

Towards an Autonomy Scale for Poverty Analysis:

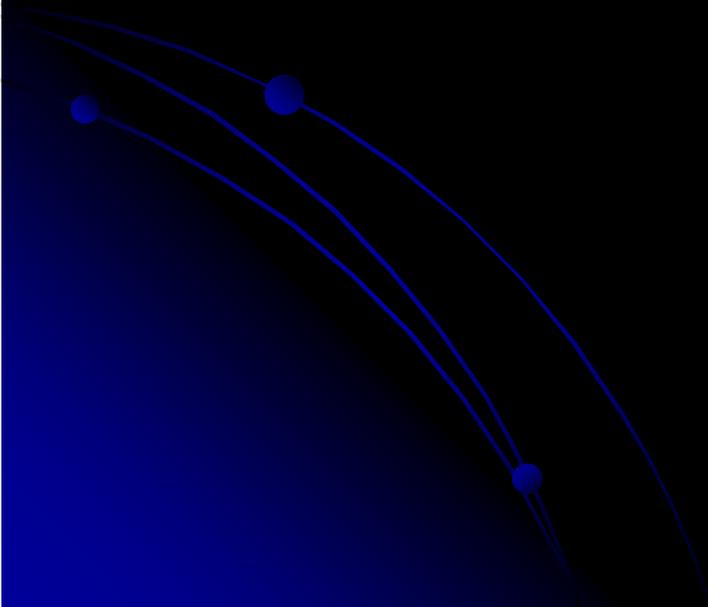
Validity and reliability evaluation with psychometric techniques for scale construction

José Manuel Roche

*Oxford Poverty and Human Development Initiative
Department of International Development
University of Oxford*

Jessica Morgan

*Department of Psychology and Counseling
University of Greenwich*



BACKGROUND

- Alkire (2005) identifies important affinities between the measures of relative autonomy in Self Determination Theory (Ryan and Deci 2000) and Amartya Sen's account of agency:

'Whether people are able to act on behalf of things that they are assumed to have reason to value'

- A first pilot test of the dimension-specific autonomy questions take place in India
- In 2007 OPHI proposes a module to measure empowerment which includes the relative autonomy questions by domain (Ibrahim & Alkire 2007)
- This empowerment module have been pilot tested in Chile (nationally representative survey), Sri Lanka, Nigeria, Chad, and Philippines
- Additional test and validations in Latin American cities (Santos, Samman and Yalowitzky 2009)

MOTIVATIONS

- Undertaking a systematic validity and reliability evaluation of the autonomy scales using available data based on psychometric techniques
- Evaluating the feasibility of constructing domain-specific autonomy scales
- Identifying areas for improvements and refinements

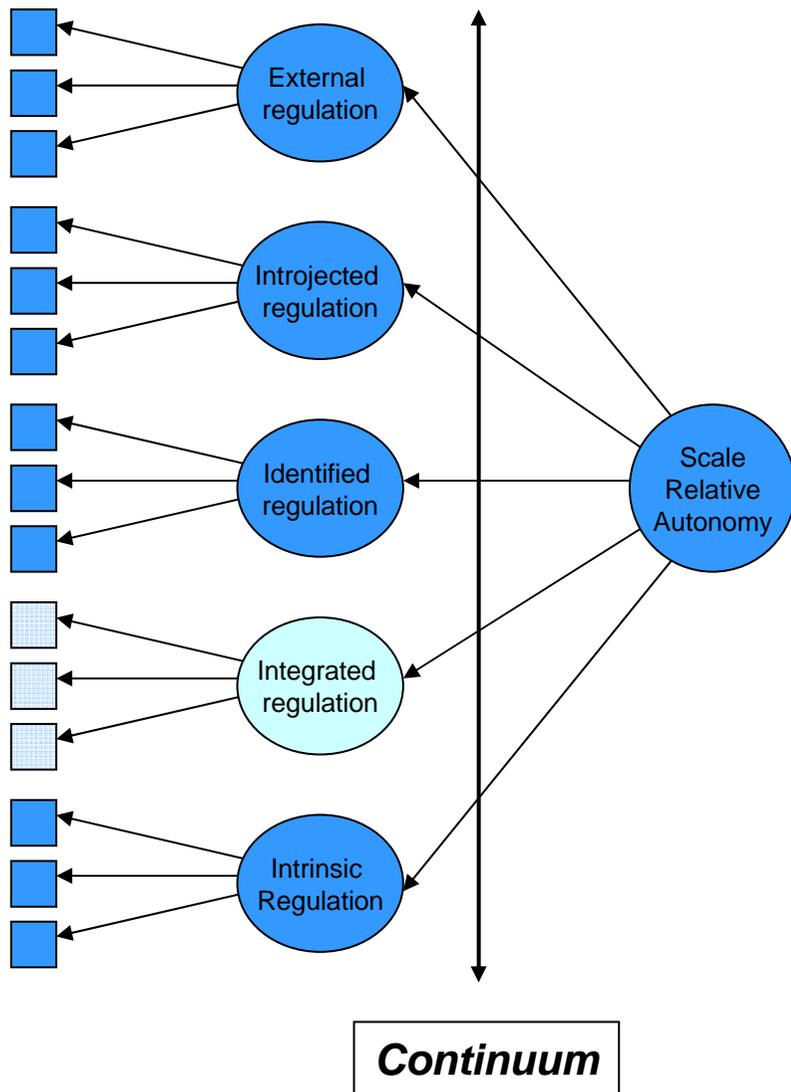
Psychometric evaluation:

- Examine internal consistency (Kendal Tau b correlations)
- Examine reliability based (Cronbach's alpha)
- Examine the convergent and discriminant validity (Exploratory Factor Analysis)
- Test for Goodness-of-fit of the final scales (Confirmatory Factor Analysis)

EFA in a sub-sample of the Chilean data (50%)

