

Schalet, B. D., Lim, S., Cella, D., Choi, S. W. Linking scores with patient-reported health outcome instruments: A validation study and comparison of three linking methods. *Psychometrika*.

Online Resource 3: Cross-walk Tables for PHQ-9 raw scores to PROMIS T-scores

Table A: PROMIS Linked T-scores by Sample and Linking Method

PHQ-9 Raw	Percentage		Unidimensional		Equipercntile		Calibrated Projection	
	O	V	O	V	O	V	O	V
0	21.8	20.9	37.4	36.1	35.4	34.1	38.2	35.7
1	10.6	7.6	42.6	41.0	43.0	40.3	44.2	42.5
2	9.8	6.7	45.9	44.3	46.9	45.1	47.3	45.9
3	6.4	5.3	48.2	46.9	49.6	48.2	49.5	48.4
4	7.1	6.0	50.5	49.2	51.7	50.5	51.4	50.5
5	6.4	4.2	52.5	51.1	53.5	52.4	53.1	52.2
6	6.3	4.6	54.2	52.9	55.0	54.0	54.5	53.7
7	4.1	4.0	55.8	54.6	56.5	55.5	55.8	55.1
8	4.0	3.6	57.3	56.1	57.8	56.8	57.1	56.5
9	2.5	4.9	58.6	57.5	59.0	58.1	58.2	57.7
10	2.4	3.6	59.9	58.9	60.2	59.4	59.3	58.9
11	2.5	3.3	61.2	60.2	61.4	60.7	60.3	60.0
12	2.0	3.5	62.4	61.5	62.5	62.0	61.3	61.1
13	1.6	3.0	63.6	62.8	63.7	63.2	62.3	62.2
14	2.3	2.9	64.8	64.0	64.7	64.5	63.3	63.3
15	1.5	2.2	65.9	65.2	65.8	65.8	64.2	64.3
16	0.9	2.0	67.0	66.5	66.9	67.1	65.2	65.3
17	1.2	2.3	68.2	67.7	67.9	68.4	66.1	66.4
18	1.3	2.0	69.3	68.9	69.0	69.7	67.1	67.4
19	1.1	0.9	70.4	70.2	70.0	70.9	68.0	68.5
20	0.9	1.0	71.6	71.5	71.1	72.2	69.1	69.6
21	0.3	0.8	72.8	72.8	72.2	73.5	70.1	70.8
22	0.1	0.9	74.1	74.2	73.3	74.8	71.3	72.0
23	0.8	1.1	75.5	75.7	74.4	76.1	72.5	73.4
24	0.5	0.6	76.9	77.3	75.7	77.5	73.8	74.9
25	0.5	0.4	78.5	79.0	77.1	79.0	75.4	76.5
26	0.4	0.7	80.2	81.0	78.9	80.9	77.0	78.4
27	0.5	0.8	82.5	83.1	82.0	83.6	79.6	80.9

Note. O = Original dataset (N = 748); V = Validation dataset (N = 1810).

Table B: PROMIS Linked T-scores by Method with Standard Error Estimates (Original Sample)

