Construct Validation and Application of a Common Measure of Social Cohesion in 33 European Countries

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Abstract The aim of the paper is to assess the construct validation of a multidimensional measure of social cohesion which is well theoretically grounded and has an equivalent/comparable interpretation across all European countries. Up-to-now published research on social cohesion is deficient in either one or both of these important aspects. This paper attempts to cover this gap. The task is accomplished in two steps. In the first step, we conceptualize social cohesion, flowing mainly from Bernard and Chan's definitions of social cohesion. Based on this theoretical framework we operationalize social cohesion and derive a set of intermediate indicators in the data. By return we verify whether these indicators empirically reflect/corroborate the multidimensional structure of the concept proposed by the theory. In the second step, we examine whether the obtained intermediate indicators of social cohesion form the same constructs across countries and whether they can yield a cross country equivalent measure of social cohesion. To test the validity of the theory we use multidimensional scaling and confirmatory factor analysis. Both models are able to verify the equivalence of the structural results between groups (i.e. countries). Confirmatory factor analysis produces further meaningful measures of these constructs. The analyses are based on the data from the 1999 European Values Study (EVS). The outcomes of the analyses reveal that, firstly, the existence of the multifaceted construct of social cohesion suggested by the theory has been corroborated by empirical analysis of the EVS data (i.e. social cohesion consists of components of formal and substantial relationships and political and socio-cultural domains). Secondly, the proposed constructs measuring social cohesion are equivalent across all analysed countries and thus allow the calculation of internationally comparable national scores of social cohesion. Application of

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the aggregate measures at the country level will illustrate the interest of the approach for further research.

1 Introduction

There have been many attempts to conceptualize and measure social cohesion. Different definitions and approaches have yielded different types of indicators. However, not much attention has been paid to an empirical verification of the multidimensional nature of social cohesion proposed by the theory and to cross-country validation/equivalence of these indicators. The purpose of our article is to cover this gap and to construct a measure of social cohesion which would respect its multidimensional nature pointed out in the theory, which would be valid in all European countries and would thus allow cross-country comparisons. The paper builds mainly on theoretical conceptualizations of social cohesion of Bernard (1999) and Chan et al. (2006).

Empirical analyses, in which we approach social cohesion as a quasi-normative, static, societal, relational, multidimensional concept, where both attitudinal and behavioural indices are taken into account, are based on the 1999 European Values Study (further only EVS) data from 33 European countries. This survey contains a great number of items that measure attitudes toward, and behaviours regarding, social relations, participation, and trust at many levels of social reality, as well as in many areas of day-to-day life, which are necessary for the construction of social cohesion indicators. We propose a set of indicators stemming from the use Bernard's and Chan's integrated conceptual schemes of social cohesion and then verify empirically whether the empirical indicators corroborate the theory.

The main challenge of this research is to assess the construct validity of social cohesion for all the 33 European countries belonging to the 1999 EVS study from micro-socio-economic data. Construct validation needs first, a clear theoretical frame for defining the concepts to be measured and secondly, methods capable of corroborating or rejecting the multiple facets of the definitions, taking group comparisons into account. Multidimensional scaling (Borg and Groenen 2005) and confirmatory factor analysis (Jöreskog and Sörbom 1993) meet these requirements and will be used in our research. If construct validity is satisfactorily assessed, application of the obtained dimensions of social cohesion on the 33 countries will be done.

The paper is structured as follows. In the first chapter we review salient theoretical approaches to social cohesion and set our theoretical framework on which our proposed multidimensional measure of social cohesion will be based, i.e. Bernard's and Chan's conceptualisations of social cohesion. The second chapter is dedicated to description of data, methodology and statistical techniques used in the paper. In the third chapter we operationalize social cohesion and, as a result, we propose a set of intermediate indicators which will lead to a composite multidimensional measure. In the fourth chapter, dedicated to data analyses, we verify whether the intermediate indicators reproduce the structure of social cohesion suggested by the theory, whether the obtained multi-facet structure is to be found in all analyzed countries and whether equivalent/comparable factor scores on social cohesion can be calculated for each analyzed country. The sixth chapter presents an application of the constructed measure of social cohesion and shows an overview of

national scores on measures of social cohesion. Finally, we will discuss and summarize the main finding of the paper.

2 Social Cohesion: Definition

Currently, it appears to be difficult to find a generally accepted definition of social cohesion. And without such a definition, the already existing measures to cover it remain very numerous.

Build up by Durkheim (1893), the notion of social cohesion was linked to the concept of solidarity and its contribution to social integration. While it had disappeared from both political agenda and the focus of scientists until the last 20 years, it is now one of the most used in scientific and political areas. This reappearance could be attributed to societal changes related to globalization, and consequently to new needs to conceptualize and clarify this notion in new economic, political and social contexts.

Trying to clarify the notion of social cohesion, Chan et al. (2006) observe that two distinctive approaches can be found in the literature.

The first approach is an academic one which further consists of sociological and socio-psychological substreams. Sociologists, such as Berger (1998) or Gough and Olofsson (2003) focus on the questions of social integration, stability, and disintegration. They do not necessarily attempt to define social cohesion, with the exception of Lockwood (1999), who considers it the opposite of social dissolution. Social psychologists contribute to the definition of social cohesion by creating a framework for measuring the concept at the level of the group.

The second approach is a political one and was illustrated by the examples of the Canadian government and European institutions. Focusing first on multiculturalism, which Canada has tried to promote since the nineties and which Europe had to manage following its enlargement, the notion of social cohesion glided towards economic and social dimensions. These dimensions were broadly adopted by international institutions, which saw factors of economic development in social cohesion (Osberg 2003). Reviewing the existing definitions, Chan et al. distinguish two types, and find them both insufficient. The first is an approach that mixes the content of the definition and the conditions of realization of social cohesion (they quote Duhaime et al. 2004; Berger-Schmitt 2000) and that reflects the political orientation of the discourse about social cohesion. The second is a pluralistic approach that is not defined precisely but depends on social issues (Beauvais and Jenson 2002; Jenson 1998; Bernard 1999).

Jenson (1998) was the first to elaborate on five dimensions measuring social cohesion: (1) affiliation/isolation (share of common values, feeling of belonging to a same community); (2) insertion/exclusion (a shared market capacity, particularly regarding the labour market; in other words, who has/does not have opportunities to participate in the economy); (3) participation/passivity (involvement in management of public affairs, third sector); (4) acceptance/rejection (pluralism in facts and also as a virtue, i.e. tolerance regarding differences); (5) legitimacy/illegitimacy (maintenance of public and privates institutions which act as mediators, i.e. how adequately the various institutions represent the people and their interests).

Based on Jenson's work, Bernard (1999) constructed an integrated scheme based, on one hand, on the domains of activity (economic, political and socio-cultural) and, on the other hand, on the formal/attitudinal or substantial/behavioural character of the dimensions. He completes Jenson's proposal by introducing the dimension of equality/inequality

with regard to social justice and equity in the economic domain (mainly related to equality of conditions, i.e. poverty and well-being).

