

Appendix 15A: TIMSS Advanced 2015 Context Questionnaire Scales, Advanced Mathematics

Home Educational Resources Scale, Advanced Mathematics

The Home Educational Resources (HER) scale was created based on students' responses concerning the availability of four resources described below.

Items in the TIMSS Advanced 2015 Home Educational Resources Scale, Advanced Mathematics

MSBG04	<p>Number of books in the home:</p> <ul style="list-style-type: none"> 1) 0-10 2) 11-25 3) 26-100 4) 101-200 5) More than 200 	<p>Highest level of education of either parent:</p> <ul style="list-style-type: none"> 1) Finished some primary or lower secondary or did not go to school 2) Finished lower secondary 3) Finished upper secondary 4) Finished post-secondary education 5) Finished university or higher 	MSDGEDUP ¹
MSDG06S ¹	<p>Number of home study supports:</p> <ul style="list-style-type: none"> 1) None 2) Study desk/table or own room 3) Both 		
MSDGOCCP ¹	<p>Highest level of occupation of either parent:</p> <ul style="list-style-type: none"> 1) Has never worked outside home for pay, general laborer, or semi-professional (skilled agricultural or fishery worker, craft or trade worker, plant or machine operator) 2) Clerical (clerk or service or sales worker) 3) Small business owner 4) Professional (corporate manager or senior official, professional, or technician or associate professional) 		

¹ Derived variable. For more details, see Supplement 3 of the TIMSS Advanced 2015 User Guide for the [International Database](#).

Item Parameters for the TIMSS Advanced 2015 Home Educational Resources Scale, Advanced Mathematics

Item	delta	tau_1	tau_2	tau_3	tau_4	Infit
MSBG04	0.63886	-0.93281	-0.47613	0.80516	0.60378	1.10
MSDG06S	-0.97302	-0.28994	0.28994			1.27
MSDGEDUP	-0.07938	-0.66004	-0.41662	0.85158	0.22508	0.96
MSDGOCCP	0.41354	-0.67697	1.24010	-0.56313		0.97

*Reverse coded

Scale Transformation Constants for the TIMSS Advanced 2015 Home Educational Resources Scale, Advanced Mathematics

Scale Transformation Constants

A = 7.705317

B = 2.192074

Transformed Scale Score = 7.705317 + 2.192074 • Logit Scale Score

Equivalence Table of the Raw Score and the Transformed Scale Score for the TIMSS Advanced 2015 Home Educational Resources Scale, Advanced Mathematics

Raw Score	Transformed Scale Score	Cutpoint
0	1.48945	
1	3.86046	
2	5.08504	
3	5.98800	6.0
4	6.72756	
5	7.36772	
6	7.93623	
7	8.46945	
8	8.98566	
9	9.51161	
10	10.07874	
11	10.73945	
12	11.62325	11.6
13	13.29245	

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

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Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS Advanced 2015 Home Educational Resources Scale, Advanced Mathematics

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item			
			MSB604	MSD606S	MSD6EDUP	MSD6CCCP
France	0.59	46	0.66	0.24	0.83	0.81
Italy	0.62	48	0.69	0.27	0.84	0.82
Lebanon	0.53	42	0.62	0.38	0.77	0.74
Norway	0.54	44	0.68	0.33	0.79	0.75
Portugal	0.69	52	0.77	0.18	0.87	0.84
Russian Federation	0.41	38	0.62	0.07	0.76	0.75
Russian Federation 6hr+	0.40	38	0.62	0.25	0.75	0.72
Slovenia	0.53	42	0.67	0.17	0.80	0.76
Sweden	0.61	48	0.72	0.47	0.77	0.76
United States	0.53	43	0.66	0.57	0.79	0.58
International Avg.	0.56	45	0.68	0.30	0.80	0.76

Relationship Between the TIMSS Advanced 2015 Home Educational Resources Scale, Advanced Mathematics, 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 (η^2)
	(r)	(r ²)	
France	0.32	0.10	0.07
Italy	0.30	0.09	0.06
Lebanon	0.22	0.05	0.03
Norway	0.28	0.08	0.05
Portugal	0.24	0.06	0.05
Russian Federation	0.18	0.03	0.02
Russian Federation 6hr+	0.23	0.05	0.03
Slovenia	0.21	0.04	0.04
Sweden	0.34	0.11	0.08
United States	0.25	0.06	0.04
International Median	0.25	0.06	0.05

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