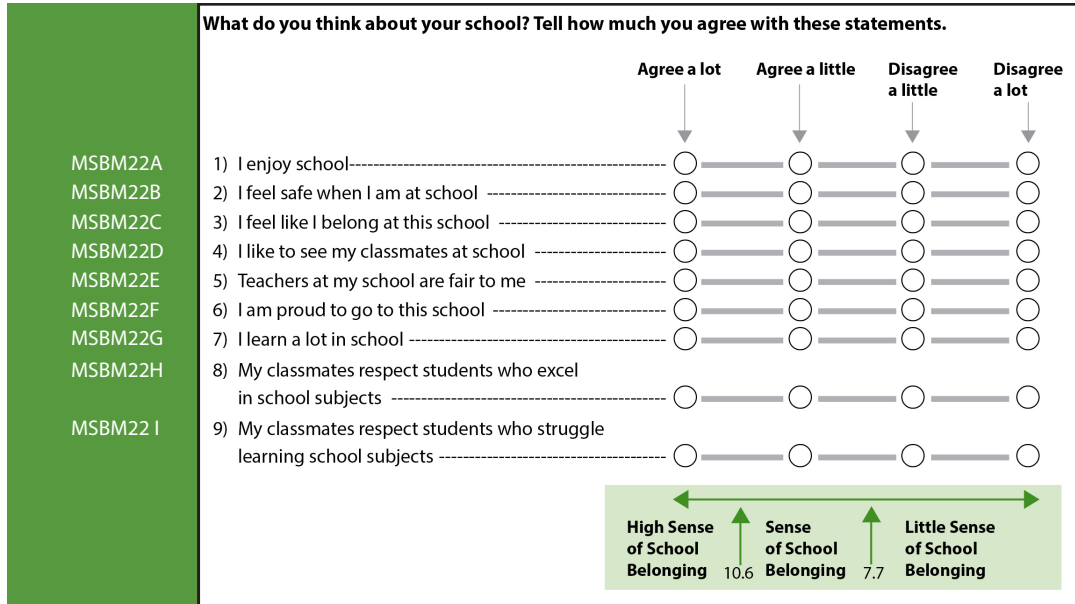


# Students' Sense of School Belonging Scale, Advanced Mathematics

The Students' Sense of School Belonging (SSB) scale was created based on students' degree of agreement with the nine statements described below.

## Items in the TIMSS Advanced 2015 Students' Sense of School Belonging Scale, Advanced Mathematics



**Item Parameters for the TIMSS Advanced 2015 Students' Sense of School Belonging Scale, Advanced Mathematics**

Item	delta	tau_1	tau_2	tau_3	Infit
MSBM22A	0.39975	-1.19908	-0.58547	1.78455	1.12
MSBM22B	-0.15512	-0.80900	-0.70858	1.51758	1.03
MSBM22C	0.28834	-1.11210	-0.31747	1.42957	0.95
MSBM22D	-0.80465	-0.67223	-0.64404	1.31627	1.22
MSBM22E	0.00294	-1.42359	-0.45338	1.87697	1.11
MSBM22F	0.41761	-1.13239	-0.45103	1.58342	0.95
MSBM22G	-0.24169	-1.34822	-0.66654	2.01476	1.01
MSBM22H	-0.10713	-1.24202	-0.52085	1.76287	1.10
MSBM22I	0.19995	-1.32373	-0.51026	1.83399	1.33

**Scale Transformation Constants for the TIMSS Advanced 2015 Students' Sense of School Belonging Scale, Advanced Mathematics**

Scale Transformation Constants

$$A = 7.993523$$

$$B = 1.272937$$

$$\text{Transformed Scale Score} = 7.993523 + 1.272937 \cdot \text{Logit Scale Score}$$

**Equivalence Table of the Raw Score and the Transformed Scale Score for the TIMSS Advanced 2015 Students' Sense of School Belonging Scale, Advanced Mathematics**

Raw Score	Transformed Scale Score	Cutpoint
0	2.80092	
1	4.17041	
2	4.81527	
3	5.25552	
4	5.59943	
5	5.88979	
6	6.14726	
7	6.38344	
8	6.60565	
9	6.81902	
10	7.02747	
11	7.23422	
12	7.44214	
13	7.65463	7.7
14	7.87272	
15	8.10081	
16	8.34184	
17	8.59861	
18	8.87410	
19	9.17103	
20	9.49135	
21	9.83727	
22	10.21291	
23	10.62626	10.6
24	11.09778	
25	11.66982	
26	12.45741	
27	13.98330	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS Advanced 2015 Students' Sense of School Belonging Scale, Advanced Mathematics**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			MSBM22A	MSBM22B	MSBM22C	MSBM22D	MSBM22E	MSBM22F	MSBM22G	MSBM22H	MSBM22I	
France	0.81	40	0.72	0.67	0.67	0.58	0.56	0.73	0.63	0.56	0.56	
Italy	0.83	43	0.71	0.71	0.76	0.53	0.62	0.79	0.68	0.52	0.53	
Lebanon	0.85	45	0.63	0.79	0.76	0.57	0.63	0.73	0.67	0.64	0.59	
Norway	0.84	45	0.73	0.70	0.78	0.67	0.58	0.72	0.66	0.60	0.56	
Portugal	0.82	42	0.73	0.69	0.73	0.58	0.52	0.77	0.67	0.54	0.56	
Russian Federation	0.89	55	0.79	0.76	0.81	0.69	0.66	0.82	0.71	0.69	0.70	
Russian Federation 6hr+	0.89	54	0.78	0.74	0.81	0.70	0.65	0.79	0.72	0.68	0.70	
Slovenia	0.85	45	0.71	0.68	0.78	0.57	0.61	0.78	0.74	0.58	0.53	
Sweden	0.85	48	0.79	0.70	0.80	0.65	0.58	0.75	0.69	0.61	0.60	
United States	0.86	48	0.71	0.66	0.78	0.70	0.65	0.79	0.72	0.66	0.56	
International Avg.	0.85	46	0.73	0.71	0.76	0.61	0.60	0.76	0.69	0.60	0.58	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Relationship Between the TIMSS Advanced 2015 Students' Sense of School Belonging Scale, and TIMSS Advanced 2015 Advanced Mathematics Achievement**

Country	Pearson's Correlation with Advanced Mathematics Achievement		Variance in Advanced Mathematics Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )
	(r)	(r <sup>2</sup> )	
France	0.20	0.04	0.04
Italy	0.05	0.00	0.01
Lebanon	0.08	0.01	0.01
Norway	0.16	0.03	0.02
Portugal	0.07	0.00	0.01
Russian Federation	0.12	0.02	0.01
Russian Federation 6hr+	0.09	0.01	0.01
Slovenia	0.22	0.05	0.04
Sweden	0.20	0.04	0.04
United States	0.07	0.01	0.01
International Median	0.12	0.02	0.01