

**Mini conference: Measurement invariance: Methods, problems and further directions**

**Zurich 15July2010**

## **Political Trust and Social Trust**

**Trends and comparison between  
Catalunya (Spain) and The Netherlands**

**Lluís Coromina, University of Girona**

■ Background

■ Measurement of Social Trust

■ Cross-national comparison with MGCFA with testing for invariance.

■ Measurement of Social Trust

■ Comparison of latent means and composite mean

■ Trends in Catalunya and The Netherlands related social and political trust.

# Background

Social Capital:

■ Instrumental or Individual Theory: James Coleman, Pierre Bourdieu... Social networks and resources.

■ Cultural or Attributes: Putnam,....

Political culture focus on a collective (civil participation) and distribution or rules and values in the society that together with individuals and its social relation create trust.

■ Structural attributes: Informal networks (relationship with family members, peers)

Formal networks (member, participate... in voluntary organizations).

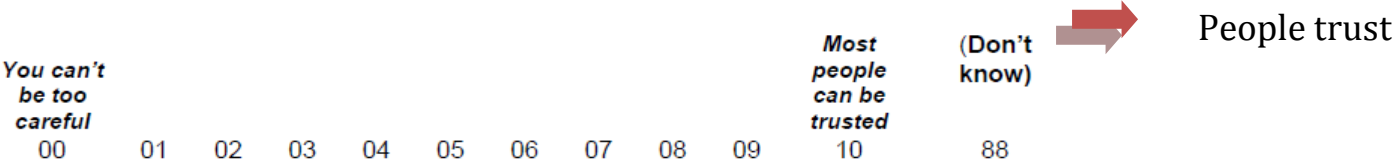
■ Cultural attributes: trust ***social trust***: relying on other people,

***political trust***: institutions and political representatives.

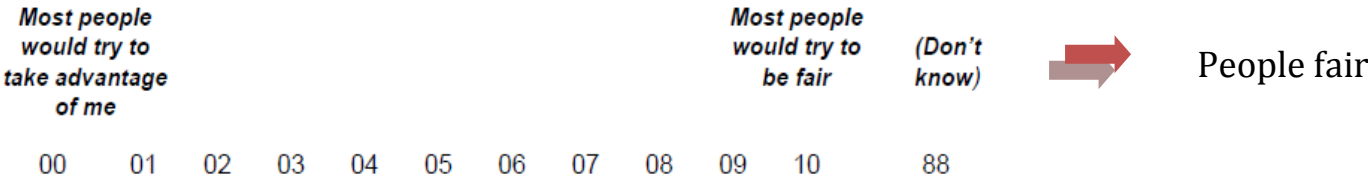
Civic values and norms of general character considered to be shared by a number of individuals or the community as a whole.

# Measurement of Social Trust

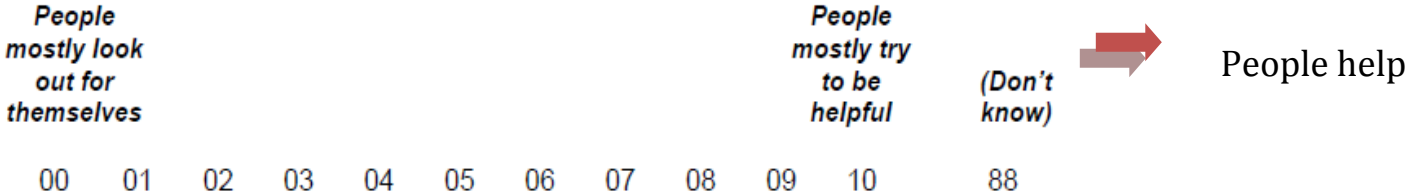
**CARD 3:** Using this card, generally speaking, would you say that most people can be trusted, or that you can't be too careful<sup>3</sup> in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted.



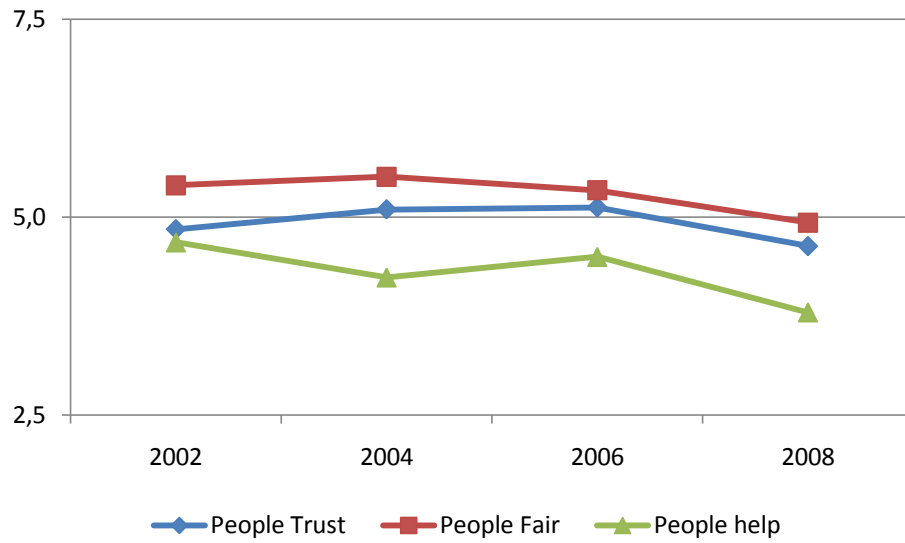
**CARD 4:** Using this card, do you think that most people would try to take advantage<sup>4</sup> of you if they got the chance, or would they try to be fair?



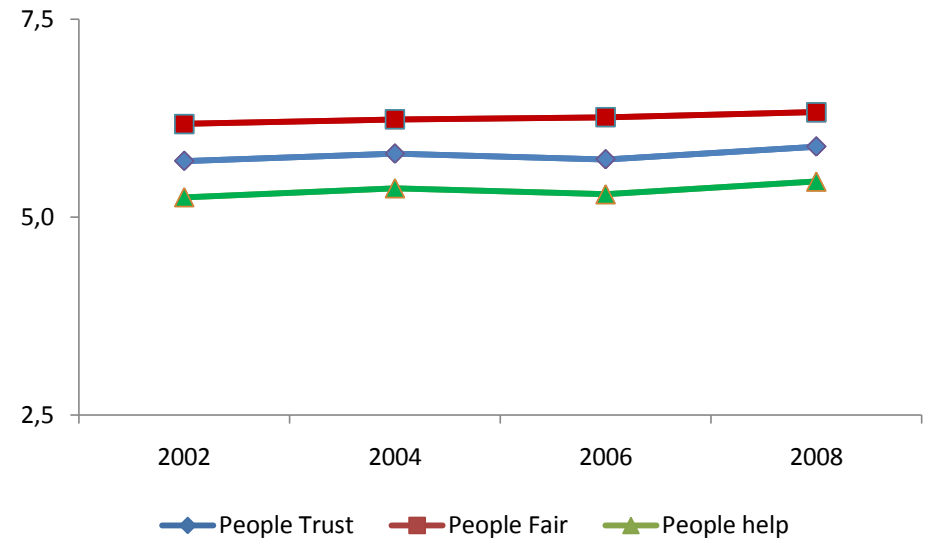
**CARD 5:** Would you say that most of the time people try to be helpful<sup>5</sup> or that they are mostly looking out for themselves? Please use this card.



