

Example Cognitive Ability Items From Intelligence Testing and Educational Measurement

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2/4/2021

“Intelligence” Test Items

Used in human cognitive abilities, child development, genetics, economics research, applications in school psychology (diagnosis)

Relatively “pure” measures of human abilities or traits (minimize multiple factor contamination)

Superficially different but highly correlated in humans

Induction (examples: figural, verbal, or numerical sets, series, matrices)

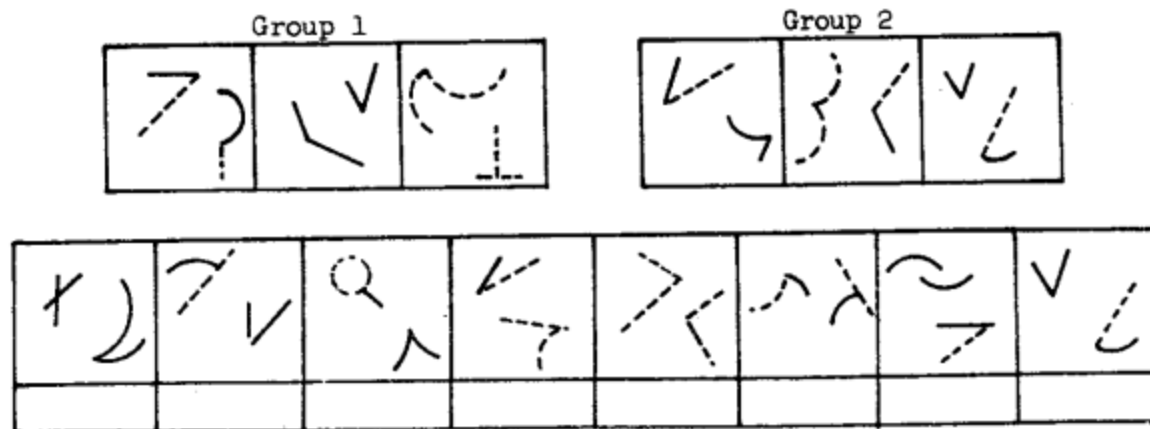
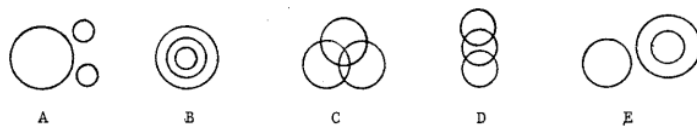


Figure Sets

Sequential Reasoning (Deductive Reasoning) (examples: logical deductions)



Diagramming Relationships

Pines, trees, stones

A B C D E

Quantitative Reasoning (examples: arithmetic word problems)

A cyclist in an international bicycle race covered an average of 9 miles every 20 minutes. If she maintained the same average speed, how long did it take her to cycle the remaining 84 miles of the race?

- 1 - divide and multiply
- 2 - subtract and divide
- 3 - add and subtract
- 4 - divide and add

Necessary Arithmetic Operations

Reading Comprehension

The metal porch swing virtually sizzled on the old wooden front porch today. But we sat there anyway. Gramma wouldn't hear of anything else. I suggested a walk through the forest, hoping to entertain a breeze or two and to take advantage of the shade. Gramma shook her head. You were supposed to sit on the porch after supper, and that's what we were going to do.

This author implies that

- A. Gramma cooked supper.
- B. Gramma didn't like the forest.
- C. Gramma didn't change her routine.
- D. Gramma couldn't hear very well

*Superficially different
but highly correlated in
humans*

Vocabulary

inclement

1-balmy

2-happy

3-righteous

4-severe

5-apprehensive

Cloze

Several different _____ for estimating the approximate functional content of adult human memory have been _____.

Landauer, 1986. *How much do people remember?...* *Cognitive Science*, 10, 477-493.

“what would happen if the government only allowed people to drive electric cars in cities?”

