Explaining trust in political institutions - before and after correction for measurement error

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Abstract

Although the study of political trust received considerable attention, research did not yet yield concluding results. Research still focuses on explaining the relationship between political trust and other variables that either affect or explain it cross-sectional or longitudinally in several parts of the world. Besides that each of these approaches faces particular challenges given the limitations of available data, most of the studies ignore measurement error. We therefore illustrate how correction for measurement error can be done when explaining trust in political institutions and how the substantive conclusions change after correction. We correct in the observed correlation matrix, use measurement quality information from different sources, and find that our corrected model explains trust in political institutions much more than the model ignoring measurement error.

1. Introduction

Hardly any measurement is without errors. In survey research measurement error can derive from the interviewer, the respondent, the mode of data collection, the interview setting, the information system, and the questionnaire. The mode of data collection refers to the means of communication used for the interview, the interview setting to the environment in which the interview takes place, and the information system to the information that is available for the respondent (Biemer and Lyberg 2003:117ff.). After the data was collected, researcher can only correct for one kind of measurement error, the one that is caused by the questionnaire. This error then describes the difference between what was intended to be measured and what was indeed measured. Measurement error can be distinguished in two parts: random and systematic measurement error. If the random errors are not taken into account the conclusions may be wrong because the correlations will be underestimated. Ignoring the systematic errors, e.g. introduced by the method, may lead to erroneous conclusions because the correlations between variables are overestimated given that the same method is used (Saris and Gallhofer 2014). Several studies have shown that these kinds of errors are considerable (Alwin 2007; Alwin and Krosnick 1991; Andrews 1984; Belson 1981; Biemer et al. 2011; Dillmann, Smyth, and Christian 2000; Költringer 1993; Scherpenzeel 1995; Schumann and Presser 1981; Tourangeau, Rips, and Rasinski 2000) and have a big effect on conclusions of research (Alwin 2007; Saris and Gallhofer 2007, 2014). So both types of errors have to be taken into account.

However, for a long time researchers had to assume the data they use from surveys is perfectly measuring their variables of interest because no information about the measurement quality or error was available. Luckily for survey data users this has changed: studies from several scholars that give information about measurement quality or the size of the measurement errors which can be used for correction (Alwin 2007; Saris and Gallhofer 2007, 2014).

In the present study we offer an example of correction for measurement error in an explanatory model of trust in political institutions. Thereby we will first develop a model which explains trust in political institutions based on the literature. Thereafter we describe how we obtain the measurement quality of the variables, explain how we correct for measurement in the observed correlation matrix, and present the result of the two regressions with and without correction for measurement error.

2. Political trust

Newton (2008:242) defines political trust as a belief that those in authorities and power will not harm the citizens but look after their interest. In this sense, similar to the relationship of social trust with society, citizens have trust in political institutions when these operate according to the principles of justice and impartiality (Newton 2006:86). Miller and Listhaug (1990:358) consider it rather as an evaluation of political actors and institutions if they act according to people's normative expectations. As citizens tend to evaluate those different political actors and institutions in a similar way, political trust seems to be a one-dimensional concept which Hooghe and Zmerli (2011:4) consider therefore as a general assessment of the political culture in a country. Not only political trust but also trust in general is difficult to define conceptually and to study empirically due to its closeness to many other social and political attitudes and behaviors. Therefore, it is not surprising that this research is controversial and inconclusive (Newton 2007:355). Norris (1999:1) argues that this confusion arises from neglecting to specify the object of political trust and that if it is taken into account, five dimensions of political support can be distinguished: political community, regime principles, regime performance, regime institutions, and political actors. Newton (2006:86) on the other hand states that there are many similar or closely associated terms, among which 'confidence in political institutions'. Political institutions need citizens' confidence in order to function as mediators between citizens and government (Offe 1999) which is considered a prerequisite for a functioning democracy.

2.1 Determinants of political trust

According to the socio-cultural model, trust in political institutions is achieved by political socialization and is an extension of interpersonal trust (cf. Almond and Verba 1963; Inglehart 1997; Putnam, Leonardi, and Nanetti 1993). Citizens' age and education can be used as proxies for political socialization (e.g. Mishler and Rose 2001:49). The younger generation born and raised in democracies, show a greater internalization of the democratic principles (Catterberg and Moreno 2006:32) which should increase their willingness to support democratic institutions (Kestilä-Kekkonen and Söderlund 2016:5). However, Quintelier (2007:117) does not find difference in levels of political trust between young and older people. Regarding education, the higher the education levels, the more citizens are expected to be critical towards political institutions (Listhaug 1995). Similar, the more interested people are in politics, the more knowledgeable they are and therefore more critical they can be. However, Catterberg and Moreno (2006:42) argue that people's interests are selective and if someone is interested in political issues they also tend to like politics which makes them more engaged and ultimately more trusting. In summary, according to this model, individual life situations, experiences and well-being create social trust and this in turn fosters trust in societal and political organizations and institutions (Newton and Norris 2000:6).

