

Appendix C. IRT analysis of ANMS GCSI-DD Items

The first two tables (Tables 2 and 3) are from the Takeda psychometric study: Revicki et al. (2018) **The American Neurogastroenterology and Motility Society Gastroparesis Cardinal Symptom Index-Daily Diary (ANMS GCSI-DD): Psychometric Evaluation in Patients with Idiopathic or Diabetic Gastroparesis.**

The second set of tables (Tables 4 and 5) are from Revicki et al. (2013) which you have listed below. Revicki DA, Thompson C, Wilson H, et al. **Psychometric Analysis for the ANMS Gastroparesis Cardinal Symptom Index-Daily Diary (ANMS GCSI-DD): Results of Confirmatory Factor Analysis, Item Response Theory Model Analysis, and Other Psychometric Analyses.** Bethesda, MD: Evidera, 2013.

**Table 2. Confirmatory Factor Analysis of the ANMS GCSI-DD Items: Standalone Psychometric Study**

Score	Standardized Coefficient	N=70 Model Fit Statistics	
		CFI	RMSEA SRMR
<b>ANMS GCSI-DD Symptoms</b>			
1. Nausea (feeling sick to your stomach as if you were going to vomit or throw up)	0.887	<b>CFI = 0.96</b>	
2. Not able to finish a normal-sized meal (for a healthy person)	0.793	<b>RMSEA = 0.15</b>	
3. Feeling excessively full after meals	0.768		
4. Upper abdominal pain (above the navel)	0.829	<b>SRMR = 0.034</b>	
5. Episodes of vomiting	0.483		

Abbreviations: CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual

Source: Revicki et al., 2018

Table 3. Item Response Theory Analysis: Standalone Psychometric Study (N=70)

Items	Marginal reliability	Slope	Category Threshold Parameters					Model Fit		Probability X2
			$\beta_1$ (SE)	$\beta_2$ (SE)	$\beta_3$ (SE)	$\beta_4$ (SE)		DF	X2	
<b>ANMS GCSI-DD Core Symptom Score</b>	0.89									
1. Nausea (feeling sick to your stomach as if you were going to vomit or throw up)		4.02	-0.51 (0.25)	0.06 (0.29)	0.71 (0.39)	1.54 (0.52)	-	12	16.92	0.152
2. Not able to finish a normal-sized meal (for a healthy person)		2.84	-1.05 (0.26)	-0.36 (0.25)	0.65 (0.34)	1.94 (0.52)	-	14	17.08	0.251
3. Feeling excessively full after meals		2.89	-1.56 (0.38)	-0.77 (0.30)	0.21 (0.31)	1.17 (0.37)	-	15	23.72	0.070
4. Upper abdominal pain (above the navel)		2.92	-0.50 (0.24)	0.11 (0.31)	0.60 (0.40)	1.63 (0.60)	-	16	20.89	0.182
5. Episodes of vomiting		1.52	1.21 (0.63)	1.78 (0.81)	2.49 (1.08)	3.00 (1.32)	-	7	12.55	0.084

**Table 4. Confirmatory Factor Analysis of ANMS GCSI-DD Core Symptom Composite Scale Items: Combined, Diabetic, and Idiopathic Gastroparesis Samples**

Symptoms	Combined Gastroparesis (N = 564)	Diabetic Gastroparesis (N = 345)	Idiopathic Gastroparesis (N = 219)
Vomiting	0.62	0.59	0.62
Nausea	0.73	0.75	0.69
Postprandial fullness	0.85	0.82	0.90
Early satiety	0.87	0.84	0.88
Upper abdominal pain	0.62	0.67	0.51
CFI	0.94	0.94	0.94
RMSEA (95% CI)	0.26 (0.23,0.29)	0.25 (0.21,0.29)	0.27 (0.22,0.32)

Source: Revicki et al. (2013)

Table 5. Item Response Theory Analysis of ANMS GCSI-DD Core Symptom Composite Scale Items (Combined, Idiopathic, and Diabetic Gastroparesis Samples)

Population	Item	Marginal Reliability	Slope	Category Threshold Parameters				Model Fit				
				b1	b2	b3	b4	df	G2	P G2	X2	P X2
<b>Combined (n=573)</b>	<b>Composite</b>	<b>0.86</b>										
	1. Number of vomiting episodes last 24 hrs		1.02	0.61	1.20	1.97	2.64	31	24.95	0.77	24.70	0.78
	3. Nausea (feeling sick to your stomach as if you were going to vomit or throw up)		1.61	-1.31	-0.24	0.73	1.68	38	56.84	0.03	51.57	0.07
	4. Feeling excessively full after meals		3.19	-1.67	-0.80	-0.01	0.83	31	34.49	0.30	34.72	0.30
	6. Not able to finish a normal-sized meal (for a healthy person)		3.25	-1.17	-0.42	0.27	1.05	33	50.91	0.02	49.42	0.03
	12. Upper abdominal pain (above the navel)		1.38	-1.11	-0.11	0.90	1.98	39	36.06	0.60	36.11	0.60
<b>Idiopathic (n=226)</b>	<b>Composite</b>	<b>0.85</b>										
	1. Number of vomiting episodes last 24 hrs		0.81	0.26	0.91	1.72	2.56	20	12.85	0.89	12.58	0.89
	3. Nausea (feeling sick to your stomach as if you were going to vomit or throw up)		1.22	-1.86	-0.57	0.49	1.59	18	33.98	0.01	29.09	0.05
	4. Feeling excessively full after meals		4.33	-1.63	-0.94	-0.26	0.42	17	8.89	0.94	8.78	0.95
	6. Not able to finish a normal-sized meal (for a healthy person)		3.39	-1.42	-0.83	-0.10	0.67	19	13.77	0.80	14.08	0.78
	12. Upper abdominal pain (above the navel)		1.04	-1.61	-0.50	0.62	1.91	21	16.95	0.71	17.73	0.67
<b>Diabetic (n=347)</b>	<b>Composite</b>	<b>0.85</b>										
	1. Number of vomiting episodes last 24 hrs		1.07	0.85	1.47	2.31	2.96	19	14.91	0.73	15.37	0.70
	3. Nausea (feeling sick to your stomach as if you were going to vomit or throw up)		1.89	-1.07	-0.08	0.88	1.80	26	34.86	0.11	32.04	0.19

Population	Item	Marginal Reliability	Slope	Category Threshold Parameters				Model Fit				
				b1	b2	b3	b4	df	G2	P G2	X2	P X2
	4. Feeling excessively full after meals		2.67	-1.72	-0.71	0.19	1.18	26	23.31	0.62	22.07	0.68
	6. Not able to finish a normal-sized meal (for a healthy person)		2.85	-1.07	-0.19	0.56	1.42	24	33.55	0.09	33.02	0.10

Source: Revicki et al. (2013)