Objectives and methods

Research questions

Question 1: How do global competence indicators affect students' academic achievement?
Question 2: Whether the impact of global competence on academic achievement changes across countries with different cultural values and economic performance?

Methods

Methods: Multilevel analysis
Software: SPSS 26 for data preparation; HLM6 for multilevel linear regression

Data description

Variables and access to data

Variables	Data link
Student Level	
Family ESCS	PISA 2018: https://www.oecd.org/en/data/datasets/pisa-2018-database.html
Gender	
Awareness of global issues	
Self-efficacy regarding global issues	
Attitudes towards immigrants	
Interest in learning about other cultures	
Ability to understand the perspectives of others	
Cognitive adaptability	
Respect for people from other cultures	
Number of spoken languages	
Number of foreign languages learned at school	
Number of scenes of contact with people from other countries	
Awareness of intercultural communication	
A sense of agency regarding global issues	
Number of actions taken by students	
Country Level	

Classification of developing and developed countries or economies	https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/groups.htm
Flexibility-monumentalism	Minkov-Hofstede model. https://doi.org/10.1016/j.intman.2022.100971
Individualism-collectivism	Minkov-Hofstede model. https://doi.org/10.1016/j.intman.2022.100971

Data Preparation

The data were acquired to obtain three separate datasets at the student-level and country-level.

Selecting and recording variables

The data from the questionnaires corresponding to the target variables analyzed in this study were screened according to the study's analytical objective and the findings of previous studies. We deleted the samples of students from countries that lack cultural values and those who did not answer any of the questions related to global competence at the student level. The final samples were retained for the 54 countries or economies, with a total of 371,976 student samples.

Treatment of missing data

There were still missing value variables in the sample. Missing values were supplemented by the mean of the multiple imputation datasets using multiple imputation with m=5. Descriptive statistics for all variables are presented in Table 1.

Student weight

As required by the official PISA manual, the student weights need to be normalized, i.e. the sum of the weights is equal to the number of students in the datasets. The sum of the weights of all samples is denoted by POPWEIGHT, the number of all samples is denoted by SAMPN, and the SPSS syntax for the normalization of the final student weight is as follows:

```
COMPUTE W_FSTUWT=(W_FSTUWT/POPWEIGHT)*SAMPN.

AGGREGATE/BREAK=CNT/POPCNT=SUM(W_FSTUWT).
COMPUTE WEIGHT=(W_FSTUWT/POPCNT)*(SAMPN/52).
```

Table 1. Descriptive statistics for variables of interest.

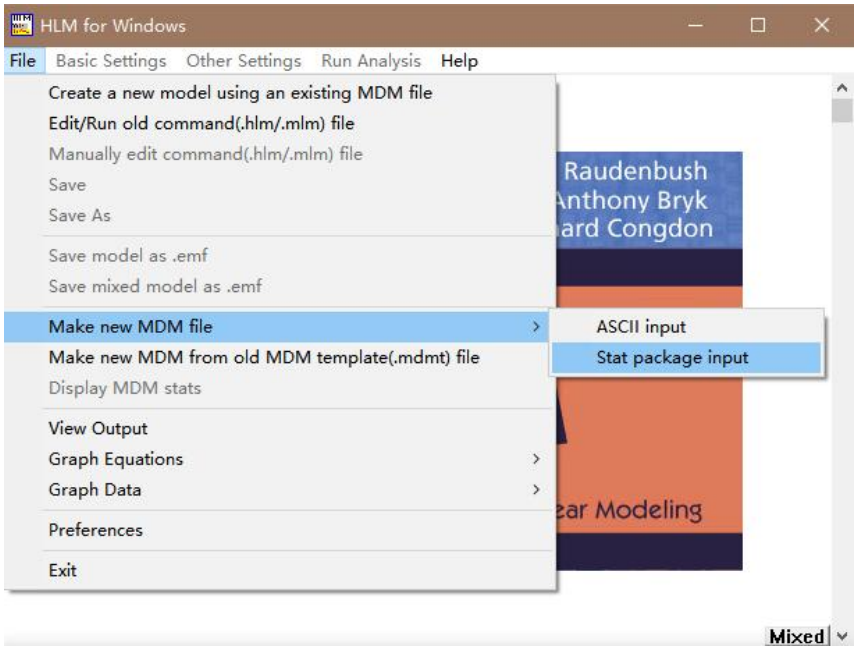
Variable		Mean	SD	Range
Gender	GENDER	0.506	0.500	0 = male; 1 = female
Index of economic, social and cultural status	ESCS	-0.307	1.097	-8.173-4.037
Awareness of global issues	GCAWARE	-0.024	1.073	-4.091-4.897
Self-efficacy regarding global issues	GCSELFEFF	-0.046	1.036	-3.753-3.958
Attitudes towards immigrants	ATTIMM	0.017	0.968	-4.182-3.881
Interest in learning about other cultures	INTCULT	0.116	0.977	-4.066-4.176
Ability to understand the perspectives of others	PERSPECT	0.059	1.021	-4.550-3.661
Cognitive adaptability	COGFLEX	0.008	1.022	-3.963-3.917
Respect for people from other cultures	RESPECT	-0.017	0.988	-4.550-3.661
Number of spoken languages	LANGUAGESPEAK	2.162	0.941	1-5
Number of foreign languages learned at school	LANGUAGELEARN	1.765	1.507	0-10
Number of scenes of contact with people from other countries	CONTACT	2.155	1.354	0-4
Awareness of intercultural communication	AWACOM	0.004	1.004	-4.228-4.085
A sense of agency regarding global issues	GLOBMIND	0.067	1.005	-4.603-4.754
Number of actions taken by students	BEHAVIOR	3.909	2.187	0-8
Classification of developing and developed countries or economies	Development	0.430	0.499	0 = developing economies; 1 = developed economies
Flexibility-monumentalism	Flexibility	-3.963	83.958	-187-199
Individualism-collectivism	Individualism	-12.870	70.737	-171-119

Source. PISA 2015 database.