Bernard (1999) conceptually integrates the different dimensions of social cohesion. He tackles the inherent difficulty of this notion, which he considers a quasi-concept, i.e., a hybrid mental construction proposed by the political game and—at the same time—based on a data analysis of the situation; such a construction must remain quite undetermined in order to be adaptable to the necessities of political action. Bernard considers social cohesion as a dialectic balance between three values: freedom, equality and solidarity. These three elements are interrelated while simultaneously standing in contradiction. So the idea of balance between the three is essential to reach social cohesion. The role of political institutions is to manage social conflicts in founding their actions on these three values.

The more recent conceptual and operational work was done by Chan et al. (2006). These authors propose their own definition, which is based on the argument that social cohesion is "a state of affairs concerning both the vertical and the horizontal interactions among members of a society, as characterized by a set of attitudes and norms that include trust, a sense of belonging, and the willingness to participate and help, as well as their behavioral manifestations" (Chan et al. 2006: 290). The authors argue for a minimalistic definition of social cohesion, close to ordinary usage. Therefore, they avoid including in the definition of social cohesion concepts or characteristics which they consider to be explicative factors or determinants of social cohesion, such as equal opportunities, equality, and social inclusion. In their view, Bernard's economic dimension is not an "essential constituent" of social cohesion, but only one of many determinants for a cohesive society.

Bernard, as well as Chan et al. views social cohesion as an attribute of a group or society, not of individuals. This implies that, even if measured using micro/individual-level data, the aim is to aggregate the individual information and describe the social cohesion of different groups/regions/communities. In addition, both authors define social cohesion as a relational concept, seeing different types of social relations (such as relations among individuals, relations between individuals and groups and relations between individuals and society as a whole) as cornerstones of the construct.

They assume also that social cohesion is multidimensional and cannot be measured by any single indicator. The multidimensionality of social cohesion is twofold. First, it covers different domains of social life, and second, it distinguishes between the objective (i.e. behavioural) and subjective (i.e. attitudinal) natures of social relationships.

In Bernard's approach, social cohesion consists of three main domains: political, socio-cultural and economic. In the framework of Chan et al. two main dimensions are considered: a horizontal dimension (cohesion within civil society) and a vertical one (cohesion between state and citizen). Going one step further, Chan et al. distinguish three main vertical levels at which social cohesion can be measured: the micro (i.e. individual), mezzo (i.e. group) and macro (i.e. state) levels. In other words, social cohesion can be approached through relationships between individuals, between groups and individuals and between state institutions and individuals.

In their work, Bernard and Chan et al. agree that the measurement of social cohesion should include subjective (opinions, attitudes, values) as well as objective (actual behaviour) indicators (Bernard 1999, Chan et al. 2006). Chan et al. 2006 define cohesion as "the reflection of individuals' states of mind, which manifests itself in a certain behaviour" (Chan et al. 2006: 289). Attitudinal and behavioural components are simultaneously necessary. Thus, indices used in our study will cover both types of information.

Broadly speaking, the analysis of the conceptual frameworks of Bernard and Chan et al. leads us to conclude that the framework of Chan et al. highly overlaps with Bernard's conceptual scheme. The definition of the horizontal (cohesion within society) dimension by Chan et al. corresponds to the social-cultural domain of Bernard. Similarly, the vertical (state-citizen cohesion) dimension coined by Chan et al. corresponds to Bernard's political domain The only exception concerns the economic domain. This domain is not a key constituent of social cohesion in the view of Chan et al. An overview of these two overlapping approaches of social cohesion is presented in Table 1.

As noted above, Chan et al. claim that the concept of social cohesion consists of micro, mezzo and macro levels. They argue that at the mezzo level, different groups should be linked and interacts to contribute to social cohesion. However, the measurement of social ties at the mezzo level can be rather problematic. When we imagine an organization or group and then try to measure how it is interconnected with other mezzo level agencies or the state, we have to take into account that most social organizations/groups are created to serve a particular purpose, and that the general idea behind most organizations is not to cooperate and interact with many other organizations. Some of them do not aim at establishing any links with state agencies per se.

Table 1 Paul Bernard's scheme of social cohesion in relation to that of Chan et al.

Domains	Nature of relations		Authors
	Formal/attitudinal	Substantial/behavioural	
Economic	Case A: Insertion/exclusion: a shared market capacity, particularly regarding the labour market	Case D: Equality/inequality: equality in chances and equality in conditions	Bernard
	Not part of social cohesion		Chan et al.
Political	Case B: Legitimacy/illegitimacy: maintenance of public and private institutions which act as mediators	Case E: Participation/passivity: involvement in management of public affairs, third sector (in opposition to political disenchantment)	Bernard
Vertical dimension (state-citizen cohesion)	*Trust in public figures Confidence in political and other major social institutions*	*Political participation*	Chan et al.
Socio-cultural	Case C: Acceptance/rejection: pluralism in facts and also as a virtue *i.e.* tolerance in differences	Case F: Affiliation/isolation : share of common values, feeling of belonging to a same community	Bernard
Horizontal dimension (cohesion within society)	*General trust with fellow citizens Willingness to cooperate and help fellow citizens, including those from ''other'' social groups Sense of belonging or identity*	*Social participation and vibrancy of civil society Voluntarism and donations Presence or absence of major inter-group alliances or cleavages*	Chan et al.

In italic: concepts of Chan et al.

A certain degree of division and conflicts is mostly seen as the guarantee of an open and pluralistic society, preventing it from slipping into totalitarianism (Pahl 1991; Helly 2002). But this central question of conflict and its treatment is most often hidden in the question of social cohesion as it is currently presented (Helly 2002; CERC 2008). Moreover, Fukuyama argues that "while people continue to participate in group life, the groups themselves are less authoritative and produce a smaller radius of trust. As a whole, then, there are fewer common values shared by societies and more competition amongst groups" (quoted in Green et al. 2003:14).

Bernard seems to be the only author who considers this central dimension of conflict or tension between the different components of social cohesion in his definition. The necessary balance between the identified dimensions of social cohesion is the keystone of his framework and allows leaving the trap of social cohesion usually seen as an objective with the risk of totalitarianism. This is also one of the main differences with the proposed definition from Chan et al. where social cohesion is defined as a social value between others. They consider that social cohesion can conflict with other social values, and that each society has to define the degree of social cohesion it wants to reach. On the contrary, Bernard integrates the necessarily tension to the facets of social cohesion and not to social cohesion itself.

Though both authors operate at different levels of abstraction and precision, it can be concluded that they agree on political and socio-cultural domains, but that Bernard includes the economic domain (equality/inequality and inclusion/exclusion) into the definition of social cohesion. Considering that the relationships between the different facets (domain × relation) of social cohesion have never been tested empirically, we will focus our analyses on the two last domains of the integrated theoretical scheme. Moreover, the practical choice in excluding the economic domain is reinforced by the impossibility to find adequate items in the EVS questionnaire.

For the sake of parsimony in our arguments, in the following text we will, from now on, call our theoretical framework Bernard's integrated scheme, keeping in mind all the overlaps described with the conceptualization of Chan et al.

