

Capturing quality of education in culturally, linguistically and educationally diverse populations

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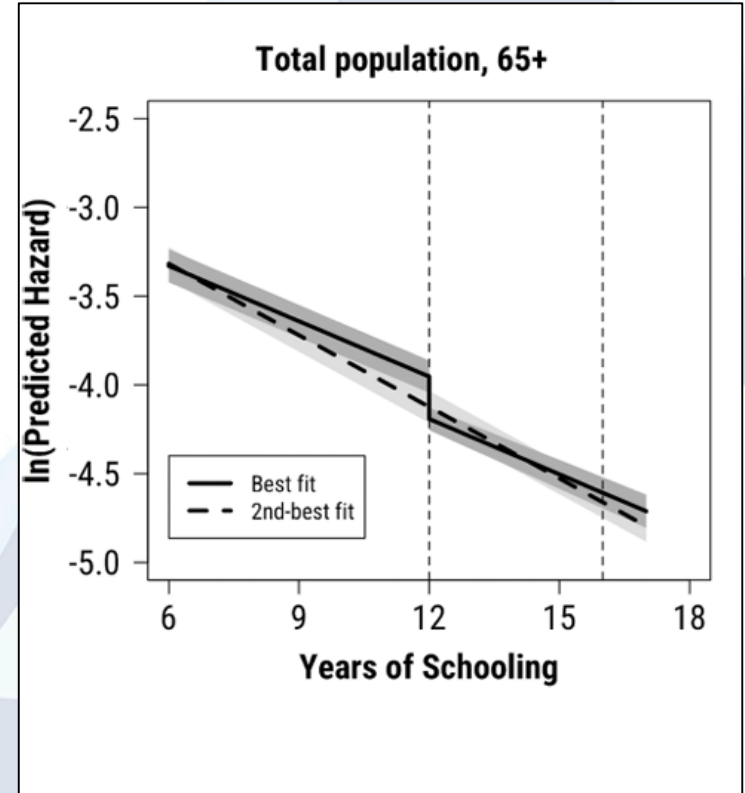


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Education & dementia risk

- More education and higher quality of education is associated with substantially lower incident dementia (Ailshire et al., 2025; Soh et al., 2023; Xu et al., 2015).
- Xu et al. (2015):
 - 55,655 for low education and 20,172 for high education were included.
 - Dementia risk was reduced by 7 % for per year increase in education.
- Chat et al. (2025): linear decline in dementia incidence with increasing years of educational attainment.



Neuropsychological test biases

- Global North populations, meaning people from countries that historically had less inequality in living standards, more sociopolitical stability, and greater access to resources (Alladi & Hachinski, 2018).
- Most neuropsychological tests require specific cultural knowledge and familiarity with testing structures and formats, or to be “test-wiseness” (Fujii, 2018).



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Education and the MMSE

Mini-Mental State Examination (MMSE)	
Max. Score	Score
Orientation	
5	----- What is the (year) (season) (day of the week) (month) (date)?
5	----- Where are we: (state) (county) (town) (hospital) (floor)?
Registration	
3	----- Name 3 unrelated objects, allow 1 second to say each. Then ask the patient to repeat all 3. Give 1 point for each correct answer. Repeat them until he learns all 3. Count trials and record. Trials: -----
Attention and Calculation	
5	----- Ask patient to count backwards from 100 by sevens. 1 point for each correct answer. Stop after 5 answers.
Recall	
3	----- Ask patient to recall the 3 objects previously stated. Give 1 point for each correct answer.
Language	
9	----- <ul style="list-style-type: none">• Show patient a wristwatch; ask patient what it is. Repeat for a pencil (2 points).• Ask patient to repeat the following: "No ifs, ands, or buts" (1 point).• Ask patient to "take a piece of paper in your right hand, fold it in half, and put it on the floor" (3 points).• Ask patient to read and obey the following sentence which you have written on a piece of paper: "Close your eyes" (1 point).• Ask patient to write a sentence (1 point).• Ask patient to copy a design (1 point).
Total Score	-----
Suggested guideline for determining the severity of cognitive impairment	
Mild: MMSE \geq 21	
Moderate: MMSE 10-20	
Severe: MMSE \leq 9	
Expected decline in MMSE scores in untreated mild to moderate Alzheimer's patient is 2 to 4 points per year.*	

- The Mini-Mental State Examination (MMSE), is one of the most used global cognitive assessment tests globally (Gallegos et al., 2022).
- Lower educated populations consistently performing worse on serial sevens, writing a sentence and the drawing of pentagons (Celik et al., 2022; Ramirez et al., 2006).
- Ng et al. (2018), Chinese participants scored better on the MMSE verbal memory task, but worse on the drawing of pentagons task than Finish participants with the same education level.