The institutional performance model, on the other hand, implies that political trust is a consequence of the actual (policy) performance of government and its institutions (Newton and Norris 2000:7), including especially economic performance (Przeworski et al. 1996). According to Mishler and Rose (2001:31) institutional trust is the expected utility of institutions performing satisfactorily. Therefore, predictors according to this model are citizens' satisfaction with government's performance, policy outputs or government's services. Moreover, the perception of the responsiveness of political institutions, whether as results of political socialization or recent experiences, was found to be among the most explanatory factor of trust in political institutions by Denter, Gabriel and Torcal (2007).

3. Data and method

The data comes from the most recent round of European Social Survey (ESS7-2014, ed.2.0) and we will test the theoretically elaborated model on the data from Spain. In Spain 1,925 interviews were conducted between January and June 2015. We use the R (RCoreTeam 2016) package *lavaan* (Rosseel 2012) for the estimation of the model.

3.1 The size of measurement error

For a long time, the main obstacle for correction of measurement error was the lack of information of the size of these errors. Measurement error is the complement of measurement quality (q^2). Measurement quality is defined as the strength of the relationship between the variable of interest and the observed variable[1].

There are different ways to estimate the measurement quality, (see for a summary Saris and Revilla 2016:1011ff.) but they need to be implemented at the time of data collection, normally being time-consuming and costly and with the clear disadvantage

[1] Measurement quality ranges from 0 to 1, following the cut-off points from Cronbach's alpha, $q^2 < .6$ is poor, $0.6 < q^2 \leq .7$ is questionable, $0.7 < q^2 \leq .8$ acceptable, $0.8 < q^2 \leq .9$ good, and $q^2 \geq 0.9$ is excellent quality (Gliem and Gliem 2003)

that the estimates of particular questions cannot be used for other questions. However, Saris and colleagues (Saris et al. 2011; Saris and Gallhofer 2007) provided a way to overcome this problem by predicting the measurement quality based on a meta-analysis of Multitrait-Multimethod (MTMM) experiments and the coding of the characteristics of the questions included in those experiments. They developed a free licensed software called the Survey Quality Predictor (SQP). This software offers researchers a database of survey questions and their measurement quality. Moreover, it also enables researchers to code the characteristics of their question of interest and achieve a prediction of the size of the measurement quality. While this software contains attitudinal and behavioral questions, the information of measurement quality of factual variables can be obtained e.g. by Alwin (2007). Following these three procedures, i.e. using the SQP authorized predictions, SQP predictions based on own coding and the information from Alwin (2007), we obtain the measurement quality for each of the observed variables we will use in the model as summarized in Table 1.

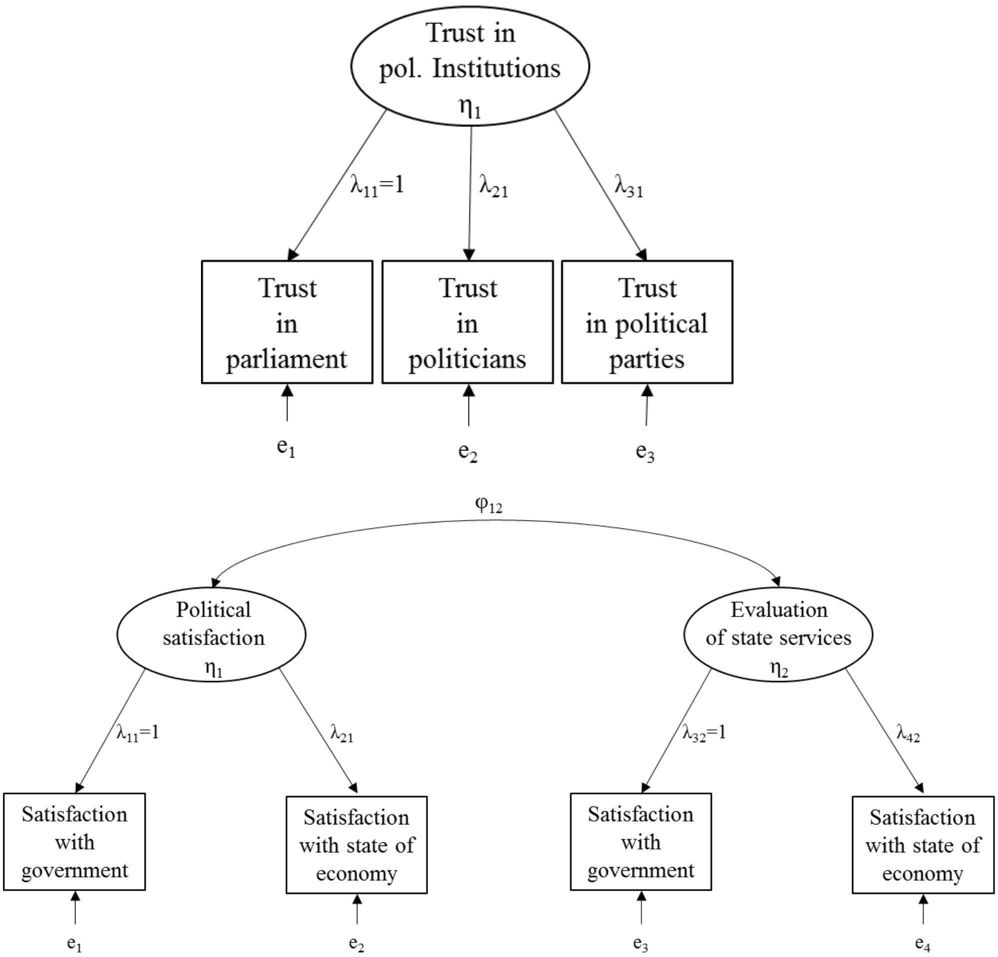
Table 1: Predictors of trust in political institutions and their measurement quality