3 Data

Empirical analyses are based on the 1999 European Values Study (EVS) conducted in 33 countries. EVS is a large-scale, cross-national, cross-sectional and repeated research program on basic human values. The first wave of the survey was launched in 1981 in ten European countries. To explore the dynamics of changes in values, a second wave was realized in 1990 in all European countries, including Switzerland, Austria and Central and Eastern European countries. About 10 years later (1999/2000), the third EVS wave was conducted in almost all European countries. The fourth wave was launched in 2008. (http://www.europeanvalues.nl/). A good reason for choosing this database is that it contains a great number of subjective and objective items that measure attitudes toward and behaviour regarding social relations, participation, and trust, at many levels of social reality, as well as in many spheres/domains of everyday life, corresponding more or less to the dimensions of social cohesion covered by the literature.

In our study, we work on representative samples of the adult population (aged 18 or more) of 33 European countries. The original pooled sample consisted of 39,919 individuals. The number of cases in each country has been adjusted to 1,000, to ensure equal

Table 2 Number of observations and 33 countries/regions

Country/region	Label	Frequency Before correction	Percent	Frequency After correction	Percent
1 Austria	AT	1,522	3.8	1,000	3.3
2 Belgium	BE	1,912	4.8	1,000	3.3
3 Bulgaria	BG	1,000	2.5	1,000	3.3
4 Belarus	BY	1,000	2.5	1,000	3.3
5 Croatia	HR	1,003	2.5	1,000	3.3
6 Czech Republic	CZ	1,908	4.8	1,000	3.3
7 Denmark	DK	1023	2.6	1,000	3.3
8 Estonia	EE	1,005	2.5	1,000	3.3
9 Finland	FI	1,038	2.6	1,000	3.3
10 France	FR	1,615	4.0	1,000	3.3
11 Greece	GR	1,142	2.9	1,000	3.3
12 Hungary	HU	1,000	2.5	1,000	3.3
13 Iceland	IS	968	2.4	1,000	3.3
14 Ireland	IE	1,012	2.5	1,000	3.3
15 Italy	IT	2,000	5.0	1,000	3.3
16 Latvia	LV	1,013	2.5	1,000	3.3
17 Lithuania	LT	1,018	2.6	1,000	3.3
18 Luxembourg	LU	1,211	3.0	1,000	3.3
19 Malta	MT	1,002	2.5	1,000	3.3
20 Netherlands	NL	1,003	2.5	1,000	3.3
21 Poland	PL	1,095	2.7	1,000	3.3
22 Portugal	PT	1,000	2.5	1,000	3.3
23 Romania	RO	1,146	2.9	1,000	3.3
24 Russian Federation	RU	2,500	6.3	1,000	3.3
25 Slovakia	SK	1,331	3.3	1,000	3.3
26 Slovenia	SI	1,006	2.5	1,000	3.3
27 Spain	ES	1,200	3.0	1,000	3.3
28 Sweden	SE	1,015	2.5	1,000	3.3
29 Ukraine	UA	1,195	3.0	1,000	3.3
30 Great Britain	GB	1,000	2.5	1,000	3.3
31 Germany West	DEW	1,037	2.6	1,000	3.3
32 Germany East	DEO	999	2.5	1,000	3.3
33 Northern Ireland	IEN	1,000	2.5	1,000	3.3
Total		39,919	100.0	33,000	100.0

Source: EVS 1999

weighting in the analyses. Therefore, the final number of observation in the study is 33,000 (Table 2).

Two data files are created. As weighting is not possible for multidimensional scaling (MDS), an equal national sample sized file with 1,000 respondents for each country is created. National sample sizes have all been put to 1,000 observations by randomly duplicating/dropping observations. For structural equation modeling (SEM), a weighted

equal-sized sample is chosen. The weights reproduce 1,000 observations per country, but also correct country-specific biases.

4 Operationalization

Keeping in mind the theoretical framework and the nature of the available data, we list certain points which should be taken into consideration when operationalizing the concept of social cohesion.

We measure social cohesion from a measurement theory. We use observed responses on items, which indicate the presence or absence of social connectedness, ties and confidence at different levels, and we examine whether the integrated conceptual scheme of social cohesion can be empirically proven. Consequently, we leave aside all attempts to examine causal relationships between different dimensions of social cohesion. This being said, we do not seek to determine how a particular society/state promotes social cohesion. Instead, our objective is to identify to what extent individual attitudes and behaviours, measured in different spheres (or domains) of life, allow us to define a society as cohesive.

All items used in our study concern relations, i.e. supra-individual ties or attitudes to and behaviours regarding supra-individual entities. As did other authors who were dealing with social cohesion (Chan et al. 2006; Jenson 1998), we stop at the national level. Thus, our analyses do not include items measuring ties regarding supranational entities, such as the European Union or the world as a whole.

We proceed with the operationalization of the concept of social cohesion in several steps, which are shown in the following table.

In a first step, 59 items are selected from the questionnaires and assigned to the theoretical frame. Only 3 items were candidates to cover the attitudinal dimension of the economic domain. Not one item was found in EVS questionnaires to represent the behavioural economic dimension. This is insufficient to test the controversial economic sphere of social cohesion theory. Additionally, we will discard the possibility of testing the multilevel hypothesis of Chan et al. i.e. the existence of distinctive micro, mezzo and macro levels of relationships, as the available data do not cover these levels. Thus, our analysis is performed only on the 56 remaining items.

Only items applicable in all countries are retained. Items names and labels are defined in "Values surveys 1981–2004, integrated questionnaire.[1]

Next, a pre-treatment of the retained items was done. Missing values were replaced by mode or mean values or other plausible values estimated with a Multiple Correspondence Analysis. If necessary, the coding scheme of the variables was reversed.

In a second step, in order to construct intermediate variables suitable for multidimensional analysis (MDS) and structural equation modeling (SEM), a certain preliminary grouping of items (parcels) was necessary. Table 4 summarizes the link between the items and intermediate variables, as well as the hypothetical assignation of the parcels in the theoretical frame of Paul Bernard. If the following conditions are met, the grouping of items in each of the different parcels is justified: where only two items constitute a parcel, the correlation between the two items must be significant in each of the countries; if more than two items form a parcel, they must have high enough saturations on the first principal component (equal or greater than 0.10). Only a few countries do not follow these rules: Belarus for VI13, VI14 and VI15, Portugal for VI15, and West Germany for VI16.

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[1] http://www.jdsurvey.net/evs/EVSAnalize.jsp.

5 Data Analyses

Two measurement models are applied to the data to verify the theoretical propositions of the integrated scheme presented in Table 1. The choice of the measurement models is based mainly on the two following considerations.

The models must be confirmatory. Thus, we place greater emphasis on deductive rather than inductive appraisals. The theory of social cohesion is expressed in the integrated theoretical scheme with two categories of relations, the formal and substantial, and three categories of domains or life spheres, economic, political and cultural. Confirmatory models must be able to verify or corroborate the theory. The interpretation of the results is thus reinforced by goodness of fits indexes Table 3.

The models must also be able to take into consideration group differences. The challenge of our research is not only to test the theory on the 33 countries taken as a whole, but also to verify the generalization of the results on the various countries. Models must thus have the property of taking group differences into account, i.e. cross-country equivalence of measurement.