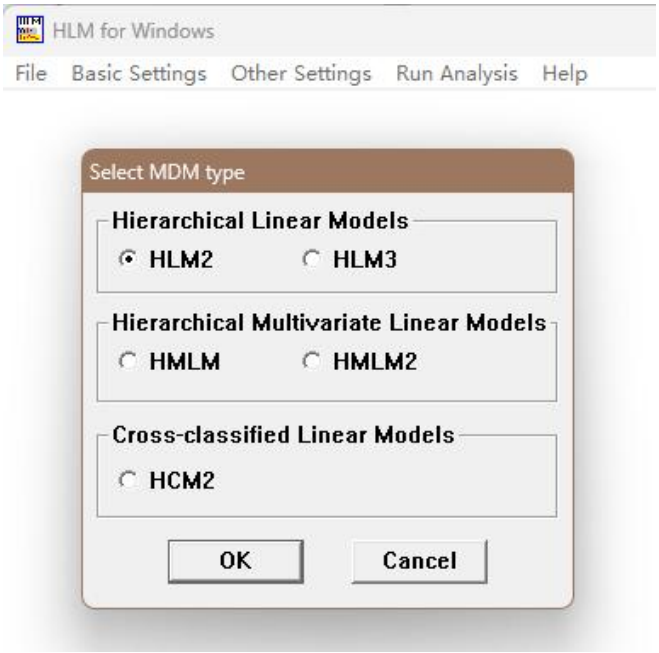
Multilevel analysis

Data entry and settings

Step 1: Import data

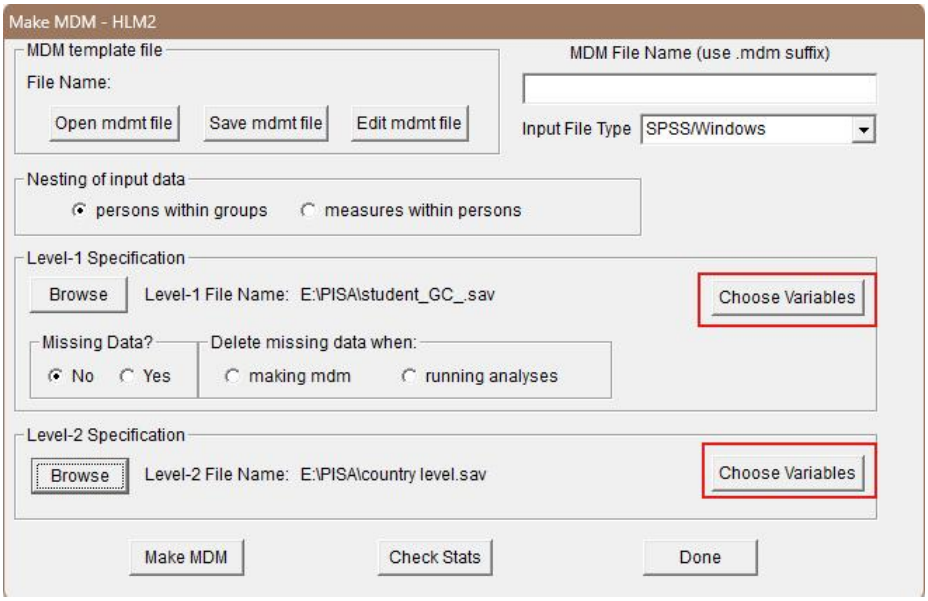


- This analysis was based on two levels, student, and country, so HLM2 was chosen.

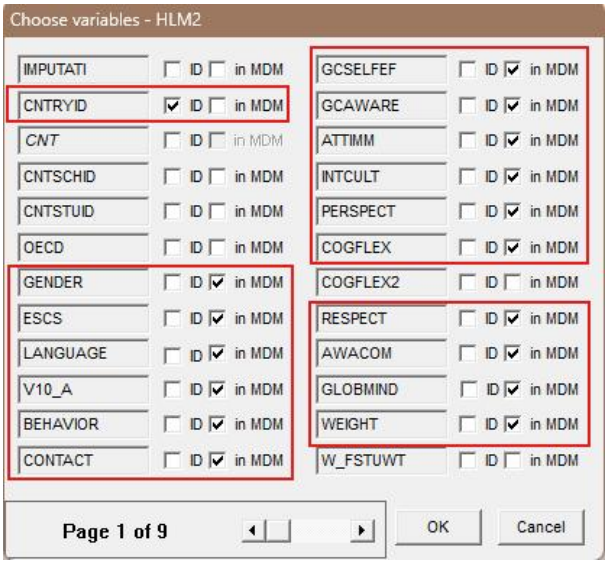


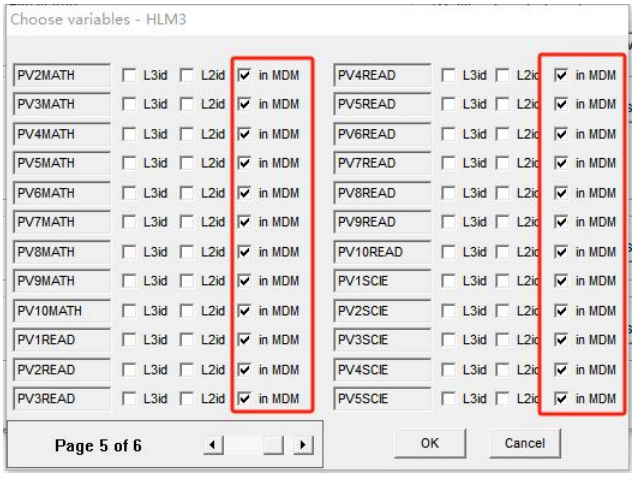
- Import two levels of data separately.

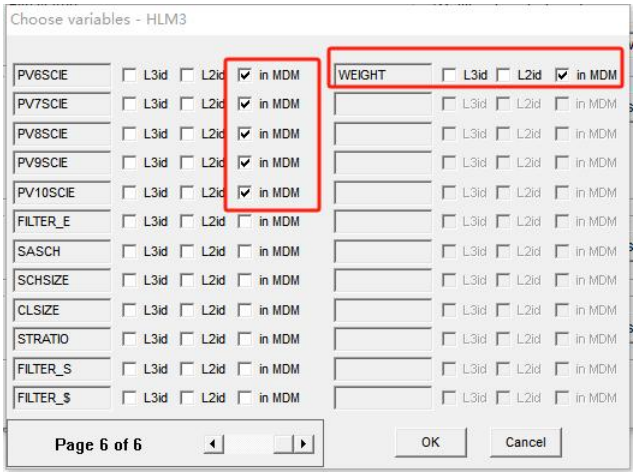
Step2: Variable selection. Select the variable data in each of the two level datasets that need to be included in the HLM analysis.



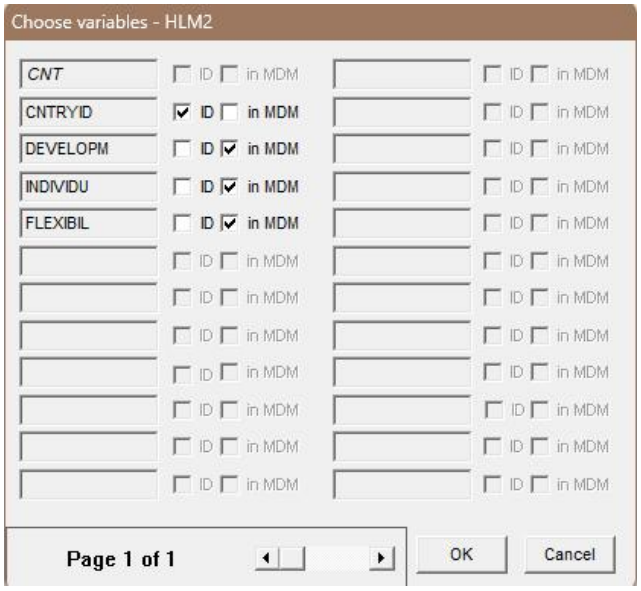
- Variable selection for student-level: ID is the linking identifier for country-level and student-level, here CNTRYID (country-region ID in PISA data) was selected. After selecting the linking identifiers for each level, select the independent variable, dependent variable, and sample weight (WEIGHT) for student-level.



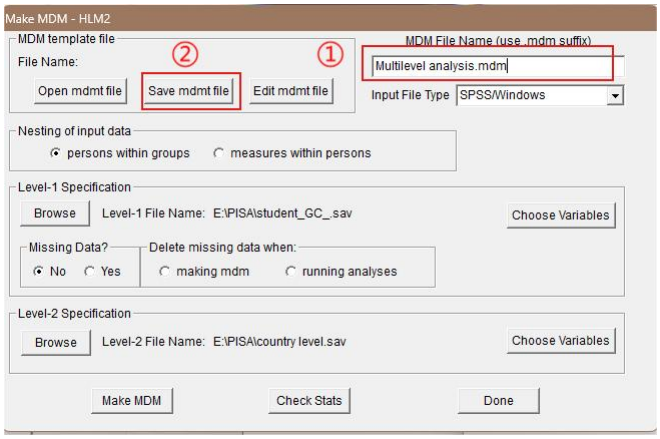




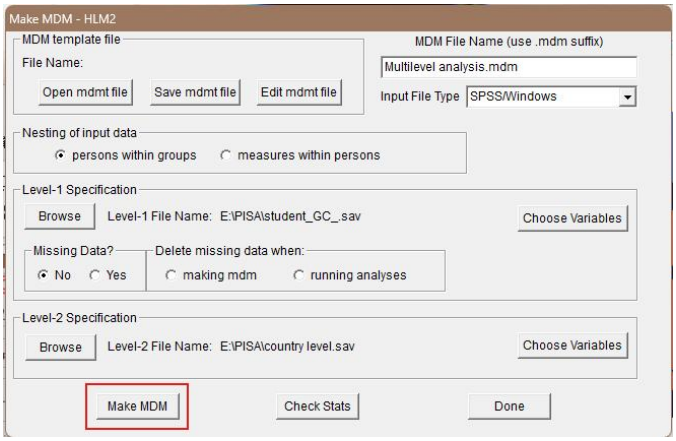
- Country-level variable selection:



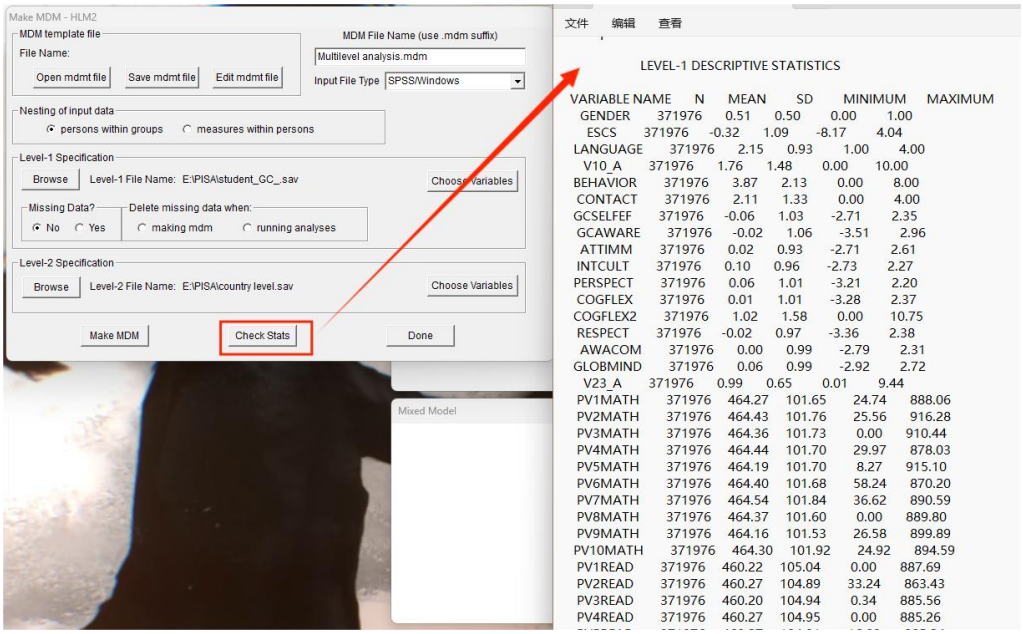
Step 3: Save and create MDM file.



- Create MDM file.

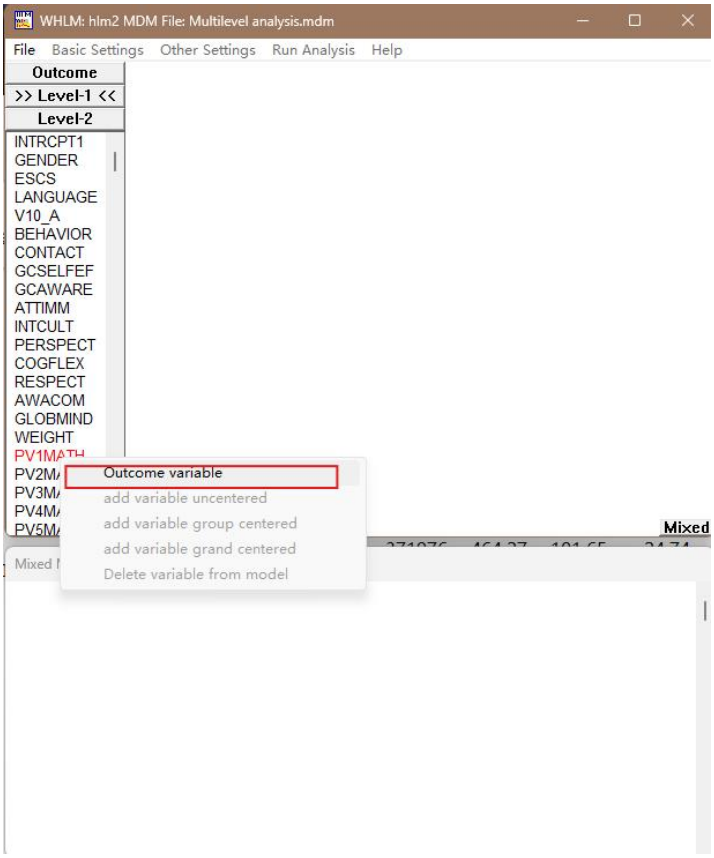


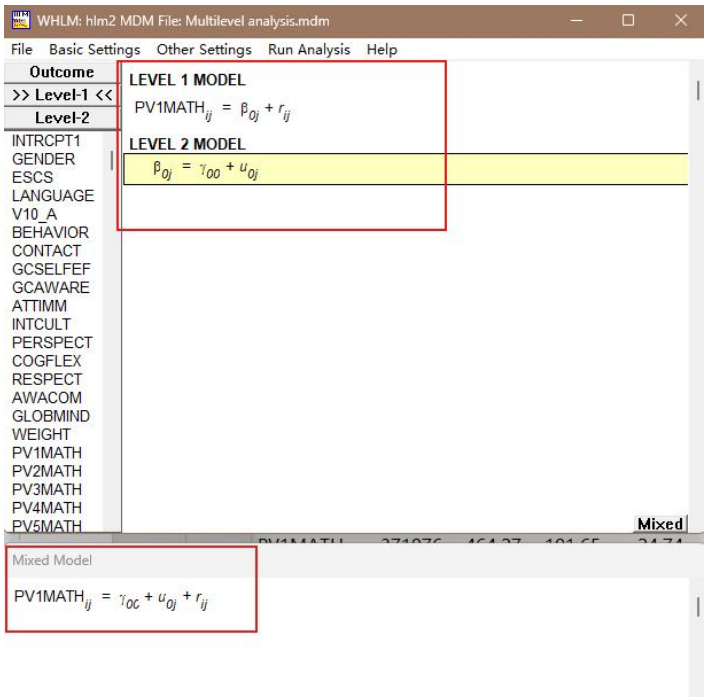
  - After the MDM file was created successfully, *Check Stats* button was tapped to view the data overview. Finally, tap *Done* to complete data entry and MDM file creation.



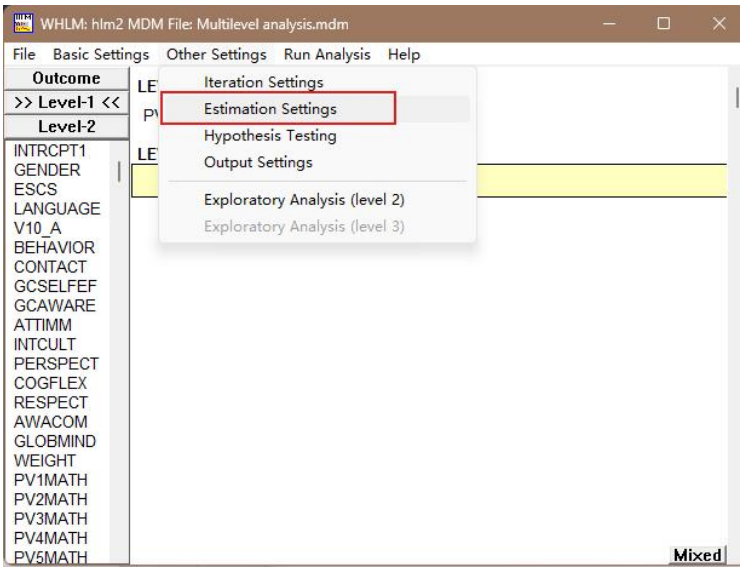
Step 4：Settings of weights and dependent variable Plausible Values (PV).