### Catalunya



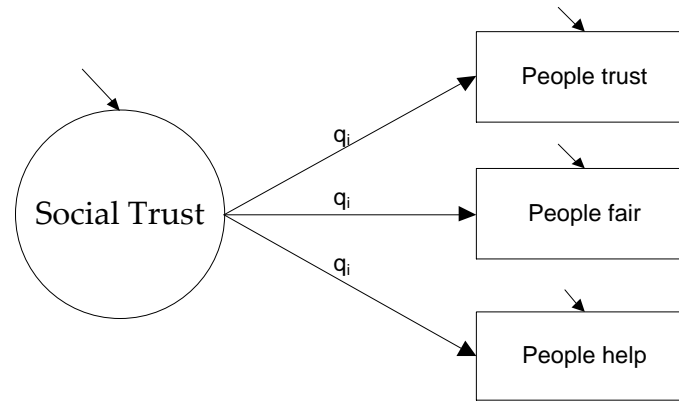
### Netherlands



Netherlands: Scores > 5 points and are very similar trend to each other.

Catalunya: Lower scores for three questions between 2006 and 2008.

## Confirmatory Factor Analysis (CFA) for Social Trust



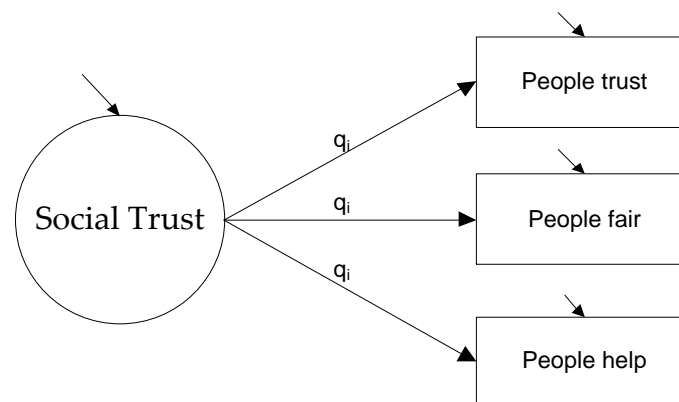
The model with **no parameters constrained** to be equal across **countries** is **just identified**, meaning that no test for the model is possible.

## Comparability across countries

In order to be able to compare relationships and means across countries one has to show first that the measures in the different countries are comparable.

Saris & Gallhofer (2007) show that this does not necessarily mean that the measures are equally good.

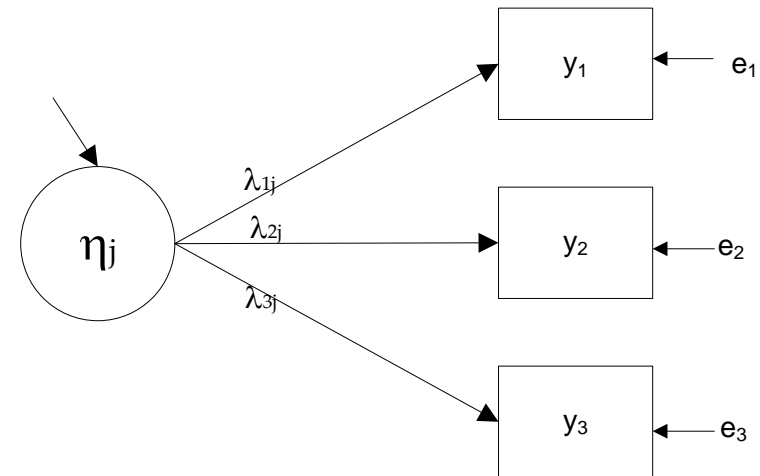
We need to test for “**Invariance of Measurement Instruments**” across countries.



Saris, W. E., & Gallhofer, I. N. (2007). *Design, evaluation, and analysis of questionnaires for survey research*. Hoboken, N.J.: Wiley-Interscience.

# Testing for cross-cultural Equivalence

■ **Configural Invariance:** Same pattern across countries



$$y_1 = \tau_1 + \lambda_{11}\eta_1 + e_1$$

$$y_2 = \tau_2 + \lambda_{21}\eta_1 + e_2$$

$$y_3 = \tau_3 + \lambda_{31}\eta_1 + e_3$$

$$E(e_i) = E(e_i \eta_1) = E(e_i e_j) = 0 \text{ for } i \neq j$$

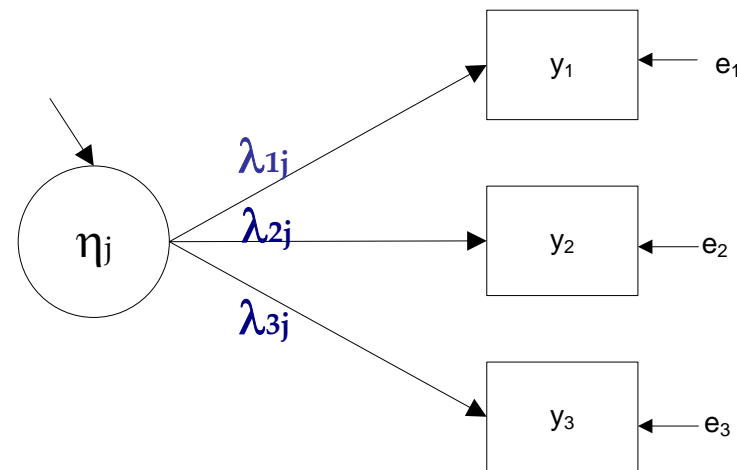


# Testing for cross-cultural Equivalence

■ **Configural Invariance:** Same pattern across countries

■ **Metric Invariance:** Loadings equal across countries ( $\lambda_{ij}$ ).

Comparison of relationships.



$$y_1 = \tau_1 + \lambda_{11}\eta_1 + e_1$$

$$y_2 = \tau_2 + \lambda_{21}\eta_1 + e_2$$

$$y_3 = \tau_3 + \lambda_{31}\eta_1 + e_3$$

$$E(e_i) = E(e_i \eta_1) = E(e_i e_j) = 0 \text{ for } i \neq j$$

# Testing for cross-cultural Equivalence

■ **Configural Invariance:** Same pattern across countries

■ **Metric Invariance:** Loadings equal across countries ( $\lambda_{ij}$ ).

Comparison of relationships.

■ **Scalar Invariance:** Loadings ( $\lambda_{ij}$ ) and intercepts ( $\tau_{ij}$ ) equal across countries.

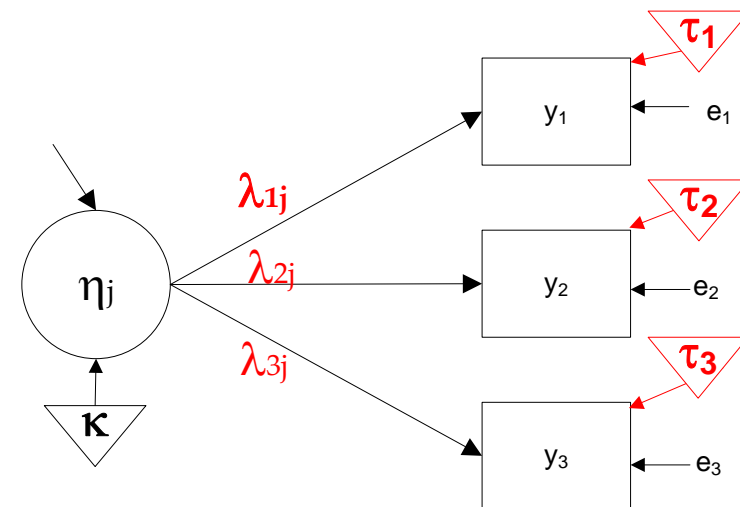
Comparison of latent means ( $\kappa$ ).

$$y_1 = \tau_1 + \lambda_{11}\eta_1 + e_1$$

$$y_2 = \tau_2 + \lambda_{21}\eta_1 + e_2$$

$$y_3 = \tau_3 + \lambda_{31}\eta_1 + e_3$$

$$E(e_i) = E(e_i \eta_1) = E(e_i e_j) = 0 \text{ for } i \neq j$$



## Fit of the model with SEM

This was detected with a procedure which has been developed by Saris, Satorra & Van der Veld (2009). This method determines whether misspecifications are present in the specified model.

