

Evaluating Measurement Invariance for Social and Political Trust in Western Europe over Four Measurement Time Points (2002-2008)*

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It is a well-documented fact that social trust, i.e., the extent to which people trust others, and political trust, i.e., trust in political institutions, are key factors in social capital theory. However, to compare these concepts in cross-national or longitudinal frameworks, it is important to first establish whether the measurements of these concepts are compatible across countries or over time. This paper tests the measurement and cross-national and longitudinal invariance properties of social and political trust. We use multiple-group confirmatory factor analyses (MG-CFA) to evaluate the different levels of invariance (configural, metric and scalar) using data from the European Social Survey (ESS) measured at four different time points (2002, 2004, 2006 and 2008) in seven Western European countries. In a second step, the country mean rankings of social and political trust are computed based on the latent scores and compared with those based on traditional sum score measurements. This comparison illustrates the potential inaccuracy of sum scores for country mean comparisons when measurement invariance is not supported by the data.

Key words: political trust; social trust; cross-national comparison; multiple-group confirmatory factor analysis (MG-CFA); measurement invariance; European Social Survey (ESS)

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INTRODUCTION

Nowadays, social trust and political trust are broadly studied in different academic fields such as political science, sociology or economics. Most articles dealing with these types of trust are focused on studying their relationships with behavioral outcomes such as civic or political participation (Allum, Patulny, Read and Sturgis 2010; Uslaner and Brown 2005) or socio-cultural outcomes (Denters, Gabriel and Torcal 2007; Newton 2001; Torcal and Montero 1999) just to name a few. Thus, a major focus in current research is on associations of various variables of interest with dimensions of trust. Less attention has been devoted to the question of whether and to what extent the measurement components of trust per se are suitable for both cross-cultural and longitudinal comparisons (Freitag and Bauer 2013; Reeskens and Hooghe 2008).

The current paper focuses on the measurement properties of the concepts of social and political trust in order to study and compare their level and longitudinal trend across countries over a period of six years. In this study we focus on seven Western European countries and investigate four time points. While examining the measurement properties of social and political trust, we take survey measurement error into account and test for cross-country and longitudinal measurement invariance in the data using Multiple-Group Confirmatory Factor Analysis (MGCFA: Bollen 1989). This procedure allows us to disentangle the levels of cross-national and longitudinal invariance systematically. Once full or partial measurement invariance is established, trends over time may be compared meaningfully. Finally, we will compare our findings using latent variables vs. the widely used sum score measurements and point to possible misinterpretations or erroneous conclusions when using sum scores when full measurement invariance is not given. This article goes beyond previous studies (e.g., Allum, Read and Sturgis 2011) in several important ways. First, in addition to older data, it also uses data available from the fourth round of the European Social Survey. Second, this article empirically demonstrates differences in means and mean rankings when using latent variables compared to sum scores and illustrates with real data the danger of using sum scores for comparisons even when partial scalar invariance is given. Finally, we treat each country at each point in time as a separate unit of analysis and do not pool the data either across countries in each round or over measurement time points as previous studies have done (e.g., Allum et al. 2011). In this way we can test for measurement invariance more rigorously and identify more accurately cross-country and/or cross-time model misspecifications before evaluating longitudinal changes in trust in each country separately. Before turning to the empirical part, we begin with a brief description of our theoretical concepts, social and political trust.

SOCIAL AND POLITICAL TRUST

Trust is an important ingredient for the smooth functioning of a community or society. Fukuyama (1995: 26) defined trust as “the expectation that arises within a community of regular, honest and cooperative behavior, based on commonly shared norms, on the part of other members of the community.” Thus, trust can be understood from an axiomatic point of view as a situation where individual A trusts B (individual, institution) to do X (Hardin 1992; Levi 1998). Therefore, trust is the belief that a person/institute will act in the same way that the other person would expect it to act. In that sense, the act of trust is based on the personal evaluation of trustworthiness, which links with Sztompka’s (1999: 25) concept of trust as “a bet about the future contingent actions of others.”