Misdiagnosis

Consequently, culturally, linguistically, and educationally diverse populations are more likely to score poorly on tests of social cognition, leading to misdiagnosis and inappropriate healthcare management (Nielsen et al., 2018; Olabarrieta-Landa et al., 2022).

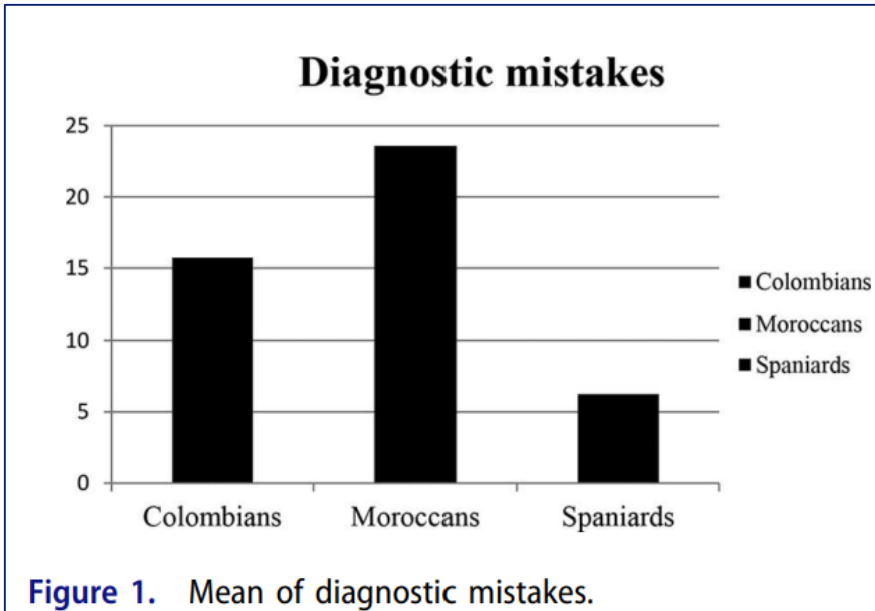


Figure 1. Mean of diagnostic mistakes.

(Daugherty et al., 2017)

Measuring quality of education

- Even with tools designed for low educated populations, it is important to consider what has been learned, or in other words, their quality of education.
- Studies suggest quality of education may explain differences on cognitive tests across cultural groups (e.g. reading level) in multiple cognitive domains (Manly et al., 2002; Seblova et al., 2023).
- Assessing quality of education remains challenging, as it is inherently embedded within and influenced by cultural values (Barrett et al. 2006).