Fit criteria of the models:

- To determine whether misspecifications are present in the specified model (Saris, Satorra & Van der Veld, 2009).
- Procedure based on the size of MI, the power of the test for misspecifications and the EPC to determine whether a restriction is most likely incorrectly made.

		Power	
		High	Low
MI	Significant	Use EPC	Misspecification
	Not	No misspecification	No decision

From EPC and MI  $\rightarrow$  s.e of the EPC ( $\sigma_{EPC}$ ) and the power of the test.

$$\sigma_{EPC} = \frac{EPC}{\sqrt{MI}}$$

The power of the test (Noncentrality Parameter)  $\rightarrow$  probability of detecting a misspecification of size  $\Delta$  in the estimates

$$NCP = \left( \frac{MI}{EPC^2} \right) \Delta^2$$

# Data



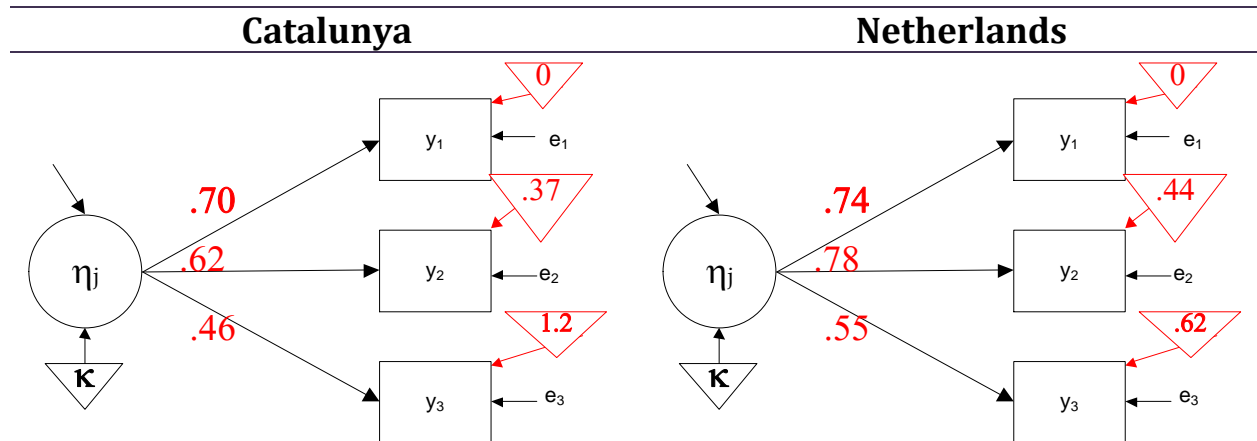
	<b>2002</b>	<b>2004</b>	<b>2006</b>	<b>2008</b>
Catalunya	<b>288</b>	<b>198</b>	<b>273</b>	<b>527</b>
	19.11.02 -20.02.03	27.09.04-31.01.05	25.10.06-04.03.07	05.09.08-31.01.09
Netherlands	<b>2364</b>	<b>1881</b>	<b>1889</b>	<b>1778</b>
	01.09.02-24.02.03	11.09.04-19.02.05	16.09.06-18.03.07	08.09.08-28.06.09

## Cross-national Invariance Test for Social Trust

2002	Catalunya & The Netherlands											
$\lambda_{\text{trst,ST}}$	$\lambda_{\text{fair,ST}}$	$\lambda_{\text{help,ST}}$	$\tau_{\text{trst}}$	$\tau_{\text{fair}}$	$\tau_{\text{help}}$	$\chi^2$	df	P	CFI	TLI	SRMR	Jrule
1	.936	.703	0	0.827	1.240	1.274	4	.87	1	1	.008	

		Latent mean	Composite mean
2002	The Netherlands	5.714	5.72
2002	Catalunya	4.866	4.97

### SCALAR INVARIANCE



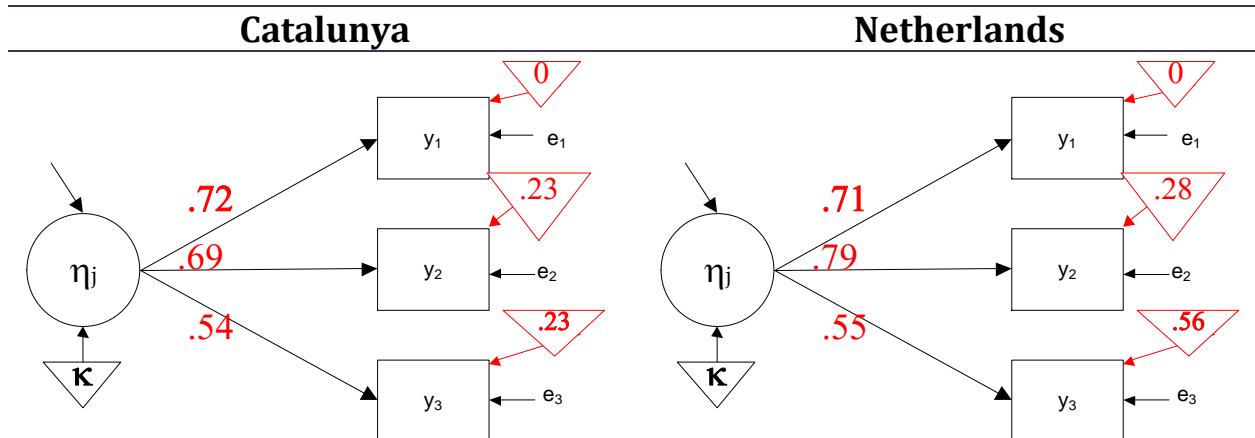
**Strong Scalar Invariance → Equal Latent Means**

2004		Catalunya & The Netherlands					$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
$\lambda_{trst,ST}$	$\lambda_{fair,ST}$	$\lambda_{help,ST}$	$\tau_{trst}$	$\tau_{fair}$	$\tau_{help}$	21.090*	4	.000	.986	.979	.064	.028	[pplhelp]	
1	.989	.764	0	.487	.882									
1	.988	.739	0	0.571	.47-C 1.07-N	4.38	3	.230	.999	.999	.021	.016		

\*  $\chi^2$  contribution

		Latent mean	Composite mean
2004	The Netherlands	5.802	5.80
2004	Catalunya	5.083	4.94