The “others” in trust relations may be unknown or known to the one who is doing the trusting. Definitions or typologies of forms of *social trust* are based on the characterization of these “others,” that is, the categorization of the ones to be trusted. Freitag and Bauer (2013) empirically differentiate different types of social trust: particularized trust (trust at close social range which is exhibited toward people the individual knows personally from everyday interactions, such as friends or neighbors); identity-based trust (based in the group or category where the unknown individual belongs, like ethnicity or religion); and generalized trust (trust in people in general or strangers that are not related with specific situations). This paper focuses on generalized trust.

Political trust is mainly defined as the trust between citizens and political elites or institutions (Newton 2007). Political trust is necessary for the stability of democratic politics. A high level of political trust can be seen as an indicator of legitimacy concerning political decisions that affect individuals, groups or institutions. In this study we refer to the second type of political trust specified by Easton (1975: 444), the so-called diffuse support, which focuses on the evaluation of the political system as a whole.

The concepts of social and political trust are related with different societal outcomes (Zmerli, Newton and Montero 2007). Nevertheless, these two typologies of trust are also related to each other (Putnam 1993; 1995; Tao, Yang, Li and Lu 2013). Social trust alone is not sufficient to maintain a stable democracy (Inglehart 1999) – the survival of a democratic political system also requires a commitment to its political institutions. Such confidence is a social resource which helps the market economy and democratic politics function smoothly (Stolle 2003). The relationship between these two types of trust means that individuals within a society are willing to make positive evaluations of both citizens and political institutions. Social and political trust together lessen transaction costs by reducing the economic and social necessity of contracts, legal frameworks, regulations

and other forms of coercive authority (Hardin 1999). Furthermore, a society with a high level of political trust might produce social trust thus helping to create a productive economy (Fukuyama 1995; Levi 1998; Levi and Stoker 2000; Tao et al 2013).

THE MEASUREMENT OF SOCIAL AND POLITICAL TRUST

Social trust

The origin of social trust measurement is generally accredited to Rosenberg (1956) who introduced the classic question concerning social trust based on the opposite poles of one survey question explicitly asking about trust: “*In general, most people can be trusted*” versus “*You can’t be too careful in dealing with other people.*” This classical measure is commonly used in sociological research to measure social trust (Delhey and Newton 2005; Freitag and Bühlmann 2009; Newton 2001; van der Veld and Saris 2011; van der Meer, van Deth and Scheepers 2009). However, it might be difficult to measure social trust as defined in the theoretical section as a simple concept with a unique question as it is, in fact, a complex concept. Since a single measure of trust might not be sufficient to capture its complexity, several behavioral indicators of social trust would be desirable (Glaeser, Laibson, Scheinkman and Soutter 2000; Putnam 1995). Additionally, the quality of a measurement is higher when using multiple indicators than when using a single indicator or question (Saris and Gallhofer 2007). This is why the use of several indicators to measure social trust has been practiced in sociological research (Allum et al. 2010; Allum et al. 2011; Freitag and Bauer 2013; Reeskens and Hooghe 2008; van der Veld and Saris 2011). The social trust measurement applied in this paper uses three different classical indicators that have been included as part of the European Social Survey (ESS) in several waves to present.¹

Political trust

Political trust, like social trust, does not have a single agreed-upon definition, and accordingly, its measurement appears to be relatively complex (Saris and Gallhofer 2007). It can hardly be gauged by a single question, and it is more appropriate to use different indicators to measure this concept in order to obtain a more reliable and interpretable result.