Multidimensional scaling (MDS) and confirmatory factor analysis (CFA) fulfill these two conditions. The two models will check the validity of social cohesion theory with regard to group differences. On the one side, MDS leads to compact representations of relations between the variables and is especially fruitful in testing facetted theories (Cantor 1985). On the other side, only CFA can lead to composite social indicators taking group differences into account. MDS can consider qualitative (monotonic) relationships between observed dissimilarities and obtained distances between the variables. CFA is more restrictive and admits only linear relationships. We consider that the theory is validated if the MDS results and the measurement by confirmatory factor analysis represent all or most of the features of the integrated conceptual scheme.

MDS is mainly conceived as a "method that represents measurement of similarity (or dissimilarity) among pairs of objects as distances between points of a low-dimensional

Table 3 From items to the measures

Item1		
Item2	→ intermediate variable 1	
Item3		
		→ Composite indicator 1
Item4		
Item5	→ intermediate variable 2	
Item6		
		→ Measures
Item7		
Item8	→ intermediate variable 3	
Item9		
		→ Composite indicator 2
Item10		
Item11	→ intermediate variable 4	
Item12		

multidimensional space" (see Borg and Groenen 2005, p. 3). Carroll and Chang (1970) extended the basic MDS model, referred to as INDSCAL or weighted MDS, to include group differences also. This application takes into account the structure common to all the countries as well as each one's structure. A comprehensive presentation of MDS and INDSCAL may be found inter alia in Kruskal and Wish (1978), Coxon (1982), Tournois and Dickes (1993), and Borg and Groenen (2005). Links between theoretical propositions and their validation with MDS may be found in Cantor (1985).

CFA belongs to the family of structural equation models, where constraints about linear relationship between observed and unobserved (latent) variables can be introduced and tested. The LISREL (Linear Structural Relationships) model (Jöreskog and Sörbom 1993) allows testing a theoretical representation of dimensions about social cohesion, and can assess whether they are in accordance with observed data. Application of the model on one group, as well as on many other groups, is possible for testing the invariance of the factor structure between groups.

5.1 Multidimensional Scaling

Input data for MDS[2] must reflect proximity (similarity or dissimilarity) between the 16 intermediate variables. There is great flexibility in choosing the coefficients expressing this. Contrary to factor analytic procedures, MDS is not restricted to correlation and covariance coefficients, but can use more coefficients. We choose the standardized squared Euclidian distances between observed variables.[3] This dissimilarity coefficient is sensitive enough in order to lead to a fine-tuning of the rankings and to neutralize the influence of the means of the observed variables on the resulting MDS configuration.

MDS offers the possibility of selecting the nature of the function between proximities and distances. In our research, we opt for a monotonic relationship corresponding to the qualitative nature of the data. Thus, with iterative procedures, we expect that the ranking of distances in the resulting MDS space will reproduce as closely as possible the ranking of the observed proximities. The so called stress-coefficients will provide information on the quality of the adjustment.

Weighted MDS, considering national differences, will transform the results of all the countries in common and individual spaces. This can be done if the transformations are applied across all countries simultaneously, or if the transformations are applied within each country separately. We opt here for the first condition, so that we are in agreement with the individual differences model of Carroll and Chang (1970).

5.1.1 Qualitative Interpretation of the Configurations

The outcomes of the MSD applied to the 16 intermediate variables suggested that two dimensions are sufficient to interpret the results. The common space is represented in Fig. 1. The fit does not really improve when more than two dimensions are allowed. The interpretation is supported by the geometric localisation of the 16 intermediate variables

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[2] We use PROXSCAL SPSS procedure.

[3] Negative linear relationship exists between the standardized squared Euclidean distances and Person's correlation coefficients.
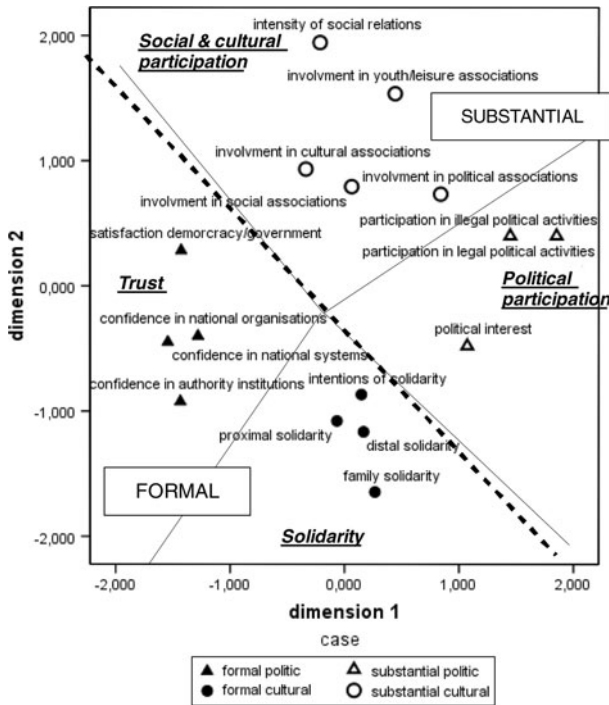
Fig. 1 The common space of weighted MDS. Source: EVS 1999, Stress and model fit diagnostics: Normalized Raw Stress = 0.059, Stress-I = 0.242, Stress-II = 0.604, S-Stress = 0.151, Dispersion Accounted For (D.A.F.) = 0.941, Tucker's Coefficient of Congruence = 0.970

coordinates in two-dimensional space. The following features will support the meaning of the localizations of the points.

The space is first divided by a dotted line into two main regions. On the right side of the line, all intermediate variables corresponding to substantial/behavioural relations are located. They are identified by blank marks. Conversely, on the left side of the line, variables belonging to the formal/attitudinal relations can be found. These variables are represented by full marks.

The borders of four sub-regions/quadrants delimited by two thin lines may be drawn, and form a well-known polar *radex* structure. We can see that the quadrants of Fig. 1 represent most of the features of the integrated conceptual scheme. North–south quadrants cluster variables representing socio-cultural sphere of the theoretical scheme, and East–West quadrants contain variables that belong to the political sphere.[4]

By applying the weighted MDS model, we use transformations across all 33 sources (countries) simultaneously, which produces, without exception, configurations for each country similar to those represented in Fig. 1. The features of the qualitative (regional)

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[4] More precisely, case B is represented by three variables (VI01, VI02, VI03 and VI04) and in Fig. 1 is labeled "trust". Case C is represented by four variables (VI05, VI06, VI07 and VI08) and is called "solidarity"; case D by three variables (VI09, VI10 and VI11) and is named "political participation"; and case E by five variables (VI12, VI13, VI14, VI15 and VI16) and is labelled as "social participation".

interpretation of the individual countries' configurations correspond exactly to those given for the common space.

In summary, the qualitative interpretation of the results (Fig. 1) leads to a fair corroboration of Bernard's theory. (1) The formal and substantial relations indicators are clearly located in the MDS space. (2) Each of the indicators for a given theoretical case is clearly identifiable and isolated in a quadrant whose borders join together in the centre of the MDS figure. Thus, regions of political participation, social and cultural participation, trust and solidarity measure Bernard's hypothetical constructs. (3) A clear polarization of formal and substantial dimensions within each domain suggests potential tensions between behaviours and attitudes in social cohesion.

The equality/inequality and insertion/exclusion dimensions are not represented due to the absence of relevant information in the EVS questionnaire.

