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Table S1 Measurement invariance of the PHQ-9 across sex groups

Sample in each group	Invariance	χ^2	*df*	RMSEA	CFI	TLI	SRMR	Model comparison	$\Delta\chi^2$ (Δdf)	Δ CFI	Δ RMSEA	Δ SRMR	Decision
Female = 48,047 Male = 42,799	Configural	9026.91	54	0.080	0.971	0.962	0.055						
	Threshold	9138.692	71	0.074	0.968	0.968	0.055	Configural	254.2 (17)	0.003	0.007	0.000	Accept
	Loadings	9354.332	79	0.062	0.975	0.977	0.055	Threshold	104.4 (8)	0.007	0.012	0.000	Accept

Invariance decision is based on ΔCFI < 0.010 supplemented by ΔRMSEA < 0.015 or ΔSRMR < 0.010.
χ^2 = chi-square test; DF = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean-square residual; Δ = differences between fit index.
* p < 0.01; ** p < 0.001.

Table S2 Measurement invariance of the PHQ-9 across age groups

Sample in each group	Invariance	χ^2	*df*	RMSEA	CFI	TLI	SRMR	Model comparison	$\Delta\chi^2$ (Δdf)	Δ CFI	Δ RMSEA	Δ SRMR	Decision
15 to 19 = 4,336	Configural	9364.582	378	0.080	0.975	0.967	0.054						
20 to 24 = 6,124	Threshold	10208.748	599	0.070	0.970	0.975	0.054	Configural	702.1 (221)	0.005	0.010	0.000	Accept
25 to 29 = 7,249	Loadings	12445.391	703	0.055	0.978	0.984	0.056	Threshold	379.5 (104)	0.008	0.015	0.003	Accept
30 to 34 = 8,721													
35 to 39 = 9,429													
40 to 44 = 8,604													
45 to 49 = 7,998													
50 to 54 = 7,887													
55 to 59 = 7,770													
60 to 64 = 6,802													
65 to 69 = 5,753													
70 to 74 = 4,212													
75 to 79 = 2,945													
80 or more = 3,016													

Invariance decision is based on ΔCFI < 0.010 supplemented by ΔRMSEA < 0.015 or ΔSRMR < 0.010.
χ^2 = chi-square test; DF = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean-square residual; Δ = differences between fit index
* p < 0.01; ** p < 0.001.

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Table S3 Measurement invariance of the PHQ-9 across Brazilian states

Sample in each group	Invariance	χ^2	*df*	RMSEA	CFI	TLI	SRMR	Model comparison	$\Delta\chi^2$ (Δdf)	Δ CFI	Δ RMSEA	Δ SRMR	Decision
Acre = 2380	Configural	9455.664	729	0.080	0.975	0.967	0.055						
Alagoas = 2987	Threshold	9865.671	1171	0.067	0.972	0.976	0.055	Configural	550.8 (442)	0.003	0.013	0.000	Accept
Amazonas = 3479													
Amapá = 1554													
Bahia = 3659													
Ceará = 4265													
Distrito Federal = 2365													
Espírito Santo = 3541													
Goiás = 2702													
Maranhão = 5080													
Minas Gerais = 5209													
Mato Grosso do Sul = 2863													
Mato Grosso = 2468													
Pará = 3853													
Paraíba = 3158	Loadings	10899.283	1379	0.049	0.982	0.987	0.056	Threshold	273.8 (208)	0.010	0.018	0.002	Accept
Pernambuco = 4083													
Piauí = 2740													
Paraná = 3967													
Rio de Janeiro = 4966													
Rio Grande do Norte = 2962													
Rondônia = 2176													
Roraima = 2238													
Rio Grande do Sul = 3767													
Santa Catarina = 3738													
Sergipe = 2610													
São Paulo = 6114													
Tocantins = 1922													

Invariance decision is based on ΔCFI < 0.010 supplemented by ΔRMSEA < 0.015 or ΔSRMR < 0.010.
χ^2 = chi-square test; DF = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean-square residual; Δ = differences between fit index
* p < 0.01; ** p < 0.001.