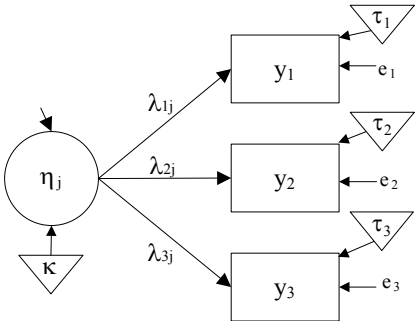
Political trust is not a single concept but a complex one that involves trust in different political institutions in a country. Because of this complexity, several authors have measured political trust using multiple indicators (Allum et al. 2010; Allum et al. 2011; Rothstein and Stolle 2002; Torney-Purta, Barber and Richardson 2004). For instance, Rothstein and Stolle (2002) differentiated between types of institutions such as political institutions or representatives (parliament, political

parties or government), institutions or groups of order (police, army, courts, schools) and institutions of control (press, officials or public employees). Research carried out by Torney-Purta and colleagues (2004) distinguished between political institutions (parliament, government, political parties) and entities that maintain direct relationships with citizens (schools or police). Measuring political trust by assessments of various democratic institutions (e.g., parliament or the legal system) can also be considered as measuring the level of legitimacy for the political system in a specific country or region. The conceptual approach of the political trust measurement used in this paper is similar, and it studies political trust as a combination of confidence in the national parliament, the legal system and politicians.² In the following section we describe the data used to measure social and political trust and the method used to analyze their level of cross-national and longitudinal invariance.

DATA AND METHOD

The paper studies the cross-country development of social and political trust across four time periods (2002, 2004, 2006 and 2008) over six years in seven Western European countries using ESS data. The total sample sizes for each country and survey year (2002, 2004, 2006 and 2008, respectively) were the following: Belgium (1,898, 1,778, 1,798 and 1,760); France (1,503, 1,806, 1,986 and 2,073); Germany (2,919, 2,870, 2,916 and 2,751); Portugal (1,511, 2,051, 2,202 and 2,366); Spain (1,717, 1,663, 1,875 and 2,576); Switzerland (2,040, 2,141, 1,804 and 1,819); and the Netherlands (2,364, 1,881, 1,888 and 1,778).³

Figure 1 Generalization of a Confirmatory Factor Analysis (CFA) Model



Note: y_i = three observed indicators; τ_i = the intercept of each of the three observed indicators; η_j = the latent variable; λ_{ij} = the factor loading or slope from the j latent variable to the y_i observed indicator; e_i = a random measurement error for the responses for each of the three indicators.

Both types of trust are measured as constructs or latent factors with three reflective indicators (Bollen 1989; Byrne 2012; Kaplan 2009). The estimated measurement model for each type of trust is shown in a generalized form in Figure 1. This model is known as a confirmatory factor analysis (CFA) model (Brown 2006).

In the model tested here, y_i symbolizes the three observed indicators, τ_i is the intercept of each of the three observed indicators, η_j is the latent variable, λ_{ij} is the factor loading or slope from the j latent variable to the y_i observed indicator and e_i is a random measurement error for the responses for each of the three indicators. Covariances between the latent variable (η_j) and the error variance (e_i) or among the error variances themselves are constrained to zero.

The estimation of each observed variables is based on the general equation:

$$y_i = \tau_i + \lambda_{ij}\eta_j + e_i \quad (1)$$

which in this case can be decomposed into the following three equations for each of the two factors (see Figure 2):

$$\begin{aligned} y_1 &= \tau_1 + \lambda_{11}\eta + e_1 \\ y_2 &= \tau_2 + \lambda_{21}\eta + e_2 \\ y_3 &= \tau_3 + \lambda_{31}\eta + e_3 \end{aligned} \quad (2)$$

where y_1 , y_2 and y_3 stand for the three indicators of social or political trust.