5.1.2 Quantitative Indexes for Estimating the Adequacy of the Configurations

The quantitative evaluation of the congruence of the MDS solutions of the 33 countries is provided, first, by adequacy indexes and, next, by the inspection of the weights of their own MDS representations.

Several quantitative indexes provide information concerning the adjustment of the proximities observed and the distances obtained. Stress indexes refer to the residuals of the transformations. The higher the stress indexes, the worse the fit. If unconditional transformations are chosen, the normalized raw stress is the mean of the normalized raw stress of each country. The normalized raw stress = 0.064, and corresponds to the Tucker congruence coefficient of 0.97,[5] the meaning of which is quite similar to the square root of the percentage of explained variance in linear regression models. Residuals are thus very low, and corroborate the validity of the results, even if some countries have better normalized raw stress coefficients than others. Nevertheless all Tucker's congruence coefficients for all countries are greater than 0.90, and thus have satisfactory adjustment indexes. For comparative purpose, stress formula 1 is equal to 0.25 and satisfies the usual conditions of weighted MDS adjustment.

Another way of examining the validity of the MDS results is to consider each country's position in a weight space (Fig. 2), expressing its attractiveness towards the dimensions of the common space. The closer the points are in the weight space, the better is the congruence between countries. The angle between the coordinates of the points in the weight space describes the similarity of the configurations of the countries. The outcomes of the analysis suggest that, in our case, these coordinates cluster together, so that the same interpretation may be given to the resulting configuration of each country.

5.2 Confirmatory Factor Analyses

In this section, we apply CFA to specify fitting models that would allow measuring social cohesion and creating factor scores. We expect to find valid factor scores for the 33 countries receiving the same interpretation, in accordance with our theoretical scheme. We compare four models of factor analytic invariance between the 33 groups. The best model of factor analytic invariance will be kept and used to estimate factor scores.

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[5] Coefficient of congruence of Tucker = sqrt $(1 - \sigma^2)$ where σ^2 is the normalized raw stress.
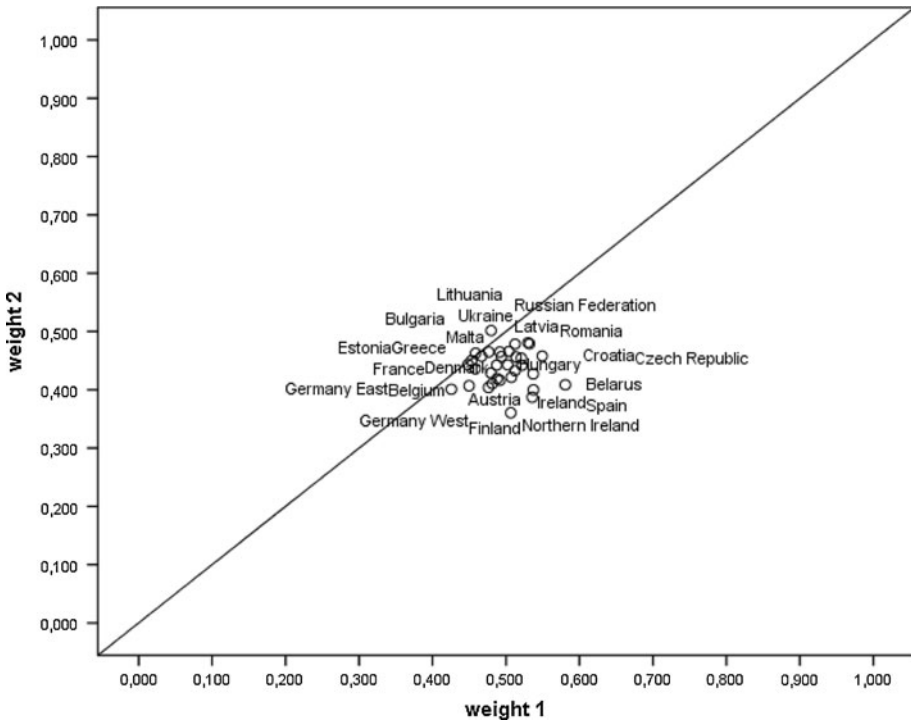
Fig. 2 INDSCAL weights for the 33 regions/countries. Source: EVS 1999

We retain three intermediate observed variables for each of the four cases (B, C, E and F) from integrated theoretical schemes. Only intermediate variables with the best adjusted alpha coefficients (Table 4) are chosen, so we expect that VI01, VI02 and VI04 will measure trust; VI05, VI06 and VI08, solidarity; VI09, VI10 and VI11, political participation; and VI12, VI14 and VI15, social participation.

The variance-covariance matrix of the weighted data file constitutes the observed data treated with maximum likelihood estimators. Exact and close fit indexes are used to evaluate the global adequacy of the models. Preference is given to close fit indexes, like the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI), over exact fit indicators, like Least Squares Chi-Square. It is difficult to meet the requirements of exact fit conditions because statistical significance depends on the number of observations.

The CFA model may be written as follows:

$$\sum = \Lambda\Phi\Lambda' + \Theta_\delta$$

Σ is the observed variances-covariances matrix; Λ is the rectangular factor matrix and Λ' its transpose; Φ is the variance-covariance matrix between the factors; Θ_δ is the variance covariance matrix of the errors.

Table 4 List of intermediate variables (VINE) and the corresponding items, mode of parcel composition and statistical characteristics

Intermediate variables	Items	n	α (α')	Composition	M sd	Skew kurt
Case B: political domain–formal relations						
Dimension: legitimacy/illegitimacy						
VI01 Confidence in national distribution systems	e071 Confidence: education system	4	.73	e071 +	10.40	−.107
	e077 Confidence: social security system		(.80)	e077+	2.36	.096
	e084 Confidence: health care system			e084 +		
	e085 Confidence: justice system			e085		
VI02 Confidence in national organizations	e072 Confidence: the press	5	.73	e072+	11.58	.065
	e073 Confidence: labour unions		(.76)	e073+	2.70	.199
	e074 Confidence: the police			e074+		
	e075 Confidence: parliament			e075+		
	e076 Confidence: the civil service			e076		
VI03 Confidence in authority institutions	e069 Confidence: churches	2	.49	e069+	5.20	−.152
	e070 Confidence: armed forces		(.74)	e070	1.44	−.409
VI04 Satisfaction in democracy and government	e110 Satisfaction with the way democracy develops	2	.68	e110+	4.63	−.054
	e111r Rate political system for governing country–4 categories		(.86)	e111r	1.31	−.373
Case C: cultural domain–formal relations						
Dimension: acceptance/reject						
VI05 Proximal solidarity	e154 Concerned with people in the neighbourhood	3	.85	e154+	8.69	−.036
	e155 Concerned with people in the region		(.91)	e155+	2.61	−.009
	e156 Concerned with fellow countrymen			e156		
VI06 Distal solidarity	e159 Concerned with elderly people	4	.80	e159+	13.43	−2.61
	e160 Concerned with unemployed people		(.86)	e160+		.132
	e161 Concerned with immigrants			e161+		
	e162 Concerned with sick and disabled people			e162		
VI07 Family solidarity	e153 Concerned with immediate family	2	.45	e153+	9.02	−1.582
	e163 Prepared to help immediate family		(.62)	e163	1.38	2.383
VI08 Intention of solidarity	e164 Prepared to help people in the neighbourhood	4	.84	e164+	13.60	
	e165 Prepared to help elderly people		(.89)	e165+	3.06	−.563
	e166 Prepared to help immigrants			e166+		.772
	e167 Prepared to help sick and disabled people			e167		

