

Summary of Rating Scale Model

July 28, 2018

1 Checking Assumptions

Table 1: Goodness of fit statistics related to the test of unidimensionality in the RSM-based instrument for measuring the intrinsic motivation of participants in the pilot study

data	df	chisq	AGFI	TLI	CFI	DETECT	ASSI	RATIO
Intrinsic Motivation	8.451	19.955	0.945	0.690	0.729	0.565	0.020	0.015
Interest/Enjoyment	2.468	1.426	0.998	1.023	1.000	0.716	0.067	0.049
Perceived Choice	3.064	9.713	0.978	0.711	0.788	22.998	0.200	0.714
Pressure/Tension	1.982	0.534	0.998	1.117	1.000	17.068	0.333	0.873
Effort/Importance	0.000	0.000	1.000	1.000	1.000	10.746	0.333	0.358

df: degree of freedom; AGFI: Adjusted Goodness of Fit Index; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index;

Table 2: Item residual correlation statistics related to the test of local independence in the RSM-based instrument for measuring the intrinsic motivation of participants in the pilot study

data	max.chisq	maxaQ3	MADaQ3	SRMSR	p.value
Intrinsic Motivation	106.343	0.771	0.244	0.244	0.009
Interest/Enjoyment	498.445	0.353	0.157	0.083	1.000
Perceived Choice	114.058	0.500	0.248	0.165	0.093
Pressure/Tension	36.673	0.302	0.214	0.153	0.696
Effort/Importance	38.718	0.066	0.044	0.037	1.000

aQ3: adjusted correlation of item residuals; maxaQ3: maximum aQ3; MADaQ3: Median Absolute Deviation of aQ3;

Table 3: Test of monotonicity in the RSM-based instrument for measuring the intrinsic motivation of participants in the pilot study

data	ItemH	ac	vi	vi/ac	maxvi	sum	sum/ac	zmax	zsig	crit
Intrinsic Motivation.Item22IE	0.50	1	0	0.0	0.00	0.0	0.00	0	0	0

Table 3: (continued)

data	ItemH	ac	vi	vi/ac	maxvi	sum	sum/ac	zmax	zsig	crit
Intrinsic Motivation.Item09IE	0.45	2	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item12IE	0.52	0	0		0.00	0.0		0	0	0
Intrinsic Motivation.Item24IE	0.44	4	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item21IE	0.39	4	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item01IE	0.46	4	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item17PC	0.32	5	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item15PC	0.15	6	3	0.5	0.07	0.2	0.03	0	0	103
Intrinsic Motivation.Item06PC	0.20	0	0		0.00	0.0		0	0	0
Intrinsic Motivation.Item02PC	0.40	3	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item08PC	0.47	5	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item16PT	0.26	4	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item14PT	0.19	3	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item18PT	0.33	4	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item11PT	0.37	5	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item13EI	0.24	4	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item03EI	0.19	3	0	0.0	0.00	0.0	0.00	0	0	0
Intrinsic Motivation.Item07EI	0.19	0	0		0.00	0.0		0	0	0
Interest/Enjoyment.Item22IE	0.85	0	0		0.00	0.0		0	0	0
Interest/Enjoyment.Item09IE	0.79	0	0		0.00	0.0		0	0	0
Interest/Enjoyment.Item12IE	0.81	0	0		0.00	0.0		0	0	0
Interest/Enjoyment.Item24IE	0.77	4	0	0.0	0.00	0.0	0.00	0	0	0
Interest/Enjoyment.Item21IE	0.72	0	0		0.00	0.0		0	0	0
Interest/Enjoyment.Item01IE	0.69	0	0		0.00	0.0		0	0	0
Perceived Choice.Item17PC	0.60	4	0	0.0	0.00	0.0	0.00	0	0	0
Perceived Choice.Item15PC	0.47	4	0	0.0	0.00	0.0	0.00	0	0	0
Perceived Choice.Item06PC	0.52	1	0	0.0	0.00	0.0	0.00	0	0	0
Perceived Choice.Item02PC	0.47	5	0	0.0	0.00	0.0	0.00	0	0	0
Perceived Choice.Item08PC	0.38	0	0		0.00	0.0		0	0	0
Pressure/Tension.Item16PT	0.53	0	0		0.00	0.0		0	0	0
Pressure/Tension.Item14PT	0.45	3	0	0.0	0.00	0.0	0.00	0	0	0
Pressure/Tension.Item18PT	0.56	4	0	0.0	0.00	0.0	0.00	0	0	0
Pressure/Tension.Item11PT	0.36	0	0		0.00	0.0		0	0	0
Effort/Importance.Item13EI	0.46	0	0		0.00	0.0		0	0	0
Effort/Importance.Item03EI	0.44	0	0		0.00	0.0		0	0	0
Effort/Importance.Item07EI	0.48	0	0		0.00	0.0		0	0	0

vi: numer of violations; vi/ac: proportion of active pairs; maxvi: maximum violations; sum: sum of all violations;

zmax: maximum z-value; zsig: number of significant z-values; crit: Critical value