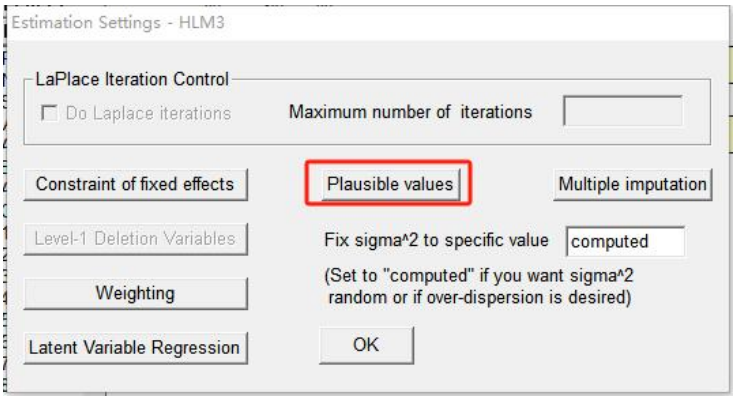
- Setting of the dependent variable: in the case of maths achievement, PV1MATH was chosen as the dependent variable.

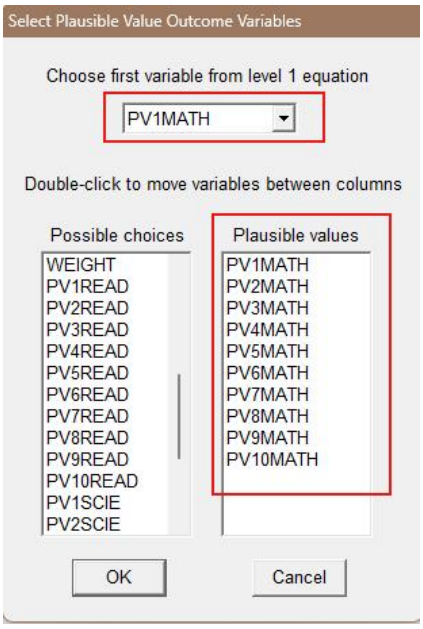




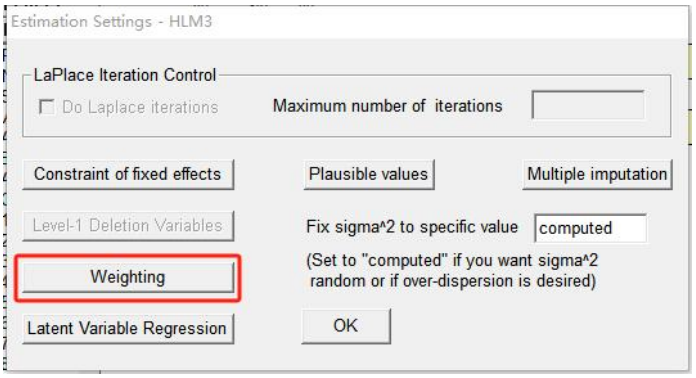
- Setting of PV1-PV10: According to the official PISA data analysis operational documentation recommendations, regression analyses should be performed on the basis of 10 PV values, which can be achieved in the HLM6 software.

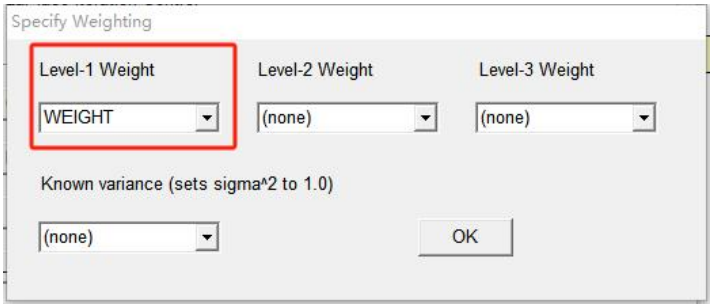






- Setting of weights: WEIGHT has been normalized.





Two-level modelling

The following analysis process is based on the example of maths achievement.

Null model

The null model, which incorporated no variables, was principally constructed for the purpose of calculating the intraclass correlation coefficients (ICCs) values. The equation in the null model can be

expressed as follows:

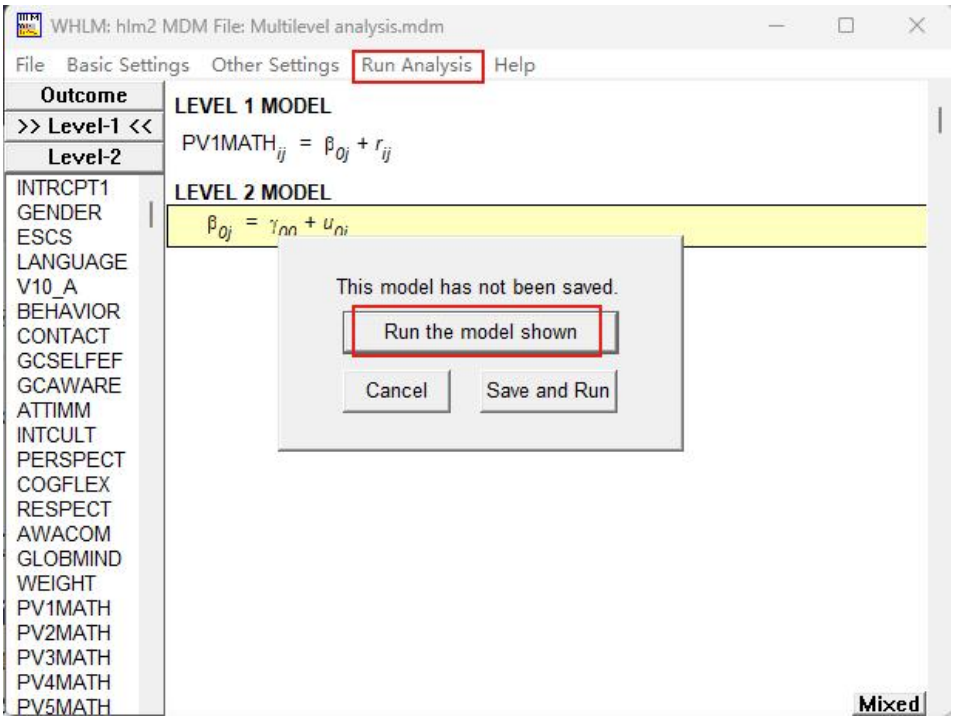
$$Y_{ijk} = \gamma_{000} + r_{0jk} + \mu_{ook} + e_{ijk} \quad (1)$$

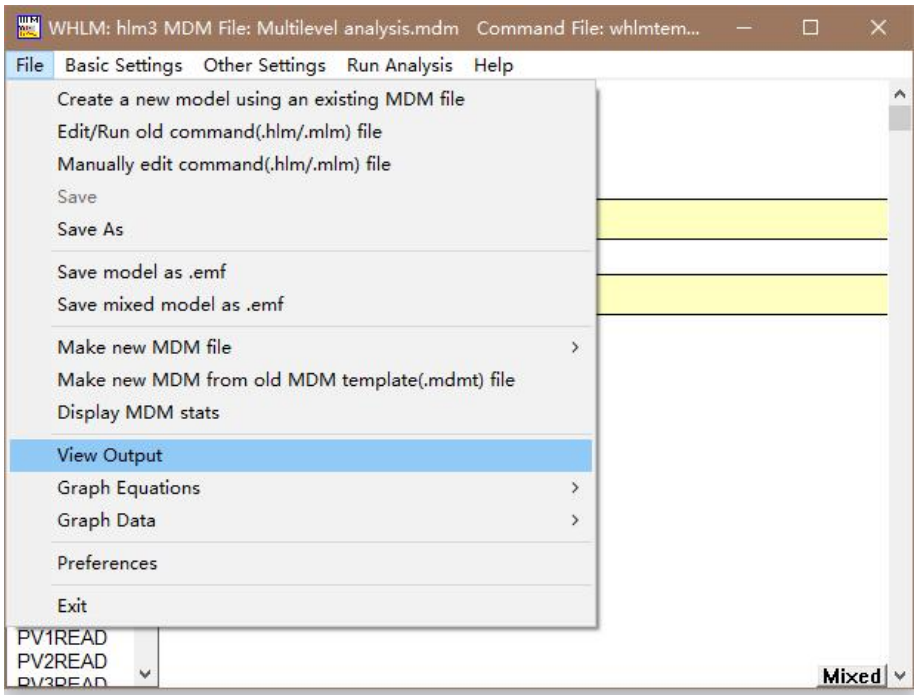
In the context of multilevel linear modeling (HLM), ICC serves as a pivotal metric for evaluating the degree of intra-group correlation.The ICC is utilized to ascertain the extent to which individual members within a group share similarities, that is, the degree to which measurements of individuals in the same group are similar. Specifically, the ICC is a measure of the ratio of within-group differences to total differences when aggregating data, and has a value between 0 and 1. When the ICC is close to 0, it indicates that the proportion of inter-individual variation to total variation is small, i.e., individuals are almost unaffected by the group to which they belong; when the ICC is close to 1, it indicates that the proportion of inter-individual variation to total variation is large, i.e., individuals are almost entirely determined by the group to which they belong.