Original Sample						
Unidimensional IRT			Equipercntile Linking		Calibrated Projection	
Percentage	T-score	SE	T-score	SEE	T-score	SE
21.8	37.4	6.4	35.9	0.6	38.2	7.9
10.6	42.6	5.3	43.9	0.7	44.2	6.7
9.8	45.9	4.9	47.1	0.7	47.3	6.3
6.4	48.2	4.7	49.3	0.7	49.5	6.2
7.1	50.5	4.3	51.2	0.7	51.4	6.0
6.4	52.5	4.1	53.0	0.7	53.1	5.9
6.3	54.2	3.9	54.7	0.7	54.5	5.8
4.1	55.8	3.7	56.3	0.8	55.8	5.7
4.0	57.3	3.6	57.8	0.9	57.1	5.7
2.5	58.6	3.5	59.2	0.9	58.2	5.7
2.4	59.9	3.4	60.5	0.9	59.3	5.7
2.5	61.2	3.4	61.7	0.9	60.3	5.6
2.0	62.4	3.3	62.8	1.0	61.3	5.6
1.6	63.6	3.3	63.8	1.0	62.3	5.6
2.3	64.8	3.2	64.8	1.0	63.3	5.6
1.5	65.9	3.2	65.8	1.0	64.2	5.6
0.9	67.0	3.2	66.7	1.0	65.2	5.6
1.2	68.2	3.2	67.7	1.1	66.1	5.6
1.3	69.3	3.2	68.7	1.1	67.1	5.6
1.1	70.4	3.2	69.7	1.2	68.0	5.6
0.9	71.6	3.3	70.8	1.3	69.1	5.6
0.3	72.8	3.3	71.9	1.4	70.1	5.7
0.1	74.1	3.4	73.0	1.5	71.3	5.7
0.8	75.5	3.5	74.0	1.6	72.5	5.8
0.5	76.9	3.6	75.1	1.9	73.8	5.8
0.5	78.5	3.7	76.4	2.2	75.4	5.8
0.4	80.2	3.8	78.2	7.8	77.0	5.8
0.5	82.5	3.8	83.1	21.3	79.6	5.7

Note. SE = Standard Error based on the IRT model. SEE = Standard Error of Equating. SEE is an index of random error estimated with bootstrapping (replications = 1,000) on smoothed equivalentents using the log-linear model (C =6).

Table C: PROMIS Linked T-scores by Method with Standard Error Estimates (Validation Sample)

Validation Sample						
Unidimensional IRT			Equipercetile Linking		Calibrated Projection	
Percentage	T-score	SE	T-score	SEE	T-score	SE
20.9	36.1	6.2	34.7	0.2	35.7	8.9
7.6	41.0	5.2	42.1	0.8	42.5	7.5
6.7	44.3	4.8	45.9	0.7	45.9	7.1
5.3	46.9	4.5	48.3	0.6	48.4	6.8
6.0	49.2	4.2	50.2	0.6	50.5	6.7
4.2	51.1	4.0	51.9	0.6	52.2	6.6
4.6	52.9	3.9	53.5	0.6	53.7	6.6
4.0	54.6	3.8	55.1	0.6	55.1	6.5
3.6	56.1	3.7	56.6	0.6	56.5	6.5
4.9	57.5	3.6	58.1	0.6	57.7	6.5
3.6	58.9	3.6	59.5	0.6	58.9	6.5
3.3	60.2	3.5	60.9	0.5	60.0	6.5
3.5	61.5	3.5	62.2	0.5	61.1	6.4
3.0	62.8	3.5	63.4	0.5	62.2	6.4
2.9	64.0	3.5	64.5	0.5	63.3	6.4
2.2	65.2	3.4	65.6	0.5	64.3	6.4
2.0	66.5	3.4	66.7	0.6	65.3	6.4
2.3	67.7	3.4	67.8	0.6	66.4	6.4
2.0	68.9	3.4	68.9	0.6	67.4	6.4
0.9	70.2	3.4	70.1	0.7	68.5	6.4
1.0	71.5	3.5	71.2	0.7	69.6	6.4
0.8	72.8	3.5	72.5	0.8	70.8	6.4
0.9	74.2	3.6	73.8	1.0	72.0	6.5
1.1	75.7	3.7	75.2	1.3	73.4	6.5
0.6	77.3	3.8	77.0	1.8	74.9	6.4
0.4	79.0	3.8	79.7	2.2	76.5	6.4
0.7	81.0	3.9	83.2	1.6	78.4	6.2
0.8	83.1	3.8	84.9	0.3	80.9	5.8

Note. SE = Standard Error based on the IRT model. SEE = Standard Error of Equating. SEE is an index of random error estimated with bootstrapping (replications = 1,000) on smoothed equivalents using the log-linear model (C =6).