Variable	Question	Measurement quality	Source of measurement quality
Social trust	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 score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted.	.69	SQP authorized prediction
Life satisfaction	All things considered, how satisfied are you with your life as a whole nowadays? Please answer using this card, where 0 means extremely dissatisfied and 10 means extremely satisfied.	.64	SQP own coding
Political interest	How interested would you say you are in politics – are you… 1 Very interested 2 Quite interested 3 Hardly interested 4 Not at all interested	.64	SQP own coding
System responsiveness	How much would you say the political system in [country] allows people like you to have a say in what the government does? 0 Not at all – 10 Completely	0.71	SQP authorized prediction

Age	Calculated from the year born	.99	Alwin (2007:327)
Education	What is the highest level of education you have successfully completed?	.87	Alwin (2007:328)

However, the dependent variable as well as predictors 'political satisfaction' and the 'evaluation of state services' are sum scores of observed variables and therefore we need to calculate the measurement quality ourselves. The dependent variable is constructed by summing the people's trust in the parliament, politicians, and political parties (see for detailed model testing Pirralha 2016). 'Political satisfaction' is the sum of people's satisfaction with the government and the current state of the economy and the 'evaluation of state services' is the sum of the evaluation of the current state of the health and education system. For the three sum scores the indicators are reflective as illustrated in Figure 1.

Figure 1: Measurement models of the sum scores with reflective indicators



We conduct a factor analysis for each model in order to estimate the loadings (λ_i) and then calculate the measurement quality of the sum score S using the following equation:

$$Quality\ of\ S = 1 - \frac{\Sigma(1 - {y_i}^2) * var(y_i)}{var(S)}$$

where $var(y_i)$ is the variance of the indicators y_i and var(S) is the variance of the sum score S (see Appendix 1 for more information).

Table 2 summarizes the questions which were used to construct the sum scores and their calculated measurement quality.

Table 2: Sum scores and their measurement quality

Sum score	Questions	Measurement quality
Trust in political institutions	Please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust. [country]'s parliament? politicians? political parties?	.87
Political Satisfaction	Now thinking about the [country] government, how satisfied are you with the way it is doing its job? 0 Extremely dissatisfied – 10 Extremely satisfied On the whole how satisfied are you with the present state of the economy in [country]? 0 Extremely dissatisfied – 10 Extremely satisfied	.73
Evaluation state services	Please say what you think overall about the state of health services in [country] nowadays? 0 Extremely bad – 10 Extremely good Please say what you think overall about the state of education in [country] nowadays? 0 Extremely bad – 10 Extremely good	.77

3.2 Correction for measurement error

There are different ways to correct for measurement error. As mentioned before, we define measurement error as the complement of measurement quality and measurement quality is defined as the strength of the relationship between the variable of interest and the observed variable. Thus, if the variable of interest and the measurement errors are uncorrelated and the observed variables are standardized, then the variance of the observed variable is 1 and it follows that the quality is 1 minus the error variances:

$$q_i^2 = 1 - \ var(e_i)$$

Here we want to illustrate the effect of CME by correcting the observed correlation matrix. The observed correlation between two variables ($\rho(y_1,y_2)$) and the relationship to the true variables of interest $\rho(f_1,f_2)$ is determined by the measurement quality of the observed variables (q_1 q_2) (Lord and Novick 1968):