CFA in the complementary sub-sample of the Chilean data to test hypothesis

Further CFA in the Sri Lankan and Philippines datasets



Eg. Gagne et al (2010): The Motivation at Work Scale

External:

1. Because this job affords me a certain standard of living
2. Because it allows me to make a lot of money
3. I do this job for the paycheck

Introjected:

1. Because I have to be the best in my job, I have to be a "winner"
2. Because my work is my life and I don't want to fail
3. Because my reputation depends on it

Identified:

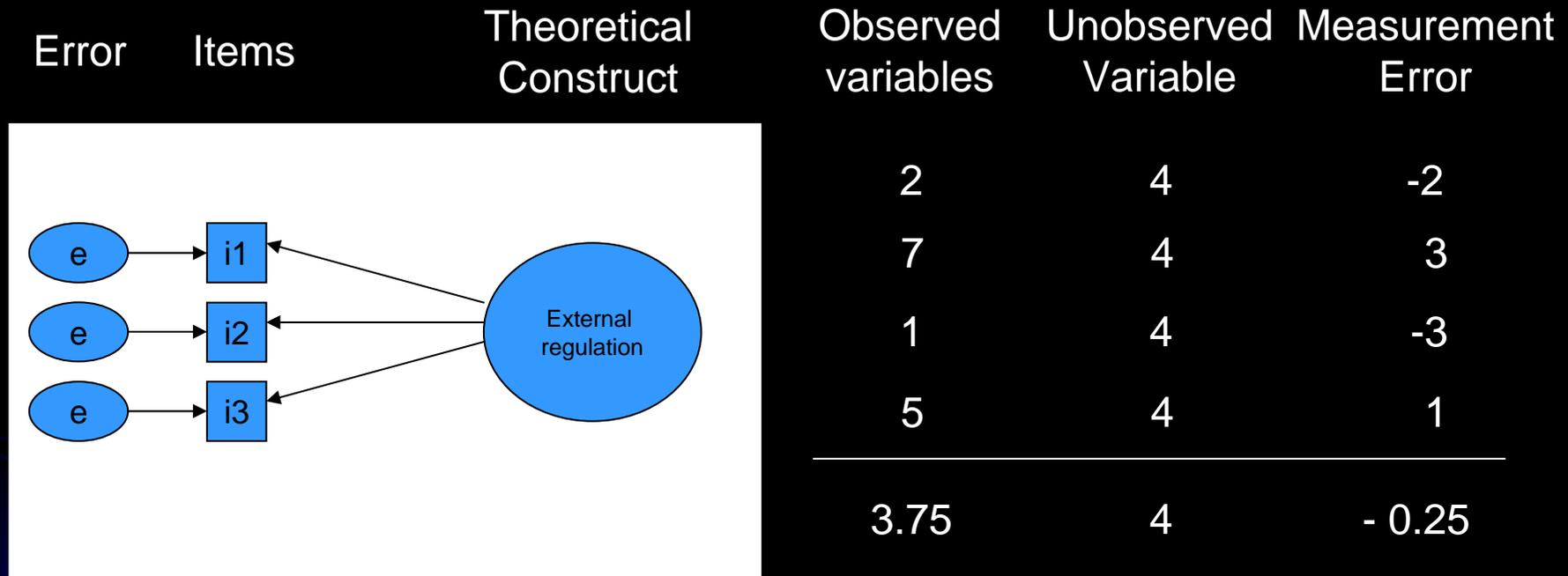
1. I chose this job because it allows me to reach my life goals
2. Because this job fulfills my career plans
3. Because this job fits my personal values

Intrinsic

1. Because I enjoy this work very much
2. Because I have fun doing my job
3. For the moments of pleasure that this job brings me

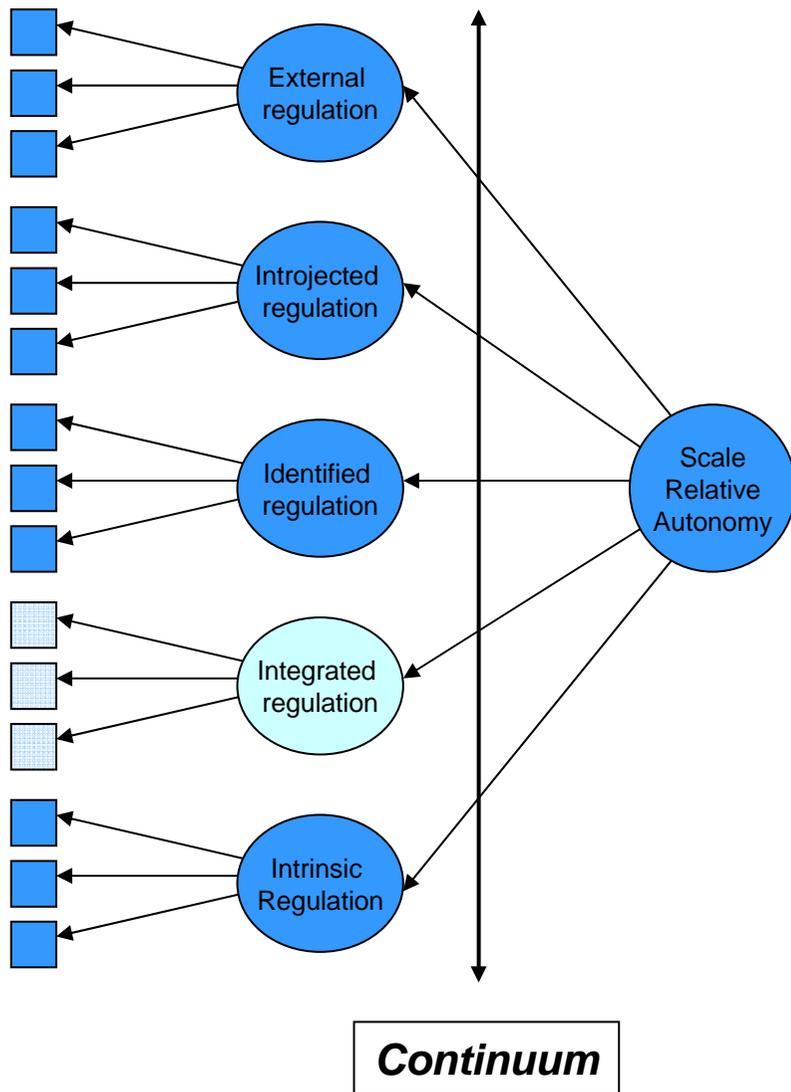
The stem is "Using the scale below, please indicate for each of the following statements to what degree they presently correspond to one of the reasons for which you are doing this specific job" and is accompanied by the scale 1= not at all; 2= very little; 3 = a little; 4 = moderately; 5 = strongly; 6 = very strongly; 7= exactly.