The variances at the student-, and country-level are respectively σ^2_e, and $\sigma^2_{r_0}$. The method (Davis & Scott, 1995) defines the ICC values at the country level as:

$$\rho_{\text{country}} = \frac{\sigma^2_{r_0}}{\sigma^2_e + \sigma^2_{r_0}} \quad (2)$$

In this context, the between-group variance is defined as the variance attributable to differences in means between groups, while the total variance is the sum of the between-group variance and the within-group variance. The larger the ICC value, the larger the proportion of the total variance accounted for by the between-group (e.g., school, class, etc.) variance, suggesting that the between-group variance is contributing more to the total variance, which usually suggests that the use of the HLM model is appropriate.





Results:

文件 编辑 查看 H1

Level-1 Model

Y = B0 + R

Level-2 Model
B0 = G00 + U0

THE AVERAGED RESULTS FOR THIS PLAUSIBLE VALUE RUN
Sigma_squared = 7907.03007

Tau
INTRCPT1,B0 2647.90882

Tau (as correlations)
INTRCPT1,B0 1.000

Random level-1 coefficient Reliability estimate

INTRCPT1, B0 1.000

The outcome variables are: PV1MATH, PV2MATH, PV3MATH, PV4MATH, PV5MAT

Final estimation of fixed effects
(with robust standard errors)

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	465.042778	7.410065	62.758	51	0.000

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between country level

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1,	U0	51.45784	2647.90882	51	121422.87327	0.000
level-1,	R	88.92148	7907.03007			

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within-group variance

The between-country variance $\sigma^2_{r_0}$ was 2647.91, the within-group variance σ^2_e was 7907.03 and the

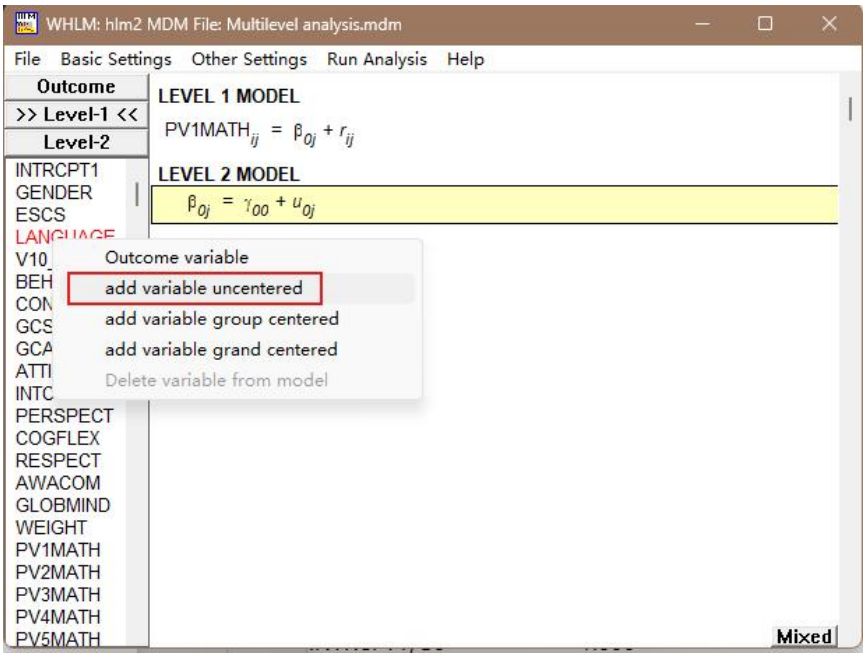
total unexplained variance $\sigma^2_{r_0} + \sigma^2_e$ was 10554.94. The intraclass correlation coefficients for country was:

$$\frac{\text{between country variance}}{\text{total vairance}} = \frac{\sigma^2_{r_0}}{\sigma^2_e + \sigma^2_{r_0}} = 0.251$$

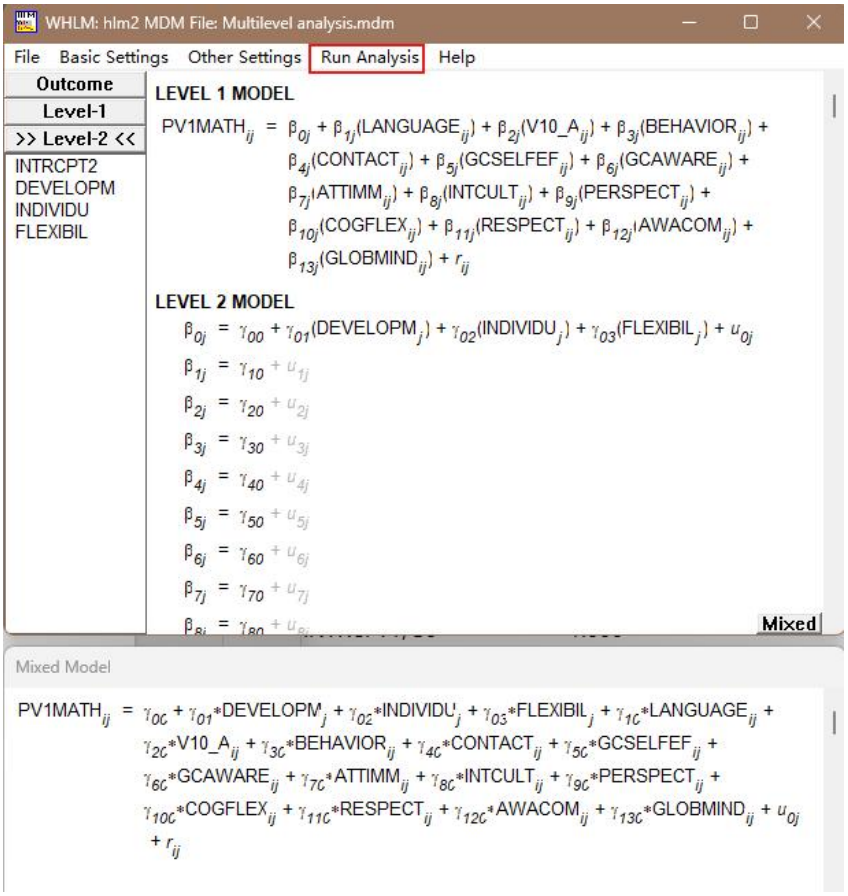
According to the result, ICCs of the two levels for all disciplines were all above 0.059, which indicated the existence of variations in student academic achievement between countries and proved the validity of conducting HLM analysis (Cohen, 1988).