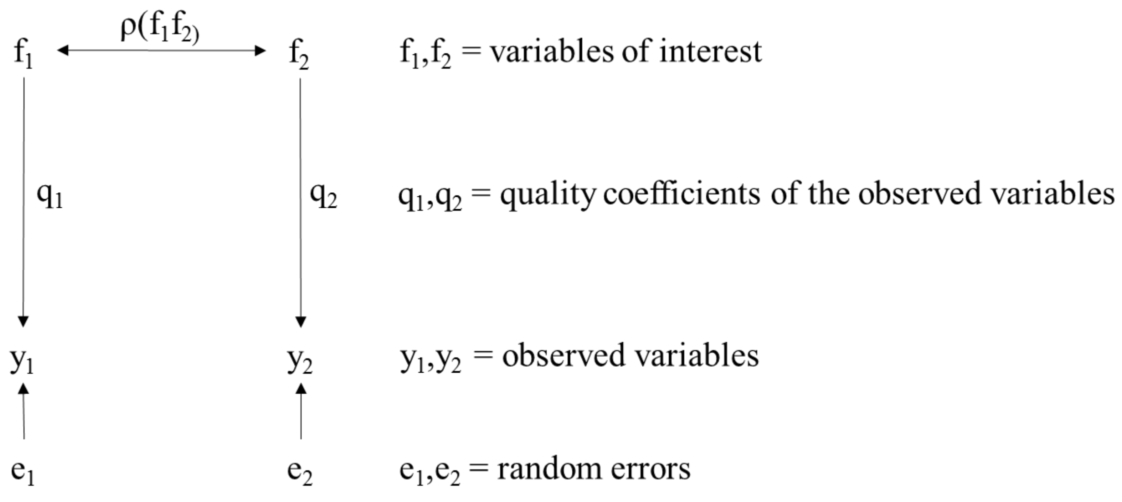
$$\rho(y_1, y_2) = \rho(f_1, f_2) * q_1 * q_2$$

If we have information about the observed correlation and the measurement quality of the variables, then we can calculate the true correlation:

$$\rho(f_1, f_2) = \frac{\rho(y_1, y_2)}{q_1 * q_2}$$

Figure 2 illustrates the just described relationships for two variables which are measured with different methods.

Figure 2: The measurement model for two traits measured with different methods



When the questions are measured with the same method respondents can have a standard reaction, e.g. choosing always the same answer category (Campbell and Fiske

1959). This is called a method effect. It occurs in all variables which are measured with the same method and thereby cause an additional correlation between the variables which is called the common method variance (CMV) and can be calculated as follows:

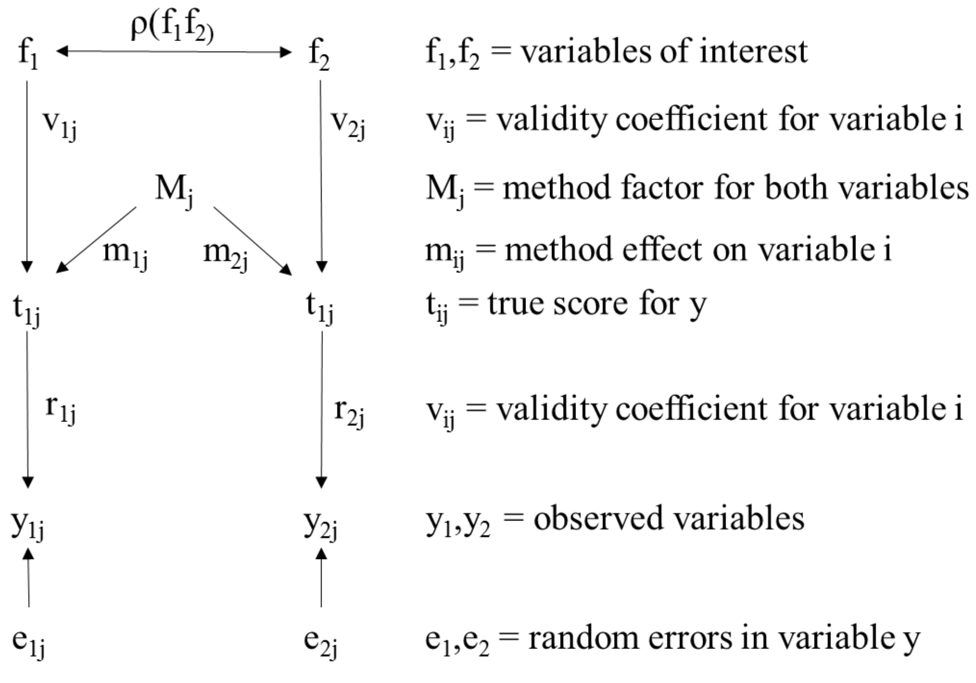
$$CMV = r_{1j} * m_{1j} * m_{2j} * r_{2j} \quad (6)$$

