057	0.94	0.96	9	0
	Rus							48	
	Est	3 ty	2581	949	0.053	0.94	0.96	9	0
	Rus							29	

The full Estonian sample is first analysed as one group. In this case the model has 428 degrees of freedom, chi-square=1974 and the fit indexes: RMSEA=0.054; NFI=0.96; CFI=0.97. Based on RMSEA, the model should be rejected (Steiger 1990), but at same time NFI and CFI suggest that the model is acceptable (Bentler & Bonett 1980; Bentler 1990). When comparing these general figures of the given 19-factor model with original 10-factor model, it has clearly a better fit, although it isn't perfect.

According to JRule, the model has 30 possible misspecifications of which 7 are cross-loadings and 23 correlated errors.

But as earlier mentioned, based on peculiarity of Estonian sample, before a final evaluation is made it's reasonable to split the sample into two language-based groups.

Primary the two-group model (which tests configural equivalence) has 856 degrees of freedom, chi-square=2573, RMSEA=0.057, NFI=0.94, CFI=0.96. When looking for possible misspecifications, there are 37 for Estonian-speakers, 61 for Russian- speakers and 13 of them are present in both samples, which is proportionally much less than in 10-factor model (because it had smaller number of possible misspecifications). And as all shared misspecifications are correlated errors between items of non-adjacent value types, they don't refer necessarily to structural deviations.

[4] In doing so we have fixed the loading of the items for values with only one indicator on 1 while the error variance was fixed on the value estimated with SQP2.0 (Saris et al. 2011).

When looking into strengths of relationships between factors, from one-group model two deviations become evident. There is a high correlation (1.0) between the conformity sub-values (*conformity to authority* and *conformity to expectations*) and achievement (.95) sub-values (*achieving recognition* and *achieving advancement*), which may refer to the fact that these factors should be re-unified again.

When looking at the groups separately, both Estonian- and Russian-speakers have high correlations between conformity sub-values (respectively 1.0 and >1.0), which means that apparently there is just one value and not two sub-values. But concerning *achievement*, the situation is more complicated – while for Russian-speakers *achieving recognition* and *achieving advancement* are highly correlated (.98), for Estonians a high correlation exists instead between *achieving advancement* and *power* (.98). In addition to that, there exists another deviation for Russian-speakers – a correlation larger than 1.0 between *equality and conformity to authority*, was found while for Estonians this correlation was much lower (.79). As these tendencies don't match between samples, they needed further analyses.

When unifying the sub-values *conformity to authority* and *conformity to expectations*, the chi-square increases a bit, but for Estonian-speakers, the number of misspecifications drops. And looking into correlations, for Russian-speakers the strength of the relationship between unified *conformity* factor and *equality* is normal (.80).

While the correlations between achievement sub-values have also changed – to .97 for Estonian-speakers and .89 for Russian-speakers, which raises again the question, if they should be unified. Trying this possibility out we see that indeed the fit, evaluated by the chi2 becomes worse, but the number of significant misspecifications, our criterion, decreases. Therefore we accepted this one factor solution for achievement as well; it seems that the Estonian and the Russian respondents do not see the differences between the items that the German student population saw.

Next 6 correlated errors are introduced, which are present in both samples and exist between items of different values. The model becomes acceptable, as there aren't any shared misspecifications left and the other might just be random. This suggests that configural invariance between Estonian- and Russian-speakers in Estonia holds for the Saris and Knoppen model with only two substantive modifications.

Testing metric invariance, which means restricting the factor loadings to be equal across groups, the chi-square increases expectedly, but the fit-indices remain the same and surprisingly the number of possible misspecifications decreases sharply. As there are no misspecified loadings, the metric invariance between Estonian- and Russian-speakers holds as well, which means that relationships between concepts are comparable across groups.

However, in order to be sure that one can also compare the means across the subgroups scalar invariance should also hold. This requires that in addition to the equality of the loadings, also the intercepts in the relationships between the latent variables and the observed variables are the same across groups.

Expectedly the new model has a bit lower fit compared with test of metric invariance model. JRule identifies 5 possible non-scalar intercepts for *conformity*, *achievement* and *autonomy of thought* factors. When releasing 3 of those problematic intercepts, the other two disappear and the model fit increases.

For item 16[5], that is an item of the value *conformity*, Estonian-speakers tend to give systematically .44 points higher values than Russian-speakers. Because this value has four

[5] Question wording*: It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong*.

items of which 3 are scalar invariant, this value is called partial scalar invariant. This means that the latent means can be compared across groups. The same is true for item 24[6], which is an item of the *achievement*, for what Russian speakers score .69 points higher. For item 22[7], an indicator for the value *autonomy of action*, Russian-speakers give .57 points higher evaluations. But as there are only two items for this value the means can not be compared.

For all the other intercepts JRule does not indicate a misspecification assuming that they are equal. Given that this test has high power, it can be assumed that all these intercepts are not significantly different from each other. Therefore 11 out of the 12 values with multiple indicators are scalar invariant and so the means can be compared. For the values with a single indicator one can not control the metric and scalar invariance because minimal 2 items per value are necessary for the test.