Table 4 continued

Intermediate variables	Items	n	α (α')	Composition	M sd	Skew kurt
Case E: political domain–substantial relations						
Dimension: participation/passivity						
VI09 Participation in legal political activities	e025 Political action: signing a petition	3	.70	e025+	5.51	.137
	e026 Political action: joining in boycotts		(.82)	e026+	1.74	−.850
	e027 Political action: attending lawful demonstrations			e027		
VI10 Participation in illegal political activities	e028 Political action: joining unofficial strikes	2	.65	e028+	2.49	1.763
	e029 Political action: occupying buildings or factories		(.94)	e029	0.87	2.525
VI11 Political interest	a062 How often discusses political matters with friends	2	.58	a062+	4.18	−.319
	e150r How often follows politics in the news–3 categories		(.81)	e150 r	1.18	−.722
Case F: Cultural domain–substantial relations						
Dimension: belonging/isolation						
VI12 Involvement in social associations	a064 Belong to social welfare service for elderly, handicapped or deprived people	4	.61	a064+	0.15	3.932
	a069 Belong to local political actions		(.70)	a069+	0.52	17.212
	a081 Unpaid work: social welfare service for elderly, handicapped or deprived people			a081+		
	a086 Unpaid work: local political action groups			a086		
VI13 Involvement in political associations	a067 Belong to labour unions	6	.52	a067+	0.33	2.804
	a068 Belong to political parties			a068+	0.72	10.095
	a072 Belong to professional associations			a072+		
	a084 Unpaid work: labour unions			a084+		
	a085 Unpaid work: political parties or groups			a085+		
	a089 Unpaid work: professional associations			a089		
VI14 Involvement in cultural associations	a065 Belong to religious organization	6	.56	a065+	0.40	2.413
	a066 Belong to education, arts, music or cultural activities			a066+	0.82	6.560
	a075 Belong to women's group			a075+		
	a082 Unpaid work: religious or church organization			a082+		
	a083 Unpaid work: education, arts, music or cultural activities			a083+		
	a092 Unpaid work: women's group			a092		

Table 4 continued

Intermediate variables	Items	n	α (α')	Composition	M sd	Skew kurt
VI15 Involvement in youth/leisure associations	a073 Belong to youth work	4	.58	a073+	0.30	2.570
	a074 Belong to sports or recreation		(.67)	a074+	0.68	6.993
	a090 Unpaid work: youth work			a090+		
	a091 Unpaid work: sports or recreation			a091		
VI16 Intensity of social relations	a058 Spend time with friends	1	–	a058	3.17	−1.056
					0.87	0.159

Source: EVS 1999

α = alpha coefficient of Cronbach; α' = adjusted alpha with Spearman-Brown' generalized formula if the number of items equals 6; sd = standard deviation; skew = skewness; kurt = kurtosis; e150r: item e150 recoded; e111r: item e111 recoded

For exact wording of the items used, see the following documentation: http://www.jdsurvey.net/evs/EVSDocs.jsp

Using EVS Data, other authors covered similar latent structures : confidence in institutions (Halman and Vloet 1994; Listhaug 1995; Galland 2002; Hagenaars et al. 2003; Fahey et al. 2006; Petterson 2008); Protest (Hagenaars et al. 2003; Fahey et al. 2006) Solidarity (Galland 2002; Hagenaars et al. 2003); Volunteering (Dekker and van den Broek 2006); Interest in politics (Fahey et al. 2006)

Our model has the following features:

- The factor matrix has four columns, corresponding to the four expected dimensions of Bernard's theory, and 12 lines, corresponding to the number of retained observed variables. The first three variables are assigned to the first factor, the following three to the second one, the next three to the third one, and the last three variables to the fourth factor. All other parameters were set at 0. The four dimensions of Paul Bernard's theoretical scheme are only measured by variables belonging to a same case (see Table 1).
- All the parameters under the diagonal of the variances-covariance matrix are set free and must be estimated. This reflects the hypothesis of interrelated social-cohesion dimensions.
- The variance-covariance matrix of the errors is diagonal: only error variances are estimated, but covariances between observed variables are supposed to be 0. No relationships between the errors are allowed.

Four different models of factor invariance between the 33 countries are estimated. These models are schematized in Table 5.

Table 5 Four models of factor invariance between the 33 countries

	Invariance between the 33 countries		
Model A	Factor matrix	Factor covariance matrix	Error variances
Model B		Factor covariance matrix	Error variances
Model C		Factor covariance matrix	
Model D	Factor matrix	Factor covariance matrix	

Table 6 Goodness of fit statistics of comparative analysis between the 33 countries

Model	Normal theory weighted least squares Chi-square	Degrees of freedom	Root mean square error of approximation (RMSEA)	p-Value for test of close fit (RMSEA <0.05)	Comparative fit index (CFI)
A	40033.17 ($p < 0.001$)	2544	0.12	0.00	0.45
B	27248.07 ($p < 0.001$)	2160	0.11	0.00	0.64
C	8337.64 ($p < 0.001$)	1904	0.06	0.00	0.91
D	12348.87 ($p < 0.001$)	2160	0.07	0.00	0.86

Source: EVS 1999

With model A, we suppose that all the solutions for all 33 countries are identical. This model is the most constraining and does not allow countries to differ. The three other models relax these constraints. Less constraint will be found for model C. Model B admits different factor structures for the countries, so that different interpretations of the factors may be given by the respondents of different countries. Model D hypotheses a same factor structure between the 33 countries, as well as same correlations between factors, but admits specific measurement errors.

In Table 6, the close fit statistics for models A and B are insufficient and very different from those of models C and D. Model C, the least restrictive model, has the best fit statistics, but will not be very useful in measuring social cohesion with inter-country valuable scales. Conversely, the interest of model D is obvious. We can construct social cohesion scales, applicable to all the countries. Only structural differences between countries are due to measurement errors specific to each country. We can adopt model D, and if we follow the recommendations of Jöreskog and Sörbom (1993), a RMSEA index lower than 0.08 is sufficient for validation purposes.

Analytical statistics are also provided for each country with group comparison procedures. Both the goodness of fit index (GFI) of Jöreskog and Sörbom (1993) and the Standardized Root Mean Square Residual are considered. GFI varies between 0 and 1. The closer GFI is to 1.0, the better the fit. Values over 0.90 are acceptable. Conversely, the closer the mean residual is to 0, the more adequate the solution will be. Residuals lower than 0.11 are acceptable. In Table 7, the values of GFI and the standardized residual are listed for all 33 countries and all four models.

Local indexes confirm the global indexes of Table 7. Models C and D have better fits than A and B. The best local fits are those of model C. But local fit for model D is high enough for accepting the interpretation inherent to this model.