Model 1

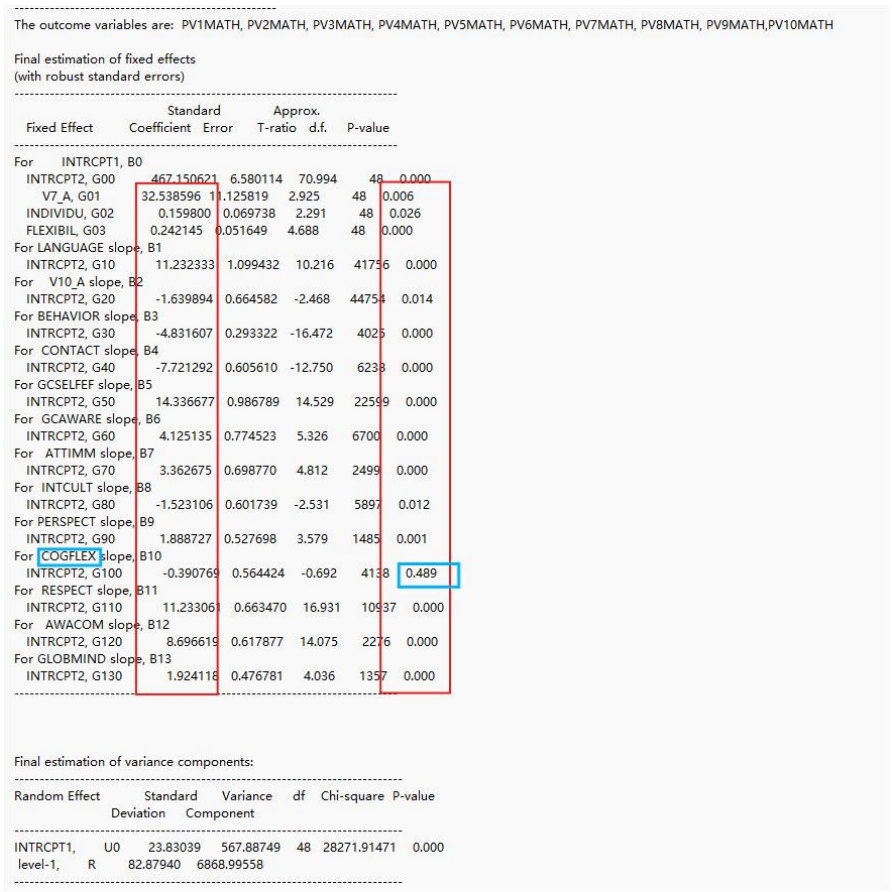
Model 1: Incorporation of indicators of global competence and the variables at the country level.



Following the addition of the explanatory variables at each level, the complete model 1 was constructed, as illustrated below:



After building, click 'Run Analysis', then click 'File' and 'View Output'. The results are shown in the figure below: All variables except for COGFLEX showed significance.



The outcome variables are: PV1MATH, PV2MATH, PV3MATH, PV4MATH, PV5MATH, PV6MATH, PV7MATH, PV8MATH, PV9MATH,PV10MATH

Final estimation of fixed effects
(with robust standard errors)

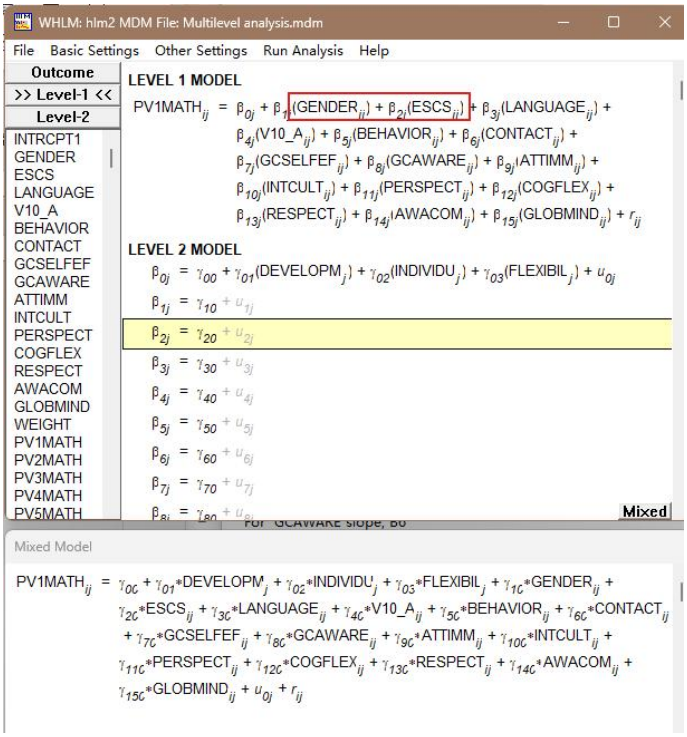
Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	467.150621	6.580114	70.994	48	0.000
V7_A, G01	32.538596	11.125819	2.925	48	0.006
INDIVIDU, G02	0.159800	0.069738	2.291	48	0.026
FLEXIBIL, G03	0.242145	0.051649	4.688	48	0.000
For LANGUAGE slope, B1					
INTRCPT2, G10	11.232333	1.099432	10.216	41756	0.000
For V10_A slope, B2					
INTRCPT2, G20	-1.639894	0.664582	-2.468	44754	0.014
For BEHAVIOR slope, B3					
INTRCPT2, G30	-4.831607	0.293322	-16.472	4025	0.000
For CONTACT slope, B4					
INTRCPT2, G40	-7.721292	0.605610	-12.750	6238	0.000
For GCSELFEF slope, B5					
INTRCPT2, G50	14.336677	0.986789	14.529	22599	0.000
For GCAWARE slope, B6					
INTRCPT2, G60	4.125135	0.774523	5.326	6700	0.000
For ATTIMM slope, B7					
INTRCPT2, G70	3.362675	0.698770	4.812	2499	0.000
For INTCULT slope, B8					
INTRCPT2, G80	-1.523106	0.601739	-2.531	5897	0.012
For PERSPECT slope, B9					
INTRCPT2, G90	1.888727	0.527698	3.579	1485	0.001
For COGFLEX slope, B10					
INTRCPT2, G100	-0.390769	0.564424	-0.692	4138	0.489
For RESPECT slope, B11					
INTRCPT2, G110	11.233061	0.663470	16.931	10937	0.000
For AWACOM slope, B12					
INTRCPT2, G120	8.696619	0.617877	14.075	2276	0.000
For GLOBMIND slope, B13					
INTRCPT2, G130	1.924118	0.476781	4.036	1357	0.000

Final estimation of variance components:

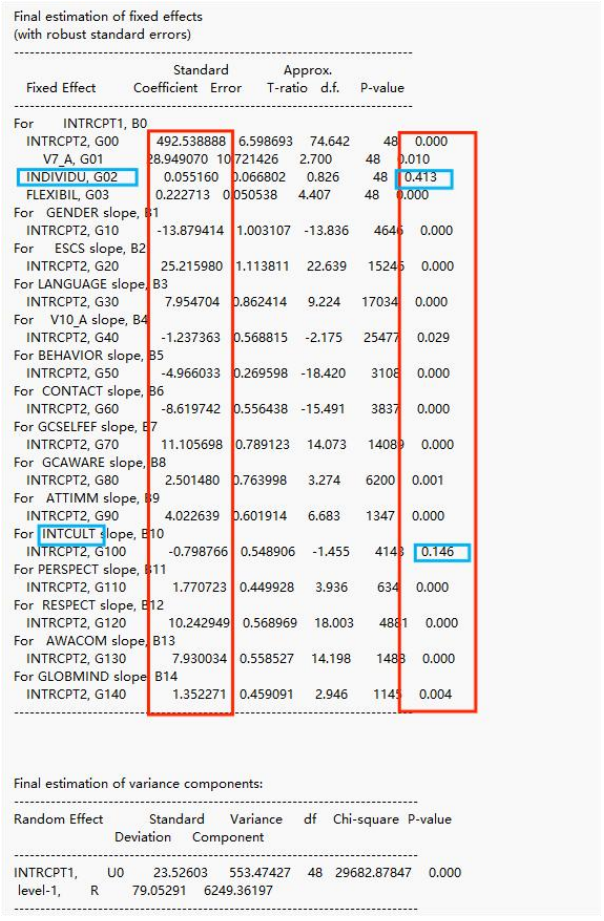
Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1,	U0	23.83039	567.88749	48	28271.91471	0.000
level-1,	R	82.87940	6868.99558			

Model 2

Model 2: To assess the robustness of the models, the control variables were incorporated.



