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MEASUREMENT INVARIANCE OF A REFINED VALUES SCALE

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Running Head: MEASUREMENT INVARIANCE OF A REFINED VALUES SCALE

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Abstract

Several studies that measured basic human values across countries with the Portrait Values Questionnaire (PVQ-21) reported violations of measurement invariance. Such violations may hinder meaningful cross-cultural research on human values because value scores may not be comparable. Schwartz et al. (2012) proposed a refined value theory and a new instrument (PVQ-5X) to measure 19 more narrowly defined values. We tested the measurement invariance of this instrument across eight countries. Configural and metric invariance were established for all values across almost all countries. Scalar invariance was supported across nearly all countries for 10 values. The analyses revealed that the cross-country invariance properties of the values measured with the PVQ-5X are substantially better than those measured with the PVQ-21.

Keywords: human values; measurement invariance; cross-national comparison; Portrait Values Questionnaire

Schwartz (1992, 1994) defined values as broad, trans-situational goals that vary in importance and serve as guiding principles in the life of a person or group. The central proposition of the Schwartz value theory is that values form a circular motivational continuum. Values located in adjacent regions (wedges) of the circle have similar motivational content (e.g., conformity and tradition). Hence, any behavior that promotes, maintains, or defends one value (e.g., following family customs) is likely to serve the adjacent values at the same time. Values located in opposing wedges of the circle express conflicting motivations (e.g., security and stimulation). Hence, any behavior that serves one (e.g., bungee jumping, serving stimulation) is likely simultaneously to come at the expense of the opposing value (security). The assumption that values form a continuum implies that the circle of values can be partitioned for scientific convenience in many different ways. Depending on the aims of a study, one might distinguish fewer, broadly defined values or more, narrowly defined values.

The classic version of the theory (Schwartz, 1992) proposed partitioning the circular continuum into 10 basic human values or four higher order values. Recently, Schwartz et al. (2012) proposed a refined theory of human values which distinguished 19 more narrowly defined values. Some of these values derive from a finer partitioning of previous broad values (e.g., two subtypes of security, personal and societal). Others are newly discriminated values that capture a part of the motivational continuum that is situated between two of the previous broad values (e.g., 'face', between power and security in the original version). Figure 1 presents the circle of 19 narrowly defined values of the refined theory. Table 1 defines each of these values, the 10 values of the classic theory, and four higher order classifications of the values.

Figure 1 about here

Table 1 about here

To measure the original 10 values, Schwartz developed the Schwartz Value Survey (SVS, Schwartz, 1992) and both the 40-item and 21-item versions of the Portrait Value Questionnaire (PVQ, Schwartz, 2003; Schwartz et al., 2001). The first instrument for measuring the 19 values in the refined theory uses the PVQ format and contains 57 items (Schwartz et al., 2012). This instrument is called the PVQ-5X, for fifth, experimental version.¹

Studies of the original 10 values, with various PVQ versions, have been carried out in over 50 countries (e.g., Bilsky, Janik, & Schwartz, 2010; Schwartz, 2006). However, the full measurement invariance needed for meaningful cross-cultural comparison (Steenkamp & Baumgartner, 1998; Chen, 2008; Vandenberg, 2002; Vandenberg & Lance, 2000) has rarely been established. Several studies with the PVQ-21 have revealed severe violations of cross-country measurement invariance (e.g., Davidov, 2008; Davidov, 2010; Davidov, Schmidt, & Schwartz, 2008). No study has examined the measurement invariance properties of the new scale to measure 19 values.

Schwartz et al. (2012) reported that both confirmatory factor analysis (CFA) and multidimensional scaling (MDS) performed on the pooled sample of data gathered across countries supported the discrimination of the 19 values in the refined theory. They also found that the 19 values exhibited greater predictive and explanatory power than the original 10 basic values. These findings point to gains from adopting the refined theory. However, nothing is known of the measurement invariance of this instrument that measures the 19 values. Consequently, we do not know if it has better properties for cross-cultural comparisons than previous scales. The current study examines the measurement invariance properties of the first instrument developed to test the refined values theory, the PVQ-5X.

¹ The final version of this questionnaire, the PVQ-RR, is available from the fifth author.

Evidence of measurement invariance would encourage researchers to use the PVQ of the refined theory to measure values in various contexts and to collect data in different countries. We tested the measurement invariance of the PVQ-5X across eight countries. First, we briefly present the topic of measurement invariance and discuss some previous results of tests of measurement invariance with the PVQ. We then present our results and discuss their implications.