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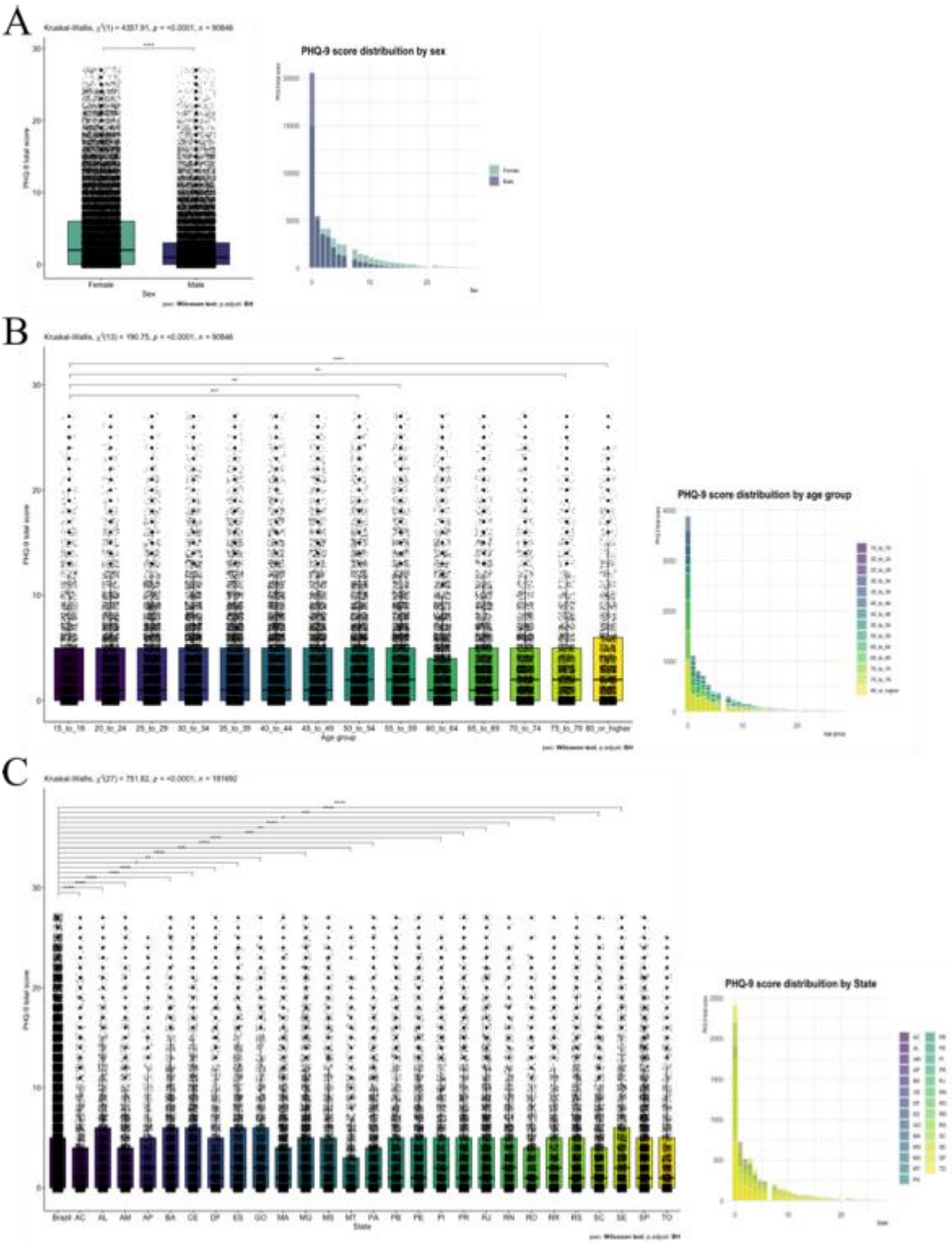
Table S4 PHQ-9 group differences in the 2019 Brazilian National Health Survey