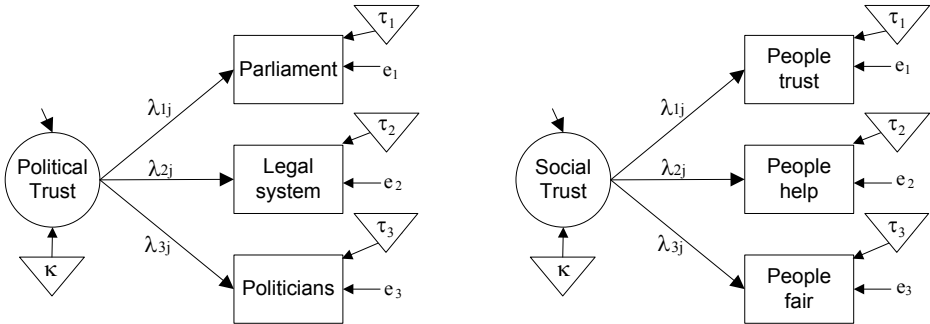
In order to compare groups using MGCFA, measurement invariance for some parameters is required (Ariely and Davidov 2011; Davidov, Schmidt and Billiet 2011; Meredith 1993; Reeskens and Hooghe 2008; Steenkamp and Baumgartner 1998). Establishing measurement invariance would permit meaningful comparisons of the latent means of social and political trust or their relations with other theoretical constructs of interest across groups (time or countries in this case) while ensuring that the latent constructs – social and political trust – have the same meaning and scaling across groups. Three hierarchical levels of invariance have to be tested: configural, metric and scalar invariance (Allum et al. 2011; Meulemann and Billiet 2012; Steenkamp and Baumgartner 1998).

- **Configural invariance (pattern invariance):** This type of invariance holds if the model fits for the different groups, with the only requirement being that the model structure be the same while the estimated parameters may have different values. It is the least restrictive level of invariance. This type of invariance is the baseline model for more restrictive models.

- **Metric invariance (weak invariance):** Factor loadings (λ_{ij}) are constrained to be equal across groups. If metric invariance holds, relationships between the latent construct and other theoretical constructs of interest may be compared across groups meaningfully.
- **Scalar invariance (strong invariance):** This is a more restrictive level of invariance. Not only are the model structure and the factor loadings (λ_{ij}) constrained to be equal across groups, but the indicator intercepts (τ_i) are also required to be invariant across groups. If scalar invariance holds, the means (κ) of the latent factors may be meaningfully compared across groups.

When full (metric or scalar) invariance does not hold, comparisons may still be possible if **partial measurement invariance** holds (Byrne, Shavelson and Muthén 1989). Equalities are required for some but not all factor loadings or intercepts (Brown 2006; Saris and Gallhofer 2007). Byrne et al. (1989) and Steenkamp and Baumgartner (1998) suggest that at least two items per latent variable should have equal parameters across groups to support partial invariance. In the empirical section we are going to test for measurement invariance across countries and time points for social and political trust as illustrated in Figure 2.

Figure 2 CFA Models for Political and Social Trust



Note: For parameter notations, see Figure 1.

An MGCFA model is analyzed for 28 groups composed of four time points (2002, 2004, 2006 and 2008) and seven countries (Belgium, France, Germany, Spain, the Netherlands, Portugal and Switzerland) to test for cross-country and longitudinal invariance. Missing values are dealt with by using the full information maximum likelihood (FIML) procedure which utilizes all available information from the variables (Schafer and Graham 2002). We use a bottom-up strategy for the test

(van der Veld and Saris 2011; Meuleman and Billiet 2012), starting with the least constrained model (configural invariance) and then introducing more constraints to the model (metric and scalar invariance, respectively). For the evaluation of model fit for each level of invariance, different goodness-of-fit criteria are applied. The first two criteria we use are the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) measures. We consider SRMR values of 0.09 or lower and RMSEA values of 0.06 or lower as indication of acceptable fit (Hu and Bentler 1999; MacCallum, Browne and Sugawara 1996). In addition, we use as incremental fit indices the comparative fit index (CFI) and the Tucker-Lewis index (TLI) to calculate improvements over competing models. We consider values higher than 0.90 for these two indices as an indication of acceptable model fit (Hu and Bentler 1999). Furthermore, we consider a decrease in the CFI measure larger than 0.01 as a considerable decrease in fit (Chen 2007). Evaluation of these fit measures is combined with the examination of modification indices (MI), expected parameter change (EPC) and the power of the test for possible misspecification (Saris, Satorra and van der Veld 2009).⁴ Mplus 6.12 (Muthén and Muthén 1998-2010) is used for the analyses.

