Should People from Different Groups Be Confused about the Distinction between Constructs, Is There Still Room for Structured Means?

Marco Vassallo *Council for Agricultural Research and Economics, Italy*

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Abstract
Aim of this study is to encourage the using of structured means modelling as a measurement error-free method, and culturally invariant approach (i.e., measurement invariance at strong level), for evaluating between-group differences in latent means and controlling for the inclusion of latent covariates. Although this technique is not novel in academic literature, applications to quantitative psychology are still uncommon. To compensate this gap an application of latent means and latent ANCOVA, latent covariates models is proposed to the Schwartz's taxonomy of basic human values theory. Data were collected in June 2011 on a regional basis and age categories and analyzed by means of structural equation modelling for a representative sample of roughly 3,000 Italian food consumers.
Empirical applications of the Schwartz's elliptical taxonomy often leads to the overlapping of its adjacent domains both at whole sample and at group level. Hence, someone may come to bias conclusions that no between-group differences exist in those overlapped domains. This study confirms that there is still room for between-group differences at latent mean level. Standardized effect sizes of structured means differences were estimated for all the ten motivational value domains of the Schwartz's taxonomy across the main four Italian macro-regions. Self-direction, stimulation, power and achievement factors were successively regressed on hedonism latent covariate, with using latent ANCOVA models, due to the ambivalent nature of hedonism domain that the Schwartz's theory stipulates to share (strongly overlaps) elements of both openness to change (i.e., self-direction and stimulation) and self-enhancement (i.e., power and achievement).

Keywords: Schwartz theory of human values, structural equation modelling, latent means models, latent ANCOVA models, hedonism, openness to change, self-enhancement.

Introduction

The present study focuses on promoting structured means modelling (SMM; Sörbom, 1974) and latent ANCOVA, latent covariate models (Hancock, 2004) for evaluating between-group differences in construct means across different populations and testing for structured mean differences above and beyond a latent covariate influence. Even though SMM has been discussed and applied for more than two decades (Aiken, Stein & Bentler, 1994; Cole, Arvey & Salas, 1993; Gallo, Anthony & Múthen, 1994; Green & Thompson, 2003; Hancock, 1997; Thompson & Green, 2006) research applications are still pretty uncommon.

SMM is a type of structural equation model that is able to compare means at latent level (i.e., factors means) controlling for variations and shared variations (i.e., factor variances and covariances) among latent variables across groups, simultaneously. As a result, this approach immediately appears to be more sound than the one based on traditional methods of between-subjects (multivariate) analysis of variance, such as (M)ANOVA (Hancock, 1997), whenever a researcher has to deal with latent constructs (i.e., latent factors). This latter statement is basically accurate for the following two reasons: a) traditional methods require assessment of the homogeneity of variances (and covariances for longitudinal studies) in order to make group means comparisons meaningfully defensible, whereas SMM does not since all variances and covariances of each latent are simultaneously estimated and thus controlled for; b) a researcher who deals with latent means he/she is handles error-free means because measurement errors are still modelled for each involved latent.

The only restriction required for the application of SMM is the assessment of measurement equivalence across groups at level of metric and scalar invariance (i.e., strong factorial invariance). The reason of this assumption is straightforward and due to mathematical identification problems (see next subsection about methodological details), supported by strong theoretical foundations. As a matter of fact, in order to meaningfully compare latent means across different populations it is theoretically necessary that: 1) each latent factor has to have the same meaning across those populations early on (i.e., metric invariance, that is factor loadings need to be equal across groups); 2) different cultural forces across those populations have to be controlled for early on (i.e., scalar invariance, that is intercept terms have to be equal across groups since they represent those cultural forces unrelated to the factor, but possibly existing in the observed measures when compared across groups). If these two latter assumptions are not met, differences in latent means will not solely due to the true value means, but to differences in the subset of observed variables that are possibly loading different factors and reflecting cultural biases of the measurement instrument applied across groups of comparison (Brown, 2006; Gregorich, 2006; Hancock, 1997; Thompson & Green, 2006).

In sum, the rationale behind SMM is to compare factor means controlling for factor sources of covariation across the populations of interest under the assumption of strong factorial invariance (i.e., cross-cultural validity of the measurement instrument), simultaneously and thus having a culturally unbiased analytic framework to accommodate latent means comparison. Furthermore, SMM preserves the true nature, measurement error-free, of each latent variable and so does the estimated structured means. To this end, it is possible to examine true value differences in latent