Multiple items and measurement error



The errors cancel each other up!

(Provided that they are uncorrelated)



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Example OPHI indicators - RAI questions

EMP8_1 I will now ask you to express your level of disagreement or agreement with the following statements, where 1 is greatly disagree with the statement and 4 is strongly agree, **regarding why you do the job you do.**
(Strongly disagree, Disagree, Agree, Strongly agree)

- a. I do this job only because I need the money.
- b. I do this job because my spouse/partner, other people, society, social organisations or my community insist that I do.
- c. I do this job because others expect it of me or to obtain their approval. If I didn't, they might blame me.
- d. I do this job because I personally consider it important.

EMP12. I will now ask you to express your level of disagreement or agreement with the following statements, where 1 is greatly disagree with the statement and 4 is strongly agree, **regarding how you would resolve a serious health problem.**
(Strongly disagree, Disagree, Agree, Strongly agree)

- a. I can't face a serious health problem of my own differently from how I do.
- b. If I have a serious health problem, I do what my spouse or some other person, society or social organisations insist that I do.
- c. If I have a serious health problem, I act according to what other people expect of me or to get their approval. If I didn't, they might blame me.
- d. If I have a serious health problem, I do what I personally consider is important.

EMP20. I will now ask you to express your level of disagreement or agreement with the following statements, where 1 is greatly disagree with the statement and 4 is strongly agree, **regarding what actions you take to protect your household's security.**

- a. I cannot do anything to prevent or reduce the risk of crime differently to what I already do.
- b. To prevent or reduce the risk of crime I do what my spouse, another person, society, social organisations or my community insist that I do.
- c. To prevent or reduce the risk of crime I do what others expect of me or what will obtain their approval. If I didn't, they might blame me.
- d. To prevent or reduce the risk of crime I do what I personally consider important.

Internal consistency: Kendal Tau b correlations

	e45_1a	e45_1b	e45_1c	e45_1d
	<i>Job</i>			
e45_1a	1.000	0.137	0.090	-0.083
e45_1b	0.137	1.000	0.671	-0.199
e45_1c	0.090	0.671	1.000	-0.128
e45_1d	-0.083	-0.199	-0.128	1.000

E45_1 I will now ask you to express your level of disagreement or agreement with the following statements, where 1 is greatly disagree with the statement and 4 is strongly agree, **regarding why you do the job you do**.
(Strongly disagree, Disagree, Agree, Strongly agree)

- a. I do this job only because I need the money.
- b. I do this job because my spouse/partner, other people, society, social organizations or my community insist that I do.
- c. I do this job because others expect it of me or to obtain their approval. If I didn't, they might blame me. .
- d. I do this job because I personally consider it important.