RESULTS

Table 1 displays the global fit indices for each MGCFA model for the different levels of measurement invariance. Each MGCFA model is composed of 28 groups (seven countries in four measurement time points).

Table 1 does not show the model fit for the configural invariance model since the MGCFA model for a single latent variable with three indicators was just identified and no fit indices can be obtained. The full metric invariance model for social trust (Model 1a) in 28 groups across time and countries displayed an acceptable fit for the data. Additionally, MI and EPC did not suggest any significant model misspecifications, and all factor loadings were substantial in the 28 groups. Thus, relationships between social trust and other theoretical constructs of interest may be meaningfully compared across groups with this model. However, the full scalar invariance model (1b) indicates a considerable reduction in model fit. Further inspection of MI, EPC and the power of the test points to several model misspecifications which indicate that some of the intercepts may not be constrained to be equal across groups. Thus, full scalar invariance does not hold for social trust in the 28 groups.

Next, we turn to testing whether partial scalar invariance is supported by the data. In this model (1c) we released the equality constraint of the intercept of the item measuring people's fairness since the misspecifications of this constraint were the largest. At the same time, the equality constraint on the intercept of the

two other items was kept. This model still displayed a poor fit for the data and could not be accepted. A further inspection of the MI, EPC and the power of the test pointed to some further misspecifications in the model. In 12 groups the equality constraint of the intercept of a second item measuring social trust had to be released (Model 1d in Table 1). These modifications affect the possibility for meaningful comparison of the means for those 12 groups where the intercepts for less than two items were equal across groups. These groups were Germany and Spain for all time periods, Belgium in 2004, Switzerland in 2006 and 2008 and Portugal in 2002. After these modifications, the model was supported by the data and no additional misspecifications were found. Thus, we were able to compare meaningfully the means for the latent factor social trust in 16 groups (countries in specific measurement time points). These groups were France and the Netherlands in all time periods, Belgium in 2002, 2006 and 2008, Switzerland in 2002 and 2004 and Portugal in 2004, 2006 and 2008.

Table 1 Global Fit Measures for Models Testing for Measurement Invariance for Social and Political Trust

	χ^2	df	CFI	TLI	RMSEA	SRMR
Model 1: Social Trust						
a. Metric Full	213.755	54	.995	.992	.038	.024
b. Scalar Full	1810.445	108	.945	.957	.087	.046
c. Scalar Partial (1)	864.835	81	.974	.974	.069	.030
d. Scalar Partial (2)	292.917	69	.993	.991	.040	.026
Model 2: Political Trust						
a. Metric Full	531.076	54	.991	.987	.066	.037
b. Metric Partial	273.292	47	.996	.993	.048	.029
c. Scalar Full	5394.448	94	.904	.915	.166	.100
d. Scalar Partial (1)	3624.871	76	.936	.929	.151	.082
e. Scalar Partial (2)	346.441	58	.995	.992	.049	.030

Notes:

In Model 1d, partial scalar invariance holds in only 16 groups. In Model 2e, partial scalar invariance holds in only 12 groups.

χ^2 = chi-square; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual

Next we turned to Model 2 for political trust. The fit measures for the **full metric** invariance model for **political trust** (Model 2a) were not acceptable, as displayed in Table 1. However, after releasing the equality constraint for the factor

loading of the item “trust in politicians,” the fit of the model became acceptable, as indicated by the fit indices for Model 2b in Table 1. An inspection of the MI and the EPC did not reveal any additional considerable misspecifications in the model. Thus, we were able to meaningfully compare relationships between political trust and other theoretical constructs of interest across groups using this model. The **scalar invariance** model for political trust (Model 2c) did not hold for all groups. An inspection of the EPC and MI values suggested that the equality constraint of the intercept of the item measuring “trust in politicians” had to be released. In Model 2d, partial scalar invariance was tested. In this model, the equality constraints on both the factor loadings and the intercepts of the item measuring “trust in politician” were released, and the equality constraints on the parameters of the other two items were held equal across groups. As Table 1 demonstrates, the fit measures of this model (2d) were not acceptable, and misspecifications were still present in the model. The cross-group equality constraints of other intercepts had to be released for several groups.