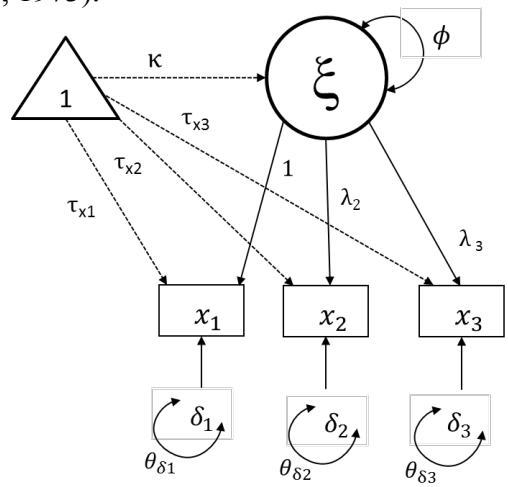
means through the standardized effects. Such true differences cannot be found out in the underlying measured variables means as these latter are affected by measurement errors which, acting like a confound, would lead to differences that are potentially dampened in their magnitude. Furthermore, differences in latent means are particularly useful in presence of severe correlation between latent factors across populations. Substantial correlations do not permit a clear understanding of the relations between factors and they can also mask structural differences in the factors themselves across different populations with leading to unbiased conclusions. Differences that may exist at factor mean level, nevertheless. SMM is able to detect these differences above and beyond severe estimated factor correlations.

In this respect, the present study proposes an application of SMM, with its extension of latent ANCOVA, to the Schwartz taxonomy of basic human values (Schwartz, 1992) across the main four geographical macro-regions of the Italian territory: Northwest, Northeast, Central, South and Insular (hereafter South). This partition is conventionally used in the official annual statistics reports for describing social, demographic and economic differences in Italy (Italian National Institute of Statistics – ISTAT 2012a, b).

Structured means models – methodological details

In order to understand how SMM works it is important to start with looking at figure 1 in which a hypothetical common factor ξ is loaded by three indicators x_1, x_2, x_3, where λ_s represent the factor loadings, τ_s the intercepts, δ_s the measurement errors, $\theta_{\delta s}$ the measurement error variances, ϕ the factor variance (for the time being the reader forgets about that pseudo-variable 1 denoted as a triangle).

Figure 1 - Latent mean path diagram with using JKW notation (Joreskog, 1973; Keesling, 1972; Wiley, 1973).



The structural equations related to that common factor ξ can be written with the following well-known regression system of structural equations (with i=1, 3; λ_1=1, for scaling the construct)

$$x_i = \lambda_i \xi + \delta_i \qquad (1)$$

Since SEM operates with data deviated from the observed means, the intercept terms in the system (1) is omitted. Nevertheless, in the case a researcher wants to explore

the construct ξ mean he/she is obliged to include the observed means in the system (1) and so that the intercept terms allowing for nonzero means both for factors and measures (Thompson & Green, 2006). As a matter of fact, recalling from simple linear regression expression with the intercept term:

$$y = a + bx + \varepsilon \qquad (2)$$

the expectation of y yields to E(y) = a + bE(x) and the intercept "a" can be re-written as a= E(y) – bE(x). Hence, it is clear how the mean vector of the observed variables needs to be considered along with the observed variances and covariance's. In this latter respect, the intercepts must be introduced into the structural equation system (1) that operates just as in simple regression (2) where x is ξ and y is x :

$$x_i = 1\tau_i + \lambda_i\xi + \delta_i$$
$$E(x_i) = \tau_i + \lambda_i E(\xi) \qquad (3)$$

Now, backing to figure 1, it is easy to understand how the system (3) is visualized. The predictor variable depicted as a triangle barely defines a pseudo-variable with no variance which is equal to 1 for all the individuals because it represents the coefficient 1 of all intercept terms included the intercept κ of the factor ξ. The intercept κ is also the factor mean:

$$\xi = 1\kappa + \phi$$
$$E(\xi) = 1\kappa \qquad (4)$$

Merging the system (3) with (4):

$$x_i = 1\tau_i + \lambda_i\xi + \delta_i$$
$$E(x_i) = \tau_i + \lambda_i \kappa \qquad (5)$$