Measurement Invariance

Horn and McArdle (1992, p. 117) defined measurement invariance as “whether or not, under different conditions of observing and studying phenomena, measurement operations yield measures of the same attribute.” The most widely used method to investigate measurement invariance is multigroup confirmatory factor analysis (MGCFA, Jöreskog 1971; Bollen 1989). This method involves setting cross-group constraints and comparing more restricted models with less restricted models (Byrne, Shavelson, & Muthén 1989; Steenkamp & Baumgartner 1998). According to this method, there are three levels of measurement invariance (Vandenberg & Lance, 2000): (1) configural (all groups have the same pattern of factor loadings); (2) metric (the factor loadings are constrained to be equal across the compared groups); and (3) scalar (additionally, the indicator intercepts are constrained to be equal across groups). Metric invariance is required to compare factor covariances or unstandardized regression coefficients across groups; its presence indicates that a construct has the same metric and the same meaning across groups. Scalar invariance is required to compare construct means across groups; its presence indicates that the scales are used in a similar way in each group.²

If a model that constrains the parameters of all appropriate indicators to be equal across groups (loadings at the metric and loadings plus intercepts at the scalar level of

² Metric invariance does not allow comparing correlations meaningfully. Comparing correlations requires additionally that the variances are equal across groups (Steenkamp & Baumgartner 1998).

measurement) is acceptable, then full metric and scalar invariance are supported. Some researchers have argued, however, that partial scalar invariance (metric and scalar) is sufficient for meaningful comparisons (Byrne et al., 1989; Steenkamp & Baumgartner, 1998). Partial invariance is supported when the parameters of at least two indicators (loadings at the metric and loadings plus intercepts at the scalar level of measurement) are constrained to be equal across groups.

Findings of Previous Cross-National Measurement Invariance Tests of Values

The measurement invariance across countries of the of the PVQ-21 has been tested in several studies (e.g., Davidov, 2008; Davidov, 2010; Davidov et al., 2008; Davidov, Datler, Schmidt, & Schwartz, 2011). Tests of this instrument have been conducted on data from the European Social Survey (ESS). Davidov and colleagues found two types of problems with this scale. First, only seven values were identified at the configural level in most of the countries. It was necessary to unify some pairs of adjacent values, specifically, power with achievement, benevolence with universalism, and conformity with tradition (Davidov et al., 2008). Unifying these pairs of values did not contradict the theory because adjacent values express similar motivations and each partitioning of the continuum is arbitrary to some extent. However, it would be preferable to choose how to partition the continuum based on theoretical considerations and on the purpose of a study rather than to be constrained by the limitations of the instrument. The second problem was that metric, but not scalar, invariance was established for the seven values. Although this is sufficient for comparing associations across samples, the lack of scalar invariance implies that value means are not strictly comparable using the PVQ-21.

Knoppen and Saris (2009) challenged the idea of unifying adjacent values. They suggested that the need to unify values was not due to limitations of the theory but to the strategy used to choose the items of the PVQ-21. That strategy sought to cover the conceptual

content of the entire circle of values with as few items as possible. Consequently, the items chosen to represent each specific value were not sufficiently homogeneous (see also Saris, Knoppen, & Schwartz, 2013). This suggests that the need to unify values can be eliminated by choosing more homogenous items to measure each value. Cieciuch and Davidov (2012) followed the suggestion of Knoppen and Saris (2009) not to test all of the values in one model. Instead, they created separate models for each higher order value, applying the so-called magnifying glass strategy (Cieciuch & Schwartz, 2012). We too adopt this approach.³

The Current Study

The current study is the first to test the measurement invariance across countries of the PVQ-5X. In doing so, it is also the first to test the measurement invariance of the 19 values in the refined values theory. Three features of the PVQ-5X, made possible by the refinement of the values theory, lead us to expect a higher level of measurement invariance than found with the PVQ-21: (1) The items chosen to measure each value are more homogeneous because the values are defined more narrowly. (2) There are more indicators per value (three) than in the PVQ-21. (3) The narrower values can be combined to measure the original ten values with even more indicators per value (6-9 (Cieciuch, Davidov, Vecchione, & Schwartz, in press)). We therefore formulate the following two expectations:

1. Configural and metric measurement invariance will be established for all values.
2. Scalar measurement invariance will be supported for at least several values.

Methods

Samples and Procedure

We collected data during 2010 in the following countries: Finland ($N = 334$, 65% female, $M_{\text{age}} = 42.3$, $SD_{\text{age}} = 6.1$), Germany ($N = 325$, 77% female, $M_{\text{age}} = 23.4$, $SD_{\text{age}} = 5.0$), Israel ($N = 394$, 65% female, $M_{\text{age}} = 25.7$, $SD_{\text{age}} = 6.2$), Italy ($N = 388$, 59% female, $M_{\text{age}} =$

³ In the only test of cross-sample invariance of the PVQ-40, Cieciuch and Davidov (2012) established scalar invariance across two countries, Poland and Germany, for all values except stimulation.