### PARTIAL SCALAR INVARIANCE



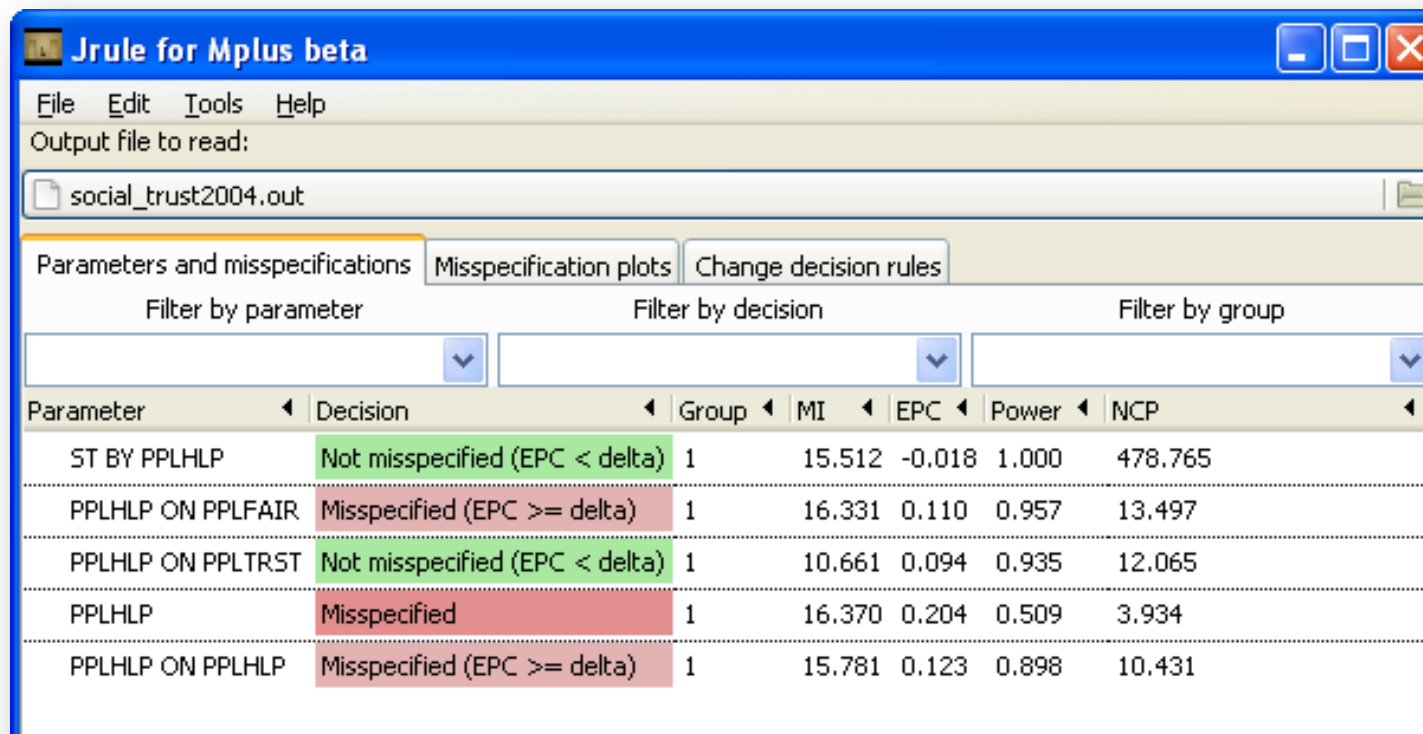
MODEL MODIFICATION INDICES

<i>Group</i>	<i>ESS2CAT</i>	<i>M.I.</i>	<i>E.P.C.</i>	<i>Std E.P.C.</i>	<i>StdYX E.P.C.</i>
ON/BY Statements					
PPLHLP	ON ST /				
ST	BY PPLHLP	15.521	-0.131	-0.194	-0.092
ON Statements					
PPLHLP	ON PPLTRST	11.640	-0.094	-0.094	-0.093
PPLHLP	ON PPLFAIR	17.168	-0.105	-0.105	-0.106
PPLHLP	ON PPLHLP	15.789	-0.123	-0.123	-0.123
Means/Intercepts/Thresholds					
[ PPLHLP ]		16.377	-0.398	-0.398	-0.189
<b>Group ESS2NL</b>					
ON/BY Statements					
PPLHLP	ON ST /				
ST	BY PPLHLP	15.512	-0.018	-0.025	-0.013
ON Statements					
PPLHLP	ON PPLTRST	10.661	0.094	0.094	0.099
PPLHLP	ON PPLFAIR	16.331	0.110	0.110	0.102
PPLHLP	ON PPLHLP	15.781	0.123	0.123	0.123
Means/Intercepts/Thresholds					
[ PPLHLP ]		16.370	0.204	0.204	0.106



# Jrule

## Help to detect misspecifications in the model!



The screenshot shows the 'Jrule for Mplus beta' application window. The title bar includes standard window controls. The menu bar contains 'File', 'Edit', 'Tools', and 'Help'. Below the menu bar, there is a field for 'Output file to read:' containing 'social\_trust2004.out'. Three tabs are visible: 'Parameters and misspecifications' (selected), 'Misspecification plots', and 'Change decision rules'. Below the tabs are three filter dropdown menus: 'Filter by parameter', 'Filter by decision', and 'Filter by group'. The main area displays a table with the following columns: Parameter, Decision, Group, MI, EPC, Power, and NCP. The table contains five rows of data, with the 'Decision' column highlighted in green for 'Not misspecified' and red for 'Misspecified'.

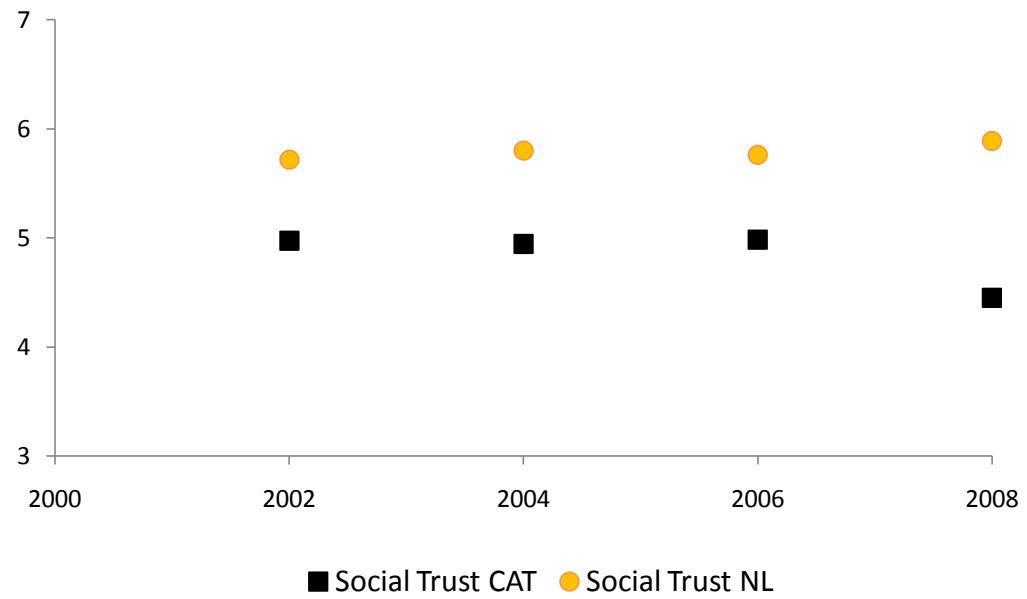
Parameter	Decision	Group	MI	EPC	Power	NCP
ST BY PPLHLP	Not misspecified (EPC < delta)	1	15.512	-0.018	1.000	478.765
PPLHLP ON PPLFAIR	Misspecified (EPC >= delta)	1	16.331	0.110	0.957	13.497
PPLHLP ON PPLTRST	Not misspecified (EPC < delta)	1	10.661	0.094	0.935	12.065
PPLHLP	Misspecified	1	16.370	0.204	0.509	3.934
PPLHLP ON PPLHLP	Misspecified (EPC >= delta)	1	15.781	0.123	0.898	10.431

2006		Catalunya & The Netherlands											
$\lambda_{trst,ST}$	$\lambda_{fair,ST}$	$\lambda_{help,ST}$	$\tau_{trst}$	$\tau_{fair}$	$\tau_{help}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	1.003	.705	0	.471	1.202	12.814	4	0.012	.992	.989	.045	.020	