where r_{ij} is the reliability coefficient and m_{ij} is the method coefficient. Reliability (r_{ij}^2) is defined as the strength of the relationship between the observed response (y_{ij}) and the true score (t_{ij}). The method coefficients are the standardized effects of the method factor on the true score, therefore also called the method effect, and they affect the validity (v_{ij}^2). It can be calculated as follows:

$$m_{ij} = \sqrt{(1 - v_{ij}^2)} \quad (7)$$

Figure 3 illustrated the relationship and for a more detailed explanation we refer to Saris and Gallhofer (2014:165ff.).

Figure 3: The measurement model for two traits measured with different methods



In order to account for the method effect, we need to subtract the CMV from the correlation between the variables which are measured with the same method. For our model, only the response scale of 'Life satisfaction' and indicators of 'Political satisfaction' are the same. We obtained the information about reliability and validity of these questions from SQP 2.1 (2016) as presented in Table 3. Using the equations 6 and 7, the CMV for these two variables is .077 (see Appendix 2) and will be subtracted from their observed correlation.

Table 3: Reliability and validity from SQP

Variable	Reliability (r2)	Validity (v2)
Life satisfaction	.716	.899
Political satisfaction2	.824	.901

The observed correlation matrix for all variables and sum scores is presented in Table 4. We correct for measurement error by reducing the variance on the diagonal of the correlation matrix to the measurement quality and specify in the statistical software to transform this covariance matrix in a correlation matrix. The software then divides the covariances by the square root of the product of the measurement qualities, e.g. the correlation between the sum score 'Trust in political institutions' and the observed variables 'Social trust' is .185 and the corrected correlation is obtained as .185/√(.868*.69)= .239. Table 5 presents the correlations of all observed variables and sum scores corrected for measurement error.

Table 4: Correlation matrix before correction for measurement error

	TrustInst	TrustSoc	LifeStf	PolIntr	SystResp	PolSat	StaServ	Age	Educlvl
TrustInst	1								
TrustSoc	.185	1							
LifeStf	.136	.148	1						
PolIntr	-.199	-.204	-.045	1					
SystResp	.445	.144	.113	-.133	1				
PolSat	.571	.080	.243	-.100	.300	1			
StaServ	.425	.104	.176	-.026	.229	.485	1		
Age	.033	-.054	-.030	.005	.071	.063	.015	1	
Educlvl	-.003	.183	.071	-.318	-.015	.017	-.047	-.236	1

Table 5: Correlation matrix after correction for measurement error and common method variance

	TrustInst	TrustSoc	LifeStf	PolIntr	SystResp	PolSat	StaServ	Age	Educlvl
TrustInst	1								
TrustSoc	.239	1							
LifeStf	.181	.222	1						
PolIntr	-.268	-.307	-.070	1					
SystResp	.566	.206	.167	-.198	1				
PolSat	.716	.113	.242	-.146	.416	1			
StaServ	.521	.142	.250	-.037	.310	.646	1		
Age	.036	-.065	-.038	.006	.085	.074	.018	1	
Educlvl	-.004	.236	.094	-.428	-.019	.021	-.058	-.254	1

[2] The reliability and validity of the sum score is calculated as the average of the reliability and validity of its two indicators obtained from SQP: r^2=.824 and v^2=.899 for 'Satisfaction with the government' and r^2=.823 and v^2=.903 for 'Satisfaction with the state of the economy'.

3.3 Regression analyses

The correlation matrices are the input for the regression analyses we conduct to explain ‘Trust in political institutions’. We run the same model twice, once on the observed and another time on the corrected correlation matrix. The results of each analysis are presented in Table 6.

Table 6: Regression results without and with correction for measurement error (standardized solution)

	Without correction for measurement error		**With correction for measurement error**		**Relative change**
	Coefficient	Std.error	Coefficient	Std.error	
Social trust	.088***	(.019)	.093***	(.016)	1.060
Satisfaction with life	-.036	(.019)	-.037*	(.016)	1.015
Political interest	-.121***	(.020)	-.149***	(.017)	1.224
System responsiveness	.262***	(.019)	.281***	(.017)	1.074
Political Satisfaction	.407***	(.022)	.532***	(.021)	1.309
Evaluation of state services	.160***	(.022)	.076**	(.021)	.472
Age	-.022	(.019)	-.048***	(.016)	2.116
Education	-.056**	(.020)	-.100***	(.017)	1.777
R^2	.45		.63		