35.6, $SD_{age} = 14.5$), New Zealand ($N = 527$, 68% female, $M_{age} = 19.5$, $SD_{age} = 4.2$), Poland ($N = 547$, 66% female, $M_{age} = 27.0$, $SD_{age} = 10.0$), Portugal ($N = 295$, 58% female, $M_{age} = 27.0$, $SD_{age} = 10.4$), and Switzerland ($N = 201$, 70% female, $M_{age} = 28.8$, $SD_{age} = 7.7$). Researchers (or instructed assistants) gathered data through self-report questionnaires. Participation was voluntary and respondents were assured that their responses would be kept anonymous. In New Zealand, Israel, Switzerland, and partially in Portugal, the data were gathered on-line, whereas a written format was used in the other countries (further details are available from the first author).

Questionnaire

The PVQ-5X (Schwartz et al., 2012) contains three items to measure each of the 19 values. Like previous version of the PVQ, each item describes a person in terms of his/her values and respondents are asked to rate “*How much is this person like you*” on a scale ranging from 1 (*not like me at all*) to 6 (*very much like me*). Unlike previous PVQ versions, each item contains only one sentence. Multi-language versions of the PVQ-5X were prepared using an iterative process of translation and back-translation until the author of the survey and native speakers agreed that the translation optimally captured the nuances of each item.

Schwartz et al. (2012) excluded nine items based on multidimensional scaling and confirmatory factor analyses performed on the pooled within-sample covariance matrix. We included in our analyses only the 48 items which they retained. Most values were measured by three indicators and the rest with two. The items included in the current study as well as the scale we recommend are available from the fifth author .

Statistical Analyses

The analyses consisted of three steps:

1. Following Byrne (2004), we performed a CFA separately in each country prior to testing measurement invariance. We applied maximum likelihood estimation.

We used three global fit measures to determine whether the model was acceptable. Root mean square error of approximation (RMSEA) reflects the degree to which a researcher's model reasonably fits the population covariance matrix while taking into account the degrees of freedom and sample size (Brown, 2006). It is a parsimony-adjusted index that favors simpler models. When the RMSEA value is smaller than 0.05, the model can be assumed to perform very well (Browne & Cudeck, 1993). When the RMSEA value is 0.08 or less, the model can be assumed to perform reasonably well (Hu & Bentler 1999; Marsh, Hau, & Wen, 2004). The comparative fit index (CFI) compares the fit of a researcher's model to a more restricted baseline model. CFI values that are larger than 0.90 indicate an acceptable model fit (Hu & Bentler, 1999). The standardized root mean square residual (SRMR) compares the sample variances and covariances to the estimated variances and covariances. When the SRMR value is smaller than 0.05, the model can be assumed to perform very well, and when it is lower than 0.08, the model can be assumed to perform reasonably well (Hu & Bentler 1999; Marsh et al., 2004). Because the p value is sensitive to the sample size, we did not rely on its value (Cheung & Rensvold, 2002; Saris, Satorra, & van der Veld, 2009).

2. We ran the MGCFA without any constraints in order to assess configural invariance. In subsequent MGCFA's, we added the restrictions necessary to test each more stringent level of measurement invariance. If measurement invariance was not established at a given level, we searched for and released the constraints of the parameters that caused the misspecification.

To determine whether the fit of more restrictive models deteriorated significantly, we relied on the cut-off criteria suggested by Chen (2007). The criteria for identifying a lack of metric invariance compared with the configural invariance model, in a sample larger than 300, were a change larger than .01 in CFI, supplemented by a change larger than .015 in RMSEA or a change larger than .03 in SRMR. The criteria for identifying a lack of scalar invariance compared with the metric invariance model were a change larger than .01 in CFI,

supplemented by a change larger than .015 in RMSEA or a change larger than .01 in SRMR. As an overall criterion, we used changes in CFI larger than 0.01 as indicating the absence of invariance (Byrne & Stewart, 2006). The analyses were performed in Mplus 7.11 (Muthén & Muthén, 2012).

3. We used the Jrule program (Oberski, 2009; Saris et al., 2009) to detect local misspecifications of the parameters in the model. For metric invariance, we determined which item loadings in which country caused the largest misspecification. For scalar invariance, we determined which item intercept in which country caused the largest misspecification. Next, we released only the misspecified items in these particular countries and repeated the analysis. However, if there was a need to release a parameter in more than half of the countries, we released it in all countries. After detecting the largest misspecification and releasing noninvariant parameters, we relied on the global fit measures of the final models.

Figure 2 about here

Results

We created a separate model for the first-order factors of each higher order value (Cieciuch & Davidov, 2012; Cieciuch & Schwartz, 2012). For example, Figure 2 illustrates the model for openness to change values. Separate analyses of the results for each higher order value in each country led to the conclusion that all models in all countries reached acceptable model fit (The global fit indices for each sample are reported in the Appendix). Next, we ran multigroup analyses for each model of higher order value. Table 2 presents the global fit measures for each model.