		Latent mean	Composite mean
2006	The Netherlands	5.761	5.76
2006	Catalunya	4.941	4.98

2008		Catalunya & The Netherlands											
$\lambda_{trst,ST}$	$\lambda_{fair,ST}$	$\lambda_{help,ST}$	$\tau_{trst}$	$\tau_{fair}$	$\tau_{help}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.974	.887	0	.527	.094	47.99	4	.000	.975	.963	.098	.057	[pplhlp]
1	.966	.810	0	.585	.099-C .657-N	14.872	3	.001	.993	.987	.059	.028	

		Latent mean	Composite mean
2008	The Netherlands	5.911	5.89
2008	Catalunya	4.589	4.45



## Cross-years Invariance Test for Social Trust in Catalunya

Catalunya 2002-2008													
$\lambda_{trst,ST}$	$\lambda_{fair,ST}$	$\lambda_{help,ST}$	$\tau_{trst}$	$\tau_{fair}$	$\tau_{help}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.974	.887	0	.527	.094	29.464	12	.003	.971	.971	.068	.053	[pplhlp]
1	.873	.818	0	.941	.107	18.034	11	.081	.988	.987	.045	.045	
.645(2002)													

		2002	2004	2006	2008
Latent mean	Catalunya	4.937	5.123	5.132	4.599
Composite mean	Catalunya	4.97	4.94	4.98	4.45

### Test for Strong Scalar invariance: Equal latent means

Mean	$\lambda_{trst,ST}$	$\lambda_{fair,ST}$	$\lambda_{help,ST}$	$\tau_{trst}$	$\tau_{fair}$	$\tau_{help}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
<b>4.89</b>	1	.860	.808	0	.985	.154	35.445	14	.001	.965	.970	.070	.079	[ST]
						.709(2002)								
<b>5.07</b>	1	.877	.820	0	.924	.105	20.199	13	.090	.988	.989	.048	.042	
<b>4.60</b>						.591(2002)								
<b>(2008)</b>														

## Cross-years Invariance Test for Social Trust in The Netherlands

The Netherlands 2002-2008													
$\lambda_{\text{trst,ST}}$	$\lambda_{\text{fair,ST}}$	$\lambda_{\text{help,ST}}$	$\tau_{\text{trst}}$	$\tau_{\text{fair}}$	$\tau_{\text{help}}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.960	.721	0	.964	1.165	10.477	12	.574	1	1	.000	.010	

		2002	2004	2006	2008
Latent mean	The Netherlands	5.707	5.789	5.765	5.885
Composite mean	The Netherlands	5.72	5.80	5.76	5.89

Test for Strong Scalar invariance: Equal latent means

<b>Mean</b>	$\lambda_{\text{trst,ST}}$	$\lambda_{\text{fair,ST}}$	$\lambda_{\text{help,ST}}$	$\tau_{\text{trst}}$	$\tau_{\text{fair}}$	$\tau_{\text{help}}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
<b>5.781</b>	1	.960	.721	0	.964	1.165	21.053	15	0.135	.999	.999	.014	.021	

## Measurement of Political Trust

Some studies refer to the question: *Trust in parliament in the country.*

Political trust is a complex concept, which can be affected by the difference to individuals, groups or political institutions.

Political Trust is a complex concept → A *combination of measures* is most appropriate to measure the concept that one, higher reliability (Allum, N., Patulny, R., Read, S., & Sturgis, P. (2010); Allum, N., Read, S., & Sturgis, P. (in press); Guillén, L., Coromina, L., & Saris, W. (2011).

Rothstein & Stolle (2002) differentiated between

*political and representative institutions* (parliament, political parties, government)

groups of order (police, army, justice, schools ...

control institutions (newspapers, officials or public employees).

Torney-Purta et al. (2004) found *political institutions* (parliament, government, political parties)

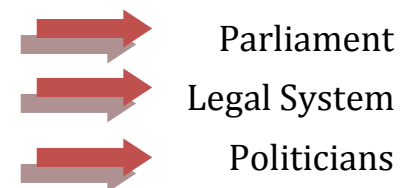
other representatives who maintain more direct relationship with citizens (schools, police ,...).

Following the argument of these investigations, this criterion is followed in this work where trust is defined as a combination of political confidence in the national parliament, government and politicians.

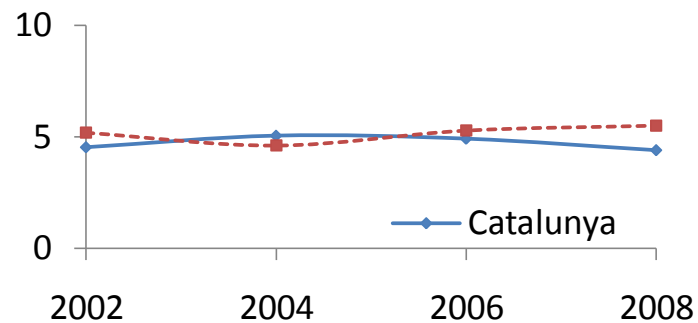
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**CARD 11:** Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust. Firstly...**READ OUT**

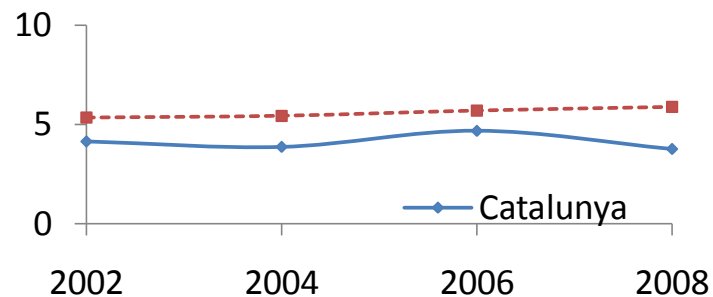
<i>No trust at all</i>												<i>Complete trust</i>	<i>(DK)</i>
00	01	02	03	04	05	06	07	08	09	10			88
... [country]'s parliament?													
... the legal system?													
... politicians?													



		Parliament			
		2002	2004	2006	2008
<i>Catalunya</i>	<i>x</i>	<b>4.535</b>	<b>5.053</b>	<b>4.918</b>	<b>4.403</b>
	<i>sd</i>	2.200	2.154	2.090	2.338
	<i>n</i>	273	188	269	472
<i>Netherlands</i>	<i>x</i>	<b>5.192</b>	<b>4.614</b>	<b>5.289</b>	<b>5.513</b>
	<i>sd</i>	2.024	2.109	1.939	1.908
	<i>n</i>	2326	1864	1861	1761

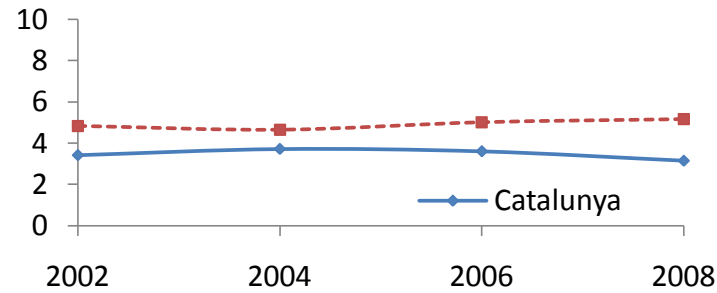


		Legal System			
		2002	2004	2006	2008
<i>Catalunya</i>	<i>x</i>	<b>4.146</b>	<b>3.873</b>	<b>4.678</b>	<b>3.768</b>
	<i>sd</i>	2.185	2.251	2.294	2.361
	<i>n</i>	281	189	267	512
<i>Netherlands</i>	<i>x</i>	<b>5.351</b>	<b>5.443</b>	<b>5.708</b>	<b>5.893</b>
	<i>sd</i>	2.195	2.110	1.997	2.039
	<i>n</i>	2329	1845	1860	1763