In the next model (2e) we released further intercepts for several groups. After releasing equality constraints of item intercepts in 18 groups (countries in time points), the fit measures indicated an acceptable fit for the data, as displayed in Table 1. These modifications affected the possibility of meaningfully comparing means for those 18 groups where the intercepts for less than two items are equal across groups. These groups were Belgium, Germany, Spain and Portugal for all periods as well as the Netherlands in 2002 and 2004. Our findings demonstrate that a comparison of the latent means of political trust may not be accurate for these country/time point combinations, since the latent factor in these groups has only one invariant indicator. The means of social trust may be meaningfully compared between Switzerland and France in all periods and the Netherlands in 2006 and 2008.

Previous studies found even higher levels of invariance for measures of trust using ESS data (Allum et al. 2011; van der Veld and Saris 2011). However, the tests in these studies were less strict because in the current study we used more time points for our analysis, and we treated each country at each time point as a separate unit of analysis. Our findings allow the comparison of latent means across those groups where at least two invariant indicators per factor are present. Table 2 displays the latent means for social and political trust in each group (country in time point).⁵

Estimations in Table 2 display 16 comparable latent means for social trust and 10 comparable latent means for political trust. For both social and political trust, Switzerland and the Netherlands display high levels of trust, while Portugal displays low levels. The level for social and political trust varies more considerably across countries than over time. However, some changes over time can be observed. For

example, the scores for political trust in Switzerland displayed some decrease at the beginning of the period of observation between 2002 and 2004 followed by a considerable increase in 2006 and in 2008, when Switzerland displayed the highest score of political trust among the seven Western European countries we evaluated. On the other hand, the scores for social trust in Portugal slightly increased from 2004 to 2006 and considerably decreased in 2008. In 2008, Portugal displayed the lowest level of social trust among the countries we examined.

Table 2 Latent Means for Social Trust and Political Trust

	Social Trust				Political Trust			
	2002	2004	2006	2008	2002	2004	2006	2008
Belgium	4.8	5.1 ⁿ	5.2	5.4	5.0 ⁿ	4.7 ⁿ	5.0 ⁿ	4.6 ⁿ
Switzerland	5.9	6.0	6.0 ⁿ	6.3 ⁿ	5.7	5.5	5.7	5.8
Germany	5.3 ⁿ	5.2 ⁿ	5.5 ⁿ	5.5 ⁿ	4.4 ⁿ	4.1 ⁿ	4.1 ⁿ	4.6 ⁿ
Spain	4.8 ⁿ	4.5 ⁿ	4.8 ⁿ	4.8 ⁿ	4.8 ⁿ	5.0 ⁿ	5.0 ⁿ	4.9 ⁿ
France	4.8	4.9	4.8	4.8	4.4	4.2	4.3	4.5
Netherlands	5.9	6.0	6.0	6.1	5.2 ⁿ	4.6 ⁿ	5.3	5.5
Portugal	4.0 ⁿ	4.1	4.4	4.0	4.3 ⁿ	3.7 ⁿ	3.8 ⁿ	3.5 ⁿ

Notes:

ⁿ Noncomparable groups where less than two items per factor have equal intercepts

Results in Table 2 have the advantage of allowing simultaneous comparisons of both country and time. An interesting avenue to pursue would be the mean trend for a latent construct in a specific country. Alternatively, one may be interested in the comparison of a latent mean across different countries at a specific period or at different periods of time. Findings of partial scalar invariance across countries and time make both types of comparisons meaningful for substantive research.