2 Estimating Item Parameters

Table 4: Estimated parameters in the RSM-based in Intrinsic Motivation

estimated	Item01IE	Item02PC	Item03EI	Item06PC	Item07EI	Item08PC	Item09IE	Item11PT	Item12IE	Item13EI
xsi.item	0.279	0.043	-0.662	-0.220	-0.499	-0.414	-0.127	0.028	0.043	-0.043
B.Cat0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B.Cat1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
B.Cat2	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
B.Cat3	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
B.Cat4	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
B.Cat5	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
B.Cat6	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
AXsi.Cat0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AXsi.Cat1	0.083	0.319	1.024	0.582	0.862	0.776	0.489	0.334	0.319	0.083
AXsi.Cat2	0.279	0.751	2.162	1.278	1.836	1.666	1.091	0.782	0.751	0.279
AXsi.Cat3	0.547	1.255	3.373	2.046	2.884	2.629	1.765	1.302	1.255	0.547
AXsi.Cat4	-0.044	0.900	3.723	1.954	3.072	2.731	1.580	0.962	0.900	-0.044
AXsi.Cat5	-0.749	0.430	3.960	1.748	3.145	2.720	1.281	0.508	0.430	-0.749
AXsi.Cat6	-1.676	-0.261	3.975	1.321	2.997	2.487	0.760	-0.167	-0.261	-1.676

Table 4: (continued)

estimated	Item01IE	Item02PC	Item03EI	Item06PC	Item07EI	Item08PC	Item09IE	Item11PT	Item12IE	Item13EI
Outfit	0.790	0.754	1.090	1.507	1.665	0.749	0.789	1.145	0.769	0.769
Infit	0.796	0.734	1.131	1.429	1.331	0.745	0.819	1.111	0.780	0.780

Table 5: Estimated parameters in the RSM-based instrument for measuring the Interest/Enjoyment

estimated	Item01IE	Item09IE	Item12IE	Item21IE	Item22IE	Item24IE
xsi.item	0.888	-0.023	0.368	-0.132	0.332	0.472
B.Cat0	0.000	0.000	0.000	0.000	0.000	0.000
B.Cat1	1.000	1.000	1.000	1.000	1.000	1.000
B.Cat2	2.000	2.000	2.000	2.000	2.000	2.000
B.Cat3	3.000	3.000	3.000	3.000	3.000	3.000
B.Cat4	4.000	4.000	4.000	4.000	4.000	4.000
B.Cat5	5.000	5.000	5.000	5.000	5.000	5.000
B.Cat6	6.000	6.000	6.000	6.000	6.000	6.000
AXsi.Cat0	0.000	0.000	0.000	0.000	0.000	0.000
AXsi.Cat1	0.451	1.362	0.971	1.471	1.007	0.867
AXsi.Cat2	0.349	2.172	1.390	2.390	1.460	1.180
AXsi.Cat3	0.783	3.517	2.345	3.844	2.450	2.030
AXsi.Cat4	-0.153	3.493	1.929	3.929	2.070	1.510
AXsi.Cat5	-2.115	2.442	0.487	2.987	0.663	-0.037
AXsi.Cat6	-5.328	0.140	-2.205	0.794	-1.995	-2.834
Outfit	1.511	0.824	0.774	1.083	0.578	0.857
Infit	1.369	0.900	0.820	1.293	0.645	0.984

Table 6: Estimated parameters in the RSM-based instrument for measuring the Perceived Choice

estimated	Item02PC	Item06PC	Item08PC	Item15PC	Item17PC
xsi.item	0.112	-0.237	-0.491	0.030	-0.469
B.Cat0	0.000	0.000	0.000	0.000	0.000
B.Cat1	1.000	1.000	1.000	1.000	1.000
B.Cat2	2.000	2.000	2.000	2.000	2.000
B.Cat3	3.000	3.000	3.000	3.000	3.000
B.Cat4	4.000	4.000	4.000	4.000	4.000
B.Cat5	5.000	5.000	5.000	5.000	5.000
B.Cat6	6.000	6.000	6.000	6.000	6.000
AXsi.Cat0	0.000	0.000	0.000	0.000	0.000
AXsi.Cat1	1.185	1.534	1.788	1.267	1.766
AXsi.Cat2	0.898	1.597	2.104	1.062	2.061
AXsi.Cat3	2.082	3.130	3.891	2.328	3.826
AXsi.Cat4	1.103	2.500	3.515	1.431	3.428
AXsi.Cat5	0.368	2.115	3.383	0.779	3.275
AXsi.Cat6	-0.674	1.422	2.944	-0.181	2.814
Outfit	1.063	0.985	1.403	1.056	0.677
Infit	1.017	1.009	1.348	1.035	0.683

