Measures and Limits of Enem

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Summary

- Enem's numbers
  - characteristics
  - validity
  - confiability
- Enem's itens
- Do and don't with teaching physics and Enem

ENEM'S NUMBERS

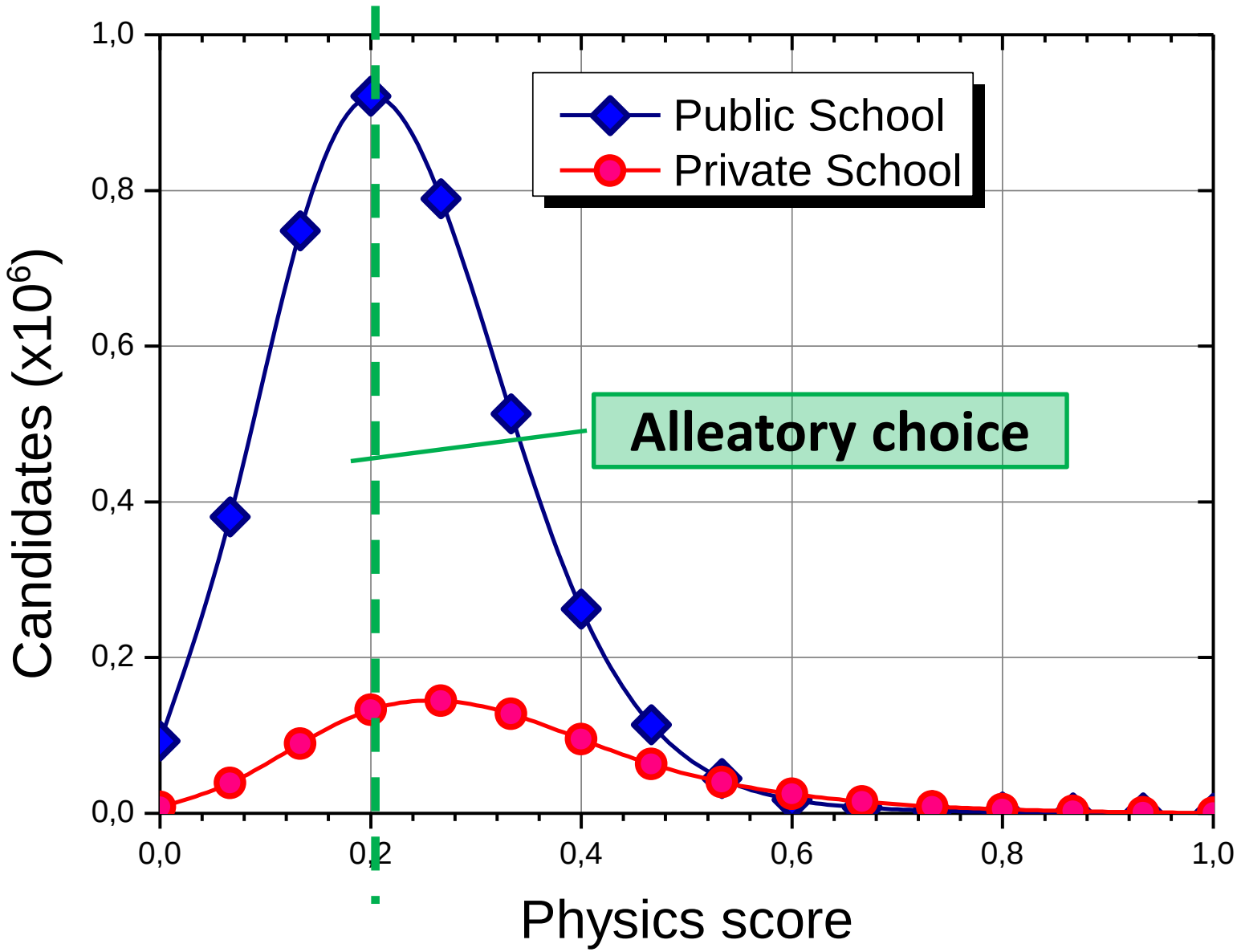
Enem as a public politic

- Enem serves to multiple purposes:
  - entry to federal institutions of higher education (without fees);
  - scholarships in private institutions;
  - high school graduation certification.