***<.001, **<.01, *<.05, highlighted with grey background are coefficients which changed being (not) significant

Overall the model with CME explains 63% of the variance of the dependent variable ‘Trust in political institutions’, while without CME it was only 45%. The effects of two predictors became significant in the model corrected for measurement error, ‘life satisfaction’, and age, whereas the effect of ‘evaluation of state services’ is not significant anymore. Without CME one would conclude wrongly that people’s life satisfaction and their age do not affect their level of trust in political institutions. But individual life satisfaction is as important as individual political interest and both effects are as theoretically expected: the more interested people are in politics, the more critical and hence less trusting they are, and the more they are satisfied with their lives, the more trusting they are. The variables which reflect the institutional performance model are the ones which affect institutional trust most: An increase in 1 standard deviation in political satisfaction yields .53 standard deviation more institutional trust and an increase in 1 standard deviation of system responsiveness an increase of .28 standard deviation.

Conclusions

The aim of this paper was to illustrate how substantive conclusions change after correction for measurement error for the example of ‘Trust in political institutions’. We developed a model explaining ‘Trust in political institutions’ based on the literature and showed how information about measurement error can be obtained: For our analyses we relied on the information from the Survey Quality Predictor (SQP 2.1.), and the work of Alwin (2007), and calculated the measurement quality of the sum scores used ourselves. This information served to correct for measurement error in the observed correlation matrix, thereby we followed the procedure described by Saris and Gallhofer (2007) and DeCastellarnau and Saris (2014). In order to illustrate the change in substantive conclusions before and after CME, we run the same linear regression model on correlation matrix with and without CME.

We see that the results of the analysis without correction and with correction for measurement errors are quite different. We have shown that after correction for measurement error, predictors which appeared not to have a significant relationship with political trust, become significant. Another major difference between the results of the two regressions is that without correction for measurement error the unexplained variance could be due to measurement errors, missing variables or nonlinear relationships. After correction for measurement error only the last two explanations remain. So in this example we see that there is still 37% unexplained and that cannot be due to measurement error but must come from incompleteness of the model used or from errors in the specification of the relationships, nonlinear or conditional relationships.

References

Almond, Gabriel Abraham and Sidney Verba. 1963. *The Civic Culture. Political Attitudes and Democracy in Five Nations*. Princeton, New Jersey: Princeton University Press.

Alwin, DF and JA Krosnick. 1991. "The Reliability of Survey Attitude Measurement the Influence of Question and Respondent Attributes." *Sociological Methods & Research*. Retrieved November 10, 2016 (http://smr.sagepub.com/content/20/1/139.short).

Alwin, Duane F. 2007. *Margins of Error: A Study of Reliability in Survey Measurement*.

Andrews, Frank M. 1984. "Construct Validity and Error Components of Survey Measures: A Structural Modeling Approach." *Public Opinion Quarterly* 48(2):409. Retrieved April 1, 2015 (http://poq.oxfordjournals.org/content/48/2/409.short).

Belson, WA. 1981. "The Design and Understanding of Survey Questions." Retrieved November 10, 2016 (http://www.ulb.tu-darmstadt.de/tocs/108533050.pdf).

Biemer, Paul P., Robert M. Groves, Lars E. Lyberg, and Seymour Sudman Nancy A. Mathiowetz. 2011. *Measurement Errors in Surveys*. Wiley.

Biemer, Paul P. and Lars E. Lyberg. 2003. "The Measurement Process and Its Implications for Questionnaire Design." Pp. 116–48 in *Introduction to Survey Quality*. Hoboken, NJ, USA: John Wiley & Sons, Inc. Retrieved November 1, 2016 (http://doi.wiley.com/10.1002/0471458740.ch4).

Campbell, D. T. and D. W. Fiske. 1959. "Convergent and Discriminant Validation by the Multitrait-Multimehtod Matrix" edited by E. S. Overman. *Psychological Bulletin* 56(2):81–105. Retrieved (http://content.apa.org/journals/bul/56/2/81).

Catterberg, G. and A. Moreno. 2006. "The Individual Bases of Political Trust: Trends in New and Established Democracies." *International Journal of Public Opinion Research*. Retrieved November 8, 2016 (http://ijpor.oxfordjournals.org/content/18/1/31.short).

DeCastellarnau, Anna and Willem E. Saris. 2014. "A Simple Way to Correct for Measurement Errors in Survey Research." *European Social Survey Education Net (ESS Edunet)*. Retrieved (http://essedunet.nsd.uib.no/cms/topics/measurement/).