Table 2 about here

Based on the cut-off criteria of Chen (2007) and Byrne and Stewart (2006), we draw the following conclusions: 16 of the 19 values demonstrated full metric invariance across all countries (self-direction-thought, stimulation, power –dominance, power-resources, face,

security-personal, security-societal, conformity-rules, conformity-interpersonal, tradition, humility, benevolence-dependability, benevolence-caring, universalism-concern, universalism-nature, universalism-tolerance). There was full metric invariance for hedonism in all countries but Switzerland and Poland. There was full metric invariance for self-direction-action in all countries but Finland, and Portugal (where partial metric invariance was established), and Italy. There was full metric invariance for achievement in all countries but Finland and Poland.

Full or partial scalar invariance was supported for the following 10 values across nearly all countries (with a few exceptions for single countries⁴): benevolence-caring, universalism tolerance, universalism concern, universalism nature, hedonism, power-dominance, power-resources, security-personal, security-societal, and self-direction-thought.

Discussion

The current study examined the invariance properties of the PVQ-5X for measuring 19 values across eight countries. The results demonstrated that the PVQ-5X has better invariance properties than the PQV-21. It was possible to differentiate all 19 values in each country in single CFA and MGCFA analyses at the configural level. Thus, configural invariance for 19 values was supported across all countries. Metric or partial metric invariance was also supported for almost all countries. In addition, scalar or partial scalar invariance was supported for approximately half of the values. Therefore, the refinements of the values theory not only improved its heuristic power (Schwartz et al., 2012), these refinements also

⁴ Full scalar invariance was established for power-dominance (except for Italy and Portugal), power-resources (except for Poland), hedonism (except for Poland, Switzerland, Italy and Israel), security-personal (except for Israel), benevolence-caring (except for Finland, where there was partial invariance), universalism-concern (except for New Zealand and Portugal, where there was partial invariance) and Germany), and universalism-tolerance (except for Poland and Portugal). Universalism nature was partially invariant in Israel, Italy, and New Zealand, non-invariant in Switzerland, and fully invariant across the other countries. Partial scalar invariance was established for self-direction-thought and societal security. For the remaining nine values (stimulation, self-direction-action, benevolence-dependability, humility, tradition, conformity-rules, conformity-interpersonal, face, and achievement), scalar measurement invariance was not established.

made it possible to develop a measurement instrument that is more appropriate for cross-national comparisons.

This is a substantial benefit because the limited scalar invariance of values measured by the PVQ-21 that is part of the ESS precluded comparisons of means for some of the 10 values across larger sets of countries. Thus, the basic values data in the ESS could only be used for other purposes (e.g., comparison of unstandardized regression coefficients or covariances between values and other theoretical constructs of interest).

A major concern of researchers who collect large-scale survey data is confidence that their instruments will yield comparable measurements across samples. This is particularly relevant for new instruments such as the value scale examined in this study. Given the theoretical importance of the value theory for describing individuals and societies and for explaining attitudes and behavior, the current study delivers encouraging results. The refined values theory and the new measurement instrument overcame several problems of noncomparability identified with previous instruments.⁵ Not only does the PVQ-5X measure the refined set of 19 values, it can also be used to measure the original 10 values (Cieciuch, Davidov, Vecchione, & Schwartz, in press), and it exhibits invariance across a large number of varied countries. Furthermore, it takes only 1-2 minutes longer to complete than the PVQ-40, and only 2-3 minutes longer to complete than the PVQ-21.

Three factors contributed to the improved measurement properties of the PVQ-5X. First, the items that measure each value are more homogeneous. This was possible because the refined theory makes 19 distinctions in the value circle rather than 10. Some of the original ten values encompassed disparate contents. By splitting them into conceptually narrower values (e.g., three subtypes of universalism), it was possible to measure their

⁵ Two recently proposed methods, alignment (Asparouhov and Muthén 2013) and Bayesian structural equation modeling (BSEM; Muthén & Asparouhov 2012, 2013), offer alternative ways to test for invariance across countries.

contents with more homogeneous items. This made it possible to identify all 19 values without having to unify any values (cf., Davidov et al., 2008). Second, each narrow value was measured by three items. Although we excluded nine items based on the CFA and MDS analyses of the pooled sample of data (Schwartz et al., 2012), three items remained for 10 of the values. Third, each item contained only one sentence rather than the two sentences in earlier PVQ instruments. This simplification eliminated the possibility of confusion due to perceiving some items as double-barreled .

Compared with studies that used the PVQ-21, the current study was limited in two important ways. First, we analyzed data from only eight countries. Second, our data were from convenience samples rather than representative population samples. It is therefore important to test for invariance with the new value scale using representative samples in a variety of countries. Our findings suggest that studies of the measurement invariance of the 19 refined values will provide stronger evidence than previous work for the validity of cross-national comparisons. Moreover, successful measurement of the more refined values makes possible more finely calibrated explanations of attitudes and behavior and more detailed analyses of differences between cultural and other groups than the original ten values did.