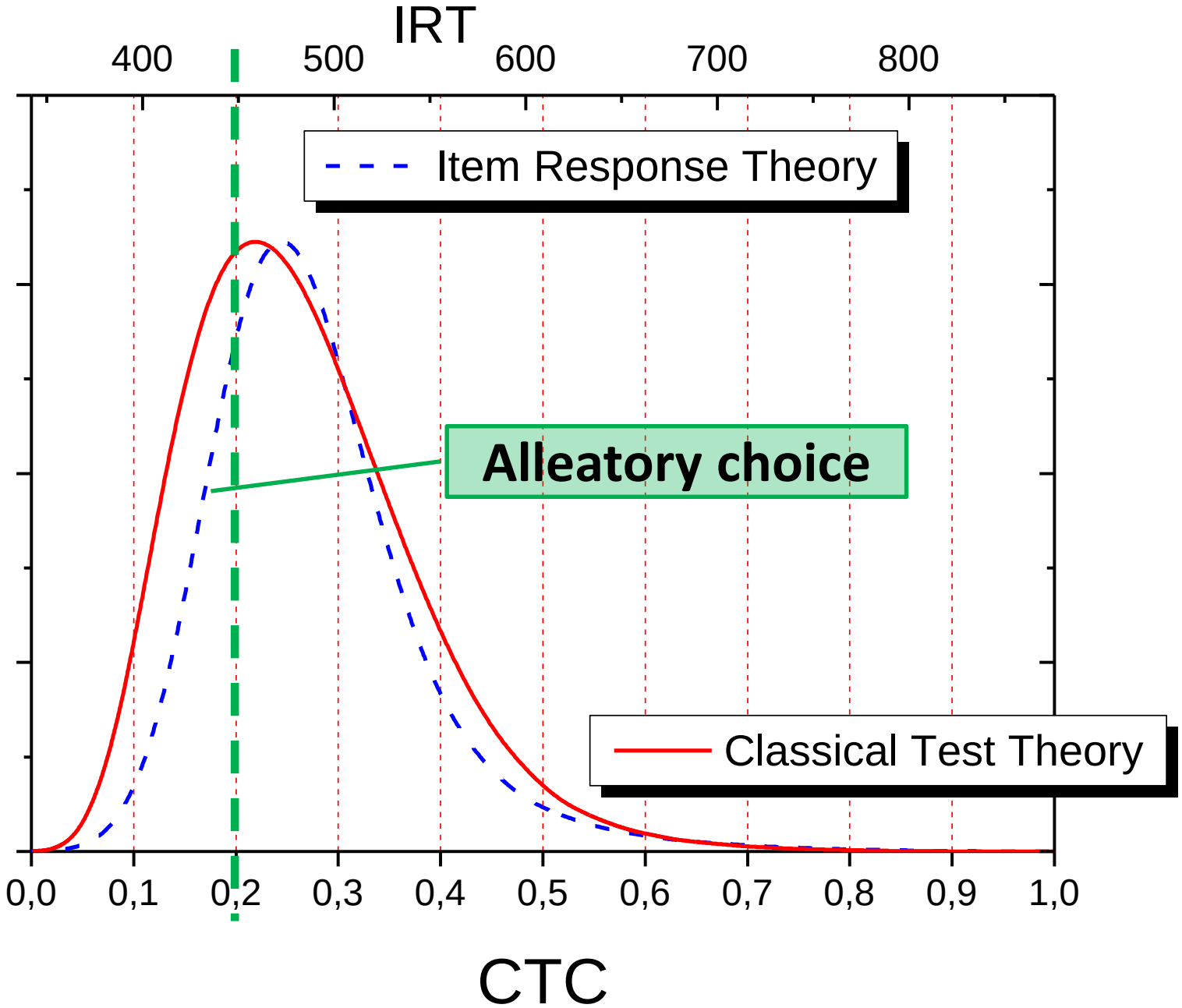
Enem as an assessment exam

- 180 multiple-choice items plus an essay;
- 45 items for natural sciences
  - 15 items of physics;
- ***Only three minutes*** to answer each item;
- In 2014, 6.161.631 candidates were present.

