

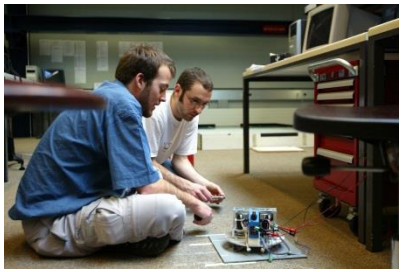

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Being ‘Bright’ - Intelligence

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How People Learn I

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Introduction

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- You will be able to
  - Identify what psychologists mean by the terms
    - ‘intelligence’
    - ‘g’
    - IQ
  - Relationship between IQ and attainment
  - Critique the idea of ‘intelligence’
  - Multiple Intelligences
  - Triarchic Intelligences

PRESENTATION

Take the test…

- ***Take the following Intelligence test:***
  - Circle the correct answer for each question
  - You have 8 minutes

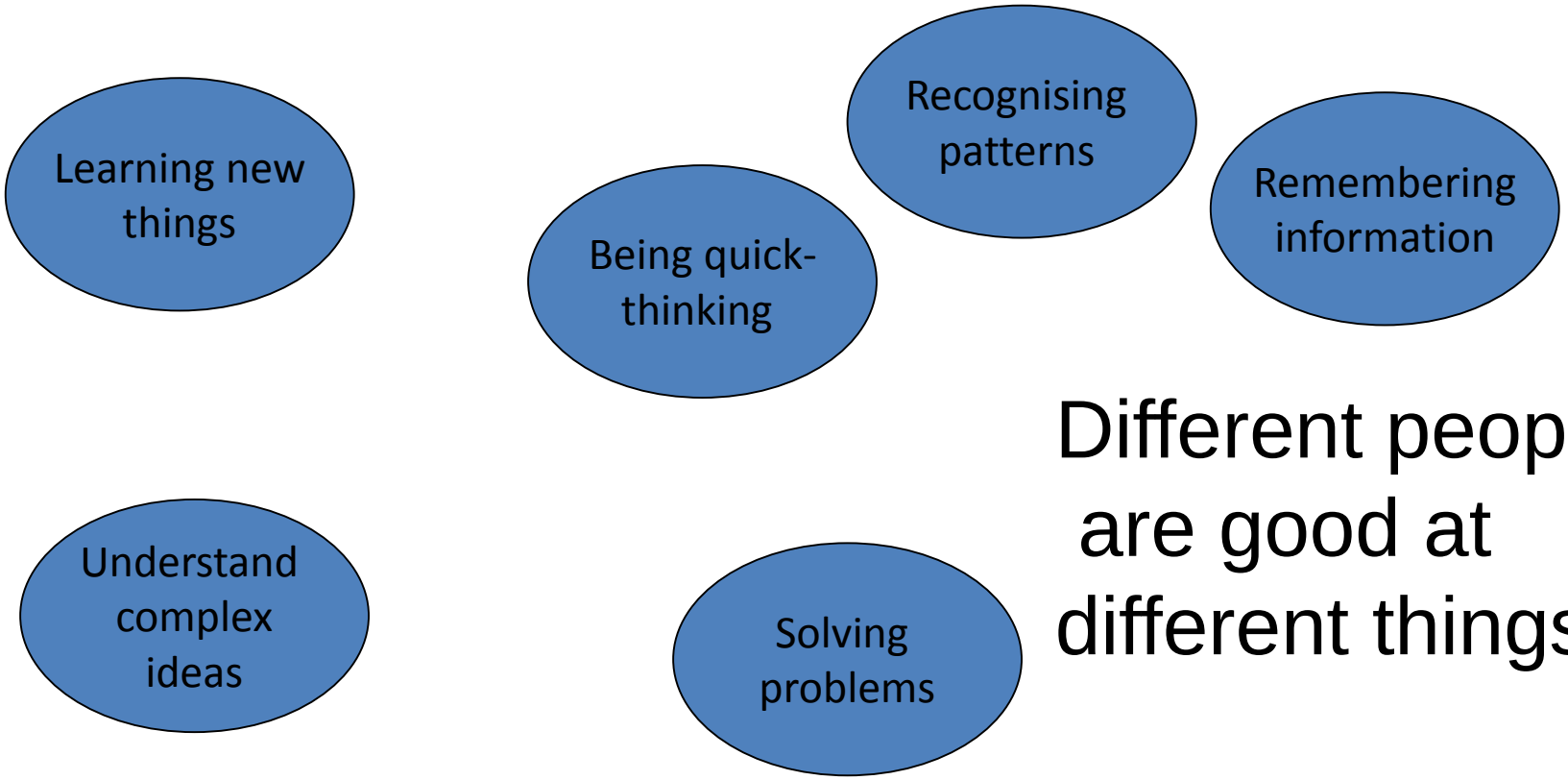
Answers

- Q.1: 7
- Q.2: 5
- Q.3: 5
- Q.4: D
- Q.5: A
- Q.6: A
- Q.7: B
- Q.8: C
- Q. 9: B
- Q. 10: A and B (1 mark for each correct)
- Q. 11: B and D (1 mark for each correct)