Results: The regression coefficients for the all variables at the two levels can be seen in the figure below, where the p-value indicated that the results of INDIVIDUAL and INTCULT were not significant.



Final estimation of fixed effects
(with robust standard errors)

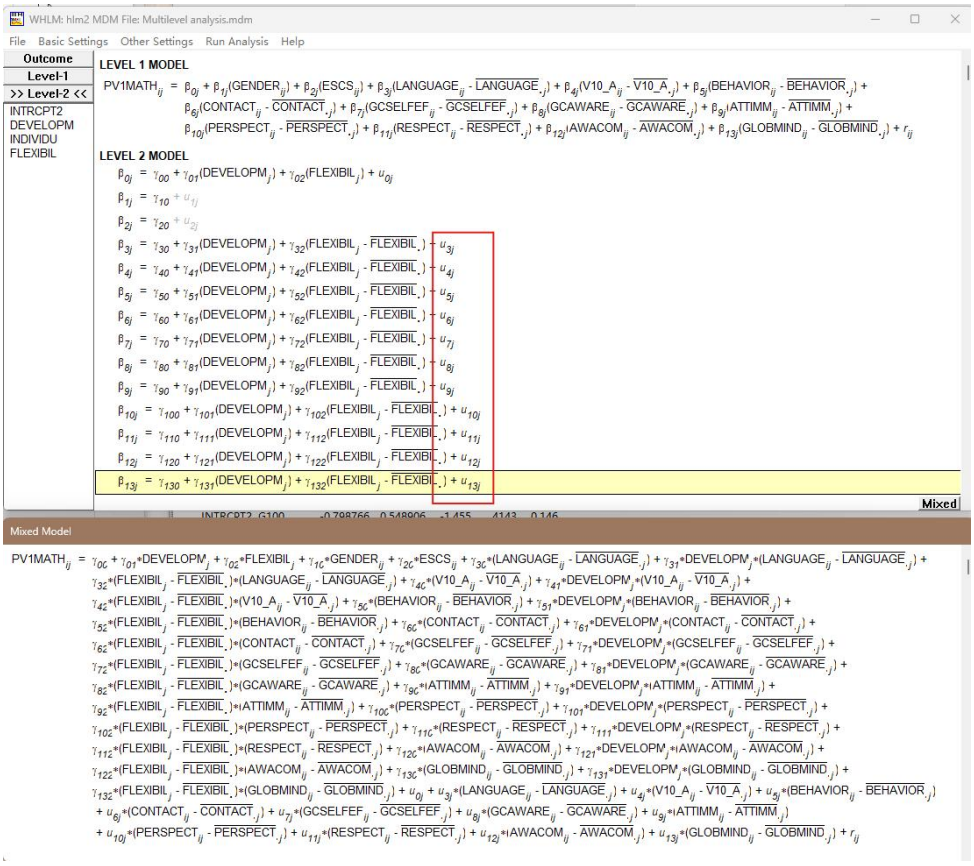
Fixed Effect	Coefficient	Standard Error	Approx. T-ratio	d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	492.538888	6.598693	74.642	48	0.000
V7_A, G01	28.949070	10.721426	2.700	48	0.010
INDIVIDU, G02	0.055160	0.066802	0.826	48	0.413
FLEXIBIL, G03	0.222713	0.050538	4.407	48	0.000
For GENDER slope, B1					
INTRCPT2, G10	-13.879414	1.003107	-13.836	4646	0.000
For ESCS slope, B2					
INTRCPT2, G20	25.215980	1.113811	22.639	15245	0.000
For LANGUAGE slope, B3					
INTRCPT2, G30	7.954704	0.862414	9.224	17034	0.000
For V10_A slope, B4					
INTRCPT2, G40	-1.237363	0.568815	-2.175	25477	0.029
For BEHAVIOR slope, B5					
INTRCPT2, G50	-4.966033	0.269598	-18.420	3108	0.000
For CONTACT slope, B6					
INTRCPT2, G60	-8.619742	0.556438	-15.491	3837	0.000
For GCSELFEF slope, B7					
INTRCPT2, G70	11.105698	0.789123	14.073	14089	0.000
For GCAWARE slope, B8					
INTRCPT2, G80	2.501480	0.763998	3.274	6200	0.001
For ATTIMM slope, B9					
INTRCPT2, G90	4.022639	0.601914	6.683	1347	0.000
For INTCULT slope, B10					
INTRCPT2, G100	-0.798766	0.548906	-1.455	4143	0.146
For PERSPECT slope, B11					
INTRCPT2, G110	1.770723	0.449928	3.936	634	0.000
For RESPECT slope, B12					
INTRCPT2, G120	10.242949	0.568969	18.003	4881	0.000
For AWACOM slope, B13					
INTRCPT2, G130	7.930034	0.558527	14.198	1488	0.000
For GLOBMIND slope, B14					
INTRCPT2, G140	1.352271	0.459091	2.946	1145	0.004

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1,	U0	23.52603	553.47427	48	29682.87847	0.000
level-1,	R	79.05291	6249.36197			

Model 3

Model 3: To explore whether variables at the country level moderated the relationship between students' global competence and their academic achievement, Model 3 was constructed. Interaction terms for country-level variables and student-level variables were included in the model. It is essential to note that when incorporating interaction terms in a multilevel model, variables at lower levels (e.g., student level) need to be group-centered, and variables at higher levels (e.g., school level and national level) need to be grand-centered. The full model is shown below.



Results: The results showed that the impact of GCSELFEFF, GCAWARE, and AWACOM on mathematics academic achievement differed between developed and developing countries or economies. Regarding cultural values, the interaction terms between GCSELFEFF and social flexibility, as well as between RESPECT and social flexibility, were significant.

Final estimation of fixed effects
(with robust standard errors)

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	461.911649	5.955242	77.564	49	0.000
DEVELOPM, G01	42.387761	7.901091	5.365	49	0.000
FLEXIBIL, G02	0.214737	0.043905	4.891	49	0.000
For GENDER slope, B1					
INTRCPT2, G10	-14.477753	1.212140	-11.944	364765	0.000
For ESCS slope, B2					
INTRCPT2, G20	25.212124	0.895054	28.168	364765	0.000
For LANGUAGE slope, B3					
INTRCPT2, G30	9.864055	0.883560	11.164	364765	0.000
DEVELOPM, G31	-3.368616	1.780937	-1.891	364765	0.058
FLEXIBIL, G32	-0.002747	0.013400	-0.205	364765	0.838
For V10_A slope, B4					
INTRCPT2, G40	-2.414102	0.617916	-3.907	364765	0.000
DEVELOPM, G41	1.811461	1.014413	1.786	364765	0.074
FLEXIBIL, G42	-0.010986	0.005685	-1.933	364765	0.053
For BEHAVIOR slope, B5					
INTRCPT2, G50	-5.311628	0.350926	-15.136	364765	0.000
DEVELOPM, G51	0.806891	0.638264	1.264	364765	0.206
FLEXIBIL, G52	-0.001483	0.003669	-0.404	364765	0.686
For CONTACT slope, B6					
INTRCPT2, G60	-8.740832	0.746209	-11.714	364765	0.000
DEVELOPM, G61	1.756525	1.256082	1.398	364765	0.162
FLEXIBIL, G62	0.006442	0.008319	0.774	364765	0.439
For GCSELFEF slope, B7					
INTRCPT2, G70	8.648007	0.905762	9.548	364765	0.000
DEVELOPM, G71	6.041173	1.298422	4.653	364765	0.000
FLEXIBIL, G72	0.017836	0.008141	2.191	364765	0.028
For GCAWARE slope, B8					
INTRCPT2, G80	5.673997	0.836116	6.786	364765	0.000
DEVELOPM, G81	-8.612101	1.597761	-5.390	364765	0.000
FLEXIBIL, G82	0.010312	0.007903	1.305	364765	0.192
For ATTIMM slope, B9					
INTRCPT2, G90	4.522663	1.116682	4.050	364765	0.000
DEVELOPM, G91	-0.464595	1.326701	-0.350	364765	0.726
FLEXIBIL, G92	0.010858	0.009580	1.133	364765	0.257
For PERSPECT slope, B10					
INTRCPT2, G100	2.416096	0.668584	3.614	364765	0.001
DEVELOPM, G101	-2.634104	1.095155	-2.405	364765	0.016
FLEXIBIL, G102	0.011182	0.006862	1.630	364765	0.103
For RESPECT slope, B11					
INTRCPT2, G110	10.635975	0.805017	13.212	364765	0.000
DEVELOPM, G111	-1.250315	1.235547	-1.012	364765	0.312
FLEXIBIL, G112	0.023219	0.008820	2.633	364765	0.009
For AWACOM slope, B12					
INTRCPT2, G120	6.164920	0.926295	6.655	364765	0.000
DEVELOPM, G121	4.039063	1.357884	2.975	364765	0.003
FLEXIBIL, G122	-0.007182	0.006089	-1.179	364765	0.239
For GLOBMIND slope, B13					
INTRCPT2, G130	0.604503	0.438101	1.380	364765	0.168
DEVELOPM, G131	1.314625	0.722629	1.819	364765	0.068
FLEXIBIL, G132	-0.022275	0.004285	-5.199	364765	0.000