Enem's numbers/physics 2014



Natural Sciences/45 items



Cultural capital

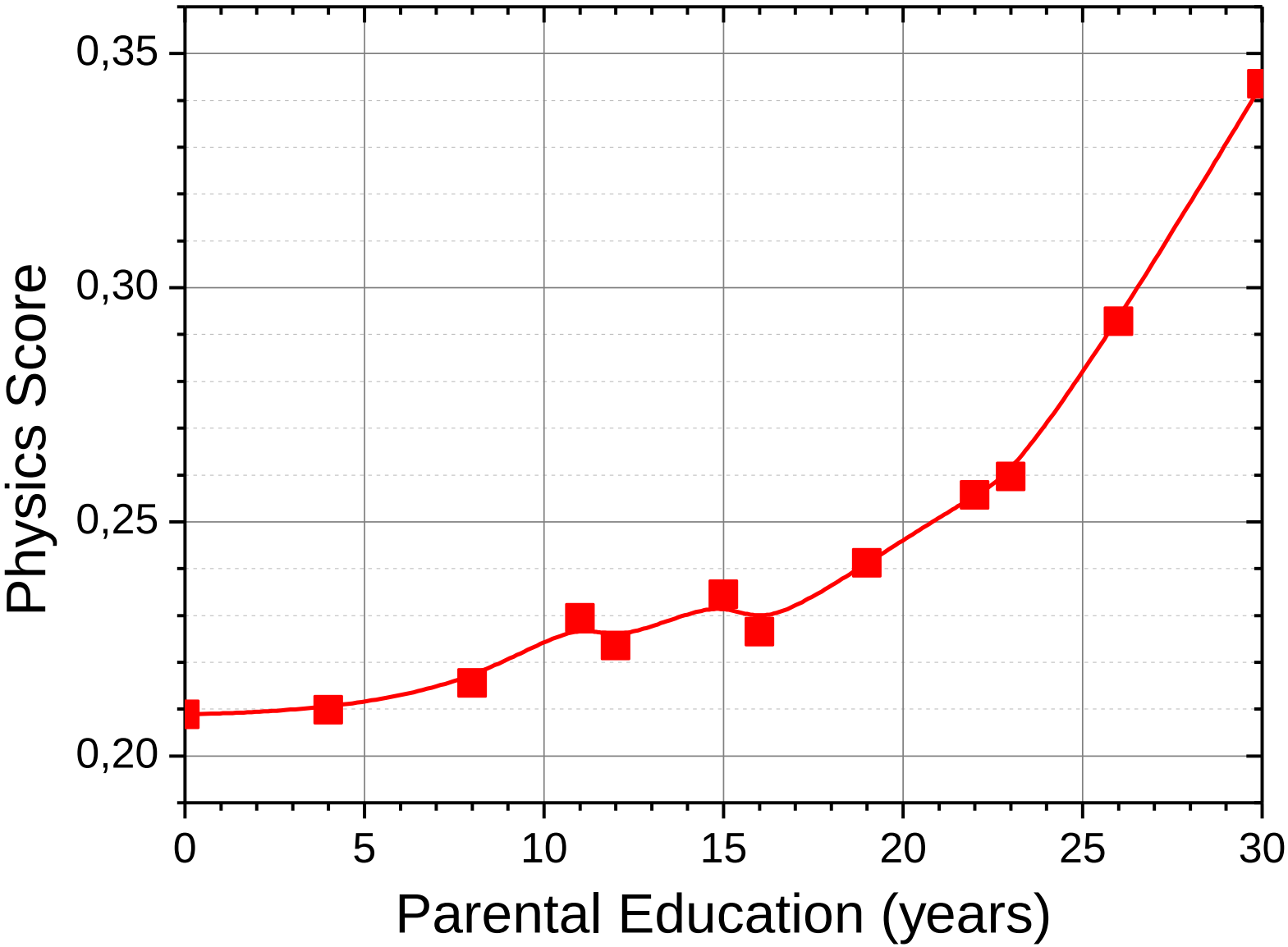
- Bourdieu used the concepts of cultural capital to explain the ways in which societal structures interact with student aspirations.

- Good performance in exams (generally) needs high-status cultural capital, rewarding the students from dominant culture backgrounds.

Parental education

- proxies to
  - capital cultural;
  - economic capital;

Cultural capital/Enem 2014



Reliability coefficient: Cronbach's α

- correlation between two or more variables which measure the same thing.
- provide a measure of the internal consistency of a test or scale;
- it is expressed as a number between 0 and 1.

α expected and measured

Expected	
Items	α
15	0.5
30	0.8
85	0.9

		Measured		
		N	Physics	Natural Sciences
	Items		***15***	***45***
	All	6,161,631	0.307	0.608
School	Public	3,896,854	0.201	0.484
	Private	798,989	0.521	0.777
Parental Education	Elem. Sch.(8 y)	607,206	0.157	0.444
	High Sch. (11 y)	727,931	0.308	0.610
	Higher Edu. (15 y)	347,865	0.547	0.793

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Items	α
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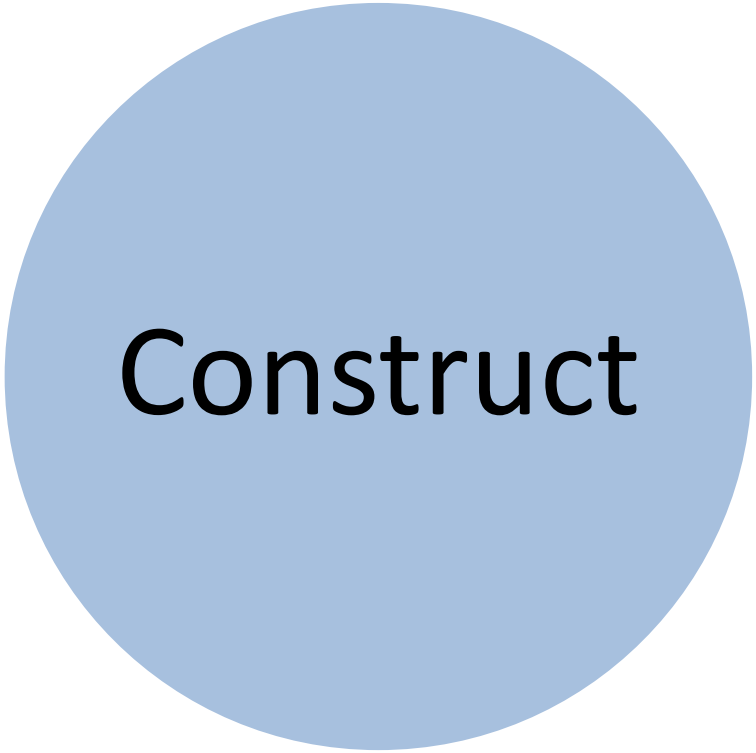
		Measured		
			Physics	Natural Sciences
	Items		***15***	***45***
School				
	Private		0.521	0.777
Parental Education				
	Higher Edu. (15 y)		0.547	0.793

