Summary of Generalized Partial Credit Model

July 16, 2018

1 Checking Assumptions

Table 1: Goodness of fit statistics related to the test of unidimensionalityin the GPCM-based instrument for measuring gains in the skill/knowledge of participants in the pilot empirical study

data	df	chisq	AGFI	TLI	CFI	DETECT	ASSI	RATIO
Pre-test	2	2.591	0.548	0.912	0.971	0.009	0.167	0.998
Post-test	2	0.387	0.990	−1.852	1.000	3.187	0.333	0.582

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

Table 2: Item residual correlation statisticsrelated to the test of local independencein the GPCM-based instrument for measuring gains in the skill/knowledge of participants in the pilot empirical study

data	max.chisq	maxaQ3	MADaQ3	SRMSR	p.value
Pre-test	5.639	0.225	0.086	0.089	1.000
Post-test	9.115	0.288	0.116	0.107	0.767

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

Table 3: Test of monotonicity in the GPCM-based instrument for measuring gains in the skill/knowledge of participants in the pilot empirical study

data	ItemH	ac	vi	vi/ac	maxvi	sum	sum/ac	zmax	zsig	crit
Pre-test.P1s0	1.00	0	0		0	0		0	0	0
Pre-test.P2s0	1.00	0	0		0	0		0	0	0
Pre-test.P3s2	0.86	0	0		0	0		0	0	0
Pre-test.P4s0	0.77	0	0		0	0		0	0	0
Post-test.PAs2	0.23	0	0		0	0		0	0	0
Post-test.PBs3	0.23	0	0		0	0		0	0	0
Post-test.PCs0	0.25	0	0		0	0		0	0	0
Post-test.PDs0	0.36	0	0		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 GPCM-based instrument for measuring the Pre-test

estimated	P1s0	P2s0	P3s2	P4s0
xsi.item	−0.643	0.433	4.444	4.227
B.Cat0	0.000	0.000	0.000	0.000
B.Cat1	1.000	1.000	1.000	1.000
B.Cat2	0.000	0.000	2.000	0.000
B.Cat3	0.000	0.000	3.000	0.000
AXsi.Cat0	0.000	0.000	0.000	0.000
AXsi.Cat1	0.643	−0.433	−4.177	−4.227
AXsi.Cat2			−7.924	
AXsi.Cat3			−13.332	
max.Outfit	0.649	0.537	0.994	0.386
max.Infit	0.844	0.755	1.500	0.961

Table 5: Estimated parameters in the GPCM-based instrument for measuring the Post-test

estimated	PAs2	PBs3	PCs0	PDs0
xsi.item	−0.506	−0.040	−0.518	1.901
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	0.000	0.000
B.Cat3	3.000	3.000	0.000	0.000
B.Cat4	0.000	4.000	0.000	0.000
AXsi.Cat0	0.000	0.000	0.000	0.000
AXsi.Cat1	2.044	1.341	0.518	−1.901
AXsi.Cat2	1.845	1.192		
AXsi.Cat3	1.518	0.708		
AXsi.Cat4		0.161		
max.Outfit	1.198	1.915	1.060	0.927
max.Infit	1.149	1.078	1.071	0.950

3 Latent Trait Estimates

Table 6: Latent trait estimates and person model fit of the GPCM-based instrument for measuring gains in the skill/knowledge of participants in the pilot empirical study

	Pre-test.theta	Pre-test.error	Pre-test.Outfit	Pre-test.Infit	Post-test.theta	Post-test.error	Post-test.Outfit	Post-test.Infit
10116	3.666	0.940	0.160	0.129	0.259	0.639	0.814	1.117
10119	−1.876	1.955	0.099	0.226	−3.280	1.766	0.216	0.232
10120	4.987	1.035	0.121	0.112	−0.514	0.715	0.343	0.243
10121	3.046	1.280	0.167	0.355	−1.684	1.085	0.422	0.422
10122	3.046	1.280	0.167	0.355	0.310	0.659	1.253	0.704
10126	2.620	1.298	0.148	0.199	−1.090	0.831	0.163	0.108
10127	3.046	1.280	0.167	0.355	−1.684	1.085	0.422	0.422
10128	2.620	1.298	0.148	0.199	0.606	0.660	0.184	0.109
10129	−1.876	1.955	0.099	0.226	−0.094	0.656	0.351	0.368
10130	−0.103	1.443	0.394	0.567	−0.477	0.723	0.431	0.262
10131	−2.145	2.095	0.223	0.223	−0.052	0.668	0.581	0.226
10132	−1.876	1.955	0.099	0.226	0.606	0.660	1.016	1.429
10133	2.620	1.298	0.148	0.199	−1.921	1.050	0.377	0.405
10134	−1.876	1.955	0.099	0.226	−0.514	0.715	0.343	0.243
10135	2.620	1.298	0.148	0.199	0.259	0.639	1.477	1.865
10136	−1.876	1.955	0.099	0.226	0.606	0.660	0.482	0.531
10137	−1.874	1.962	0.131	0.228	−0.094	0.656	0.357	0.290
10138	−1.876	1.955	0.099	0.226	1.010	0.733	0.309	0.243
10139	−2.145	2.095	0.223	0.223	0.674	0.697	1.548	1.065
10140	−0.103	1.443	0.394	0.567	0.259	0.639	1.703	0.703
10141	−1.876	1.955	0.099	0.226	3.106	1.673	0.117	0.181
10143	3.046	1.280	0.167	0.355	−3.002	2.068	0.379	0.379
10144	4.271	0.903	0.300	0.360	0.606	0.660	1.102	0.605
10145	4.987	1.035	0.121	0.112	0.606	0.660	0.184	0.109
10146	−0.104	1.424	0.299	0.552	1.628	0.929	0.832	0.865
10148	−1.876	1.955	0.099	0.226	1.010	0.733	1.138	1.138
10149	−1.876	1.955	0.099	0.226	0.606	0.660	0.184	0.109
10152	4.987	1.035	0.858	1.461	−0.514	0.715	0.446	0.384
10153	−0.103	1.443	0.394	0.567	1.628	0.929	0.385	0.411
10154	−2.145	2.095	0.223	0.223	−3.002	2.068	0.379	0.379