Denters, Bas, Oscar Gabriel, and Mariano Torcal. 2007. "Political Confidence in Representative Democracies." Pp. 66–87 in *Citizenship and Involvement in European Democracies*, edited by J. W. van Deth, J. R. Montero, and A. Westholm. Routledge. Retrieved (https://books.google.es/books?hl=ca&lr=&id=uIoHKa1ZfmgC&oi=fnd&pg=PA66&dq=political+confidence+torcal&ots=idN8b4ZQf8&sig=gKIQT4gcbdHftZhLSNqUFFnYvOY).

Dillmann, Don A., Jolene D. Smyth, and Leah Melani Christian. 2000. *Mail and Internet Surveys*. 2nd ed. Wiley.

Gliem, Joseph A. and Rosemary R. Gliem. 2003. "Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales." *Midwest Research to Practice Conference in Adult, Continuing, and Community Education* (1992):82–88.

Inglehart, Ronald. 1997. *Modernization and Postmodernization : Cultural, Economic, and Political Change in 43 Societies*. Princeton, New Jersey: Princeton University Press.

Kestilä-Kekkonen, Elina and Peter Söderlund. 2016. "Political Trust, Individual-Level

Characteristics and Institutional Performance: Evidence from Finland, 2004-13." *Scandinavian Political Studies* 39(2):138–60. Retrieved November 8, 2016 (http://doi.wiley.com/10.1111/1467-9477.12052).

Költringer, Richard. 1993. *Gültigkeit von Umfragedaten*. Wien: Böhlau.

Listhaug, Ola. 1995. "The Dynamics of Trust in Politicians." Pp. 262–98 in *Citizens and the State*, edited by H.-D. Klingemann and D. Fuchs. Oxford University Press. Retrieved November 8, 2016 (http://www.oxfordscholarship.com/view/10.1093/0198294735.001.0001/acprof-9780198294733-chapter-9).

Lord, Frederic M. and Melvin R. Novick. 1968. *Statistical Theories of Mental Test Scores*. Reading, MA: Addison─Wesley.

Miller, Arthur H. and Ola Listhaug. 1990. "Political Parties and Confidence in Government: A Comparison of Norway, Sweden and the United States." *British Journal of Political Science* 20(3):357. Retrieved November 10, 2016 (http://www.journals.cambridge.org/abstract_S0007123400005883).

Mishler, W. and R. Rose. 2001. "What Are the Origins of Political Trust? Testing Institutional and Cultural Theories in Post-Communist Societies." *Comparative Political Studies*. Retrieved March 30, 2015 (http://cps.sagepub.com/content/34/1/30.short).

Newton, Kenneth. 2006. "Institutional Confidence and Social Trust: Aggregate and Individual Relations." Pp. 81–100 in *Political Disaffection in Contemporary Democracies: Social Capital, Institutions and Politics*, edited by M. Torcal and J. Montero. Retrieved October 31, 2016 (https://books.google.com/books?hl=de&lr=&id=eUN-AgAAQBAJ&oi=fnd&pg=PP1&dq=Political+disaffection+in+contemporary+democracies+&ots=MmF7S8Ixge&sig=r7U8rSQWHrxXjUUjI5DSsadpB1k).

Newton, Kenneth. 2007. *Social and Political Trust*. Oxford University Press. Retrieved November 10, 2016 (http://oxfordhandbooks.com/view/10.1093/oxfordhb/9780199270125.001.0001/oxfordhb-9780199270125-e-018).

Newton, Kenneth. 2008. "Trust and Politics." in *The Handbook of Social Capital*, edited by D. Castiglione, J. Van Deth, and G. Wolleb. Oxford: Oxford University Press.

Newton, Kenneth and Pippa Norris. 2000. "Confidence in Public Institutions: Faith, Culture or Performance?" *Disaffected Democracies. What's Troubling the ...* (September):1–33. Retrieved October 31, 2016 (https://www.hks.harvard.edu/fs/pnorris/Acrobat/NEWTON.PDF).

Norris, Pippa. 1999. "Introduction: The Growth of Critical Citizens?" Pp. 1–28 in *Critical Citizens*. Oxford University Press. Retrieved October 31, 2016 (http://www.oxfordscholarship.com/view/10.1093/0198295685.001.0001/acprof-9780198295686-chapter-1).

Pirralha, André. 2016. "Assessing Political Trust Measurement Equivalence: A Longitudinal European Analysis." *Working Paper*.

Przeworski, Adam, Michael Alvarez, Jose Antonio Cheibub, and Fernando Limongi. 1996. "What Makes Democracies Endure?" *Journal of Democracy* 7(1996):39–55. Retrieved November 8, 2016 (http://muse.jhu.edu/content/crossref/journals/journal_of_democracy/v007/7.1przeworski.html).