References

- Asparouhov, T., & Muthén, B. (2013). Multiple-group factor analysis alignment. Forthcoming in *Structural Equation Modeling*.
- Bilsky, W., Janik, M., & Schwartz, S. H. (2011). The structural organization of human values – Evidence from three rounds of the European Social Survey (ESS). *Journal of Cross-Cultural Psychology, 42*, 759-776. doi: 10.1177/0022022110362757
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford Press.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage.
- Byrne, B. M. (2004). Testing for multigroup invariance using AMOS Graphics: A road less traveled. *Structural Equation Modeling, 11*(2), 272-300. doi: 10.1207/s15328007sem1102_8
- Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin, 105*(3), 456-466. doi: 10.1207/s15328007sem1102_8
- Byrne, B. M., & Stewart, S. M. (2006). The MACS approach to testing for multigroup invariance of a second-order structure: A walk through the process. *Structural Equation Modeling, 13*(2), 287-321. doi: 10.1207/s15328007sem1302_7
- Chen, F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. doi: 10.1080/10705510701301834

- Chen, F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparison in cross-cultural research. *Journal of Personality and Social Psychology, 95*(5), 1005-1018. doi: 10.1037/a0013193
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255. doi: 10.1207/S15328007SEM0902_5
- Cieciuch, J., & Davidov, E. (2012). A comparison of the invariance properties of the PVQ-40 and the PVQ-21 to measure human values across German and Polish samples. *Survey Research Methods, 6*(1), 37-48
- Cieciuch, J., Davidov, E., Vecchione, M., & Schwartz, S. H. (in press). A hierarchical structure of basic human values in a third-order confirmatory factor analysis. *Swiss Journal of Psychology*.
- Cieciuch, J., & Schwartz, S. H. (2012). The number of distinct basic values and their structure assessed by PVQ-40. *Journal of Personality Assessment, 94*(3), 321-328. doi: 10.1080/00223891.2012.655817
- Davidov, E. (2008). A cross-country and cross-time comparison of the human values measurements with the second round of the European Social Survey. *Survey Research Methods, 2*(1), 33-46.
- Davidov, E. (2010). Testing for comparability of human values across countries and time with the third round of the European Social Survey. *International Journal of Comparative Sociology, 51*(3), 171-191. doi: 10.1177/0020715210363534
- Davidov, E., Schmidt, P., & Schwartz, S. H. (2008). Bringing values back in. The adequacy of the European Social Survey to measure values in 20 countries. *Public Opinion Quarterly, 72*(3), 420-445. doi: 10.1093/poq/nfn035

- Davidov, E., Datler, G., Schmidt, P., & Schwartz, S. H. (2011). Testing the invariance of values in the Benelux countries with the European Social Survey: Accounting for ordinality. In: E. Davidov, P. Schmidt, & J. Billiet (Eds.) *Cross-cultural analysis: Methods and applications* (pp. 151-117). New York: Routledge.
- Horn, J., & McArdle, J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research*, 18(3), 117-144.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55. doi: 10.1080/10705519909540118
- Jöreskog, K. (1971). Simultaneous factor analysis in several populations. *Psychometrika*, 36(4), 409-426. doi: 10.1007/BF02291366
- Knoppen, D., & Saris, W. E. (2009). Do we have combine values in the Schwartz' human values scale? A comment on the Davidov studies. *Survey Research Methods*, 3(2), 91-103.
- Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cut-off values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, 11(3), 320-341. doi: 10.1207/s15328007sem1103_2
- Muthén L., & Muthén B. O. (1998-2012). *Mplus User's Guide. Version 7*. Los Angeles (CA): Muthén & Muthén
- Oberski D. L. (2009). *Jrule for Mplus version 0.91 [computer software]*. Github social coding website: <http://www.daob.nl/software>
- Saris, W. E., Knoppen, D., & Schwartz, S. H. (2013). Operationalizing the theory of human values: Balancing homogeneity of reflective items and theoretical coverage. *Survey Research Methods*, 7(1), 29-44.

- Saris, W. E., Satorra, A., & van der Veld, W. M. (2009). Testing structural equation models or detection of misspecifications? *Structural Equation Modeling, 16*, 561-582. doi: 10.1080/10705510903203433
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theory and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1-65). New York: Academic Press.
- Schwartz, S. H. (1994). Are there universal aspects in the content and structure of values? *Journal of Social Issues, 50*, 19-45.
- Schwartz, S. H. (2006). Les valeurs de base de la personne: Théorie, mesures et applications [Basic human values: Theory, measurement, and applications]. *Revue Française de Sociologie, 47*, 929-968.
- Schwartz, S. H. (2003). A proposal for measuring value orientations across nations. In *Questionnaire Development Package of the European Social Survey* (pp. 259-319). Retrieved from www.europeansocialsurvey.org.
- Schwartz, S. H., Melech, G., Lehmann, A., Burgess, S., & Harris, M. (2001). Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *Journal of Cross-Cultural Psychology, 32*, 519-542. doi: 10.1177/0022022101032005001
- Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., Ramos, A., Verkasalo, M., Lönnqvist, J.-E., Demirutku, K., Dirilen-Gumus, O., & Konty, M. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology, 103*(4), 663-688. doi: 10.1037/a0029393
- Steenkamp, J.-B. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research, 25*, 78-90. doi: 10.1086/209528