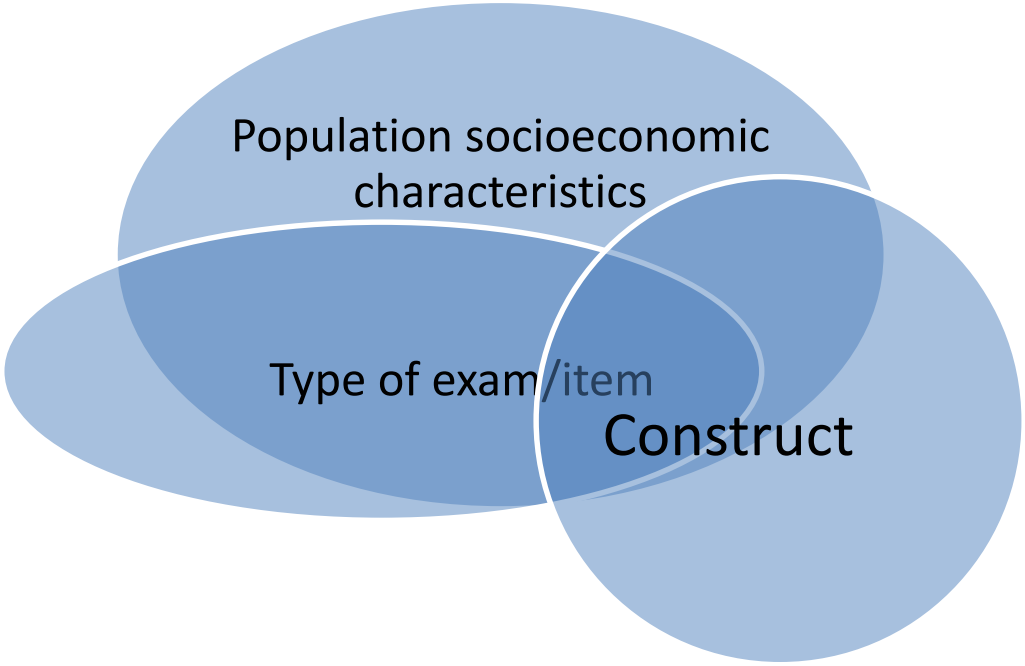
Alpha constraints

- A common construct for all participants are expected by the items writers



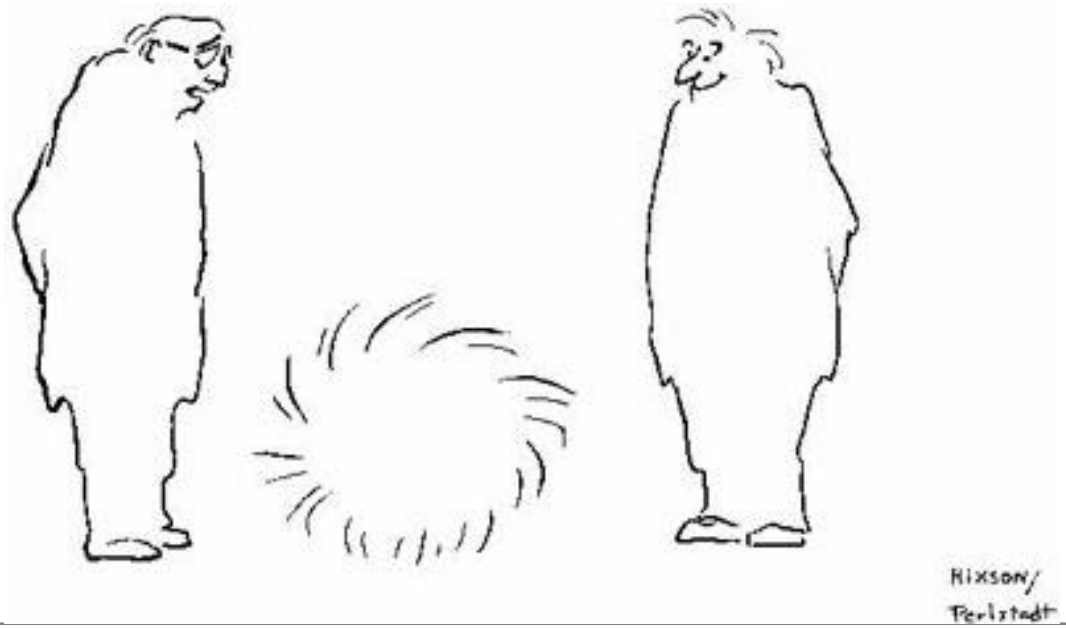
Alpha constraints

- A common construct for all participants are expected by the items writers, but this expectation failed.



Face validity

- refers to the degree to which a test appears to measure what it purports to measure.



Enem’s face validity

- Items are expected to be contextualized, in what context? student's context? judge's context?
- Items where the statement is unnecessary long;
- Few items present controversial or wrong answers.