Inaccuracy of mean comparisons when sum scores are used

Comparisons of means across groups are often conducted using sum or composite scores. Sum scores may be used for meaningful comparisons when *full* scalar invariance holds (Saris and Gallhofer 2007). Sum or composite scores take into account neither measurement error nor measurement (non)invariance or partial invariance. These scores also cannot detect variations of factor loadings or indicators' intercepts. Thus, results of comparisons based on such scores may be inaccurate, and might lead to incorrect conclusions when full invariance is not supported by the data.

Table 3 displays the ranking of the latent means of social and political trust (indicated by κ) as well as the ranking of the means based on sum score computations (indicated by m) for the two constructs for each country and at each time point, where “1” indicates the country with the highest level of trust and “7” indicates the country with the lowest level of trust. As Table 3 demonstrates, composite means (m) do not always follow the same rank order of the latent means. For example, Germany has a lower ranking for political trust when using the latent means compared with the sum scores. By way of contrast, Spain ranks higher in political trust when using latent means compared to sum scores. It should be noted that the scores of these countries are not comparable because for these countries and time points even partial scalar invariance was not supported by the data.

The correlation between the country ranking using composite and latent means scores is 0.85 for social trust and 0.69 for political trust. Thus, the use of a composite mean rank may result in an inadequate country ranking classification. In our example, the country ranking based on sum scores is even more problematic for political trust than for social trust, since for political trust it was more difficult to establish scalar invariance than in the case of social trust.

Table 3 Ranking for Latent and Composite Score Means of Social and Political Trust

	Social Trust								Political Trust							
	2002		2004		2006		2008		2002		2004		2006		2008	
	κ	m	κ	m	κ	m	κ	m	κ	m	κ	m	κ	m	κ	m
Switzerland	1	1	2	1	1 ⁿ	1 ⁿ	1 ⁿ	1 ⁿ	1	1	1	1	1	1	1	1
Netherlands	2	2	1	2	2	2	2	2	2 ⁿ	2 ⁿ	4 ⁿ	2 ⁿ	2	2	2	2
Belgium	4	4	4 ⁿ	3 ⁿ	4	3	4	4	3	4	3 ⁿ	4 ⁿ	3 ⁿ	4 ⁿ	4 ⁿ	3 ⁿ
Germany	3 ⁿ	3 ⁿ	3 ⁿ	5 ⁿ	3 ⁿ	5 ⁿ	3	3	6 ⁿ	3 ⁿ	6 ⁿ	3 ⁿ	6 ⁿ	3 ⁿ	5 ⁿ	4 ⁿ
France	6	5	5	6	6	6	6	5	5	5	5	5	5	6	6	5
Spain	5 ⁿ	6 ⁿ	6 ⁿ	4 ⁿ	5 ⁿ	4 ⁿ	5 ⁿ	6 ⁿ	4 ⁿ	6 ⁿ	2 ⁿ	6 ⁿ	4 ⁿ	5 ⁿ	3 ⁿ	6 ⁿ
Portugal	7 ⁿ	7 ⁿ	7	7	7	7	7	7	7 ⁿ	7 ⁿ	7 ⁿ	7 ⁿ	7 ⁿ	7 ⁿ	7 ⁿ	7 ⁿ

Notes:

ⁿ Noncomparable groups where less than two items per factor have equal intercepts

κ = country ranking based on latent means

m = country ranking based on sum scores

SUMMARY AND CONCLUSIONS

In this study we aimed to investigate the cross-national and longitudinal measurement properties of social and political trust in seven Western European countries (Belgium, France, Germany, Portugal, Spain, Switzerland and the Netherlands) and four measurement time points (2002, 2004, 2006 and 2008) using data from the ESS. Previous studies investigated the invariance properties of these concepts using ESS data (e.g., Allum et al. 2011; Reeskens and Hooghe 2008; van der Veld and Saris 2011). Our study goes beyond previous studies in the following ways: First, it complements the analysis with newer data from the fourth round (2008) of the ESS. Second, it illustrates how country mean rankings may be biased when sum scores rather than latent means are used for cross-country mean comparison when full measurement invariance is not given. Third, we treat each country at each point in time as a separate unit of analysis and do not pool the data across countries in each round or over measurement time points as previous studies did (e.g., Allum et al. 2011). In this way we can more accurately identify cross-country and/or cross-time model misspecifications and can evaluate longitudinal changes in trust in each country separately.