Putnam, Robert D., Robert Leonardi, and Raffaella Y. Nanetti. 1993. *Making Democracy Work*. Princeton, New Jersey: Princeton University Press.

Quintelier, Ellen. 2007. "Differences in Political Participation between Young and Old People." *Contemporary Politics* 13(2):165–80.

RCoreTeam. 2016. "A Language and Environment for Statistical Computing." Retrieved (https://www.r-project.org).

Rosseel, Yves. 2012. "Lavaan : An *R* Package for Structural Equation Modeling." *Journal of Statistical Software* 48(2):1–36. Retrieved November 13, 2016 (http://www.jstatsoft.org/v48/i02/).

Saris, Willem et al. 2011. *The Development of the Program SQP 2.0 for the Prediction of the Quality of Survey Questions*. Barcelona.

Saris, Willem E. and Irmtraud N. Gallhofer. 2007. *Design, Evaluation, and Analysis of Questionnaires for Survey Research*. Hoboken, NJ, USA: John Wiley & Sons, Inc. Retrieved June 12, 2014 (http://doi.wiley.com/10.1002/9780470165195).

Saris, Willem E. and Irmtraud N. Gallhofer. 2014. *Design, Evaluation, and Analysis of Questionnaires for Survey Research (Google eBook)*. Retrieved April 2, 2014 (http://books.google.com/books?hl=de&lr=&id=njCpAgAAQBAJ&pgis=1).

Saris, Willem E. and Melanie Revilla. 2016. "Correction for Measurement Errors in Survey Research: Necessary and Possible." *Social Indicators Research* 127(3):1005–20. Retrieved October 31, 2016 (http://link.springer.com/10.1007/s11205-015-1002-x).

Scherpenzeel, Annette Clarine. 1995. *A Question of Quality : Evaluating Survey Questions by Multitrait-Multimethod Studies*. Leidschendam: Royal PTT.

Schumann, Howard and Stanley Presser. 1981. *Questions and Answers*. Academic Press.

SQPTeam. 2016. "Survey Quality Predictor (SQP 2.1)." Retrieved (sqp.upf.edu).

Tourangeau, Roger, Lance J. Rips, and Kenneth Rasinski. 2000. *The Psychology of Survey Response*. Cambridge University Press.

Zmerli, Sonja and Marc. Hooghe. 2011. *Political Trust : Why Context Matters*. ECPR Press.

Appendix 1: Calculation of measurement quality of sum scores

The quality of the unweighted sum score S is defined as (Saris and Gallhofer 2014:297):

$$Quality\ of\ S = 1 - \frac{var(e_s)}{var(S)} \qquad \text{(A1)}$$

where var(e_s) is the variance of the errors in S and var(S) is the variance of the sum score S. The variance of the errors in S is:

$$var(e_s) = \Sigma(1 - y_i{}^2) * var(y_i) \qquad \text{(A2)}$$

where λ_i are the loadings and var(y_i) is the variance of the indicators y_i. Therefore, by carrying out a factor analysis we can estimate the factor loadings (λ_i) and then calculate the quality by substituting equation A2 in A1:

$$Quality\ of\ S = 1 - \frac{\Sigma(1 - y_i{}^2) * var(y_i)}{var(S)} \qquad \text{(A3)}$$

Appendix 2: Calculation of common method variance

$r_{1j}{}^2 = .716$
$r_{2j}{}^2 = .824$
$v_{1j}{}^2 = .899$
$v_{2j}{}^2 = .901$

$$CMV = r_{1j} * m_{1j} * m_{2j} * r_{2j}$$

$$m_{ij} = \sqrt{(1 - v_{ij}^2)}$$

$$CMV = r_{1j} * \sqrt{(1 - v_{1j}^2)} * \sqrt{(1 - v_{2j}^2)} * r_{2j}$$

$$CMV = \sqrt{.716} * \sqrt{(1 - .899)} * \sqrt{(1 - .901)} * \sqrt{.824}$$

$$CMV = .0768$$

Appendix 3: Correlation matrix with quality on the diagonal and CMV of Life and Political satisfaction subtracted

	TrustInst	TrustSoc	LifeStf	PolIntr	SystResp	PolSat	StaServ	Age	Educlvl
TrustInst	.868								
TrustSoc	.185	.693							
LifeStf	.136	.148	.644						
PolIntr	-.199	-.204	-.045	.636					
SystResp	.445	.144	.113	-.133	.710				
PolSat	.571	.080	.166	-.100	.300	.733			
StaServ	.425	.104	.176	-.026	.229	.485	.767		
Age	.033	-.054	-.030	.005	.071	.063	.015	.990	
Educlvl	-.003	.183	.071	-.318	-.015	.017	-.047	-.236	.870