Vandenberg, R. J. (2002). Towards a further understanding of and improvement in measurement invariance methods and procedures. *Organizational Research Methods*, 5(2), 139-158. doi: 10.1177/1094428102005002001

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4-69. doi: 10.1177/109442810031002

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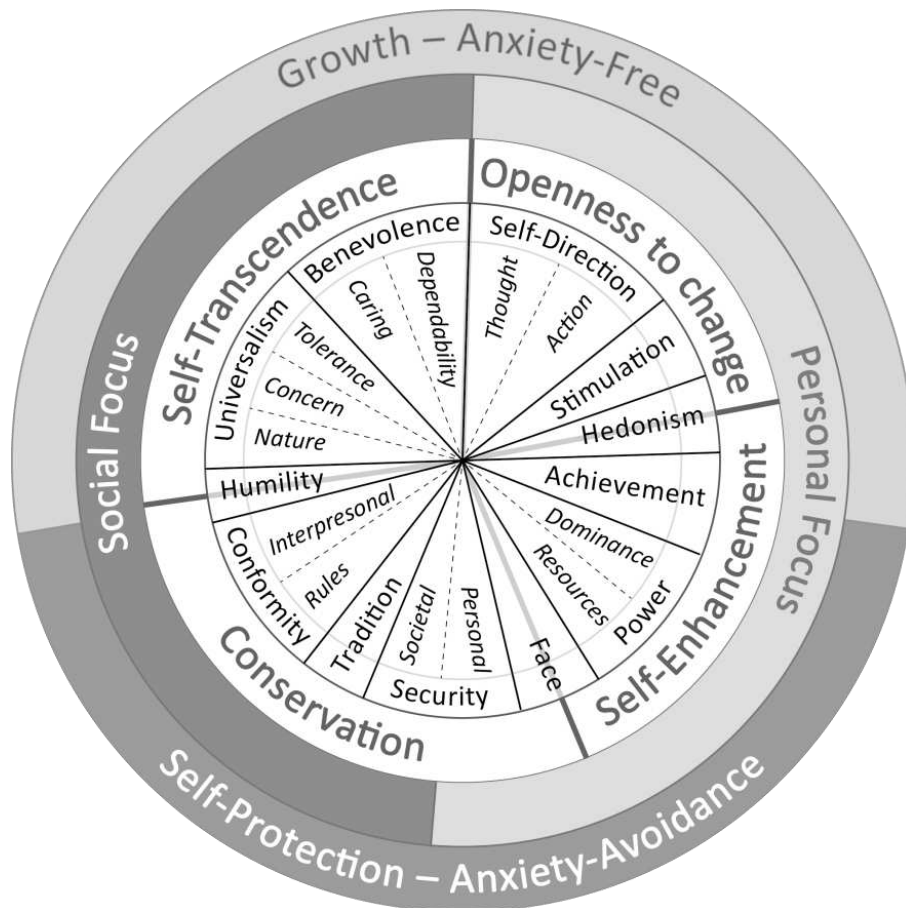


Figure 1. Circular motivational continuum of 19 values in the refined value theory (modified from Schwartz et al., 2012).