One can also see that countries like Austria (AT), the Czech Republic (CZ), Italy (IT), Malta (MT) and Slovenia (SL) fit well for all four models. This is not the case for Belarus (BY), Lithuania (LT), the Netherlands (NL), Romania (RO), the Russian Federation (RU), and East Germany (DEO).

Model D may be chosen because estimation of factor coefficients and correlation coefficients between factors do not vary between countries. Only the estimation of error parameters of manifest variables is country specific. Due to the invariance of factor coefficients and correlation matrix, second order factors may be estimated. The parameters of standardized invariant factor matrix of model D's solution is presented in Table 8, and the invariant correlation matrix in Table 9.

With model D, we can estimate four first order correlated factor scores. From the first order factors, two second order correlated factor scores will be estimated: A formal factor

Table 7 Goodness of fit index and standardized root mean square residual for each model and each country/region

Country		Goodness of fit index (GFI) model				Standardized root mean square residual			
		A	B	C	D	A	B	C	D
Austria	AT	.91	.93	.97	.96	.11	.08	.05	.06
Belgium	BE	.86	.89	.95	.92	.20	.12	.07	.10
Bulgaria	BG	.83	.89	.98	.96	.14	.11	.05	.08
Belarus	BY	.70	.79	.94	.92	.20	.15	.09	.12
Croatia	HR	.89	.93	.96	.94	.12	.07	.07	.09
Czech Republic	CZ	.92	.92	.97	.96	.12	.09	.06	.08
Denmark	DK	.85	.85	.95	.94	.17	.14	.07	.09
Estonia	EE	.86	.91	.96	.95	.12	.09	.06	.08
Finland	FI	.87	.89	.96	.95	.14	.12	.06	.08
France	FR	.88	.94	.96	.94	.17	.08	.08	.11
Greece	GR	.80	.91	.96	.93	.20	.09	.07	.09
Hungary	HU	.82	.89	.97	.96	.16	.11	.06	.09
Iceland	IS	.87	.91	.96	.95	.15	.10	.07	.07
Ireland	IE	.88	.89	.95	.93	.16	.11	.07	.09
Italy	IT	.94	.93	.97	.96	.10	.07	.05	.08
Latvia	LV	.82	.91	.98	.96	.15	.09	.04	.07
Lithuania	LT	.68	.87	.97	.94	.18	.11	.05	.11
Luxembourg	LU	.90	.90	.95	.93	.16	.11	.08	.10
Malta	MT	.90	.93	.96	.95	.11	.08	.06	.07
Netherlands	NL	.72	.79	.96	.92	.29	.18	.06	.11
Poland	PL	.84	.87	.97	.95	.14	.11	.06	.08
Portugal	PT	.83	.90	.95	.94	.14	.09	.07	.09
Romania	RO	.75	.83	.96	.92	.24	.13	.07	.13
Russian Federation	RU	.72	.82	.97	.93	.20	.14	.06	.12
Slovakia	SK	.85	.89	.97	.96	.17	.12	.06	.08
Slovenia	SI	.90	.92	.95	.94	.13	.08	.07	.08
Spain	ES	.89	.91	.97	.95	.12	.08	.06	.10
Sweden	SE	.67	.79	.97	.96	.31	.20	.05	.07
Ukraine	UA	.72	.83	.97	.95	.20	.13	.07	.09
Great Britain	GB	.91	.91	.96	.91	.11	.09	.07	.12
Germany West	DEW	.84	.89	.93	.92	.13	.09	.09	.10
Germany East	DEO	.74	.85	.92	.90	.16	.11	.11	.10
Northern Ireland	NIR	.90	.92	.95	.92	.15	.09	.08	.12
M		0.08	0.88	0.96	0.94	0.16	0.11	0.07	0.09
sd		0.08	0.04	0.01	0.02	0.05	0.03	0.01	0.02

Source: EVS 1999

reflects the two attitudinal dimensions (trust and solidarity) and a substantial factor, the two behavioural dimensions (political and social participations). First and second-order factor scores may be used in various research projects, whether as dependent or independent variables.

Table 8 Standardized coefficients of the common factor matrix for model D

Manifest variables	Factors			
	Trust	Solidarity	Political participation	Social participation
VI01 Confidence in national distribution systems	0.72			
VI02 Confidence in national organisations	0.83			
VI04 Satisfaction in democracy and government	0.39			
VI05 Proximal solidarity		0.63		
VI06 Distal solidarity		0.77		
VI08 Intention of solidarity		0.66		
VI09 Participation in legal political activities			0.95	
VI10 Participation in illegal political activities			0.45	
VI11 Political interest			0.26	
VI12 Involvement in social associations				0.32
VI14 Involvement in cultural associations				0.44
VI15 Involvement in youth/leisure associations				0.25

Source: EVS 1999

Table 9 Common correlation matrix between the factors for model D

Trust	1.0			
Solidarity	0.19	1.0		
Political participation	−0.04	0.11	1.0	
Social participation	0.07	0.07	0.24	1.0
	Trust	Solidarity	Political participation	Social participation

Source: EVS 1999

6 Application

Mean factor scores of the 33 countries and ranking of the countries with respect to these scores are presented in Table 10. A classification of the 33 countries, suggested by Halman et al. (2005) in five different European areas, was also included in Table 10 (variable area).

Relations between social cohesion's dimensions and European EVS areas are statistically significant. The lowest relationship is observed with Political Participation $[F(4,28) = 4.021, \; p < 0.05, \; \eta^2 = 0.365]$, followed by Solidarity $[F(4,28) = 6.805, \; p < 0.01, \; \eta^2 = 0.493]$ and Social Participation $[F(4,28) = 9.807, \; p < 0.001, \; \eta^2 = 0.584]$. The best relation with the first order factor score is Trust $[F(4,28) = 11.402, \; p < 0.001, \; \eta^2 = 0.620]$. The relationships with the 2 second order factor scores are very significant. The attitudinal (formal) component is related to the European areas with $[F(4,28) = 14.457, \; p < 0.001, \; \eta^2 = 0.674]$ and the behavioural (substantial) component with $[F(4,28) = 8.134, \; p < 0.001, \; \eta^2 = 0.537]$. Figure 3 represents the mean standardized second order dimensions of the 33 countries with respect to the five geographical EVS areas. North and West countries have positive (above the mean) formal and substantial