	PHQ-9 total score				
	Sample size	**Mean (SD)**	**Median [Min, Max]**	**Kruskal-Wallis test and effect size**	**FDR-adjusted p-values for paired differences (Wilcoxon test)**
Sex					
Female	(n = 48047)	4.27 (5.21)	2.00 [0, 27.0]	$\chi^2(1) = 4357.9$; $p < 0.001$; $\eta 2 = 0.047$	Reference
Male	(n = 42799)	2.36 (3.84)	1.00 [0, 27.0]		< 0.001
Age group (15 to 19 as comparator)					
15 to 19	(n = 4336)	3.30 (4.60)	1.00 [0, 27.0]		Reference
20 to 24	(n = 6124)	3.25 (4.49)	1.00 [0, 27.0]		0.995
25 to 29	(n = 7249)	3.16 (4.51)	1.00 [0, 27.0]		0.121
30 to 34	(n = 8721)	3.21 (4.60)	1.00 [0, 27.0]		0.208
35 to 39	(n = 9429)	3.18 (4.61)	1.00 [0, 27.0]		0.104
40 to 44	(n = 8604)	3.53 (4.91)	1.00 [0, 27.0]		0.032
45 to 49	(n = 7998)	3.49 (4.91)	1.00 [0, 27.0]	$\chi^2(13) = 190.8$; $p < 0.001$; $\eta 2 = 0.002$	0.107
50 to 54	(n = 7887)	3.69 (4.98)	2.00 [0, 27.0]		< 0.001
55 to 59	(n = 7770)	3.64 (5.05)	2.00 [0, 27.0]		0.002
60 to 64	(n = 6802)	3.21 (4.62)	1.00 [0, 27.0]		0.295
65 to 69	(n = 5753)	3.20 (4.42)	1.00 [0, 27.0]		0.660
70 to 74	(n = 4212)	3.18 (4.38)	2.00 [0, 27.0]		0.478
75 to 79	(n = 2945)	3.45 (4.55)	2.00 [0, 27.0]		< 0.001
≥ 80	(n = 3016)	3.85 (4.84)	2.00 [0, 27.0]		< 0.001
State (Acre as comparator)					
Brazil	(n = 90846)	3.37 (4.71)	1.00 [0, 27.0]		Reference
Acre	(n = 2380)	3.08 (4.78)	1.00 [0, 27.0]		< 0.001
Alagoas	(n = 2987)	3.85 (4.92)	2.00 [0, 27.0]	$\chi^2(27) = 751.8$; $p < 0.001$; $\eta 2 = 0.004$	< 0.001
Amazonas	(n = 3479)	2.74 (4.18)	1.00 [0, 27.0]		< 0.001

Amapá	(n = 1554)	3.33 (4.48)	2.00 [0, 25.0]	0.341
Bahia	(n = 3659)	3.79 (4.79)	2.00 [0, 27.0]	< 0.001
Ceará	(n = 4265)	3.63 (4.63)	2.00 [0, 27.0]	< 0.001
Distrito Federal	(n = 2365)	3.27 (4.70)	1.00 [0, 27.0]	0.043
Espírito Santo	(n = 3541)	3.68 (4.94)	2.00 [0, 27.0]	0.001
Goiás	(n = 2702)	3.84 (5.03)	2.00 [0, 27.0]	< 0.001
Maranhão	(n = 5080)	2.96 (4.11)	1.00 [0, 27.0]	0.051
Minas Gerais	(n = 5209)	3.61 (4.96)	2.00 [0, 27.0]	0.001
Mato Grosso do Sul	(n = 2863)	3.63 (5.06)	2.00 [0, 27.0]	0.204
Mato Grosso	(n = 2468)	2.57 (4.31)	0 [0, 26.0]	< 0.001
Pará	(n = 3853)	2.89 (4.19)	1.00 [0, 27.0]	< 0.001
Paraíba	(n = 3158)	3.37 (4.74)	1.00 [0, 27.0]	0.873
Pernambuco	(n = 4083)	3.35 (4.82)	1.00 [0, 27.0]	0.131
Piauí	(n = 2740)	3.64 (4.80)	2.00 [0, 27.0]	0.001
Paraná	(n = 3967)	3.31 (4.84)	1.00 [0, 27.0]	0.009
Rio de Janeiro	(n = 4966)	3.21 (4.79)	1.00 [0, 27.0]	0.000
Rio Grande do Norte	(n = 2962)	3.39 (4.56)	2.00 [0, 27.0]	0.018
Rondônia	(n = 2176)	3.24 (4.49)	1.00 [0, 27.0]	0.860
Roraima	(n = 2238)	3.51 (4.56)	2.00 [0, 27.0]	0.001
Rio Grande do Sul	(n = 3767)	3.40 (4.64)	1.00 [0, 27.0]	0.640
Santa Catarina	(n = 3738)	2.91 (4.57)	1.00 [0, 27.0]	< 0.001
Sergipe	(n = 2610)	4.26 (5.30)	2.00 [0, 27.0]	< 0.001
São Paulo	(n = 6114)	3.47 (4.88)	1.00 [0, 27.0]	0.766
Tocantins	(n = 1922)	3.20 (4.37)	1.00 [0, 25.0]	0.782