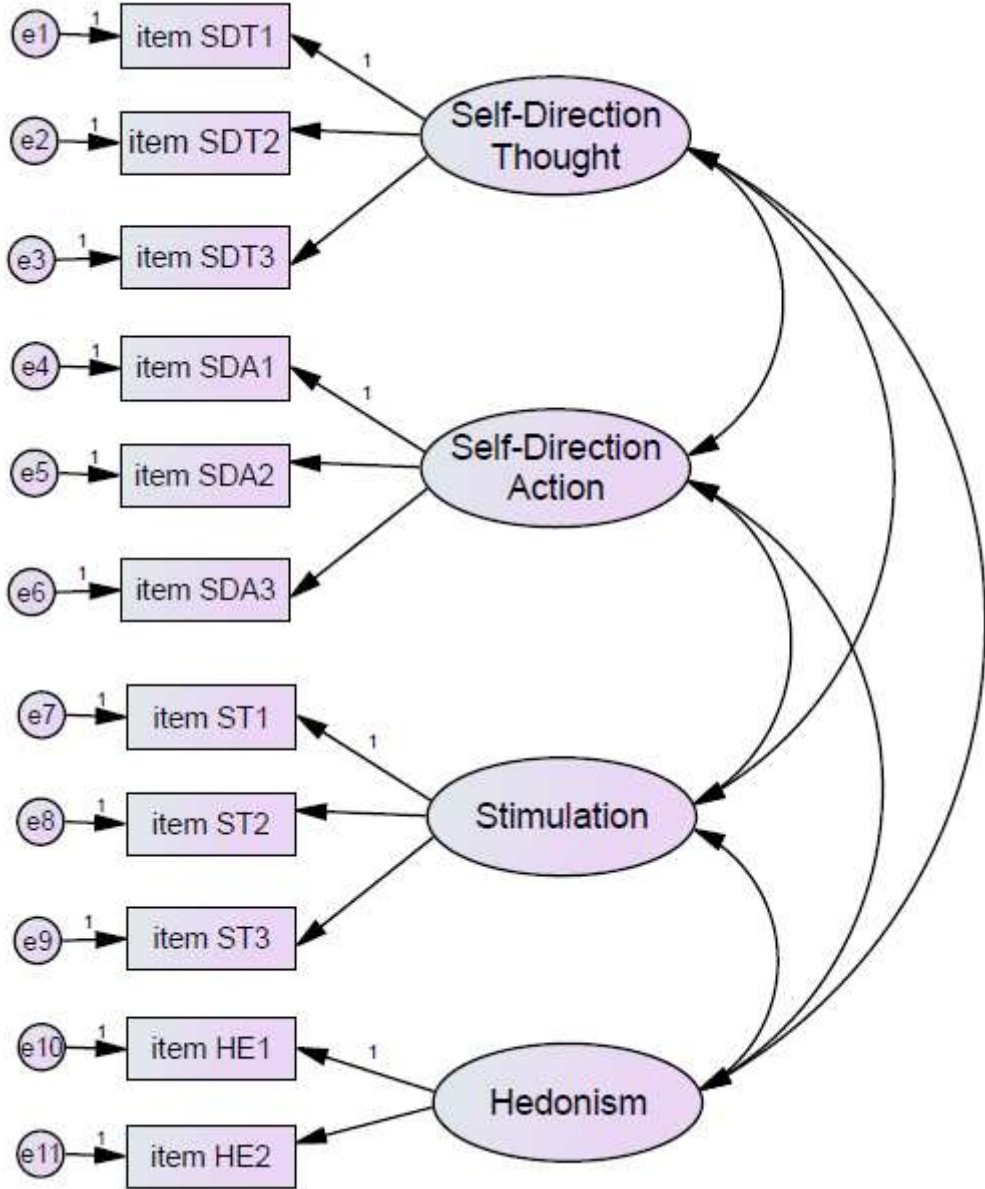


Figure 2. A CFA model for the openness values. The large ellipses represent the values, the small ellipses represent measurement errors and the rectangles represent the value items.

Table 1

The Four Higher Order Values, the 10 Basic Values and 19 More Narrowly Defined Values in the Refined Theory of Values (Schwartz et al., 2012)

Higher order values	Basic values	More narrowly defined values
Openness to change	Self-Direction - Independent thought and action, choosing, creating, and exploring	Self-Direction-Thought: Freedom to cultivate one's own ideas and abilities (3 items) Self-Direction-Action: Freedom to determine one's own actions (3 items)
	Stimulation - Excitement, novelty, and challenge in life	Stimulation: Definition unchanged (3 items)
	Hedonism - Pleasure and sensuous gratification for oneself	Hedonism ^a : Definition unchanged (2 items)
Self-enhancement	Achievement - Personal success through demonstrating competence according to social standards	Achievement: Definition unchanged (3 items)
	Power - Control or dominance over people and resources	Power –Dominance: Power through exercising control over people (2 items)
		Power-Resources: Power through control of material and social resources (2 items)
Conservation	Security - Safety, harmony, and stability of society, relationships, and self	Face ^b : Security and power through maintaining one's public image and avoiding humiliation (2 items)
		Security-Personal: Safety in one's immediate environment (2 items) Security-Societal: Safety and stability in the wider society (3 items)
	Conformity - The restraint of actions, inclinations, and impulses that are likely to upset or harm others and violate social expectations or norms	Conformity-Rules: Compliance with rules, laws, and formal obligations) (2 items) Conformity-Interpersonal: Avoidance of upsetting or harming other people (3 items)

(continued)

	Tradition - Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provides	Tradition: Maintaining and preserving cultural, family, or religious traditions (3 items)
		Humility ^c : Recognizing one's insignificance in the larger scheme of things (2 items)
Self-transcendence	Benevolence - Preservation and enhancement of the welfare of people with whom one is in frequent personal contact	Benevolence-Dependability: Being a reliable and trustworthy member of the ingroup (2 items) Benevolence-Caring: Devotion to the welfare of ingroup members (3 items)
	Universalism - Understanding, appreciation, tolerance, and protection for the welfare of <i>all</i> people and of nature	Universalism-Concern: Commitment to equality, justice, and protection for all people (3 items)
		Universalism-Nature: Preservation of the natural environment (3 items)
		Universalism-Tolerance: Acceptance and understanding of those who are different from oneself (2 items)

Note: ^a Hedonism is located on the border of openness and self-enhancement values. We included hedonism in the model for openness.