Table 10 Social cohesion's mean scores and ranking of the 33 countries

| Country		Area	Trust		Solidarity		Political participation		Social participation		Formal		Substantial	
			z	r	z	r	z	r	z	r	z	r	z	r
Austria	AT	West	.56	30	−.11	11	.00	19	.09	20	.30	25	.06	15
Belgium	BE	West	.06	20	.02	18	.16	24	.19	24	.06	20	.22	25
Bulgaria	BG	East	−.51	6	.08	19	−.30	6	−.22	11	−.28	9	−.33	11
Belarus	BY	Former SU	−.19	12	−.82	1	−.47	3	−.32	9	−.67	2	−.51	3
Croatia	HR	East	−.53	5	.40	31	.17	25	.00	15	−.08	12	.11	20
Czech Republic	CZ	East	−.42	7	−.11	10	.27	27	.07	19	−.35	7	.23	26
Denmark	DK	North	.47	27	−.46	3	.54	31	.37	28	.00	15	.58	30
Estonia	EE	Former SU	−.16	13	−.35	5	−.36	4	−.25	10	−.34	8	−.39	8
Finland	FI	North	.55	28	−.23	9	−.05	15	.29	26	.21	22	.14	22
France	FR	West	.02	18	−.04	15	.50	30	.04	18	−.01	14	.36	28
Greece	GR	South	−.59	2	.24	24	.62	32	.33	27	−.23	11	.61	31
Hungary	HU	East	−.37	9	−.44	4	−.62	1	−.49	3	−.54	4	−.71	2
Iceland	IS	North	.66	32	.10	21	.23	26	.45	31	.50	31	.43	29
Ireland	IE	West	.46	26	.65	33	−.06	14	.39	30	.74	33	.20	24
Italy	IT	South	−.30	11	.34	27	.14	22	.01	16	.03	19	.10	17
Latvia	LV	Former SU	−.14	14	−.72	2	−.18	12	−.38	7	−.57	3	−.35	9
Lithuania	LT	Former SU	−.55	4	−.24	8	−.02	18	−.46	5	−.52	6	−.29	12
Luxembourg	LU	West	.59	31	−.09	12	.06	21	.37	29	.33	26	.26	27
Malta	MT	South	.67	33	.34	28	−.29	7	−.35	8	.66	32	−.41	6
Netherlands	NL	West	.56	29	−.05	14	.36	29	.79	33	.33	27	.72	32
Poland	PL	East	−.08	15	.10	20	−.20	11	−.46	4	.01	17	−.41	5
Portugal	PT	South	.25	23	.31	26	−.35	5	−.19	13	.37	28	−.35	10
Romania	RO	East	−.41	8	.00	16	−.55	2	−.59	1	−.27	10	−.73	1
Russian Federation	RU	Former SU	−.77	1	−.29	6	−.21	10	−.52	2	−.70	1	−.45	4
Slovakia	SK	East	−.33	10	.34	29	−.04	17	.17	23	.01	16	.07	16
Slovenia	SI	East	.00	17	.12	22	.01	20	.17	22	.08	21	.11	19
Spain	ES	South	.17	21	.27	25	−.27	8	−.04	14	.29	24	−.21	13
Sweden	SE	North	.33	25	.40	30	.81	33	.75	32	.48	30	.99	33
Ukraine	UA	Former SU	−.55	3	−.24	7	−.22	9	−.42	6	−.53	5	−.40	7
Great Britain	GB	West	−.04	16	−.06	13	−.05	16	.28	25	−.07	13	.14	23
Germany West	DEW	West	.31	24	.13	23	.14	23	.04	17	.29	23	.12	21
Germany East	DEO	West	.25	22	.43	32	.34	28	−.20	12	.45	29	.11	18
Northern Ireland	NIR	West	.02	19	.00	17	−.10	13	.11	21	.02	18	.00	14
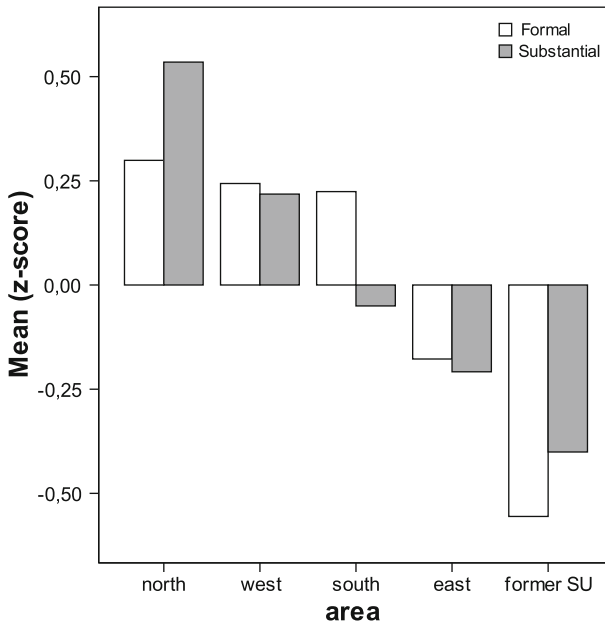
Fig. 3 Mean formal and substantial scores of the five European EVS areas

relations, East and former Soviet Union's countries have negative (above the mean) formal and substantial relations. South European countries have positive attitudes and slight negative behavioural manifestations of social cohesion.

7 Conclusions

The definition of social cohesion theory, expressed in facets based on the conceptualizations of Bernard (1999) and Chan et al. (2006), is partially verified with data from the 1999 European Values Study. Items covering the political and social spheres as well as the formal and substantial relationships could be found in the EVS Survey questionnaire and transformed into 16 intermediate variables. From a theoretical perspective, the conception of social cohesion seen as the result of the balance between its components has been verified at least for each dimensions of both measured domains (political and socio-cultural).

The economic sphere, belonging to Bernard's conceptual scheme, could not be verified. Thus, the question of whether the economic domain should be retained in the measurement theory of social cohesion, as per Bernard's suggestions, or excluded, if we adopt the theory of Chan et al. cannot be answered. Only further research may provide some insight in this debate, but only if sufficient economic items are included in the appropriate questionnaires. Also, the refinement of Bernard's theory by Chan et al. remains an open interesting question. The distinction between micro-, mezzo-, and macro-relationships is quite seminal, and suggests the possibility of extending the facet theory of Bernard. If we do not consider the economic domain, it is quite easy to conceptualize—for future questionnaire design—a hypothetical three-facet definition of social cohesion: (a) the formal and

substantial relationship, (b) political and socio-cultural spheres, and (3) micro, mezzo, and macro levels. Micro-relations may be operationalized by interpersonal relations, mezzo-relations by interactions between respondents and groups, and macro-relations by interactions between the individual and the national organizations and institutions. In such a setting, 12 different cases ($2 \times 2 \times 3$) may be considered, and the appropriate questions have to be enounced to have sufficient material for testing purposes.

Nevertheless, construct validity of political and socio-cultural life domains and attitudinal and behavioural relationships was assessed for social cohesion with MDS and CFA. First, the elements of the theory are clearly represented in the multidimensional common space and the common factor matrix of confirmatory factor analysis. Secondly, the adequacy of the representation for all the 33 countries could not be rejected.

A clear theoretical scheme, as used in this research for choosing items and variables from survey questionnaires, is a necessary prerequisite for reaching adequate and valid representations with measurement models like MDS and CFA, but is not sufficient to automatically lead to valid results in accordance with the theory. Many other structures may be obtained which can be interpreted otherwise than the presumed facets of a preliminary theory and will thus be helpful in proposals for changing the theory. Many random and/or systematic measurement errors, stemming for sampling errors, translation of the items, conditions of the interviews or understanding of the questions by the respondents are also able to distort the results of MDS and CFA in other directions than those of the preliminary theory. Thus the coherence of our results with the theory expressed in Bernard and Chan's integrated conceptual schemes of social cohesion, and the congruence of the results between the 33 countries give a sound basis for the measurement of social cohesion from individual questionnaire material.

Application of the obtained measures on macro-level unities shows significant and consistent differences of the aggregate social cohesion dimensions between North–South and East West European countries. Further investigations are necessary for comparing these indicators with traditional socio- economic macro indicators of social cohesion.

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