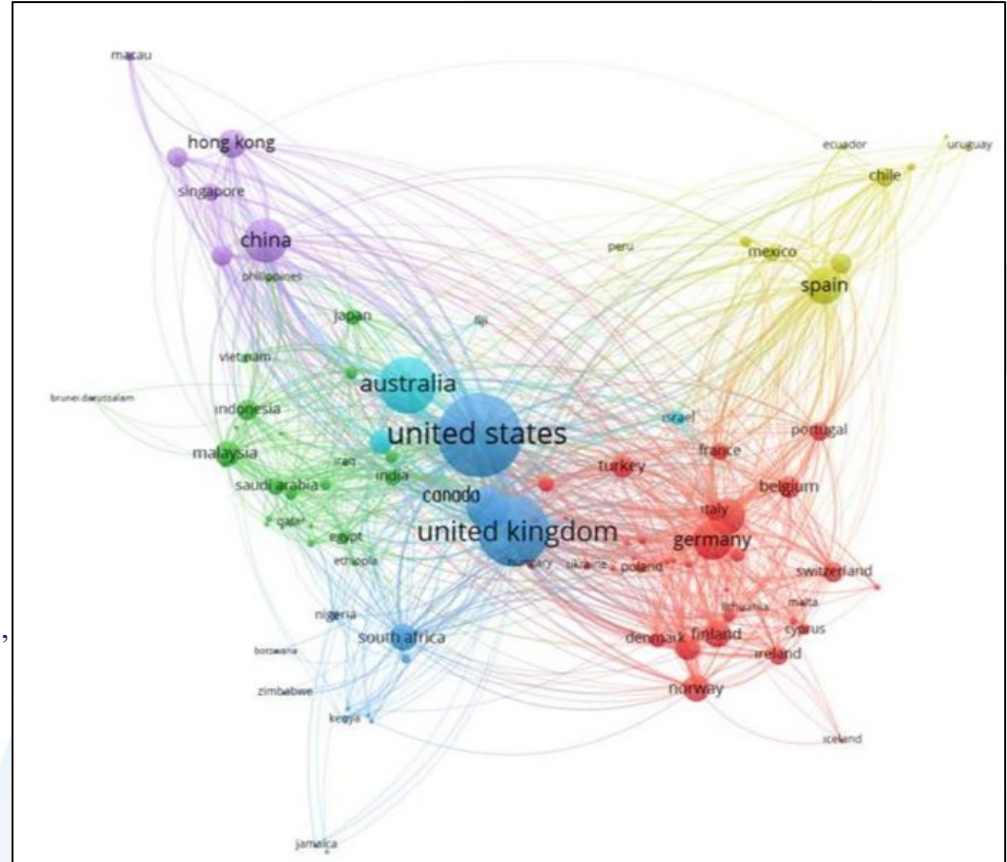
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Measuring quality of education

- To date most of the research on quality of education stems from the United States, reflecting its particular cultural perspectives (Maral, 2024).
- A study comparing American quality of education guidelines with educational standards in Australia, Kenya, and Nepal found that they were grounded in Euro-Western developmental frameworks (Nganga et al., 2024).



Quality of education study: Interview

- Initial question list with 12 closed-ended questions and 3 open-ended questions focusing on primary education
 - Closed-ended examples: Classroom size (#students), number teachers (student-to-teacher ratio)
 - Open examples: Perspectives on a “good” and “bad” school

A collaboration with Clara Calia & Eithne MacDonald (The University of Edinburgh) & Rune Nielsen (Copenhagen University Hospital - Rigshospitalet)



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Quality of education study: Interview

Table 1. Participant characteristics for all groups.

	Surinamese participants (n = 15)	Moroccan participants (n = 14)
Sex (% female)	20%	43%
Age	57 (4)	53 (28)
Education	4 (1)	4 (3)
RUDAS	28 (3)	27 (3)
GDS-15	1 (2)*	0 (1)
BASH	12 (9)	18 (11)

Note: Age, education, RUDAS, GDS-15 and BASH reported in median (IQR). Education is measured using the ISCED scale.

* p < .01

	Surinamese participants (% yes)	Moroccan participants (% yes)
Education in native language	0	86
Access to books	100	93
Shared books	43	46
Library access at school	92	31
School materials at home	100	100
Homework	77	92
Skip grade or retained	89	70
Had one teacher in the classroom	100	54
Went to public rather than private	100	70
Had different ages in the classroom	78	39
Different years in a grade	10	8

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Quality of education study: Interview

Low quality education	High quality education
Poor state of the facilities	Enough/many/free books
Corporal punishment	A large number of teachers; good teachers
Discrimination	Respect between teachers and students; respect for all regardless of background
Poor management/lack of rule enforcement	Rules/discipline/clear expectations
Fights/student conflicts not addressed	Safe environment/feeling safe
Poor organization	Frequent breaks
Chaotic atmosphere	(Individual) attention paid to students (in need)
	Proper AC/heating
	Quality materials
	Effective communication
	Warm environment; positive atmosphere; feeling welcome
	Practical/hands-on learning; fostering independence

Quality of education study: Interview UK

Country of Origin	n per group
Syria	9
Sudan	7
Hong Kong	3
Bangladesh	2
India	2
Iraq	2
Japan	1
<i>Total n</i>	26

Demographic Factors	Median (IQR)
Female (%)	76.9%
Age	62 (55.25 - 72)
Years of Education	12 (10.25 - 15)
Measures	Mdn (IQR)
RUDAS	28 (28 - 29)
GDS-15	2.19 (1 - 3)
BASH	7.5 (6 - 9)