



Measurement equivalence of Schwartz's refined value structure across countries and modes of data collection: New evidence from Estonia, Finland, and Ethiopia



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ABSTRACT

Schwartz et al. (*J Pers Soc Psychol* 103(4): 663–688, 2012) recently proposed a refined theory that describes universal aspects in the content and the structure of human values. We propose a bi-factor model in order to model the common method variance (CMV) imposed by people's response styles, which has been ignored in previous tests for measurement invariance in the revised Portrait Values Questionnaire (PVQ-R).

Four unique samples were used—two from Estonia ($N = 1954$, 82% female, $M_{age} = 31.2$ years, $SD_{age} = 13.2$, online mode; $N = 1309$, 69% female, $M_{age} = 28.2$ years, $SD_{age} = 9.6$, paper-and-pencil mode), one from Finland ($N = 250$, 80% female, $M_{age} = 24.6$ years, $SD_{age} = 6.7$), and one from Ethiopia ($N = 253$, 26% female, $M_{age} = 21.8$ years, $SD_{age} = 5.0$)—allowing assessment of the cross-cultural measurement invariance of the value circle, as well as the effect of the increasingly common mixed-mode data collection method.

After taking CMV into account, the refined value structure holds relatively well in the Estonian and Finnish samples, but not in the Ethiopian context. PVQ-R data collected through paper-and-pencil and online modes can be combined, while there exist small limitations for the comparison of relationships and latent means across Estonian and Finnish samples.

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1. Introduction

During the last two decades, the theory of basic human values (Schwartz, 1992) has gained popularity among researchers from many different fields. The main attraction of this theory lies in the fact that it has succeeded in describing universal aspects in the content and structure of basic human values, which has made it especially suitable for cross-cultural value research (Schwartz, 1994).

Though the issue is often ignored, meaningful cross-cultural comparisons and mixed mode data collection require that respondents understand and interpret questions in the same manner and use measurement instruments in the same way (Saris & Gallhofer, 2014). Concurrently with the growing popularity of Schwartz's value theory, an increasing amount of research has tested the universality of the proposed value structure and the measurement invariance (i.e., the degree of comparability) of the related value scales across samples, which, in

turn, has led to several improvements in the structure and measurement instruments. Recently, a refined value theory was introduced, together with a revised 57-item Portrait Values Questionnaire, the PVQ-R (Schwartz, Cieciuch, Vecchione, Davidov, et al., 2012).

It is well known that value ratings reflect not only values themselves but also people's response styles (He & van de Vijver, 2015; Schwartz, Verkasalo, Antonovsky, & Sagiv, 1997). We argue that inter-individual differences in the extent to which people agree or disagree with presented values items, independent of their content, imposes common method variance (CMV) on the data. CMV is commonly defined as the “variance that is attributable to the measurement method rather than to the constructs the measures represent” (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003, p. 879) and this method bias is a potential problem in personality and individual differences research, because it is one of the main sources of measurement error. It has been shown that this bias can be adjusted for by modeling a latent method factor (Welkenhuysen-Gybels, Billiet, & Cambré, 2003), but so far very few values studies have done this (Schwartz et al., 2012; Strack & Dobewall, 2012; Verkasalo, Lönnqvist, Lipsanen, & Helkama, 2009), while none has tested its model for measurement invariance across countries or modes of data collection. To overcome this limitation, we

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follow Holzinger and Swineford's (1939) advice and apply a latent method factor model, commonly referred to as a bi-factor model, to our data. Bi-factor models have recently been applied to measurements of Big 5 personality traits (Biderman, Nguyen, Cunningham, & Ghorbani, 2011) and self-esteem (Motl & DiStefano, 2002). Furthermore, bi-factor models are known to increase model fit as well as the predictive validity of a given scale (Biderman, 2014). In summary, we expect that Schwartz's refined value structure will become more comparable across countries and modes of data collection when controlling for CMV.

1.1. Schwartz's theory of basic human values

According to Schwartz's value theory, people's value ratings are, in any culture, locatable under a limited number of motivationally-distinct basic value types (Schwartz, 1992). These universal value types have dynamic interrelationships and form a quasi-circular structure, where similar value types (like *hedonism* and *stimulation*) are close to each other and conflicting value types (like *benevolence* and *power*) appear on opposite sides. In recent years, there has been intense discussion about the universality and specification of the value structure (e.g., Fontaine, Poortinga, Delbeke, & Schwartz, 2008; Knoppen & Saris, 2009; Steinmetz, Isidor, & Baeuerle, 2012; Strack & Dobewall, 2012), which has led to a refined 19-factor model (Schwartz et al., 2012). An overview of the 19 value types and their theoretical quasi-circular structure can be found in Fig. 1.