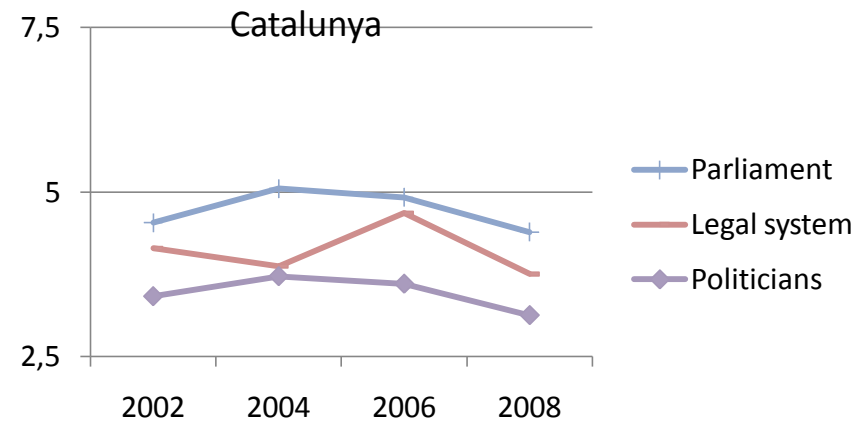
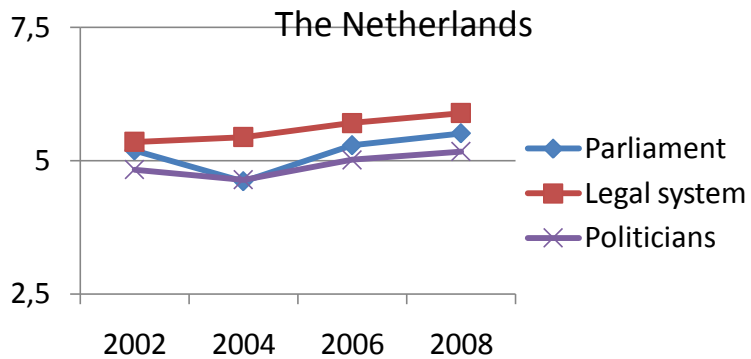


		Politicians			
		2002	2004	2006	2008
<i>Catalunya</i>	<i>x</i>	<b>3.416</b>	<b>3.720</b>	<b>3.606</b>	<b>3.143</b>
	<i>sd</i>	2.123	2.135	2.181	2.334
	<i>n</i>	281	193	264	512
<i>Netherlands</i>	<i>x</i>	<b>4.833</b>	<b>4.643</b>	<b>5.015</b>	<b>5.170</b>
	<i>sd</i>	1.943	1.994	1.850	1.852
	<i>n</i>	2323	1848	1866	1758



Higher level of political trust for The Netherlands.

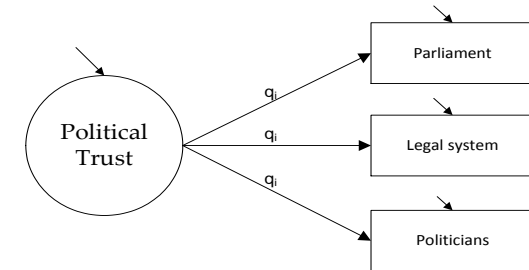
- The Netherlands: decrease trust in parliament in 2004. Stability trust in Legal System and Politicians.
- Catalunya, decrease for all types of trust in 2008 data.



# Cross-national Invariance Test for Political Trust

2002		Catalunya & The Netherlands											
$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.964	1.079	0	.298	-.813	53.760	4	.001	.982	.974	.099	.026	$\lambda_{prl,PT}$
1.19-CAT 1-NL	.935	1.041	0	.515	-.562	3.983	3	.263	.999	.999	.016	.013	

		Latent mean	Composite mean
2002	The Netherlands	5.193	5.13
2002	Catalunya	3.813	4.03



2004		Catalunya & The Netherlands											
$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	* $\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.764	.981	0	1.821	.078	121.7	4	.000	.943	.914	.171	.088	[prl]CAT [lgl]NL
1	.738	.948	0	1.18-CA 1.3-CA	.273 2.30-NL	4.370	2	.113	.999	.997	.034	.017	

Also fit if  $\lambda_{prl,PT}$  & [prl] are considered not invariant

		Latent mean	Composite mean
2004	The Netherlands	4.616	4.90
2004	Catalunya	3.680	4.23

<b>2006</b>		<b>Catalunya &amp; The Netherlands</b>											
$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.866	.981	0	1.057	-.252	82.650	4	.000	.955	.932	.137	.056	[prl]CAT
1	.813	.925	0-NL	1.416	0.112	13.034	3	.005	.994	.989	.057	.026	
1.1-CAT													

		Latent mean	Composite mean
2006	The Netherlands	5.303	5.35
2006	Catalunya	3.842	4.39

<b>2008</b>		<b>Catalunya &amp; The Netherlands</b>											
$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.983	1.070	0	.343	-.808	95.432	4	.000	.961	.942	.144	.057	[prl]CAT
1	.898	.957	0 NL	.911	-.057	10.751	3	.020	.997	.993	.048	.021	
1.03-C													

		Latent mean	Composite mean
2008	The Netherlands	5.519	5.53
2008	Catalunya	3.333	3.77

# Cross-years Invariance Test for Political Trust

Catalunya 2002-2008													
$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	Df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.938	.987	0	-.266	-1.150	42.725	12	.000	.97	.97	.093	.055	[lgl]2004
1	.952	.985	0	-.244	1.147	28.203	11	.003	.983	.982	.073	.046	[prl]2002 Aprl 2002
1	1.028	1.061	0	.628	-1.531	13.081	9	.159	.996	.995	.039	.027	
1.520 (2002)			-2.531 (2002)	-1.247 (2004)									

		2002	2004	2006	2008
Latent mean	Catalunya	4.647	5.009	4.952	4.373
Composite mean	Catalunya	4.03	4.23	4.39	3.77

Test for Strong Scalar invariance: Equal latent means

Mean	$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
4.687	1	1.022	1.071	-2.577 (2002)	-.625 -1.131 (2004)	-1.579	34.836	12	.000	.978	.978	.080	.076	PT (2008)
<b>4.647(2002)</b>	1	1.023	1.061	0	-0.602	-1.549	13.306	10	.207	.997	.996	.033	.028	
<b>4.976</b>	1.520			-2.531	-1.161									
<b>4.374(2008)</b>	(2002)			(2002)	(2004)									

**The Netherlands 2002-2008**

$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
1	.823	.952	0	1.346	.006	138.373	12	.000	.982	.982	.074	.038	[prl]2004
						61.672	11	.000	.993	.992	.049	.031	[lgl]2002
						35.196	10	.000	.996	.996	.036	.027	[pol]2002
1	.804	.969	0	1.446	-.162	24.723	9	.000	.998	.997	.030	.021	
	.913		-.350	.634									
	(2002)		(2004)	(2002)									

		2002	2004	2006	2008
Latent mean	The Netherlands	5.180	4.966	5.323	5.516
Composite mean	The Netherlands	5.13	4.90	5.35	5.53