So we can conclude, that for all 12 values with multiple indicators the unstandardized relationships can be compared across the two groups while for 11 out of the 12 the means can also be compared.

Another question is if one can also compare standardized relationships across these groups? For this we should analyze the quality of items or composite scores. If quality coefficients are across groups equal, than there isn't any limitations with respect to the comparison of standardized relationships like correlation coefficients.

In our model, the standardized loadings are the quality coefficients (q), and the quality is q^2. By standardizing the loading the results presented in Appendix 1 are obtained. The qualities are varying from .18 to .75. First we can see, that for some items the qualities are extremely low - the worst ones are *conf7, trad9, univ3* and *bene33*. The same items had the lowest quality also in Saris and Knoppen study (upcoming) and thus these indicators require substitution in a next version of the PVQ. Figure 4 compares item qualities between Russian-speakers and Estonians.

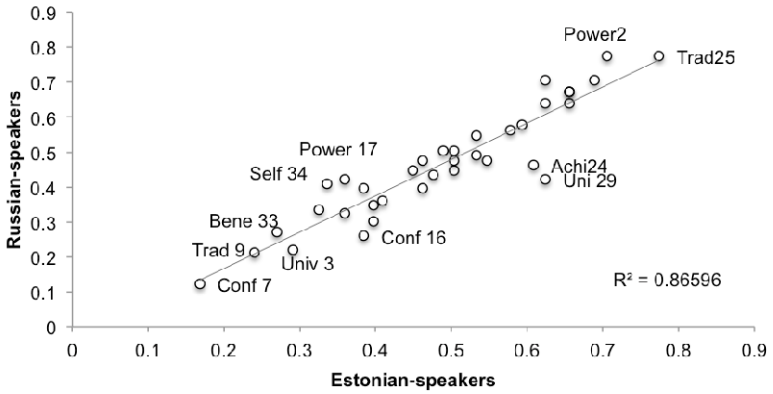

Figure 4. The relationships between the qualities of items across the two groups.

First of all we see that the R^2 between the quality coefficients of the Estonian speaking and the Russian speaking groups is .866. This shows that in general the qualities are rather similar. The most deviating items are *conf16, achi24* and *uni29*. Thus we conclude that, except for these items, the standardized relationships can be compared across these groups.

[6] *He thinks it is important to be ambitious. He wants to show how capable he is.*
[7] *He thinks it's important to be interested in things. He likes to be curious and to try to understand all sorts of things.*

Comparing the latent means and relationships across groups

As we know that these groups can be compared with respect to their latent means for 11 out of the 17 values, we will finally examine the latent means of the new value. The Figure 5 compares latent means of Estonian-speakers and Russian-speakers.

First, the comparison of the means across the groups reveals that most means are rather similar across the groups, also for some of the values measured by a single item like *health, tolerance, personal security* and *maintain tradition* but not *wealth*. However, the problem is that we do not know if the people in the two groups interpret the question in the same way. So the equalities as well as the difference in *wealth* may be misleading.

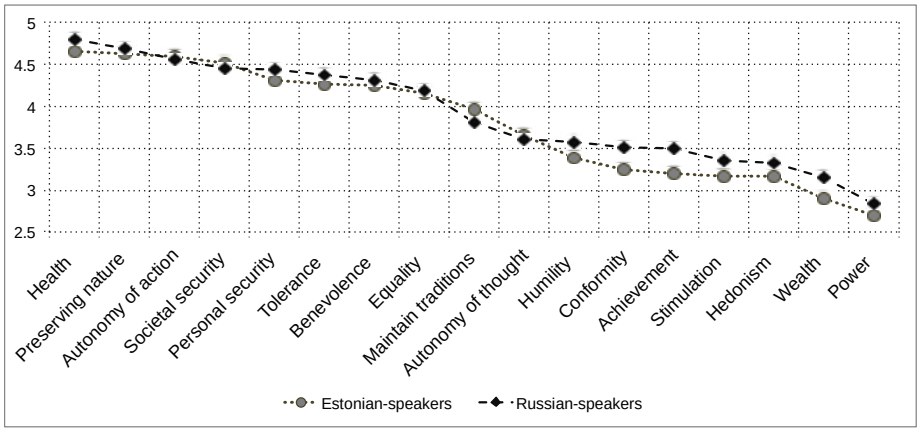

Figure 5. Comparison of latent means.

The same is true for the *autonomy of action*, which was not scalar invariant. The means for this value are nearly the same, but they can not be trusted. Maybe the equality is due to the difference in response behavior.

For the other 11 scalar invariant values the means are very comparable across groups. The largest differences are found for *achievement, conformity, humility* and *stimulation*, which are more important for Russians-speakers.