Kendal Tau b correlations

	emp05_a	emp05_b	emp05_c	emp05_d	e45_1a	e45_1b	e45_1c	e45_1d	e45_2a	e45_2b	e45_2c	e45_2d	s11_a	s11_b	s11_c	s11_d	v10_a	v10_b	v10_c	v10_d	emp10_1a	emp10_1b	emp10_1c	emp10_1d	emp10_2a	emp10_2b	emp10_2c	emp10_2d		
Minor Household Purchases																														
emp05_a	1.000	0.356	0.285	-0.126																										
emp05_b	0.356	1.000	0.738	-0.207																										
emp05_c	0.285	0.738	1.000	-0.192																										
emp05_d	-0.126	-0.207	-0.192	1.000																										
Job																														
e45_1a	0.194	0.072	0.017	-0.036	1.000	0.137	0.090	-0.083																						
e45_1b	0.228	0.466	0.399	-0.227	0.137	1.000	0.671	-0.199																						
e45_1c	0.171	0.435	0.452	-0.153	0.090	0.671	1.000	-0.128																						
e45_1d	-0.115	-0.150	-0.105	0.348	-0.083	-0.199	-0.128	1.000																						
Household task																														
e45_2a	0.277	0.209	0.162	-0.089					1.000	0.267	0.156	-0.031																		
e45_2b	0.271	0.512	0.500	-0.205					0.267	1.000	0.683	-0.222																		
e45_2c	0.208	0.446	0.530	-0.143					0.156	0.683	1.000	-0.142																		
e45_2d	-0.145	-0.195	-0.161	0.469					-0.031	-0.222	-0.142	1.000																		
Serious Health Problem																														
s11_a	0.523	0.260	0.195	-0.116	0.246	0.192	0.147	-0.111	0.266	0.223	0.138	-0.183	1.000	0.323	0.193	-0.155														
s11_b	0.296	0.479	0.418	-0.188	0.129	0.417	0.389	-0.150	0.138	0.390	0.373	-0.156	0.323	1.000	0.636	-0.237														
s11_c	0.197	0.474	0.547	-0.170	0.069	0.431	0.507	-0.120	0.072	0.398	0.453	-0.089	0.193	0.636	1.000	-0.195														
s11_d	-0.143	-0.241	-0.219	0.540	-0.042	-0.236	-0.189	0.386	-0.079	-0.241	-0.133	0.536	-0.155	-0.237	-0.195	1.000														
Preventing Crime																														
v10_a	0.448	0.212	0.139	-0.088	0.216	0.132	0.076	-0.109	0.274	0.193	0.090	-0.148	0.460	0.230	0.126	-0.145	1.000	0.364	0.243	-0.098										
v10_b	0.271	0.456	0.391	-0.141	0.109	0.370	0.348	-0.140	0.225	0.407	0.333	-0.233	0.245	0.461	0.399	-0.223	0.364	1.000	0.704	-0.172										
v10_c	0.192	0.429	0.473	-0.138	0.036	0.355	0.408	-0.108	0.151	0.385	0.439	-0.176	0.169	0.430	0.486	-0.195	0.243	0.704	1.000	-0.152										
v10_d	-0.105	-0.199	-0.179	0.461	-0.029	-0.185	-0.184	0.352	-0.115	-0.207	-0.113	0.443	-0.089	-0.164	-0.177	0.492	-0.098	-0.172	-0.152	1.000										
Religion																														
emp10_1a	0.224	0.189	0.141	-0.049	0.218	0.104	0.081	-0.040	0.254	0.146	0.099	-0.029	0.213	0.216	0.102	-0.016	0.219	0.212	0.165	-0.055	1.000	0.172	0.120	0.018						
emp10_1b	0.256	0.536	0.498	-0.251	0.054	0.487	0.416	-0.197	0.186	0.483	0.385	-0.152	0.223	0.446	0.432	-0.248	0.167	0.430	0.395	-0.216	0.172	1.000	0.820	-0.241						
emp10_1c	0.230	0.509	0.529	-0.202	0.014	0.463	0.460	-0.154	0.171	0.477	0.434	-0.081	0.187	0.419	0.487	-0.190	0.110	0.390	0.425	-0.173	0.120	0.820	1.000	-0.195						
emp10_1d	-0.120	-0.166	-0.152	0.427	-0.084	-0.193	-0.137	0.346	-0.056	-0.167	-0.095	0.429	-0.109	-0.156	-0.165	0.399	-0.119	-0.167	-0.127	0.389	0.018	-0.241	-0.195	1.000						
No Religion																														
emp10_2a	0.270	0.397	0.345	-0.102	0.094	0.315	0.272	-0.143	0.197	0.316	0.256	-0.120	0.235	0.313	0.286	-0.195	0.241	0.323	0.302	-0.131	1.000	0.628	0.560	-0.160						
emp10_2b	0.171	0.524	0.453	-0.209	0.039	0.510	0.416	-0.231	0.157	0.454	0.401	-0.322	0.168	0.361	0.371	-0.317	0.136	0.375	0.390	-0.269	0.628	1.000	0.859	-0.111						
emp10_2c	0.135	0.488	0.521	-0.179	0.005	0.504	0.502	-0.194	0.003	0.386	0.364	-0.209	0.112	0.358	0.422	-0.300	0.055	0.365	0.415	-0.259	0.560	0.859	1.000	-0.059						
emp10_2d	-0.164	-0.095	-0.087	0.256	-0.060	-0.029	-0.050	0.126	-0.056	-0.086	-0.064	0.121	-0.171	-0.172	-0.082	0.216	-0.149	-0.081	-0.069	0.190	-0.160	-0.111	-0.059	1.000						

Is it really possible to compute domain-specific autonomy scales?

Are there underlying (unobserved) variables?

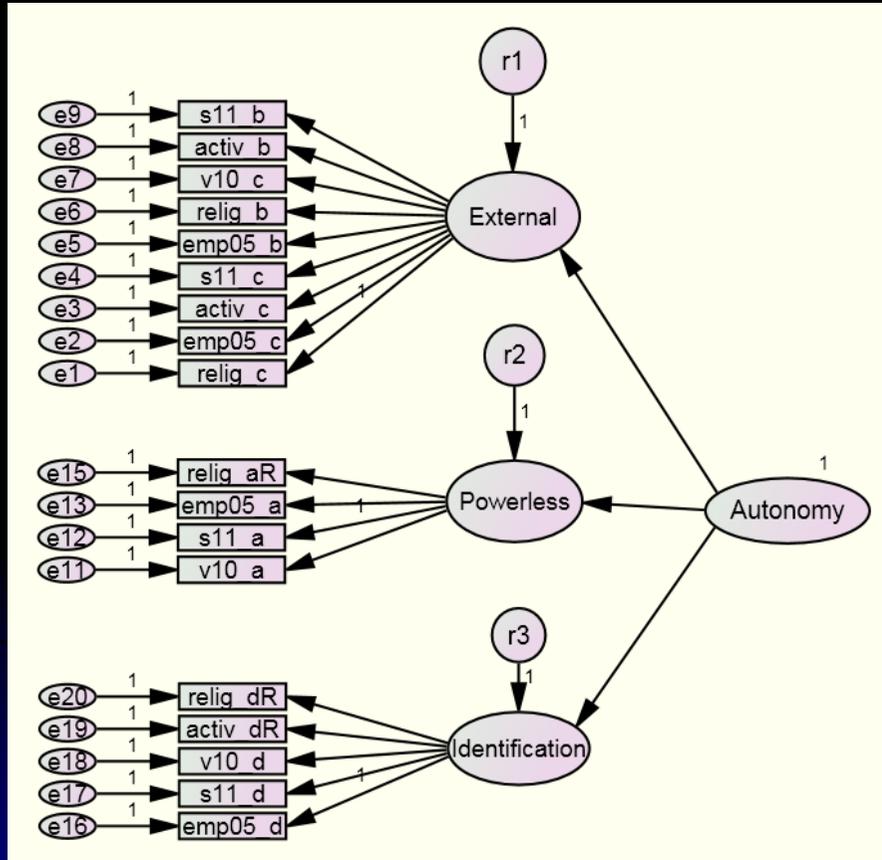
Convergent validity and reliability: EFA and Cronbach's alpha