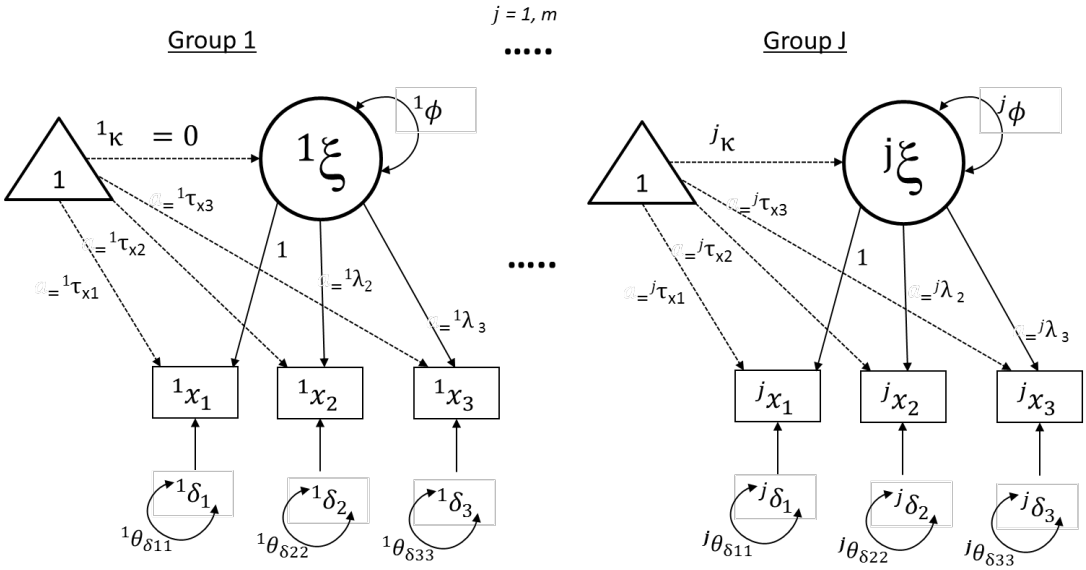
The system (5) represents the structured means modeling equations even though it results under-identified as the number of free parameters overcomes the number of the observations[1]. As a consequence, it seems that there are no way to estimate κ. However, since the rationale of SMM is to compare latent means across populations that are strong invariant as regards each involved latent, and not to estimate the latent means themselves, the first step to cope with this identification problem is to fix the construct mean of interest within one group to zero. By doing so, the population with the construct mean at zero is the reference group[2] and the other construct means in the remaining groups are freely estimated and compared to the reference one. Therefore, these estimated latent means represent deviations, average differences, from the reference group latent mean. In this respect, it will be straightforward to verify which group has significantly got, on average, more (if the average difference is significantly positive) or less (if the average difference is significantly negative) of the construct

[1] The number of observations is the number of observed variances and covariances (i.e., (v(v+1))/2; with v the number of observed variables) and the observed mean vector. Hence, the number of observations in the system (5) is nine (i.e., 3 variances, 3 covariances, 3 means) whilist the number of free parameters is ten.

[2] The way how to select the reference group is arbitrary and depends on the researcher strategy in choosing that reference group as much as it addresses the research question.

under evaluation; or, possibly, in which group it has not resulted significantly different from zero. In figure 2 is then depicted the SMM for the factor ξ across m groups with the first group set as the reference group with fixing at zero the construct mean $^{1}\kappa$. It is noteworthy that both all factor loadings and intercepts have been constrained to be equal across the m groups in respect of the strong measurement equivalence assumptions (i.e., $= {}^{j}\lambda_i$; $= {}^{j}\tau_{xi}$; i=1, 3; j=1, m). As a result, the entire model in figure 2 is identified[3]. Nevertheless, strong measurement equivalence can be achieved also at partial[4] level. If it is so, only just those items resulted invariant will be considered for computing latent means differences.

Figure 2.- Multi-group latent means comparison path diagram.



Hancock (2001) computed the estimated standardized effect size $\hat{d}$ of the structured means difference with the following formulas:

$$\hat{d} = \frac{|{}^{1}\kappa - {}^{j}\kappa|}{\sqrt{\hat{\phi}}} = \frac{|{}^{j}\kappa|}{\sqrt{\hat{\phi}}} \qquad (6)$$

$$\hat{\phi} = \frac{\sum_{j=1}^{m} n_j \left(\hat{\phi}_j\right)}{\sum_{j=1}^{m} n_j} \qquad (7)$$