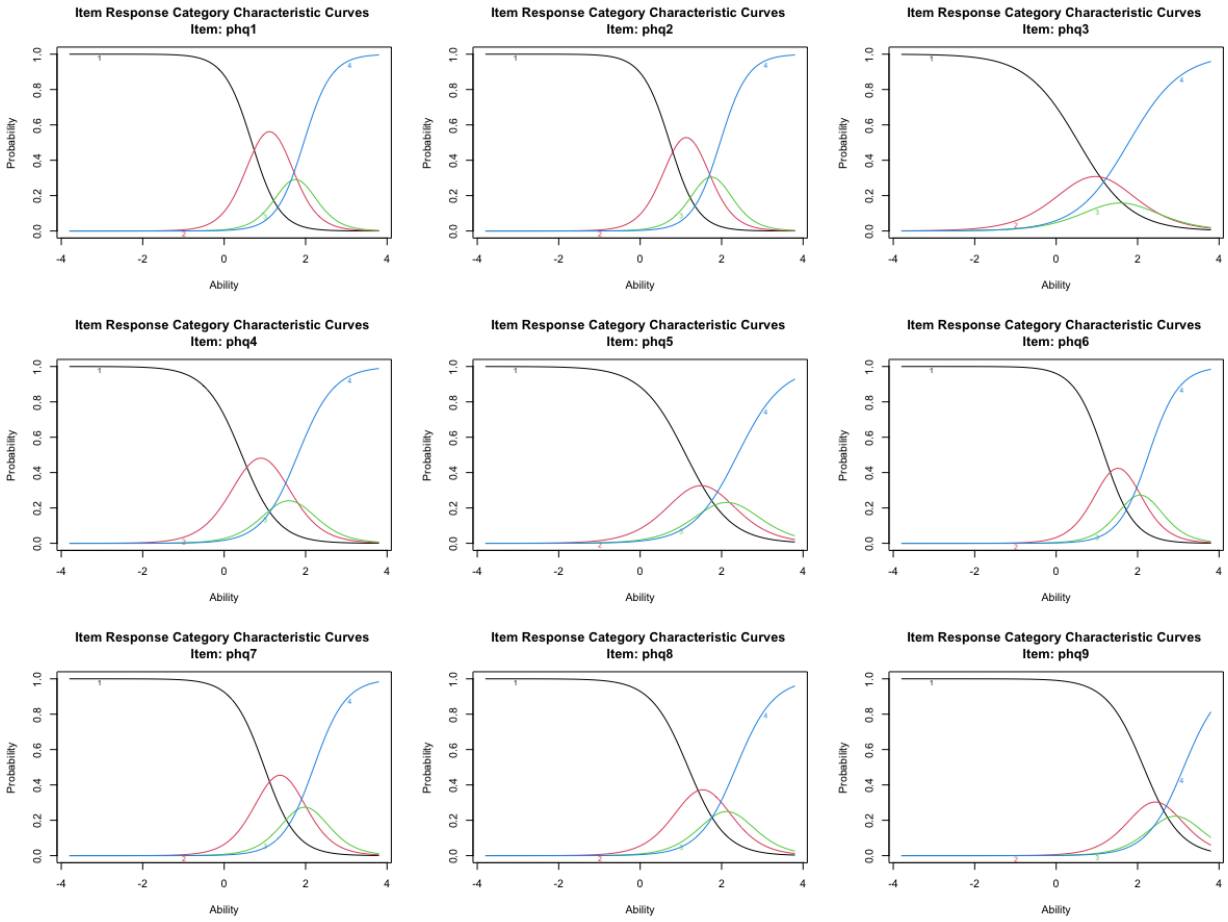
http://doi.org/10.47626/1516-4446-2022-2945
Translating measurement into practice: Brazilian norms for the Patient Health Questionnaire (PHQ-9) for assessing depressive symptoms – Damiano RF et al.