	Exploratory Factor Analysis
Job	
e45_1a I do this job only because I need the money	0.246
e45_1b I do this job because my spouse/other people force me to	0.889
e45_1c I do this job because others expect it of me or to obtain their approval	0.694
e45_1d I do this job because I personally consider it important	-0.175
Cronbach's alpha (all four items)	0.492
Cronbach's alpha (only highlighted items)	0.534
Household Task	
e45_2a I do the household tasks only because they're necessary	0.326
e45_2b I do the household tasks because my spouse/other people force me to	0.959
e45_2c I do the household tasks because others expect it(to get approval)	0.738
e45_2d I do the household tasks because I personally consider it important	-0.120
Cronbach's alpha (all four items)	0.516
Cronbach's alpha (only highlighted items)	0.620
Serious Health Problems	
s11_a I can't face a health problem of my own differently to how I do	0.354
s11_b If I have a health problem,I do what my spouse/other person tell me to	0.922
s11_c If I have a serious health problem, I do what others expect	0.687
s11_d If I have a serious health problem I do what I consider is important	-0.216
Cronbach's alpha (all four items)	0.589
Cronbach's alpha (only highlighted items)	0.639
Preventing Crime	
v10_a I cannot do anything to prevent or reduce the risk of crime	0.421
v10_b Against crime, I do what my spouse/another person force me to	0.984
v10_c Against crime, I do what others expect of me(to get approval)	0.704
v10_d Against crime, I do what I personally consider important	-0.108
Cronbach's alpha (all four items)	0.609
Cronbach's alpha (only highlighted items)	0.698

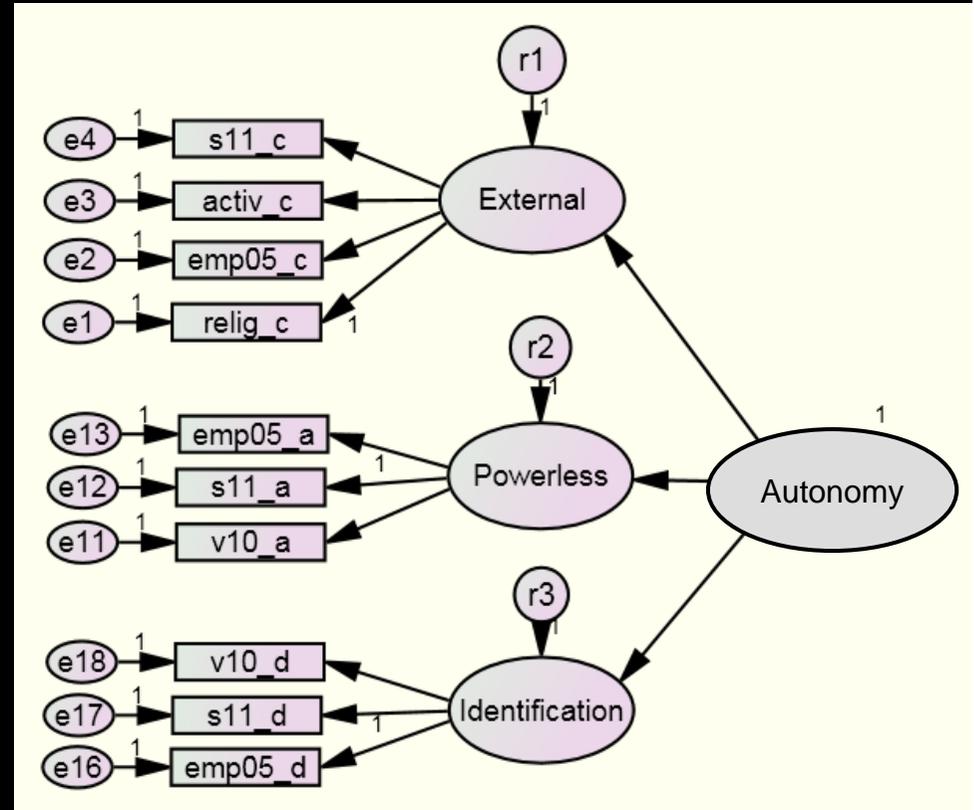
EFA: Convergent and discriminant validity test

	Promax Rotation			Uniqueness
	Factor 1	Factor 2	Factor 3	
Minor Household Purchases				
emp05_a I can't make minor purchases differently to how I do them		0.671		0.509
emp05_b I make minor purchases because my spouse/another person force me to	0.795			0.603
emp05_c I make minor purchases according to what others expect(to get approval)	0.709			0.577
emp05_d I make minor purchases according to what I personally consider important			0.699	0.481
Activities (e45_1 + e45_2)				
Activity_a (e45_1a + e45_2a) "I can't do otherwise"		0.379		0.183
Activity_b (e45_1b + e45_2b) "what my spouse/other person tell me to"	0.608			0.417
Activity_c (e45_1c + e45_2c) " I do what others expect"	0.700			0.454
Activity_d (e45_1d + e45_2d) "I do what I personally consider important"			0.506	0.258
Serious Health Problems				
s11_a I can't face a health problem of my own differently to how I do		0.754		0.562
s11_b If I have a health problem,I do what my spouse/other person tell me to	0.592			0.505
s11_c If I have a serious health problem, I do what others expect	0.738			0.525
s11_d If I have a serious health problem I do what I consider is important			0.714	0.545
Preventing Crime				
v10_a I cannot do anything to prevent or reduce the risk of crime		0.779		0.569
v10_b Against crime, I do what my spouse/another person force me to	0.527			0.460
v10_c Against crime, I do what others expect of me(to get approval)	0.690			0.534
v10_d Against crime, I do what I personally consider important			0.613	0.386
Religion (emp10_1 + emp10_2)				
relig_a (emp10_1a + emp10_2a) "I can't do otherwise"		0.370		0.199
relig_b (emp10_1b + emp10_2b) "what my spouse/other person tell me to"	0.737			0.562
relig_c (emp10_1c + emp10_2c) " I do what others expect"	0.853			0.643
relig_d (emp10_1d + emp10_2d) "I do what I personally consider important"			0.539	0.287
Alpha (for all items with loading > 0.300)	0.903	0.706	0.731	-
Alpha (for highlighted items)	0.903	0.762	-	-