^b Face is located on the border of self-enhancement and conservation values. We included face in the model for conservation.

^c Humility is located on the border of conservation and self-transcendence values. We included humility in the model for conservation.

Table 2

Global Fit Measures for the MGCFA

Level of invariance	χ^2	df	RMSEA	SRMR	CFI
<u>Self-transcendence</u>					
Configural	972.4	440	.057 [.052-.062]	.040	.960
Metric	1163.9	496	.060 [.055-.064]	.067	.950
Scalar	2040.7	552	.085 [.081-.089]	.083	.889
Partial scalar	1339.3	533	.063 [.059-.068]	.070	.940
<u>Openness</u>					
Configural	1001.9	304	.078 [.073-.084]	.048	.924
Metric	1174.9	353	.079 [.074-.084]	.073	.910
Partial metric	1104.2	347	.076 [.071-.081]	.063	.917
Scalar	2398.3	402	.115 [.110-.119]	.109	.782
Partial scalar	1198.5	355	.079 [.074-.084]	.066	.908
<u>Self-enhancement</u>					
Configural	251.1	88	.070 [.060-.080]	.035	.975
Metric	341.3	116	.072 [.063-.081]	.058	.965
Partial metric	292.2	114	.064 [.055-.074]	.045	.972
Scalar	888.6	144	.117 [.110-.125]	.096	.884
Partial scalar	369.3	125	.072 [.064-.081]	.048	.962
<u>Conservation</u>					
Configural	1629.5	784	.054 [.050-.057]	.046	.946
Metric	1814.4	854	.055 [.051-.058]	.055	.938
Scalar	3544.9	.924	.087 [.084-.090]	.082	.832
Partial scalar	1981.0	867	.058 [.055-.062]	.058	.928

Note: MGCFA = Multigroup Confirmatory Factor Analysis; df = degrees of freedom;

RMSEA = Root Mean Square Error of Approximation; PCLOSE = Probability of Close Fit;

SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index

Appendix

Global Fit Measures of Each Higher Order Value Model for the Single Sample CFAs

	Self-transcendence (df = 55) UNN, UNT, UNC, BEC, BET				Conservation (df = 98) COI, COR, TR, HU, SEP, SES, FAC				Self-enhancement (df = 11) AC, POR, POD				Openness (df = 38) SDA, SDT, ST, HE			
	χ^2	CFI	RMSEA	SRMR	χ^2	CFI	RMSEA	SRMR	χ^2	CFI	RMSEA	SRMR	χ^2	CFI	RMSEA	SRMR
Switzerland	89.6	.963	.056 [.034-.076]	.044	177.2	.945	.063 [.048-.078]	.056	31.9	.950	.097 [.059-.137]	.059	67.2	.959	.062 [.037-.086]	.045
Germany	78.0	.983	.036 [.014-.053]	.037	193.4	.950	.055 [.043-.066]	.046	41.8	.936	.093 [.064-.124]	.051	61.1	.968	.043 [.021-.063]	.039
Finland	89.8	.944	.043 [.026-.059]	.031	164.9	.977	.045 [.033-.057]	.041	35.5	.976	.082 [.053-.112]	.030	114.8	.919	.078 [.062-.094]	.048
Israel	153.1	.953	.067 [.055-.080]	.043	273.1	.924	.067 [.058-.077]	.056	14.8	.996	.030 [.000-.064]	.022	153.6	.932	.088 [.074-.103]	.042
Italy	121.6	.956	.056 [.042-.069]	.044	159.5	.967	.040 [.028-.051]	.034	36.4	.968	.077 [.050-.106]	.030	129.0	.914	.079 [.064-.094]	.056
New Zealand	216.8	.939	.075 [.064-.085]	.046	261.2	.934	.056 [.048-.065]	.044	37.2	.976	.067 [.044-.092]	.031	172.1	.922	.082 [.070-.094]	.044
Poland	137.8	.964	.053 [.042-.064]	.036	260.0	.934	.055 [.047-.063]	.047	30.3	.982	.057 [.033-.081]	.028	211.6	.884	.092 [.080-.104]	.056
Portugal	85.9	.971	.044 [.024-.061]	.037	153.9	.957	.043 [.029-.056]	.048	23.1	.981	.061 [.025-.096]	.029	92.4	.931	.070 [.052-.088]	.048

Note: df = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; χ^2 = chi square; df = degrees of freedom. Abbreviations of value labels are presented in Table 1.

JCCP

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