Finally Table 5 gives an overview of correlations between the 12 latent values with multiple indicators. The table shows that there are considerable differences between the two language groups with respect to correlations. For example for ethnic minority the *achievement* correlates more with *autonomy of though* (.69/.91), *autonomy of action* (.34/.57) and *equality* (.06/.28) and *equality* with *benevolence* (.74/.96). While for Estonian-speakers the higher correlations exist between the *autonomy of though* and the *autonomy of action* (.89/.52).

Table 5. Correlation matrix between latent means for Estonian-speakers and Russian-speakers.

	Humility		Confor-mity		Societal security							
Humility	1.00											
Conformity	.73	.77	1.00									
Societal security	.15	.30	.57	.69	1.00							
Power	-.41	-.36	-.04	-.07	.09	.13	1.00					
Achievement	-.39	-.19	.06	.08	.17	.30	.94	.87	1.00			
Hedonism	-.07	-.25	.12	-.05	.09	.10	.62	.68	.66	.73	1.00	
Stimulation	-.22	-.33	-.03	-.10	.03	.04	.74	.82	.74	.75	.90	.90
Autonomy of thought	-.16	-.15	.24	.30	.32	.36	.73	.78	.69	.91	.64	.73
Autonomy of action	-.08	.01	.14	.29	.27	.36	.43	.51	.34	.57	.41	.47
Equality	.47	.55	.69	.87	.57	.69	.00	.01	.06	.28	.18	.08
Preserving nature	.51	.52	.64	.61	.60	.60	.02	.16	.01	.19	.13	.10
Benevolence	.39	.52	.63	.87	.47	.60	.12	.06	.13	.23	.32	.22

	Stimulation		Autonomy of thought		Autonomy of action							
Stimulation	1.00											
Autonomy of thought	.82	.78	1.00									
Autonomy of action	.51	.52	.52	.89	1.00							
Equality	.16	.04	.46	.59	.26	.46	1.00					
Preserving nature	.11	.08	.41	.50	.30	.37	.69	.73	1.00			
Benevolence	.30	.17	.52	.53	.26	.30	.74	.96	.73	.72	1.00	

Besides, as already mentioned, for both samples there exist few very high correlations (around .95) – for Estonian-speakers between *power* and *achievement* (.94), and for Russian-speakers between *equality* and *benevolence* (.96).

Conclusion

This study shows that the alternative value-structure, proposed by Knoppen & Saris (2009a and b), fits well to the representative Estonian data. Only two minor adaptations were necessary. This showed that the Estonian population was not so different with respect to their value judgments from the other countries so far studied.

As this model has previously been tested only with a sample of German students, the present analysis shows its wider validity. And since Estonian sample consists of two very different cultural groups, it was also possible to test the model on the two subgroups as well.

The model didn't fit perfectly and for both samples the *conformity* and *achievement* sub-factors had to be re-unified. The high correlations between the sub-values are not due to cross loadings as was the case for items values. It seems that the differences between the items of Conformity and Achievement that the German students saw, are not detected by the Estonian population.

After introducing some extra minor corrections with respect to correlated errors across values, the model became acceptable, and both configural and metric invariance did hold, meaning that unstandardized relationships between these values can be compared across Estonian-speakers and Russian-speakers.

The scalar invariance test pointed out 3 deviating intercepts, but for 11 out of the 12 values with multiple indicators the means can be compared.

Comparing the means we saw that most of them are very similar, only for three values the mean evaluation of the Russian speaking population were higher than for the Estonian speaking one.

Concerning the correlations between the values quite some differences can be observed between the two groups. Whether that means that the basic circumplex model does not hold for one or both of the population requires further research.

This study also showed that for 5 values with only one indicator more items should be formulated while for some other values the quality of the indicators was rather low which requires also further research.

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Appendix 1. Item qualities.

Item	Estonian-speakers	Russian-speakers
Trad25	0.7744	0.7744
Powe2	0.7056	0.7744
Secu5	0.6889	0.7056
Powe39	0.6241	0.7056
Secu31	0.6561	0.6724
Univ8	0.6561	0.6724
Achie13	0.6561	0.64
Uni19	0.6241	0.64
Stimu15	0.5929	0.5776
Hedo10	0.5776	0.5625
Hedo37	0.5329	0.5476
Achi24	0.6084	0.4624
Uni29	0.6241	0.4225
Secu14	0.5476	0.4761
Bene27	0.5329	0.49
Secu35	0.5041	0.5041
Achi4	0.49	0.5041
Trad38	0.5041	0.4761
Achi32	0.5041	0.4489
Univ40	0.4624	0.4761
Conf36	0.4761	0.4356
Self11	0.4489	0.4489
Bene12	0.4624	0.3969
Powe17	0.36	0.4225
Stimu30	0.3844	0.3969
Hedo26	0.4096	0.36
Self34	0.3364	0.4096
Conf28	0.3969	0.3481
Bene18	0.3969	0.3025
Self1	0.36	0.3249
Self22	0.3249	0.3364
Conf16	0.3844	0.2601
Bene33	0.2704	0.2704
Univ3	0.2916	0.2209
Trad9	0.2401	0.2116
Conf7	0.1681	0.1225