Confirmatory Factor Analysis

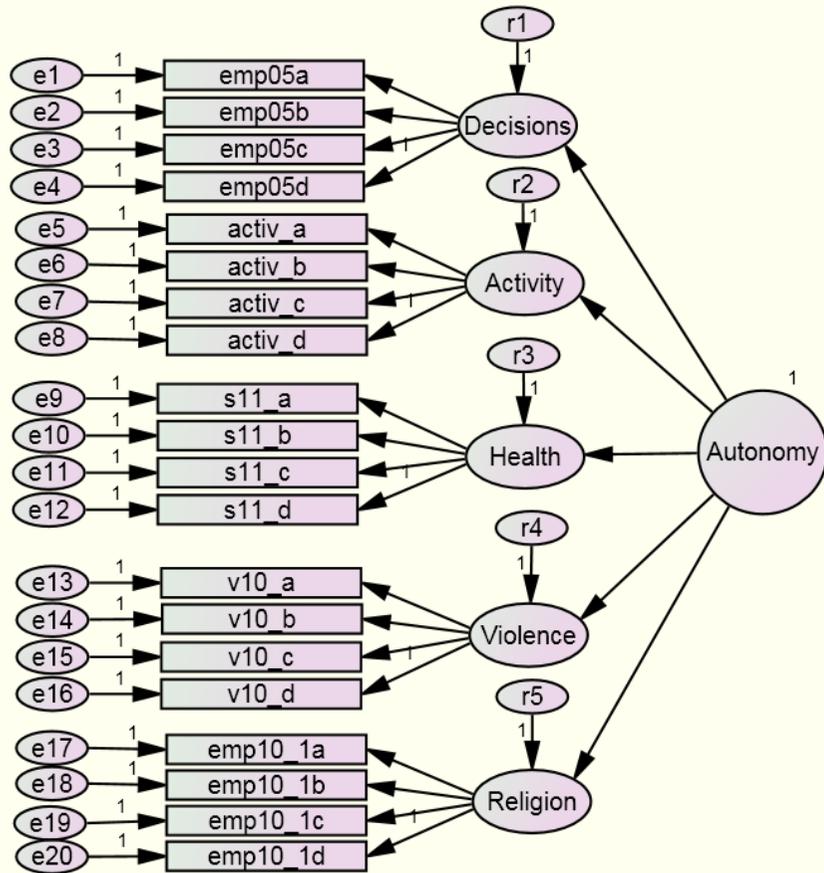


A1: EFA 3 factor solution

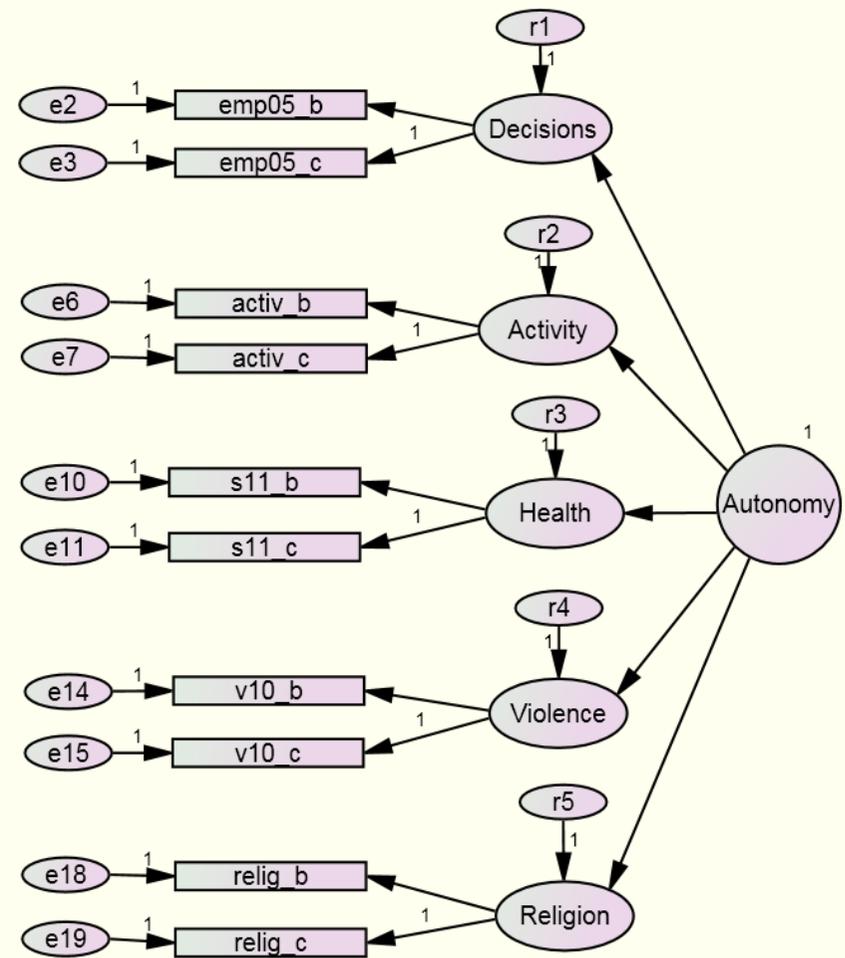


A2: EFA 3 factor solution highest loading items (X4 for factor 1, x3 for others)

Confirmatory Factor Analysis



B1: Domain Specific Autonomy scale (4 items)



B2: Domain Specific Autonomy scale (2 best items – b and c)