Figure S1 Differences in PHQ-9 scores according to sex (A), age group (B, 15–19-year-old group as comparator) and state (C, national mean as comparator).



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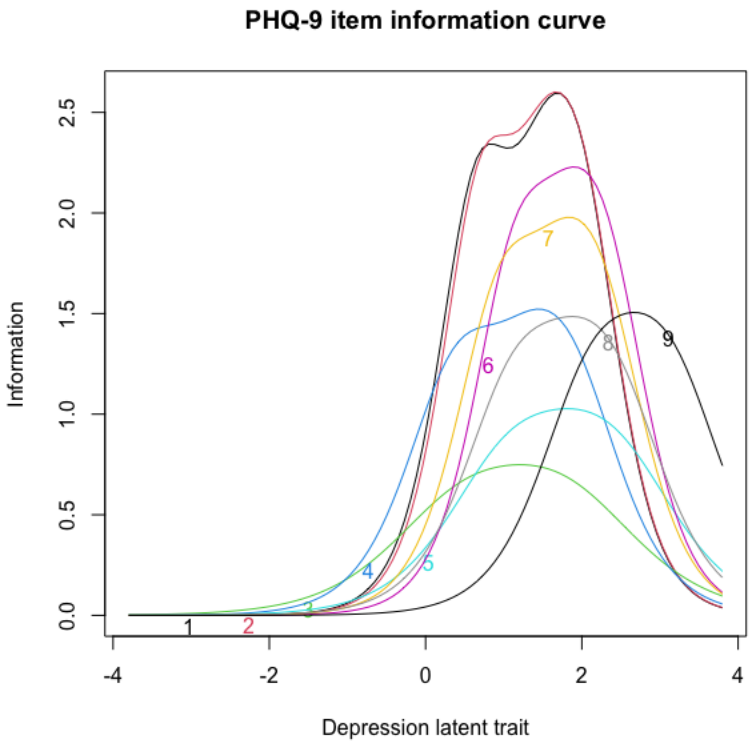
Figure S2 Item characteristic curves. Ability represents the latent depression trait in z-scores.



Item 1: Little interest or pleasure in doing things?
Item 2: Feeling down, depressed, or hopeless?
Item 3: Trouble falling or staying asleep, or sleeping too much?
Item 4: Feeling tired or having little energy?
Item 5: Poor appetite or overeating?
Item 6: Feeling bad about yourself.
Item 7: Trouble concentrating on things.
Item 8: Moving or speaking so slowly that other people could have noticed?
Item 9: Thoughts that you would be better off dead, or thoughts of hurting yourself in some way?

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Figure S3 PHQ9 item information curves.



Item 1: Little interest or pleasure in doing things?
Item 2: Feeling down, depressed, or hopeless?
Item 3: Trouble falling or staying asleep, or sleeping too much?
Item 4: Feeling tired or having little energy?
Item 5: Poor appetite or overeating?
Item 6: Feeling bad about yourself.
Item 7: Trouble concentrating on things.
Item 8: Moving or speaking so slowly that other people could have noticed?
Item 9: Thoughts that you would be better off dead, or thoughts of hurting yourself in some way?