1.2. Measurement equivalence of value structure

A well-established way to test for equivalence of measurement instruments is through Structural Equation Modeling (SEM; Meredith, 1993). Commonly, three levels of equivalence are tested across groups: configural (which maintains an equal factor structure), metric (which sets the loadings of included items as equal), and scalar (which imposes equality constraints on the intercepts of each included item) invariance. Only if the latter two levels of equivalence hold, does the comparison of relationships and means yield valid results (Saris & Gallhofer, 2014). For cases where one or more equality constraints needs to be dropped, the concept of partial invariance was developed (Byrne, Shavelson, & Muthén, 1989). If partial scalar invariance holds (i.e., for a given concept, at least two indicators need to be invariant across groups), then latent means of the scale can still be validly compared.

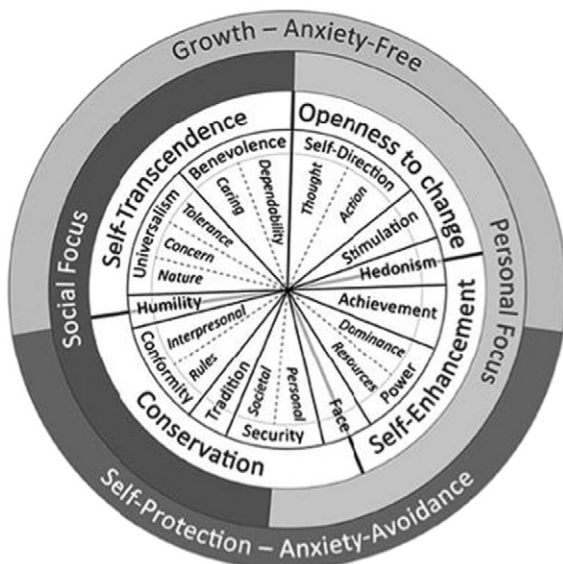


Fig. 1. The circular motivational continuum of 19 values in the refined theory of basic human values. (Adapted from Schwartz et al., 2012)

Several studies have used Schwartz's instruments to test for cross-cultural measurement invariance for a subset of his value types, but few for the entire value circle at once (e.g., Davidov et al., 2008). Most have reported some form of deviation, sometimes already at the configural level (Saris, Knoppen, & Schwartz, 2013). Cieciuch, Davidov, Vecchione, Beierlein, and Schwartz (2014) tested cross-national invariance of PVQ-R across samples from Finland, Germany, Israel, Italy, New Zealand, Poland, Portugal, and Switzerland. They found full metric invariance for 16 of the 19 values and full or partial scalar invariance for 10 of the 19 values across nearly all countries. It is important to point out, however, that the authors excluded 9 items which did not work in the expected way and they performed equivalence tests for each higher order value separately, not for the entire value circle at once.

In sum, the measurement invariance of the new PVQ-R scale has been tested in only a few studies (e.g., Cieciuch et al., 2014) and in a limited number of countries. These initial results indicate that the new PVQ-R performs better in comparison to earlier Schwartz instruments. However, none of these past studies (e.g., Cieciuch & Davidov, 2012; Lilleoja & Saris, 2014; Schwartz et al., 2012) has tested the measurement invariance of the full Schwartz value structure while including the method factor, which means that CMV among value items is ignored and substance and style are conflated (Strack & Dobewall, 2012; Hinz, Brähler, Schmidt, & Albani, 2005; He & van de Vijver, 2015; Schwartz et al., 1997). In the following, we describe a bi-factor model (Fig. 2) that consists of 19 latent substance factors (i.e., Schwartz's refined value types) which are paired according to a method factor, labelled CMV.

Previous work has shown that response styles vary across countries dependent on their level of socioeconomic development (Smith, 2011; Strack & Dobewall, 2012). This makes it likely that the variance attributable to CVM also varies between the samples studied.

1.3. Mode effects

As in many other fields, mixed-mode data collection is becoming increasingly popular in values research. As each data collection mode has its specificities, these mediate respondents' answers in different ways, and responses to the same questions may not always be comparable (Revilla, 2013). Therefore, it cannot be implicitly assumed that data collected through different modes are necessarily comparable. Although, in the present case, the paper-and-pencil and online questionnaire modes used are both self-administered and have similar formats, we do expect to find measurement equivalence. Two earlier PVQ studies also reported strict invariance across these modes of data collection (Cieciuch, Davidov, Oberski, & Algesheimer, 2015; Davidov & Depner, 2011), but, in this study, we can also test whether the strength of method effects (CMV) differs across paper-and-pencil and online survey modes.

The current study explores measurement equivalence of the new PVQ-R values scale (Schwartz et al., 2012). Unlike previous studies, we also control for the effects of method bias. Applying a bi-factor model has the strength of preserving the quasi-circular structure of Schwartz's human values, and, at the same time, takes into account the CMV among all value items. We use 4 unique datasets for the analyses – two from Estonia (one collected online and the other in paper-and-pencil mode) and one each from Finland and Ethiopia. This enables us to test for both cross-cultural and cross-mode equivalence. These analyses show whether PVQ-R data collected in paper-and-pencil and online modes can be combined and whether relationships and latent means can be compared across these countries.

Our hypotheses are the following:

- Schwartz's refined values structure is equivalent across countries and modes of data collection when controlling for CMV.

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