CFA: Goodness-of-Fit measures

Model	X ²	df	p	Absolute fit	Parsimony correction		Comparative fit		< 2.5	Largest modification indices
				RMR	RMSEA	90% CI	TLI	CFI	Largest standardised residual	
A1	567.158	132	.00	.079	.066	.061-.072	.691	.733	17.349	n/a
A2	53.854	32	.009	.029	.030	.015-.044	.952	.966	2.778 (only 2 above 2.5)	e4-e12 e2-e13 <u>sensible</u> but not needed.
B1	1114.789	165	0.00	.112	.088	.083-.093	.395	.475	21.98	n/a
B2	52.131	30	.00	.034	.031	.016-.045	.936	.957	3.08 (only 2 over 2.5)	5.808 e10-r4 (no sensible suggestions)

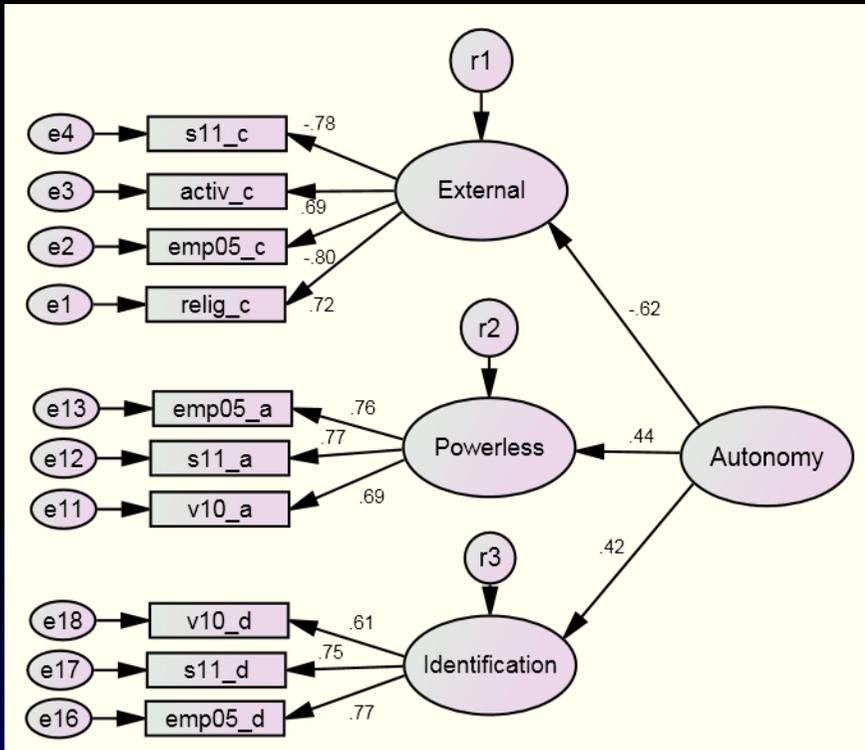
A1: EFA 3 factor solution (external, powerless, identification) 2nd order factor (Autonomy)

A2 EFA 3 factor solution highest loading items (x4 for factor 1, x3 for others), 2nd order factor

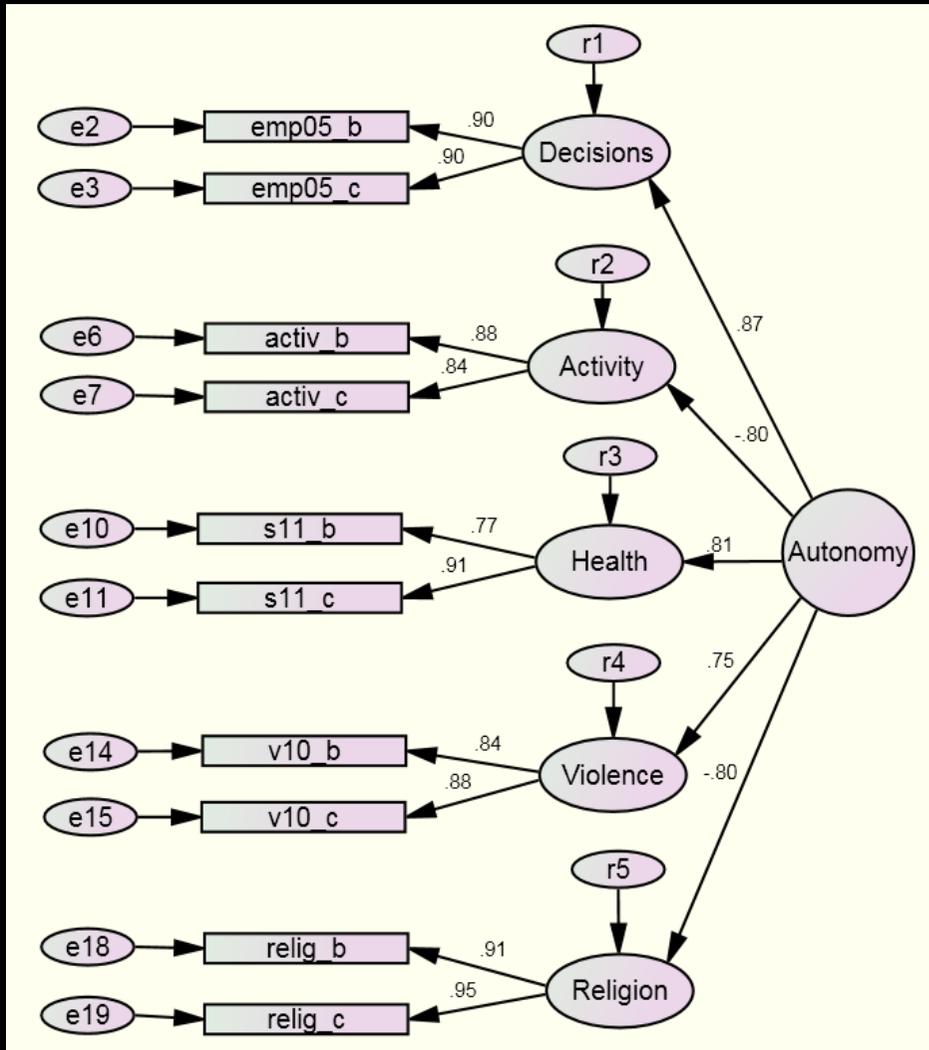
B1: OPHI 5 factors (4 items for minor purchases, activities, health, violence, religion) 2nd order factor