STUDENT 1

1. Many people would not be able to drive due to economic constraints
2. We would quickly reduce emissions
3. The consumption of fossil fuels would drop drastically.
4. The number of vehicles on the road would drop quickly.
5. More people would use public transportation
6. More low income people would be without vehicles
7. Electricity bills would increase

STUDENT 2

1. gas stations would go out of business
2. it would reduce American dependency on oil
3. it would be much better for the environment
4. the electric company would see increased profits
5. it would lessen the power of oil lobbyists
6. it would lead to legislation about what constitutes a city
7. there would be increased resentment between country and city people

Educational Assessment items

Used in higher education admissions and in large scale educational assessments (PISA, NAEP) to compare school systems outputs (students' knowledge and skills) from different economies, states

Less pure, more complex samples of human knowledge and skill

GRE Logical Reasoning Item

Because the process of freezing food consumes energy, many people keep their electric freezers half empty, using them only to store commercially frozen foods. Yet freezers that are half-empty often consume more energy than they would if they were kept fully stocked. Which of the following, if true, contributes most to an explanation of the apparent discrepancy described above?

- (A) A given volume of air in a freezer requires much more energy to be maintained at a temperature below freezing than does an identical volume of frozen food.
- (B) The more often a freezer's door is opened, the more energy is required to maintain that freezer's normal temperature.
- (C) When unfrozen foods are placed in a freezer, the average temperature of a given volume of air inside that freezer rises temporarily.
- (D) A person who normally maintains a half-empty freezer can cut energy costs considerably by using a freezer that is 50 percent smaller.
- (E) An electric freezer can operate efficiently only if chilled air is free to circulate within the freezing compartment.

Core Domain Skills: Science (Prototype)

The simulation interface is divided into several sections:

- Exploration / Data analysis:** A toolbar on the left contains icons for various sensors: barometer, galvanometer, thermometer, windmeter, tachometer, hygrometer, blade, and mast.
- Central Model:** A 3D model of a windmill is shown against a blue sky. Below the model, there are two readouts: "0 kWh" and "0 m/s". A green "run" button is located at the bottom right of the model area.
- Data Collection:** On the right, there is a "Data Collection 1" panel. It includes a "Clear" button, a "Delete" button, and a table of data points. Below the table is a legend for the data series.
- Task Description:** At the bottom left, a text box contains the following text:

Your task is to find out which factors have an influence on the amount of electric power produced by the windmill.
Question 1. How can we describe the general relationship between wind speed and the amount of produced electric power by the windmill?
- Controls:** At the bottom right, there are "Record" and "Stop" buttons, and an "interval: 2 s" setting.

Time	Galvanometer	Thermometer	Windmeter	Tachometer	Hygrometer	Blade	Mast
4	527		4			3	10
6	744		6			3	10
8	744		8			3	10
10	744		10			3	10
12	744		12			3	10
14	744		14			3	10
16	744		15			3	10

Legend:

- time (blue)
- galvanometer (red)
- windmeter (purple)
- hygrometer (orange)
- mast (pink)
- barometer (brown)
- thermometer (green)
- tachometer (yellow)
- blade (cyan)

Transversal Skills: Collaborative PS (PISA 2015)

The screenshot displays a digital interface for a collaborative problem-solving task. At the top, it is labeled "PISA 2015" and includes a progress bar and navigation icons. The interface is divided into three main sections:

- Chat Window (Left):** Titled "Who's in the Chat" with participants "You", "George", "Rachel", and "Brad". The chat history shows:
 - Rachel:** You know, the museum of local history would really give a sense of life in our town.
 - Brad:** It's kind of boring. Besides, I think it's closed.
 - You:** Rachel, the museum is open only on weekends. Let's look at the other options.
 - Rachel:** Hey, I've checked the museum website – they're NOT open Thursday afternoon. On the notepad, I'll say that the site must be open 1:00-3:00 PM on Thursday.The "You" input field contains the text: "It's a shame that it's closed Thursdays -- it would've been perfect." Below it are three more input fields with the text: "George, why haven't you suggested any ideas?", "We're wasting time arguing about this. Let's move on.", and "We should discuss the market and the car factory." A "Send" button is at the bottom.
- Central Area:** Contains three icons with labels: a blue icon for "museum of local history", a green icon for "community market", and a purple icon for "electric car factory".
- Notepad (Right):** A yellow sticky note titled "Notepad" with the following bullet points:
 - Provides sense of life in our town
 - Travel time is manageable
 - Is open Thursday, 1-3 PM