The TIMSS 2011 Students Confident in Biology Scale, Eighth Grade

The Students Confident in Biology (SCB) scale was created based on students' degree of agreement to the nine statements described below. This scale was administered in countries where the sciences are taught as separate subjects. See **Creating and Interpreting TIMSS and PIRLS 2011 Context Questionnaire Scales** for more information on how the scales were formed.

Exhibit 1: Items in the TIMSS 2011 Students Confident in Biology Scale, Eighth Grade

	How much do you agree with these statements about biology?	Agree a lot	Agree a little	Disagree a little	Disagree a lot
BSBB20A	1) I usually do well in biology	◯	◯	◯	◯
BSBB20B*	2) Biology is more difficult for me than for many of my classmates*	◯	◯	◯	◯
BSBB20C*	3) Biology is not one of my strengths*	◯	◯	◯	◯
BSBB20D	4) I learn things quickly in biology	◯	◯	◯	◯
BSBB20E*	5) Biology makes me confused and nervous*	◯	◯	◯	◯
BSBB20F	6) I am good at working out difficult biology problems	◯	◯	◯	◯
BSBB20G	7) My teacher thinks I can do well in biology <programs/classes/lessons> with difficult materials	◯	◯	◯	◯
BSBB20H	8) My teacher tells me I am good at biology	◯	◯	◯	◯
BSBB20I*	9) Biology is harder for me than any other subject*	◯	◯	◯	◯

* Reverse coded

Confident — Somewhat Confident — Not Confident

11.4   8.5

Exhibit 2: Item Parameters for the TIMSS 2011 Students Confident in Biology Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3
BSBB20A	−1.22587	−1.22640	−0.40660	1.63300
BSBB20B*	−0.83792	−1.03634	−0.12226	1.15860
BSBB20C*	−0.43376	−1.23490	0.07260	1.16230
BSBB20D	−1.06827	−1.32973	−0.15248	1.48221
BSBB20E*	−1.10141	−0.74864	−0.23389	0.98253
BSBB20F	−0.40928	−1.49155	−0.07053	1.56208
BSBB20G	−0.67406	−1.35081	−0.10686	1.45767
BSBB20H	−0.63714	−1.34407	−0.12747	1.47154
BSBB20I*	−0.94359	−0.74835	−0.15095	0.89930

*Reverse coded

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants	
A = 9.92660	Transformed Scale Score = 9.92660 + 1.54141 · Logit Scale Score
B = 1.54141	

Exhibit 4: Equivalence Table of the Raw Score and the Transformed Scale Score

Raw Score	Transformed Scale Score	Cutpoint	Raw Score	Transformed Scale Score	Cutpoint
0	2.33398		14	8.70981	
1	4.07436		15	8.95624	
2	4.91337		16	9.20920	
3	5.49038		17	9.47210	
4	5.94214		18	9.74580	
5	6.31986		19	10.03552	
6	6.65087		20	10.34605	
7	6.95026		21	10.68368	
8	7.22763		22	11.05557	
9	7.48804		23	11.47952	11.4
10	7.73999		24	11.98120	
11	7.98519		25	12.61173	
12	8.22676		26	13.51159	
13	8.46747	8.5	27	15.31628	

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Students Confident in Biology Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item								
			BSBB20A	BSBB20B*	BSBB20C*	BSBB20D	BSBB20E*	BSBB20F	BSBB20G	BSBB20H	BSBB20I*
Armenia	0.79	39	0.81	0.44	0.34	0.76	0.37	0.71	0.73	0.82	0.40
Finland	0.89	54	0.82	0.68	0.77	0.79	0.64	0.74	0.77	0.75	0.62
Georgia	0.84	45	0.77	0.59	0.66	0.76	0.49	0.74	0.72	0.72	0.54
Hungary	0.89	54	0.81	0.65	0.79	0.78	0.60	0.76	0.76	0.78	0.62
Indonesia	0.80	39	0.69	0.62	0.65	0.73	0.62	0.53	0.58	0.62	0.56
Kazakhstan	0.86	48	0.73	0.64	0.69	0.74	0.55	0.75	0.73	0.75	0.61
Lebanon	0.79	38	0.70	0.52	0.47	0.74	0.47	0.70	0.63	0.74	0.52
Lithuania	0.85	46	0.77	0.62	0.64	0.77	0.57	0.73	0.73	0.68	0.60
Macedonia, Rep. of	0.80	40	0.75	0.46	0.50	0.72	0.52	0.71	0.68	0.77	0.47
Morocco	0.75	34	0.45	0.56	0.48	0.67	0.50	0.65	0.63	0.69	0.55
Romania	0.81	41	0.79	0.51	0.51	0.75	0.36	0.73	0.74	0.76	0.43
Russian Federation	0.88	51	0.75	0.65	0.76	0.81	0.56	0.77	0.68	0.74	0.65
Slovenia	0.88	52	0.79	0.68	0.77	0.79	0.68	0.66	0.66	0.75	0.70
Sweden	0.88	51	0.77	0.71	0.74	0.78	0.66	0.73	0.69	0.72	0.64
Syrian Arab Republic	0.70	30	0.26	0.64	0.52	0.59	0.63	0.53	0.46	0.59	0.63
Ukraine	0.87	51	0.79	0.62	0.62	0.78	0.58	0.78	0.78	0.79	0.65

*Reverse coded

Exhibit 6: Relationship Between the TIMSS 2011 Students Confident in Biology Scale, Eighth Grade, and TIMSS 2011 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Armenia	0.25	0.06	0.05
Finland	0.32	0.10	0.08
Georgia	0.41	0.17	0.16
Hungary	0.29	0.09	0.08
Indonesia	−0.02	0.00	0.00
Kazakhstan	0.22	0.05	0.04
Lebanon	0.37	0.13	0.12
Lithuania	0.25	0.06	0.06
Macedonia, Rep. of	0.37	0.14	0.13
Morocco	0.31	0.10	0.08
Romania	0.28	0.08	0.07
Russian Federation	0.22	0.05	0.04
Slovenia	0.24	0.06	0.05
Sweden	0.33	0.11	0.09
Syrian Arab Republic	0.28	0.08	0.06
Ukraine	0.27	0.08	0.06
International Median	**0.28**	**0.08**	**0.06**