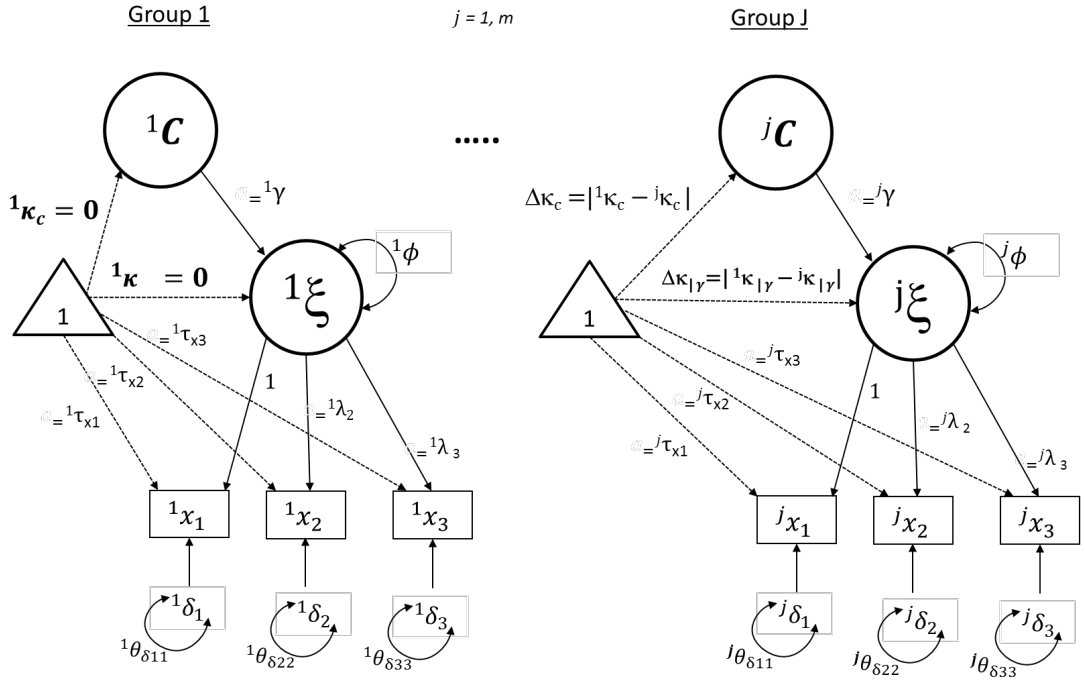
Where $|{}^{j}\kappa|$ is the estimated latent means difference between each j group and the reference one, $\hat{\phi}$ is the pooled variance estimate of ξ, n_j and $\hat{\phi}_j$ are respectively the sample size and the estimated variance of ξ in each j group. The interpretation of $\hat{d}$ is straightforward: how many standard deviations each j group are higher/lower than the reference one on that latent factor of interest.

[3] Please refer to the works of Hancock's (1997) and Thompson and Green's (2006) for further algebraic details.

[4] To achieve partial metric and scalar invariance the literature respectively stipulates that at least one factor loading (in addition to the one fixed at unity to define the scale of each latent construct) and one intercept per latent variable must be metrically invariant (be equal) (Byrne, Shavelson & Muthén, 1989; Steenkamp & Baumgartner, 1998).

Extension of SMM is latent ANCOVA model depicted in figure 3 in which the factors of interest are regressed on a measured or latent covariate (the model can be also extended with more than one measured and/or latent covariate) that presumably acts like confounding variable. By doing so, the path from the covariate to the factors of interest reveals how much of within-group factor variance is explained by between-group factor variance and therefore possibly new differences may exist in mean factors above and beyond (i.e., conditioned on) the effect of the covariate. This path from the covariate to the factors has to be constrained to be equal across groups (i.e., $= {}^{j}\gamma$; j=1, m; parallelism test[5]) in order to grant that new estimations of latent means differences are due to an equal external effect (i.e., covariate effect). Otherwise, that covariate will not be controlled for.

Figure 3.- Multi-group latent ANCOVA, latent covariate path diagram.

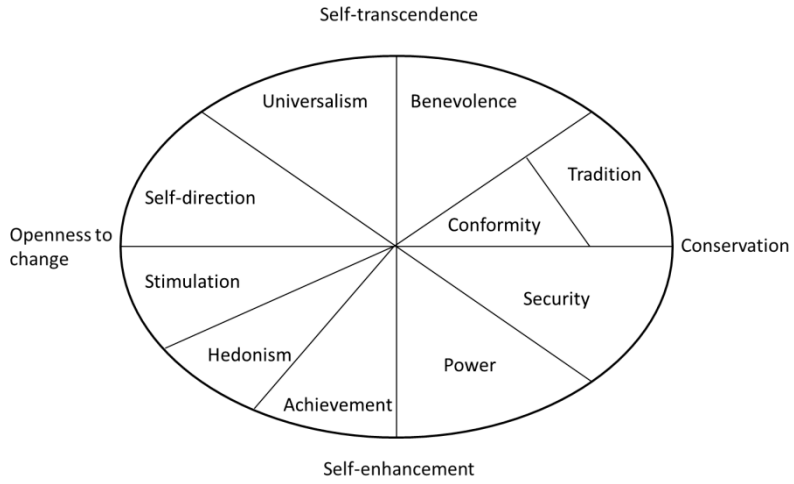


Schwartz theory of basic human values and hypotheses

SMM will be applied to the well-known Schwartz's taxonomy of basic human values (Schwartz, 1992). Briefly speaking, this theory identifies a purportedly comprehensive set of ten different types of cross-cultural values (termed value domains) that all together form an integrated circular structure of motivational constructs: benevolence, universalism, tradition, conformity, security, power, achievement, hedonism, stimulation, self-direction (see figure 4).

Figure 4. Schwartz's taxonomy of motivational value domains adapted from Schwartz (1992).

[5] Latent covariate variance and factor error variances (error covariances with more than one factor involved in the latent ANCOVA) are free to vary.