ENEM'S ITEMS

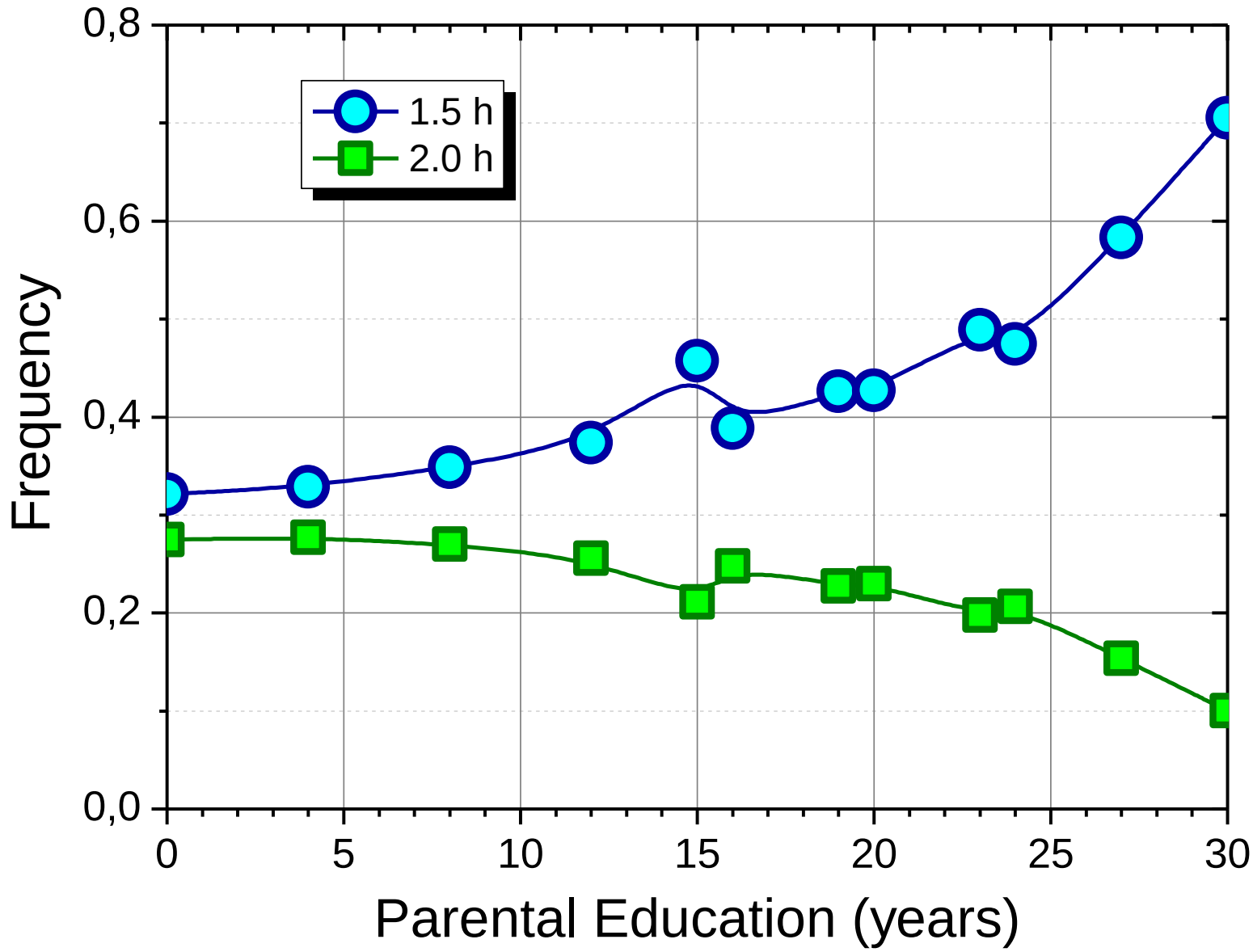
Fixation exercises

A logistics company prepares the path of a truck with two sections, the first has a length 80 km and will run through to 80 km / h and the second has a length of 60 km and will run through to 120 km / h.