**Test for Strong Scalar invariance: Equal latent means**

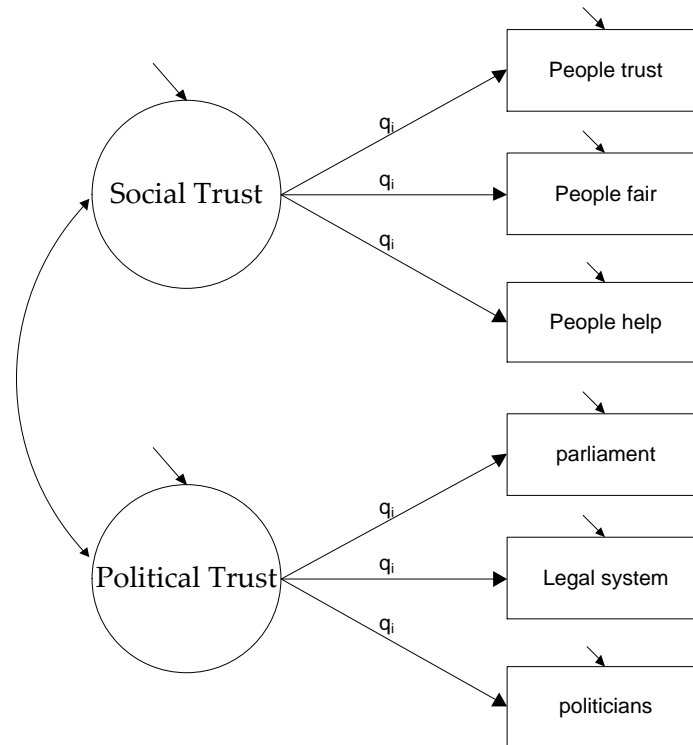
Mean	$\lambda_{prl,PT}$	$\lambda_{lgl,PT}$	$\lambda_{pol,PT}$	$\tau_{prl}$	$\tau_{lgl}$	$\tau_{pol}$	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
<b>5.248(02&amp;06)</b>	1	.804	.968	0	1.451	-.16	37.371	10	.000	.997	.996	.033	.025	
<b>4.965(04)</b>		.913		-.385	.625									
<b>5.516(08)</b>		(2002)		(2004)	(2002)									

Latent means Political Trust	2002	2004	2006	2008
<b>The Netherlands</b>	<b>5.248</b>	4.965	<b>5.248</b>	5.516
<b>Catalunya</b>	4.647	<b>4.976</b>	<b>4.976</b>	4.374

# Cross-national Invariance Test for Political & Social Trust

Correlation between latent factors taking into account the possible measurement error.

CFA's gives correct orientation on the variables that make each type of trust



# Cross-national Invariance Test for Political & Social Trust

2002	Political & Social Trust							
	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
	162.78*	24	.000	.973	.966	.066	.031	$\lambda$ prl
	112.788	23	.000	.982	.977	.054	.030	

		Social latent mean	Political latent mean	Correlation
2002	The Netherlands	5.709	5.177	.333
2002	Catalunya	4.845	3.833	.567

2004	Political & Social Trust							Jrule
	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	
	222.329*	24	.000	.952	.954	.089	.072	[prl]CAT
	119.944	23	.000	.977	.969	.064	.038	[lg]NL
	90.091	22	.000	.984	.978	.055	.034	[pplhelp]
	73.910	21	.000	.987	.982	.049	.032	

		Social latent mean	Political latent mean	Correlation
2004	The Netherlands	5.805	4.622	.440
2004	Catalunya	5.071	3.704	.517

<b>2006</b>		<b>Political &amp; Social Trust</b>					
$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
170.454	24	.000	.961	.951	.075	.054	[prl]CAT
99.324	23	.000	.980	.973	.055	.035	[ppltrust]
84.077	22	.000	.983	.977	.051	.034	$\lambda$ trstprl
74.620	21	.000	.986	.980	.049	.030	

		Social latent mean	Political latent mean	Correlation
2006	The Netherlands	5.730	5.285	.493
2006	Catalunya	4.628	2.939	.399

<b>2008</b>		<b>Political &amp; Social Trust</b>					
$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
210.219	24	.000	.964	.965	.082	.057	[prl]CAT
104.717	23	.000	.984	.979	.056	.040	[ppltrust]
76.320	22	.000	.989	.986	.046	.034	[pplhlp]
63.401	21	.000	.992	.989	.042	.028	

		Social latent mean	Political latent mean	Correlation
2008	The Netherlands	5.891	5.506	.581
2008	Catalunya	4.310	3.306	.520



## Correlations between social and political trust

Latent correlations				
	2002	2004	2006	2008
Catalunya	.325	.448	.396	.582
N	269	183	257	456
Netherlands	.567	.517	.493	.520
N	2276	1815	1827	1736

Composite Correlations				
	2002	2004	2006	2008
Catalunya	.213	.321	.308	.470
n	269	182	257	456
Netherlands	.459	.428	.399	.433
n	2276	1815	1827	1736

# Cross-years Invariance Test for Political & Social Trust

Political & Social Trust - Catalunya							
$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
159.260	56	.000	.957	.954	.076	.056	[pplhlp]2002
144.852	55	.000	.960	.956	.071	.059	[trstlgl]2004
127.739	54	.000	.967	.963	.065	.057	

		2002	2004	2006	2008
Social Trust mean	Catalunya	4.938	5.121	4.588	4.590
Political Trust mean	Catalunya	4.590	4.983	4.962	4.304
Correlation Soc Pol	Catalunya	.325	.448	.396	.582

## Test for Strong Scalar invariance: Equal latent means

$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
105.310	55	.000	.977	.975	.053	.034	

		2002	2004	2006	2008
Social Trust mean	Catalunya	<b>5.085</b>	<b>5.085</b>	<b>5.085</b>	4.586
Political Trust mean	Catalunya	4.633	<b>4.941</b>	<b>4.941</b>	4.314
Correlation Soc Pol	Catalunya	.264	.449	.481	.582

# Cross-years Invariance Test for Political & Social Trust

Political & Social Trust							
$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
401.980	56	.000	.978	.977	.056	.041	[TRSTPRL]2004
307.240	55	.000	.984	.983	.048	.037	[trstlg]2002
271.457	54	.000	.986	.985	.045	.034	$\lambda_{lg}2002;$
256.876	53	.000	.987	.986	.044	.031	

		2002	2004	2006	2008
Social Trust mean	Netherlands	5.698	5.791	5.758	5.889
Political Trust mean	Netherlands	5.165	4.970	5.308	5.501
Correlation Soc Pol	Netherlands	.566	.519	.494	.516

Test for Strong Scalar invariance:  
Equal latent mean

$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
272.979	57	.000	.986	.986	.044	.034	

		2002	2004	2006	2008
Social Trust mean	Netherlands	<b>5.779</b>	<b>5.779</b>	<b>5.779</b>	<b>5.779</b>
Political Trust mean	Netherlands	<b>5.254</b>	4.964	<b>5.254</b>	5.456
Correlation Soc Pol	Netherlands	.567	.519	.493	.517

## Cross-years & Cross-national Invariance Test for Political & Social Trust

	$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
	988.923	120	.000	.952	.952	.079	.059	[trstprl] 2208 CAT
	862.944	119	.000	.955	.955	.074	.056	[trstprl] 2006 CAT
(***)	796.256	118	.000	.963	.962	.071	.053	[trstprl] 2004 CAT
	721.267	117	.000	.967	.966	.067	.048	[trstprl] 2004 NL
	611.181	116	.000	.973	.972	.061	.045	[trstprl] 2002 CAT
	549.421	115	.000	.975	.976	.057	.044	[trstprl] 2004 CAT
	530.467	114	.000	.977	.976	.056	.044	[ppltrst] 2008 CAT
	489.775	113	.000	.979	.978	.054	.043	[trstlgl] 2002 NL
	458.734	112	.000	.981	.979	.052	.040	[pplfair] 2008 CAT
								$\chi^2$ 21.621 EPC 0.436
	436.544	111	.000	.982	.981	.051	.039	[pplhelp] 2004 CAT
								$\chi^2$ 15.497 EPC -0.508
	420.665	110	.000	.983	.981	.050	.039	[ppltrst] 2006 CAT
								$\chi^2$ 12.034 EPC 0.390
	408.454	109	.000	.983	.982	.049	.038	[trstprl] 2008 CAT
								$\chi^2$ 14.579 EPC 0.389
	393.721	108	.000	.984	.982	.048	.038	pt by trstprl 2002 CAT
								$\chi^2$ 14.264 EPC 0.335
	377.238	107	.000	.985	.983	.047	.037	

(\*\*) Some high MI, but not misspecification according Jrule criteria because low EPC and high power. If only  $\chi^2$  is used, then misspecification in the model.