Nevertheless, the circular taxonomy depicted above has been adapted alike an ellipse rather than a perfect circle. The reason is due to the fact that the structure does not constitute a perfect circle, or a circumplex (term used and defined by Guttman in 1954), where variables (here latent variables) are equally spaced, but it has, in truly, unequally spaced variables. So that, it represents a quasi-circumplex taxonomy since the ten value domains, that are latent in nature, are also supposed to vary reflecting their degree of similarity, dissimilarity (or conflict) in their underlying motivations around that quasi-circular continuum (Schwartz, 1992, 1994).

The more the value domains are adjacent the more they are positively correlated and therefore similar in their underlying motivations; conversely, the more the value domains are distant, or even at the opposite side, the more they are negatively correlated and therefore dissimilar (or conflicting) in their underlying motivations. This operationalizing easily permits to visualize the quasi-circular continuum of the motivational value types that takes the form of a sinusoidal trajectory around the hypothesized circle when it occurs. Studies assessed this lacking of perfect circularity (Perrinjaquet, Furrer, Usunier et al. 2007; Schwartz & Boehnke, 2004) due to multi-collinearity problems with a consequent possibly overlapping between adjacent domains (Schwartz et al., 2012) even though the substantial level of correlation can be controlled for with hypothesizing high-order dimensions of the human value domains (Krystallis, Vassallo, Chryssohoidis, & Perrea, 2008; Krystallis, Vassallo, Chryssohoidis, 2012; Schwartz & Boehnke, 2004). However, this quasi-circular continuum is, in turn, organized by two orthogonal high-order dimensions that bring together the integrated structure of the ten domains as follows (see figure 4): the vertical dimension of self-transcendence and self-enhancement respectively opposes values of universalism and benevolence (which emphasize attention for the welfare and interests of others) to values of power and achievement (which emphasize the detection of self-interests). On the horizontal axis, the dimensions of openness-to-change and conservation opposes values of self-direction and stimulation (which emphasize self-regulating actions and willingness for new experience) to the values of tradition, conformity and security (which emphasize self-restriction, directive and opposition to change). Hedonism shares elements of both openness-to-change and self-enhancement (Schwartz, Sagiv & Boehnke, 2000; Schwartz et al., 2001).

Hypotheses of this study were twofold: 1) to compute latent means differences across the main four macro-regions of Italian territory for all domains of Schwartz's taxonomy with highlighting latent means differences related to highest correlated domains; 2) to

compute latent means differences for power, achievement, stimulation and self-direction domains controlling for hedonism (i.e., latent ANCOVA model with hedonism as latent covariate).

Methods and data analysis

Data were collected in June 2011 from a professional agency (PRAGMA – market research company) using a three-step quota-based sampling method. In the first step, the sample quota was designed to be representative on regional basis and age categories using data from the census performed in 2001 by the Italian National Institute of Statistics (i.e., ISTAT). Then, in the second step, national sampling points were partially randomized since they included the biggest 45 municipalities in Italy in respect of the regional stratification. Finally, in the third step, within each sampling point, a random sample of households (addresses) was visited by interviewers (applying random-walk procedures) selecting only one member of the family if over 18 years of age and solely, or jointly, responsible for the family's food expenditure.

A structured self-administered questionnaire was handed out to each selected respondent. Subsequently, subjects were contacted by phone to arrange an appointment for handing in the completed questionnaire. The final sample was comprised of 3,004 consumers with a mean age of 48 years where more than half the participants were females (i.e., 60% females, 40% males), 45% with high school educational level, 31% with primary education completed, 14% with university degree (1.4% with postgraduate degree), 9% with no formal or less than primary education, and 0.3% were missing. The complete questionnaire originally included three sections. The third section was of interest in this study aimed at assessing the human value domains according to the Schwartz (1992) theory of basic human value with using the validated Italian version of the 40-item Portrait Value Questionnaire (PVQ; Capanna, Vecchione & Schwartz, 2005). PVQ included short verbal portraits/descriptions/items on the importance of each value type: 6-item for universalism; 5-item for security; 4-item for tradition, conformity, benevolence, self-direction and achievement; and 3-item for stimulation, hedonism and power.

An example of description was: "Thinking up new ideas and being creative is important to him. He likes to do things in his own original way" describes a person to whom self-direction value is important. The question: "How much like you is this person?" elicited the importance to each description. Measurement scales with 6-anchor "not like me at all, not like me, a little like me, somewhat like me, like me, very much like me", and corresponding codes from 1 to 6, provided verbal and numerical quantification. The entire PVQ questionnaire can be requested from the author.