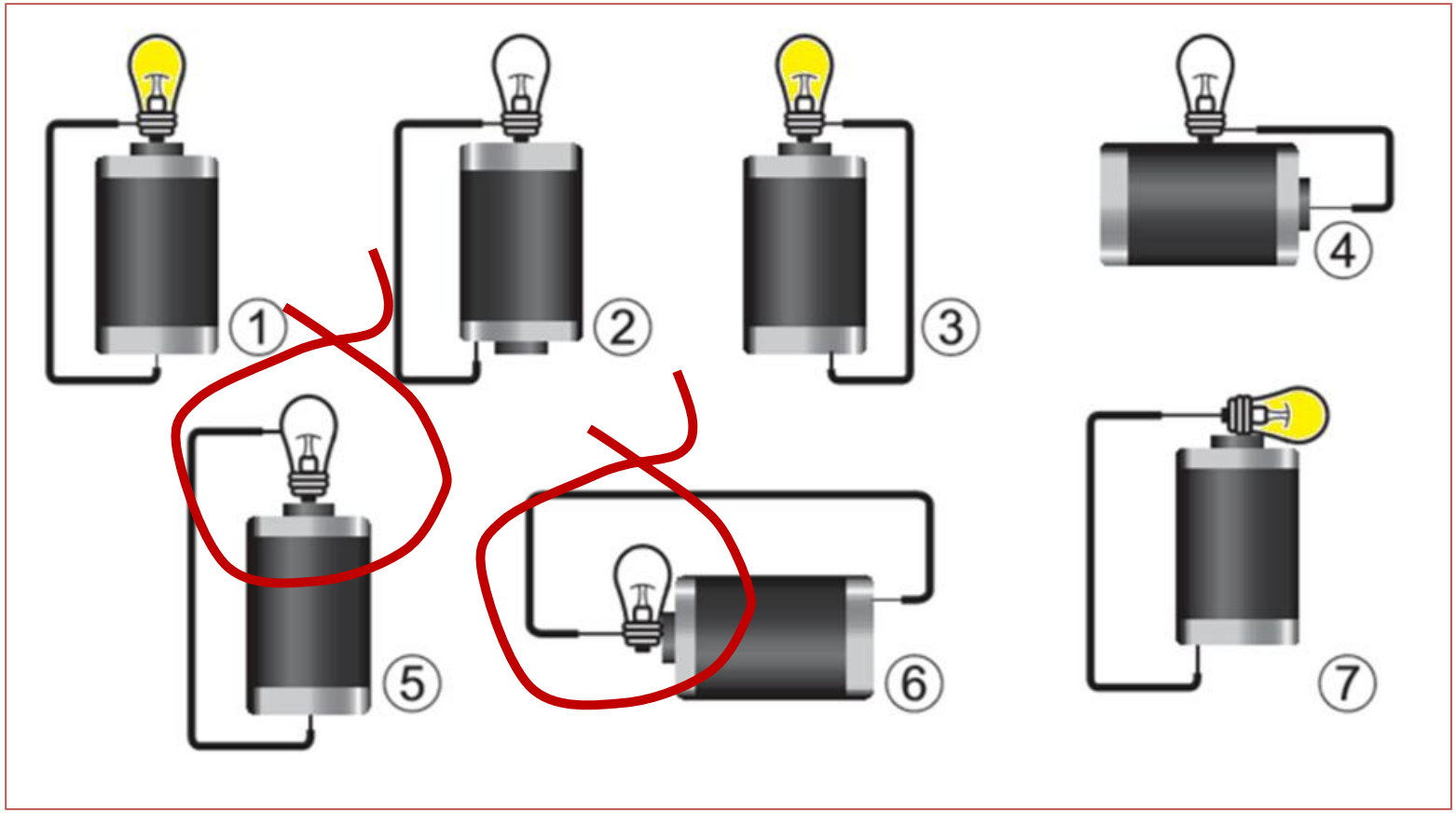
What is the time in hours spent a total path?