Our findings demonstrate that social trust and political trust are at least partially scalar invariant across several countries and time points. These results are compatible with previous findings where fewer time points were used in the analysis (e.g., Allum et al. 2011; van der Veld and Saris 2011). Thus, in those countries where at least two indicators for social and political trust are evidenced, latent means of social and political trust may be compared across countries and time points meaningfully. Findings of partial scalar invariance permit an adequate interpretation for cross-cultural and longitudinal comparisons. Latent means may be compared even if only partial scalar invariance exists since several authors have shown that two indicators per latent variable with equal parameters across groups are probably sufficient for such comparisons (Byrne et al. 1989; Steenkamp and Baumgartner 1998; for a different view see, e.g., de Beuckelaer and Swinnen 2011). Results further show that variations in the levels of political and social trust are more evident across countries than over time, but that there are some changes over time which can be observed in the data. Finally, our findings illustrate that using a sum or composite scores for country mean rankings may be misleading. If a composite score is used, different results are obtained. These results take into account neither measurement errors nor variations in some of the parameters across groups and are thus biased.

It should be noted that we tested for measurement invariance across all seven countries and four measurement time points simultaneously. This is a very strict test, but researchers may be interested in comparing subsets of countries. Alternatively, one may be interested in comparing countries only at a single

point in time. Other researchers may be interested in evaluating only longitudinal change of social or political trust in each country separately. For such a study, one may conduct invariance tests that are less strict by evaluating measurement invariance across countries at a specific measurement time point or by evaluating measurement invariance of a specific country over the four measurement time points. Findings of full or partial invariance would allow meaningful comparisons either across countries or over time points.

In sum, the use of latent variable models controlling for measurement errors to measure social and political trust as well as other theoretical constructs of interest is preferred when only partial rather than full cross-country and/or longitudinal scalar invariance is given. Such a model allows testing for cross-country and longitudinal invariance and provides more reliable measures for the comparison of scores and rankings across countries and time points. It controls for measurement errors, allows unequal measurement parameters to vary across groups and provides researchers and practitioners alike with more accurate scores to address various substantive research questions.

NOTES

- 1 The formulation of the three questions in the ESS to measure social trust is the following: (a) Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell me on a scale of 0 to 10, where 0 means "you can't be too careful" and 10 means that "most people can be trusted." (b) Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair? Please tell me on a scale of 0 to 10, where 0 means "most people would try to take advantage of me" and 10 means that "most people would try to be fair." (c) Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves? Please tell me on a scale of 0 to 10, where 0 means that "people mostly look out for themselves" and 10 means that "people mostly try to be helpful."
- 2 The formulation of the three questions in the ESS to measure social trust is as follows: On a scale of 0-10 how much do you personally trust each of the institutions? 0 means you do not trust an institution at all, and 10 means you have complete trust: [country]'s parliament, the legal system and politicians.
- 3 We decided to focus on these seven Western European countries to illustrate that measurement invariance may not be given even across relatively similar countries. Furthermore, we were interested in investigating the trend over time in Western European countries using the ESS data between 2002 and 2010. No data were available for Italy for 2006 and 2008, and it was therefore excluded from the analysis.
- 4 We considered EPC values higher than 0.15 for unstandardized factor loadings and EPC values higher than 0.20 for intercepts as cutoff criteria to decide whether invariance for these parameters is supported by the data or not. The specified power of the test was 0.80 and the type I error 0.05.
- 5 Latent means estimated for noncomparable groups in Table 2 (30 out of 56) are inaccurate measures because partial scalar invariance does not hold for these groups. Thus, using their scores for cross-country and longitudinal comparisons may lead to erroneous conclusions.

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