Table 7: Estimated parameters in the RSM-based instrument for measuring the Pressure/Tension

estimated	Item11PT	Item14PT	Item16PT	Item18PT
xsi.item	-0.036	0.288	-0.054	0.347
B.Cat0	0.000	0.000	0.000	0.000
B.Cat1	1.000	1.000	1.000	1.000
B.Cat2	2.000	2.000	2.000	2.000
B.Cat3	3.000	3.000	3.000	3.000
B.Cat4	4.000	4.000	4.000	4.000
B.Cat5	5.000	0.000	0.000	0.000
B.Cat6	6.000	0.000	0.000	0.000

Table 7: *(continued)*

estimated	Item11PT	Item14PT	Item16PT	Item18PT
AXsi.Cat0	0.000	0.000	0.000	0.000
AXsi.Cat1	1.034	0.272	0.614	0.213
AXsi.Cat2	1.249	-0.275	0.410	-0.392
AXsi.Cat3	2.096	-0.190	0.837	-0.367
AXsi.Cat4	1.895	-1.152	0.217	-1.387
AXsi.Cat5	1.711			
AXsi.Cat6	0.216			
Outfit	1.387	1.002	0.870	0.825
Infit	1.405	0.935	0.847	0.888

Table 8: Estimated parameters in the RSM-based instrument for measuring the Effort/Importance

estimated	Item03EI	Item07EI	Item13EI
xsi.item	-1.793	-1.571	-1.620
B.Cat0	0.000	0.000	0.000
B.Cat1	1.000	1.000	1.000
B.Cat2	2.000	2.000	2.000
B.Cat3	3.000	3.000	3.000
B.Cat4	4.000	4.000	4.000
B.Cat5	5.000	5.000	5.000
B.Cat6	6.000	6.000	6.000
AXsi.Cat0	0.000	0.000	0.000
AXsi.Cat1	7.416	7.195	7.243
AXsi.Cat2	9.886	9.444	9.541
AXsi.Cat3	9.821	9.158	9.303
AXsi.Cat4	10.943	10.059	10.252
AXsi.Cat5	10.732	9.626	9.868
AXsi.Cat6	10.756	9.429	9.719
Outfit	0.999	1.106	0.993
Infit	0.980	1.091	1.029

3 Latent Trait Estimates

	Intrinsic Motivation.theta	Intrinsic Motivation.error	Intrinsic Motivation.Outfit	Intrinsic Motivation.Infit	Interest/Enjoyment.theta	Interest/Enjoyment.error	Interest
10116	-0.404	0.154	0.569	0.557	-0.114	0.340	
10120	0.969	0.240	0.595	0.566	1.906	0.483	
10121	0.050	0.161	0.661	0.694	0.399	0.382	
10122	-0.171	0.155	1.833	1.867	-2.052	0.572	
10123	-0.311	0.154	0.497	0.495	-0.832	0.330	
10126	0.490	0.188	0.917	0.803	1.273	0.443	
10127	0.183	0.167	1.085	1.042	1.906	0.483	
10128	-0.521	0.155	2.364	2.405	-3.515	1.347	
10129	-0.794	0.164	0.817	0.850	-1.785	0.486	
10130	-0.147	0.155	0.870	0.817	0.553	0.395	
10131	0.239	0.170	1.986	2.120	2.400	0.530	
10132	-0.474	0.154	1.148	1.144	-3.515	1.347	
10134	-0.666	0.159	0.281	0.298	-1.285	0.375	
10135	-0.025	0.159	1.089	1.052	0.399	0.382	
10136	-1.021	0.178	0.958	0.997	-3.515	1.347	
10137	0.969	0.240	0.854	0.798	1.474	0.455	
10138	-0.001	0.159	0.790	0.756	0.553	0.395	
10139	-0.099	0.157	1.163	1.175	-0.223	0.334	
10140	-0.617	0.157	0.514	0.490	-1.045	0.346	
10141	-0.218	0.154	0.484	0.470	0.002	0.349	
10142	0.076	0.162	0.798	0.791	0.553	0.395	
10143	0.102	0.163	0.125	0.127	0.125	0.358	
10145	-0.357	0.154	0.864	0.851	-0.631	0.324	
10146	0.327	0.176	0.384	0.356	0.895	0.420	
10148	0.076	0.162	1.010	0.904	0.257	0.370	
10149	-0.716	0.161	1.830	1.804	-0.936	0.337	
10152	0.562	0.194	2.241	1.987	5.221	1.494	
10153	-0.001	0.159	0.675	0.682	0.553	0.395	
10154	-0.741	0.162	0.489	0.499	-1.160	0.358	
10158	1.160	0.269	1.112	1.220	3.026	0.623	