A) 0,7
B) 1,4
C) 1,5*
D) 2,0
E) 3,0

Principal answer frequencies

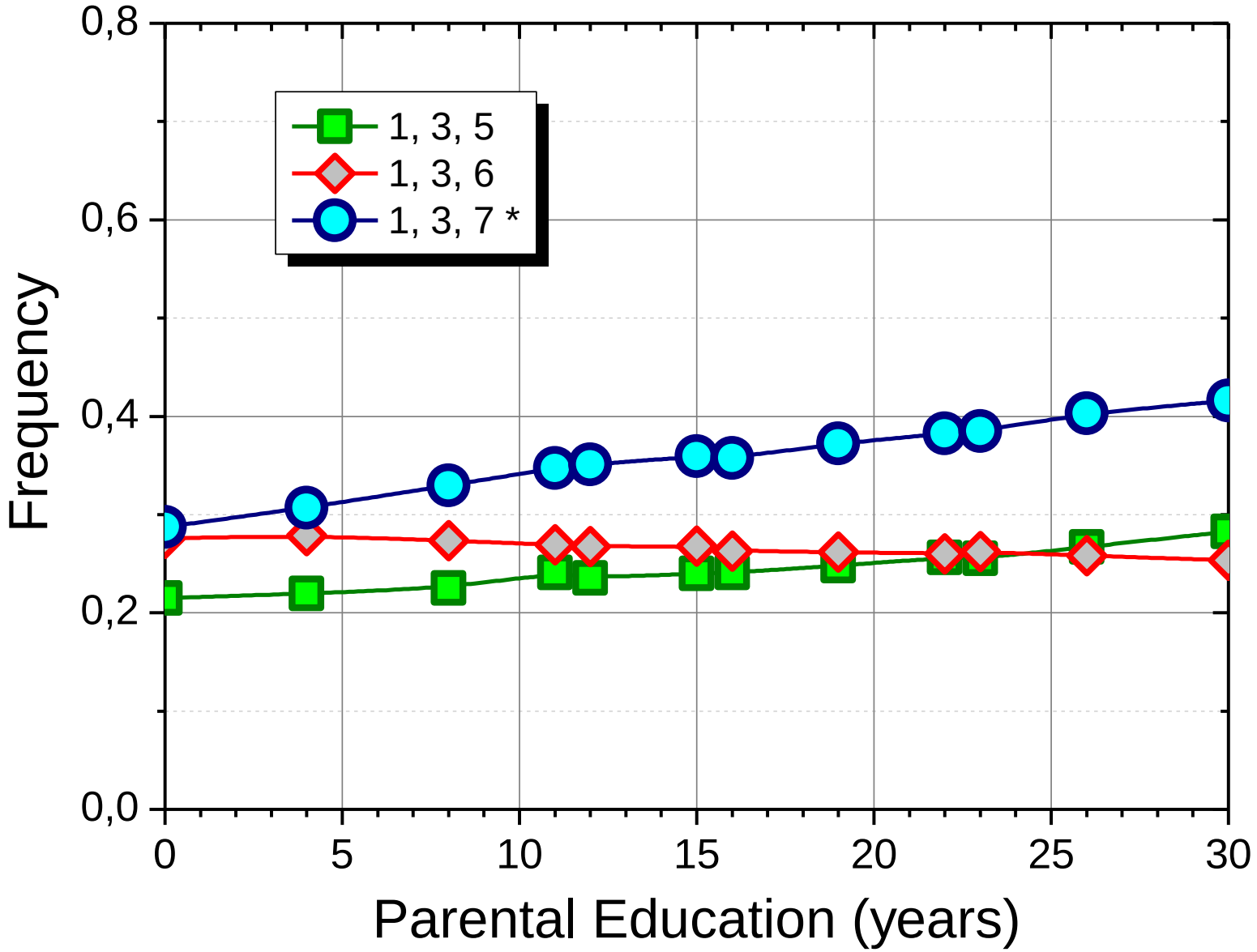


Simple experimental situations



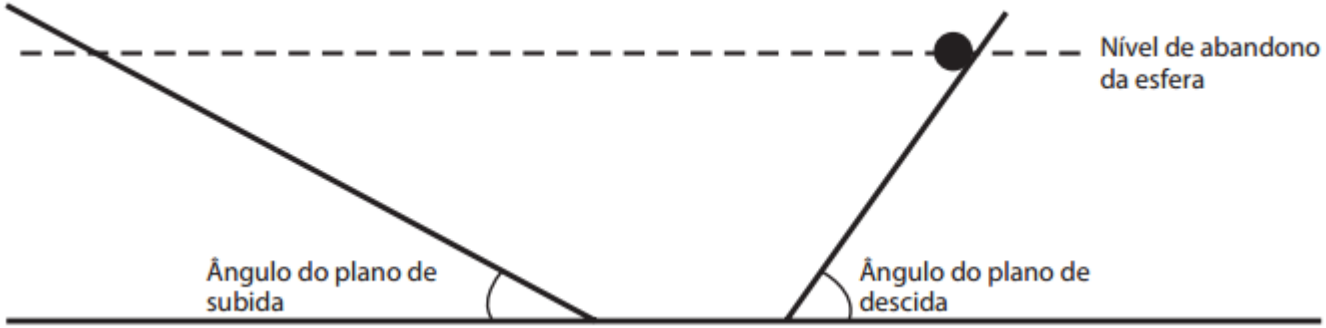
A) (1), (3), (6) B) (3), (4), (5) C) (1), (3), (5) D) (1), (3), (7)* E) (1), (2), (5)

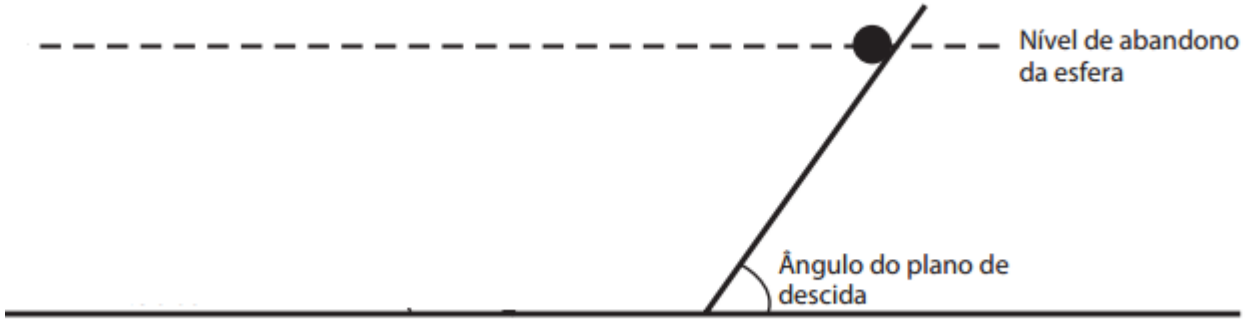
Principal answer frequencies



Alternative conceptions

The movement of a ball in two inclined planes without friction was discussed by Galileo. The height at which the ball is loose in the descendent ramp is equal to the height of the ball reaches on the upward ramp.