The strength of relationships between value domains were analyzed using Structural Equation Modeling (SEM) with Maximum Likelihood (ML) method of estimation. In all SEM analyses, cases with missing data were deleted using list-wise deletion in order to have complete records and so that measures as much consistent as possible with the constructs. The effective sample sizes for SEM analyses were respectively of 2,797 (Italy), 754 (Northwest Italy), 532 (Northeast Italy), 563 (Central Italy), 948 (South Italy).

Confirmatory Factor Analyses (CFAs) by country and macro-regions were performed on the 10-value factor structure of Schwartz's taxonomy to achieve convergent and discriminant validity among constructs (Kline, 2011) and then to validate the measurement model (Anderson & Gerbing, 1988). All CFAs were performed by arbitrarily setting one indicator to unity, for each different latent variable, in order to define the scale of the factor (Kline, 2011). Additionally, as suggested by Schermelleh-Engel, Moosbruger and Müller (2003) and Jöreskog and Sörbom (2002), a standardized residual analysis was conducted for all models adding paths between those error covariances where the correspondent standardized residuals were high (much more than ± 1.96 with $p<.05$; or ± 2.58 with $p<.01$) and the relative modification index very large (much more than ± 3.84 with $p<.05$; or ± 6.63 with $p<.01$). Nevertheless, these modifications were made with taking into account theoretical reasons (Schermelleh-Engel et al., 2003).

Multi sample structural equation modelling-based confirmatory factor analyses (MS-SEM-based CFA) were performed to check for cross-cultural validity across the four geographical macro-regions which included groups of regions according to the geographical repartition of Italy used by ISTAT. Structured means differences were evaluated by standardized estimations so as to quantify the effect size strength of the differences themselves (Hancock, 2001).

The statistical packages utilized for performing the analyses were SPSS v20.0 and LISREL v8.80 (Jöreskog & Sörbom, 2007).

Results and discussion

Preliminary results on descriptive statistics, reliability analysis and measurement models assessment were found satisfactory. However, these results were not reported here in order to preserve space, but they can be requested from the author.

The estimated zero-order correlations among the ten value domains showed different scores (see table 1) and many of them around the cut-off of .85 that it is still evidence for distinctiveness of the factors (i.e., discriminant validity; Kline, 2011). As expected, some estimated correlations were found greater than .85 for those domains that are more adjacently located in the taxonomy (i.e., conformity and tradition, conformity and security, power and achievement, hedonism and stimulation; see table 1). This result indicated that although CFAs fitted well in terms of goodness of fit indices, substantial correlations among these domains still persisted for all the four macro-regions and Italy, confirming the quasi-circumplex elliptical trajectory of Schwartz's taxonomy of motivational value domains.

Table 1.- Estimated correlations of ten value domains by macro-regions and Italy.

			North West	North East	Central	South	Italy
Universalism	↔	Benevolence	.85	.81	.81	.84	.83
Universalism	↔	Conformity	.78	.73	.68	.83	.78
Universalism	↔	Tradition	.60	.56	.39	.63	.57
Universalism	↔	Security	.76	.66	.67	.83	.76
Universalism	↔	Power	-.10	-.19	-.18	-.23	-.16
Universalism	↔	Achievement	.18	.12	.00	.05	.08
Universalism	↔	Hedonism	.16	.19	.15	.09	.13
Universalism	↔	Stimulation	.16	.32	.14	.13	.17
Universalism	↔	Self-direction	.72	.76	.70	.60	.68
Benevolence	↔	Conformity	.81	.68	.71	.81	.78
Benevolence	↔	Tradition	.61	.61	.55	.69	.63
Benevolence	↔	Security	.63	.61	.58	.71	.66
Benevolence	↔	Power	.07	-.06	.01	-.15	-.04
Benevolence	↔	Achievement	.24	.24	.21	.13	.20
Benevolence	↔	Hedonism	.27	.27	.32	.18	.25
Benevolence	↔	Stimulation	.24	.34	.27	.25	.27
Benevolence	↔	Self-direction	.75	.64	.71	.58	.67
Conformity	↔	Tradition	.89	.92	.80	.87	.88
Conformity	↔	Security	.89	.89	.83	.88	.90
Conformity	↔	Power	.13	-.06	.08	-.03	.02
Conformity	↔	Achievement	.24	.19	.21	.17	.20
Conformity	↔	Hedonism	.24	.22	.16	.15	.19
Conformit	↔	Stimulation	.07	.22	.09	.15	.13