# Jrrule: Help to detect misspecifications in the model!

**Jrrule for Mplus beta**

File Edit Tools Help

Output file to read:

social+political\_trust\_nlcat0208.out

Parameters and misspecifications Misspecification plots Change decision rules

Filter by parameter Filter by decision Filter by group

Parameter	Decision	Group	MI	EPC	Power	NCP
PPLTRST	Misspecified	1	38.394	0.492	0.472	3.569
TRSTPRL WITH PT	Misspecified	1	21.055	0.336	0.535	4.196
TRSTPLT WITH TRSTPRL	Misspecified	1	17.028	0.322	0.485	3.695
PPLFAIR WITH ST	Misspecified	1	12.912	0.318	0.396	2.873
TRSTLGL WITH ST	Misspecified	1	25.743	0.305	0.704	6.226
PPLFAIR WITH PPLTRST	Misspecified	1	10.114	0.294	0.368	2.633
PT ON TRSTPRL	Misspecified	1	21.053	0.279	0.694	6.085
PPLTRST WITH TRSTLGL	Misspecified	1	15.158	0.248	0.654	5.545
PPLHLP WITH PT	Misspecified	1	12.053	0.242	0.576	4.631
ST ON PPLFAIR	Misspecified	1	12.910	0.229	0.653	5.539
TRSTLGL	Misspecified (EPC >= delta)	1	34.657	0.190	0.996	21.601
PPLHLP WITH TRSTPLT	Misspecified (EPC >= delta)	1	10.094	0.150	0.888	10.094
ST ON TRSTLGL	Not misspecified (EPC < delta)	1	25.743	0.137	1.000	30.860
PT BY PPLTRST	Not misspecified (EPC < delta)	1	25.900	0.105	1.000	52.857
PT ON PPLHLP	Not misspecified (EPC < delta)	1	12.053	0.099	1.000	27.670

**Jrrule for Mplus beta**

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Output file to read:

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Parameters and misspecifications Misspecification plots Change decision rules

Filter by parameter Filter by decision Filter by group

Parameter	Decision	Group	MI	EPC	Power	NCP
PT BY TRSTPRL	Not misspecified (EPC < delta)	1	94.100	-0.073	1.000	397.307
TRSTPRL ON TRSTPRL	Not misspecified (EPC < delta)	1	94.100	-0.073	1.000	397.307
TRSTPRL ON TRSTLGL	Not misspecified (EPC < delta)	1	92.470	-0.063	1.000	524.206
TRSTPRL ON TRSTPLT	Not misspecified (EPC < delta)	1	80.588	-0.070	1.000	370.047
PPLHLP	Misspecified	1	47.506	-0.386	0.764	7.174
TRSTPLT ON PPLHLP	Not misspecified (EPC < delta)	1	43.109	0.041	1.000	577.009
TRSTPLT ON PPLFAIR	Not misspecified (EPC < delta)	1	39.849	0.035	1.000	731.920
PPLTRST	Misspecified	1	38.394	0.492	0.472	3.569
TRSTLGL	Misspecified (EPC >= delta)	1	34.657	0.190	0.996	21.601
PPLHLP ON PPLHLP	Not misspecified (EPC < delta)	1	33.504	-0.107	1.000	65.843
ST BY TRSTLGL	Not misspecified (EPC < delta)	1	33.051	0.044	1.000	384.115
TRSTLGL ON PPLFAIR	Not misspecified (EPC < delta)	1	32.457	0.039	1.000	480.133
ST BY PPLTRST	Not misspecified (EPC < delta)	1	31.295	0.094	1.000	79.690
PPLTRST ON PPLTRST	Not misspecified (EPC < delta)	1	31.295	0.094	1.000	79.690
ST BY PPLHLP	Not misspecified (EPC < delta)	1	30.310	-0.107	1.000	59.566
PPLTRST ON PPLFAIR	Not misspecified (EPC < delta)	1	29.604	0.081	1.000	101.523

Means and correlations

		2002	2004	2006	2008
Social Trust mean	Netherlands	5.699	5.792	5.759	5.890
	Catalunya	4.848	5.047	4.727	3.682
Political Trust mean	Netherlands	5.166	4.976	5.308	5.500
	Catalunya	3.650	3.191	3.999	3.034
Correlation Soc Pol	Netherlands	.565	.521	.497	.577
	Catalunya	.342	.442	.384	.518

Test for Strong Scalar invariance: Equal latent means

$\chi^2$	df	P	CFI	TLI	RMSEA	SRMR	Jrule
403.104	114	.000	.984	.983	.047	.040	

Means

		2002	2004	2006	2008
Social Trust	Netherlands	<b>5.781</b>	<b>5.781</b>	<b>5.781</b>	<b>5.781</b>
	Catalunya	<b>4.865</b>	<b>4.865</b>	<b>4.865</b>	3.690
Political Trust	Netherlands	<b>5.256</b>	4.970	<b>5.256</b>	5.455
	Catalunya	<b>3.515</b>	<b>3.515</b>	4.034	3.042

## Comparing means

- The means of the **latent** variable Social and Political Trust across countries is correct if **at least two** indicators are scalar invariant
- The **composite scores** require that **all** indicators are scalar invariant
- If the deviations are large the differences between the means across countries should be large and the correlation between the means should be low.

<i><b>Social Trust</b></i>	<i><b>2002</b></i>	<i><b>2004</b></i>	<i><b>2006</b></i>	<i><b>2008</b></i>	<i><b>corr</b></i>
NETHERLANDS					
SumScore Mean	5.72	5.80	5.76	5.890	
CFA Cross-national	5.71	5.80	5.76	5.911	1.000
CFA Cross-yrs	5.70	5.78	5.76	5.885	.994
Correlated model cross national	5.70	5.80	5.73	5.891	.987
Correlated model cross years	5.69	5.79	5.75	5.889	.996
Correlated +cross-national+cross-year	5.69	5.79	5.75	5.890	.996
 <i><b>Political Trust</b></i>					
NETHERLANDS					
SumScore Mean	5.13	4.90	5.35	5.53	
CFA Cross-national	5.19	4.61	5.30	5.51	.954
CFA Cross-years	5.18	4.96	5.32	5.51	.996
Correlated model cross national	5.17	4.62	4.93	5.50	.819
Correlated model cross years	5.16	4.97	5.30	5.50	.996
Correlated +cross-national+cross-year	5.16	4.97	5.30	5.50	.996

# Conclusions

- Cross-national comparison with MGCFA with testing for invariance.
- Testing SEM... Fit measures!!!
- Comparison of latent means and composite mean
- Composite score and its quality
- Trends in Catalunya and The Netherlands related social and political trust.