The final collation of the results from all the models is presented in Table 2 and Table 3. Models for reading and science follow the same process as mathematical model-building.

Table 2. Fixed effects and random effects of HLM models for students' achievement in Mathematics, reading and science.

	Mathematics		Reading		Science	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fixed effects						
Student-level factors						
Gender		-13.879***		15.047***		-8.972***
		(1.003)		(0.941)		(0.964)
ESCS		25.216***		24.749***		23.410***
		(1.114)		(1.045)		(1.097)
LANGUAGESPEAK	11.232***	7.954***	10.321***	7.130***	9.987***	7.001***
	(1.099)	(0.862)	(1.192)	(0.965)	(1.156)	(0.945)
LANGUAGELEARN	-1.640*	-1.237*	-1.937*	-1.740*	-1.461*	-1.137
	(0.665)	(0.569)	(0.772)	(0.660)	(0.717)	(0.628)
BEHAVIOR	-4.832***	-4.966***	-6.646***	-6.458***	-5.598***	-5.640***
	(0.293)	(0.270)	(0.311)	(0.285)	(0.278)	(0.257)
CONTACT	-7.721***	-8.620***	-8.528***	-9.172***	-7.937***	-8.658***
	(0.606)	(0.556)	(0.641)	(0.596)	(0.648)	(0.581)
GCSELFEFF	14.337***	11.106***	13.183***	11.061***	15.693***	12.975***
	(0.987)	(0.789)	(1.059)	(0.944)	(1.112)	(0.942)
GCAWARE	4.125***	2.501***	6.389***	4.600***	5.360***	3.920***
	(0.775)	(0.764)	(0.864)	(0.805)	(0.776)	(0.748)
ATTIMM	3.363***	4.023***	7.149***	6.921***	4.778***	5.170***
	(0.699)	(0.602)	(0.739)	(0.633)	(0.696)	(0.601)
INTCULT	-1.523*	-0.799	2.221***	1.412**	-0.485	/
	(0.602)	(0.549)	(0.604)	(0.545)	(0.626)	
PERSPECT	1.889**	1.771***	4.049***	3.594***	2.691***	3.177***
	(0.528)	(0.450)	(0.578)	(0.491)	(0.505)	(0.435)
COGFLEX	-0.391	/	-4.476***	-4.052***	-1.542***	-2.908***
	(0.564)		(0.645)	(0.572)	(0.548)	(0.528)
RESPECT	11.233***	10.243***	17.745***	14.945***	12.696***	11.826***
	(0.663)	(0.450)	(0.670)	(0.636)	(0.651)	(0.568)
AWACOM	8.697***	7.930***	12.453***	10.908***	9.736***	8.969***
	(0.618)	(0.559)	(0.765)	(0.700)	(0.695)	(0.639)
GLOBMIND	1.924***	1.352**	0.952 (0.540)	/	1.554**	1.054*
	(0.477)	(0.459)			(0.497)	(0.474)
Country-level factors						
Development	32.539**	28.949*	32.028**	29.073**	30.367**	26.867*
	(11.126)	(10.721)	(11.372)	(10.604)	(10.598)	(10.374)
Individualism	0.160* (0.070)	0.055 (0.067)	0.223**	0.119 (0.072)	0.171*	0.076 (0.070)
			(0.074)		(0.070)	
Flexibility	0.242***	0.223***	0.103*	0.082 (0.050)	0.150**	0.131**
	(0.052)	(0.051)	(0.051)		(0.048)	(0.048)
Random effects	Variance	Variance	Variance	Variance	Variance	Variance
Student level (e_{ijk})	6868.996	6249.362	6975.477	6392.091	562.441	5923.476
Country level (μ_{00k})	567.887	553.474	699.735	677.595	6433.457	577.073

*p < 0.05; **p < 0.01; ***p < 0.001.

Table 3. Interaction effects of variables at the country level and students' global competence on academic achievement (Model 3).

	Mathematics	Reading	Science
Interaction term			
Development*GCSELFEFF	6.041*** (1.298)	8.053*** (1.537)	8.942*** (1.842)
Development*GCAWARE	-8.612*** (1.598)	-7.660*** (1.440)	-6.795*** (1.219)
Development*ATTIMM	-0.465 (1.327)	1.690 (1.208)	1.666 (1.369)
Development*INTCULT	/	2.257 (1.053)	/
Development*PERSPECT	-2.634* (1.095)	-1.982 (0.839)	-3.019** (0.932)
Development*COGFLEX	/	-1.193 (0.976)	-0.095 (1.270)
Development*RESPECT	-1.250 (1.236)	1.846* (1.116)	1.078 (1.248)
Development*AWACOM	4.039*** (1.358)	4.346*** (1.187)	5.084*** (1.529)
Development*LANGUAGESPEAK	-3.369 (1.781)	-4.851 (2.010)	-4.808* (1.953)
Development*LANGUAGELEARN	1.811 (1.014)	0.807 (1.116)	/
Development*CONTACT	1.757 (1.256)	1.749 (1.437)	-0.181 (1.390)
Development*GLOBMIND	1.315 (0.723)	/	1.471 (1.060)
Development*BEHAVIOR	0.807 (0.638)	0.947 (0.789)	-0.033 (0.674)
Flexibility*GCSELFEFF	0.018* (0.008)	/	0.001 (0.010)
Flexibility*GCAWARE	0.010 (0.008)	/	0.005 (0.008)
Flexibility*ATTIMM	0.011 (0.010)	/	0.003 (0.008)
Flexibility*INTCULT	/	/	/
Flexibility*PERSPECT	0.011 (0.007)	/	0.015** (0.006)
Flexibility*COGFLEX	/	/	-0.009 (0.008)
Flexibility*RESPECT	0.023** (0.009)	/	0.014 (0.008)
Flexibility*AWACOM	-0.007 (0.006)	/	-0.013 (0.008)
Flexibility*LANGUAGESPEAK	-0.003 (0.013)	/	0.005 (0.012)
Flexibility*LANGUAGELEARN	-0.011 (0.006)	/	/
Flexibility*CONTACT	0.006 (0.008)	/	0.011 (0.009)
Flexibility*GLOBMIND	-0.023 (0.004)	/	-0.022 (0.006)
Flexibility*BEHAVIOR	-0.001 (0.004)	/	0.002 (0.004)
Random effects	Variance	Variance	Variance
Student level (e_{ijk})	6230.403	6360.595	5895.990
Country level (μ_{00k})	604.770	845.040	693.697

All indicators of global competence and variables at the country level, as well as control variables, were included in Model 3, but not all coefficients are shown here. *p < 0.05; **p < 0.01; ***p < 0.001.