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Conformity	↔	Self-direction	.58	.51	.46	.51	.52
Tradition	↔	Security	.72	.92	.68	.74	.78
Tradition	↔	Power	-.04	-.03	.11	-.03	.01
Tradition	↔	Achievement	.05	.15	.07	.08	.09
Tradition	↔	Hedonism	.03	.16	.05	.08	.07
Tradition	↔	Stimulation	-.09	.08	-.07	.06	.01
Tradition	↔	Self-direction	.25	.29	.11	.30	.25
Security	↔	Power	.28	.05	.14	.06	.14
Security	↔	Achievement	.40	.26	.21	.28	.29
Security	↔	Hedonism	.27	.24	.25	.19	.23
Security	↔	Stimulation	.18	.16	.22	.21	.20
Security	↔	Self-direction	.65	.55	.52	.61	.60
Power	↔	Achievement	.96	.81	.95	.90	.93
Power	↔	Hedonism	.65	.47	.78	.68	.65
Power	↔	Stimulation	.61	.59	.85	.72	.70
Power	↔	Self-direction	.52	.28	.50	.43	.43
Achievement	↔	Hedonism	.73	.75	.81	.82	.78
Achievement	↔	Stimulation	.78	.81	.88	.88	.84
Achievement	↔	Self-direction	.69	.57	.60	.66	.62
Hedonism	↔	Stimulation	.90	.91	.91	1	.94
Hedonism	↔	Self-direction	.66	.63	.70	.66	.66
Stimulation	↔	Self-direction	.74	.88	.83	.78	.80

The goodness of fit indices of the configural invariance was satisfactory, suggesting that the PVQ survey instrument measures the same underlying constructs across all macro-regions (see table 2).

Table 2.- Summary of multi-sample CFA models fit statistics for assessing measurement invariance at level of configural, metric and scalar.

	Configural Invariance	Full **M**etric Invariance	Full **S**calar Invariance
NT Chi-Square	9489.86	9679.29	9964.05
df	2756	2846	2936
NT-Chi-Square (difference)	Δ (**C**. **M**) = 189.43 (significant at level of .001) Chi-Sq (90; .001) = 137		Δ (**M**. **S**) = 284.76 (significant at level of .001) Chi-Sq (90; .001) = 137
SRMR	.059	.061	.061
RMSEA	.059	.059	.059
CFI	.96	.96	.96
TLI - NNFI	.95	.95	.95

A full metric invariance (all factor loadings constrained to be equal across the geographical macro-regions) was then performed. The global goodness of fit indices[6] of the full metric models were compared with those of the configural and subsequently with those of scalar invariance (see table 2). Full metric invariance and full scalar invariance was supported, even though Chi-square slightly increased (the Chi-square difference test was significant), but RMSEA, CFI and NNFI stayed the same. Thus, the solutions could be meaningfully compared across the four macro-regions and so could the structured means.

In the following tables 3 and 4 were respectively reported the estimated standardized effect size of structured means differences of each ten motivational domains by macro-region with the South as the reference group, and how the structured means differences of power, achievement, stimulation and self-direction changed when they regressed on hedonism. The South macro-region was selected as the reference group because, historically, this geographical macro-region has always been poorer than the rest of the peninsula, as well as it possessed age-old culture and different traditions from the other parts of Italy (De Rosa, 1993; Mutti, 2000). Besides, the backwardness of Italy's Southern regions has been, and still is, a crucial problem in Italian society identifying geologically differentiated development policies (Barbagallo, 1980).

Table 3.- Estimated standardized effect size of structured means differences with South as the reference group (*not significant at the 95% confidence level).

		South	Central	Northwest	Northeast
Self-transcendence	Universalism	.00	-.26	-.29	-.11*
	Benevolence	.00	-.15	-.13	-.11*
Conservation	Conformism	.00	-.33	-.20	-.23
	Tradition	.00	-.46	-.39	-.42
	Security	.00	-.36	-.31	-.23
Self-enhancement	Power	.00	-.06*	.03*	-.30

[6] The chi-square difference test is usually applied to compare nested models. However, the limitations of this latter index are well-known (violation of multi-normality assumptions, model complexity, sample size etc.; Schermelleh-Engel et al., 2003). Consequently, other fit indices, were used both as an alternative method and further support to the model comparison test as recommended by Steenkamp and Baumgartner (1998) and Vandenberg and Lance (2000).

	Achievement	.00	-.12	-.12	-.30
Hedonism	Hedonism	.00	.15	.04*	.07*
Openness to change	Stimulation	.00	.01*	-.11*	-.14
	Self-direction	.00	-.11*	-.05*	.05*

Table 4.- Estimated standardized effect size of structured means differences with South as the reference group and Hedonism as latent covariate (*not significant at the 95% confidence level).

		South	Central	Northwest	Northeast	Hedonism *Parallelism* γ
Self-enhancement	Power	.00	-.17	.00*	-.34	.71
	Achievement	.00	-.25	-.15	-.36	.82
Openness to change	Stimulation	.00	-.15	-.13	-.21	.70
	Self-direction	.00	-.20	-.08*	.03*	.95

Specifically, the numbers reported in the tables provided the following information: a) whether, or not, there were significant structured means differences in the ten motivational value domains between each group and the South; b) the sign and the strength in terms of standard deviation units (i.e., standardized effect size) of these differences.