B2: OPHI 5 factors (b-c for minor purchases, activities, health, violence, religion) 2nd order factor

Factor loadings



A2: EFA 3 factor solution highest loading items (x4 for factor 1, x3 for others)



B2: Domain Specific Autonomy scale (2 best items – b and c)

CFA: Goodness-of-Fit measures Sri Lanka, Philippines

Model	χ^2	df	p	Absolute fit	Parsimony correction		Comparative fit		< 2.5	Largest modification indices
				RMR	RMSEA	90% CI	TLI	CFI	Largest standardised residual	
Sri Lanka										
A2	47.204	28	.013	.011	.057	.026 - .085	.980	.988	1.088	e10-e14 e2-e14 both accepted
B2	31.026	30	.414	.039	.013	.000 - .054	.995	.997	31.975 All other under 3.956	e16-e18 e12-e18 both accepted
Philippines										
A2	29.781	29	.425	.049	.014	.000 - .066	.994	.990	3.009 All other under 2.371	r1 - r3 both accepted
B2	37.576	32	.229	.055	.035	.000 - .074	.906	.933	3.139 All other under 2.415	-

Post-evaluation of convergent and discriminant validity

A2: EFA 3 factor solution highest loading items

B2: Domain-Specific Autonomy scale

	external	identified	powerless	d_autonomy	RAI_activity	RAI_religion	RAI_purchas	RAI_violenc	RAI_health	RAI_aautonomy
	Correlation models EFA / CFA									
external	1									
identified	0.248	1								
powerless	0.218	0.138	1							
d_autonomy	0.535	0.473	0.608	1						
	Correlations between both models				Correlations OPHI model					
RAI_activity	0.680	0.217	0.210	0.456	1					
RAI_religion	0.639	0.244	0.200	0.454	0.479	1				
RAI_purchase	0.695	0.227	0.286	0.521	0.500	0.537	1			
RAI_violence	0.484	0.187	0.286	0.426	0.414	0.423	0.477	1		
RAI_health	0.646	0.216	0.270	0.485	0.463	0.456	0.515	0.496	1	
RAI_aautonomy	0.818	0.274	0.295	0.569	0.652	0.643	0.692	0.657	0.674	1
Correlation with other indicators of empowerment (note that eventhough the correlation are low the signs are as expected)										
mv4_a:	0.194	0.172	0.075	0.174	0.160	0.178	0.198	0.144	0.163	0.195
p	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
mv4_b:	0.235	0.224	0.121	0.230	0.214	0.221	0.239	0.165	0.205	0.245
p	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
mv4_c:	0.203	0.276	0.114	0.216	0.182	0.194	0.200	0.139	0.177	0.219
p	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
g_autonomy (mean mv4 items)	0.208	0.220	0.106	0.206	0.179	0.193	0.212	0.149	0.183	0.220
p	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

mv4_a I feel free to decide for myself how to lead my life

mv4_b I generally feel free to express my ideas and opinions

mv4_c I feel like i can pretty much be honest with myself in daily situations

CONCLUSIONS

The results indicate that it is feasible to measure dimension-specific autonomy scales but further refinements are needed:

- Items b and c work better *(some differences by domain)*
- Additional statements could be tested in order to obtain more reliable scales *(first test a larger number of statements to shortlist the best one and then evaluate reliability in various contexts)*
- Check for method effect. It might be worth trying statements with different structure in each dimensions *(e.g.. relevant to the specific dimension)*
- Would the scale work better if it does not follow the household decision making as it currently does in the questionnaire? *(Cognitive interviews indicates they might do)*

Undertaking psychometric evaluation of subjective scales should be a common practice before carrying out further analysis with these scales

**Towards an Autonomy Scale for Poverty Analysis:
Validity and reliability evaluation with psychometric techniques for scale construction**

Jose Manuel Roche

jose.roche@geh.ox.ac.uk

www.ophi.org.uk

Jessica Morgan

J.Morgan@greenwich.ac.uk

Kendal Tau b correlations: Items b and c

	emp05_b	emp05_c	e45_1b	e45_1c	e45_2b	e45_2c	s11_b	s11_c	v10_b	v10_c	emp10_1b	emp10_1c	emp10_2b	emp10_2c
emp05_b	1.000													
emp05_c	0.738	1.000												
e45_1b	0.466	0.399	1.000											
e45_1c	0.435	0.452	0.671	1.000										
e45_2b	0.512	0.500			1.000									
e45_2c	0.446	0.530			0.683	1.000								
s11_b	0.479	0.418	0.417	0.389	0.390	0.373	1.000							
s11_c	0.474	0.547	0.431	0.507	0.398	0.453	0.636	1.000						
v10_b	0.456	0.391	0.370	0.348	0.407	0.333	0.461	0.399	1.000					
v10_c	0.429	0.473	0.355	0.408	0.385	0.439	0.430	0.486	0.704	1.000				
emp10_1b	0.536	0.498	0.487	0.416	0.483	0.385	0.446	0.432	0.430	0.395	1.000			
emp10_1c	0.509	0.529	0.463	0.460	0.477	0.434	0.419	0.487	0.390	0.425	0.820	1.000		
emp10_2b	0.524	0.453	0.510	0.416	0.454	0.401	0.361	0.371	0.375	0.390			1.000	
emp10_2c	0.488	0.521	0.504	0.502	0.386	0.364	0.358	0.422	0.365	0.415			0.859	1.000