If the upward ramp's angle is reduced to zero, the sphere

A)* maintains its constant speed, because the resulting impulse on it will be null.

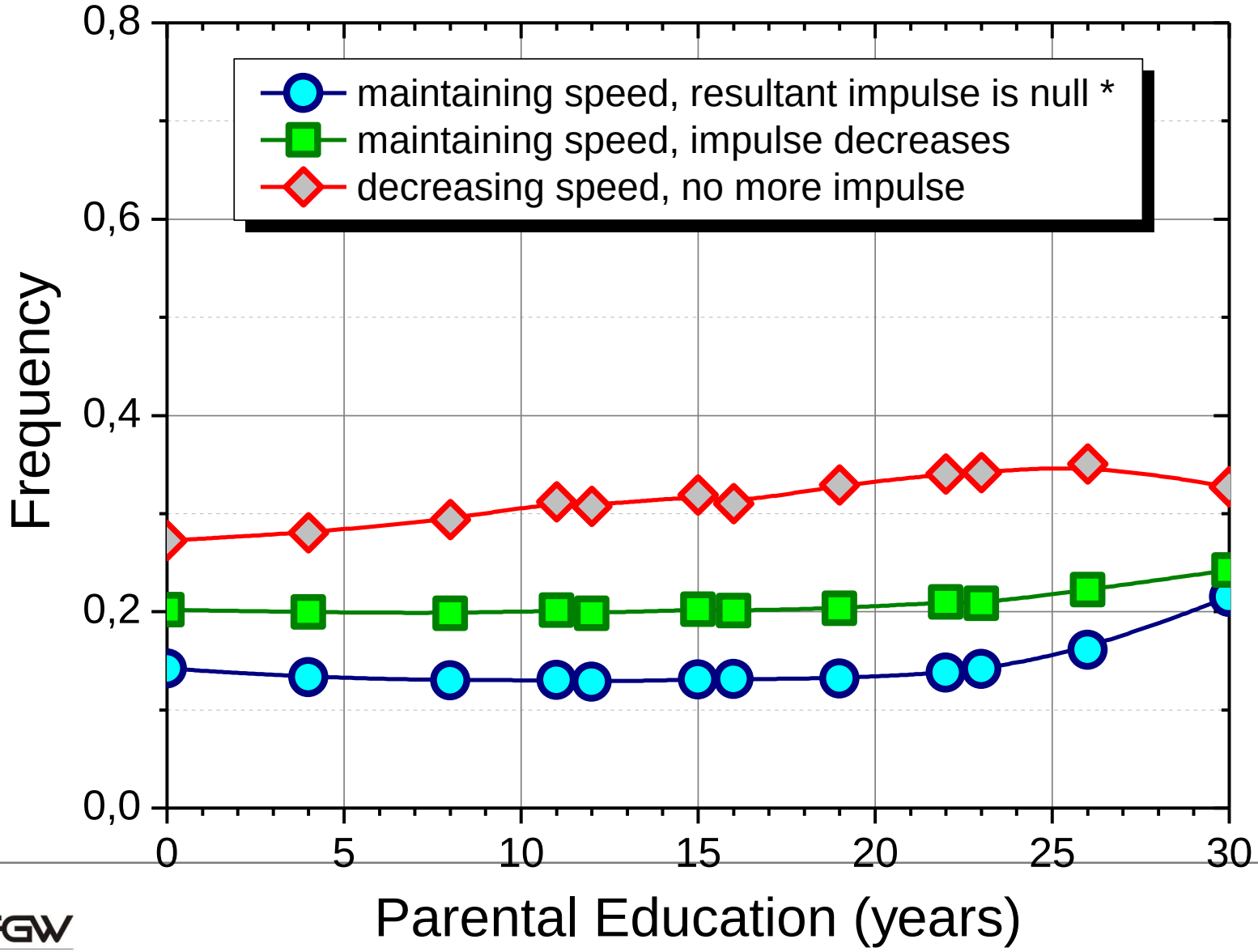
B) maintain its constant speed, because the impulse's decline will continue to push it.

C) gradually decreases your speed, because there will be no more impulse to push it.

D) gradually decreases your speed, because the resulting impulse will be contrary to their movement.

E) gradually increases your speed, because there will be no contrary impulse to their movement.

Principal answer frequencies



DO AND DON’T WITH ENEM

Teaching physics:
Do and don't with Enem

- Soft skills for the XXI century:
  - team work;
  - experimental manual abilities;
  - dissertation capacity;
  - creativity;
  - articulation of old knowledge in new situations.

Teaching physics:
Do and don't with Enem

- ***Scores***
- Overview of difficulties;
- Socio Educational aspects:
  - Regional differences;
  - Public and private school;
  - Gender performance;
- Evaluation in distinct years (IRT);
- Provide (specific) information to schools teachers.

Teaching physics:
Do and don't with Enem

- ***Items***
- Punctual analysis of difficulties - frequency analysis;
  - Pen and paper problems;
  - Alternative conceptions;
  - Preliminary experimental ideas;
- Learning about how students think the physics seeing the wrong choices.

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