So then, starting from table 3, it was impressive to observe that the Central, Northwest and Northeast Italy were characterized by highest negative differences, on average, in conservation dimension (especially in tradition) in comparison to the South Italy.

The latent means for the Central, Northwest and Northeast ranged, on average, from -.20 to -.46 standard deviation units lower than those of the South Italy on conservation dimension. In this respect, differences in the average amount of tradition, conformity and security concepts existed across macro-regions also in presence of severe estimated correlations between these domains (see table 1). So thus, someone could have easily, but inaccurately, concluded that consumers from the South did not make distinction between those concepts as well as consumers form the Central and North of Italy, but indeed differences in latent means still occurred (see table 3).

A similar negative trend was also found both in self-enhancement and self-transcendence dimensions, with the exception of power for the Central and Northwest, universalism and benevolence for the Northeast, respectively. These latter three domains, together with almost all the entire openness to change dimension, presented small differences, on average, across macro-regions. However, a slight counterpart to this negative trend was found in hedonism domain for the Central Italy with a positive difference in comparison to the South. Looking back again at the estimated correlations (table 1) regarding power and achievement domains they were found all very high across macro-regions, so then it seemed that, yet again, Italian consumers, independently from the part of the country they come from, did not make

distinction between these two concepts. But, indeed, differences in latent means on these two concepts strongly existed especially for achievement construct.

Concerning hedonism domain it was noteworthy, from table 1, that it was found higher related to stimulation than to achievement. As a consequence, hedonism construct belonged to openness to change dimension rather than to self-enhancement for all Italian consumers. Nevertheless, with regressing power, achievement, stimulation, self-direction on hedonism across macro-regions (see table 4 about Latent ANCOVA results) it was impressive how much change was found in these latent means controlling for the effect of hedonism; especially for the Central Italy: an equal control for hedonism across macro-regions (i.e., standardized path from hedonism to stimulation was found equal to .70 across groups; table 4) caused a decreasing in stimulation mean difference with the South of -.15 standard deviation units and a severe decreasing in self-direction, power and achievement means difference of .-20, -.17, -.25 standard deviation units, respectively.

All this practically means that since consumers from the Central Italy were, on average, more hedonistic than those of the South (i.e., positive value of .15 in hedonism mean difference between the South and Central; see table 3) they would be, on average, less stimulated, self-directed and power-oriented than Southern consumers if their hedonism was controlled for (i.e., hedonism not satisfied). As a consequence, Central Italian consumers were, on average, only just less achievement-oriented than the Southern ones (i.e., -.12 from table 3), but with no significant differences in power, stimulation and self-direction means because of their hedonism. This type of latent ANCOVA simulations can be tested also for all those domains of Schwartz's taxonomy that can be theoretically hypothesized as external covariates and therefore finding out further insightful implications.

Wrap-up

This study confirmed the importance of using structured means modeling, with the extension of latent ANCOVA models, when the object of the study is to compare means at latent level across different populations and especially in presence of high correlations between constructs. The application of this method is meaningfully robust both in terms of measurement equivalence (that can hold also at partial level) and homogeneity of factor variances/covariances that are simultaneously estimated across groups of comparison. Since the measurement equivalence is achieved at level of strong invariance (i.e., metric and scalar invariance), potential cultural forces across groups are controlled for and so that differences in construct means are obtained with no cultural bias. Particularly in this study, the application of this type of strategies to the Schwartz's taxonomy of human values across the most important Italian macro-regions effectively allowed to depict an average picture of Italian consumers as regards they inner motivational value domains, above and beyond their different regional cultures and the risk of overlapping of adjacent domains, providing insightful sociological matters for future perspectives.

Limitations

Usually, one limitation of the application of structured means modeling is the expected requirement of large sample size. By the way, with less than 100 cases

almost any type of SEM will result untenable due to low statistical power and unacceptable inferential properties as regards the Maximum Likelihood method of estimation, unless very simple models are considered (Kline, 2011). In the case of this study the PVQ 40-item questionnaire was summarized by a 10-factor model that it is not such a complex model, since it has not any causal paths. Nevertheless, in the unfortunate case a researcher is not able to deal with large samples he/she is bound to apply multiple indicators-multiple causes (i.e., MIMIC) models (Jöreskog & Goldberger, 1975) in order to make means comparisons at latent level and so that he/she is bound to renounce for invariance testing of the measurement models as in MIMIC models all sources of covariation among observed variables are assumed to be equal across groups with no formal test. Moreover, MIMIC models tend to control the Type I error rate when dealing with approximately equal generalized variances and/or equal sample sizes across groups, but not with both sample size and generalized variance disparities (Hancock, Lawrence & Nevitt, 2000) as structured means models are able to do.

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Contact email: marco.vassallo@entecra.it