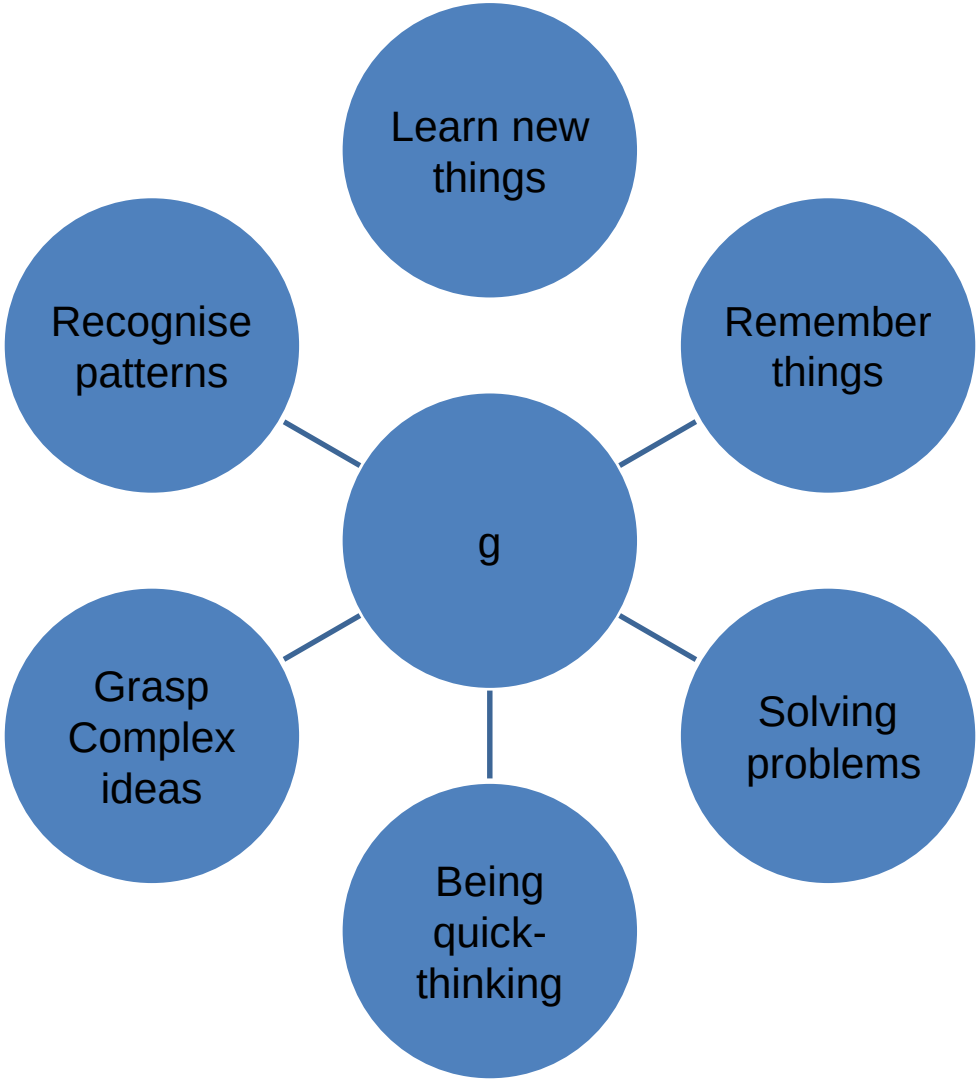
- What did you score out of 13?

Different skills assessed

- Pattern recognition
- Problem solving
- Mathematical reasoning
- Verbal understanding
- Holding things in working memory
- Speed of thought



Different people are good at different things



Are these just different examples of a single ability?

Spearman – ‘g’

Spearman's (original) IQ data

Classics	French	English	Math	Pitch	Music	
Classics	-					
French	.83	-				
English	.78	.67	-			
Math	.70	.67	.64	-		
Pitch discrimination	.66	.65	.54	.45	-	
Music	.63	.57	.51	.51	.40	-
g	.958	.882	.803	.750	.673	.646

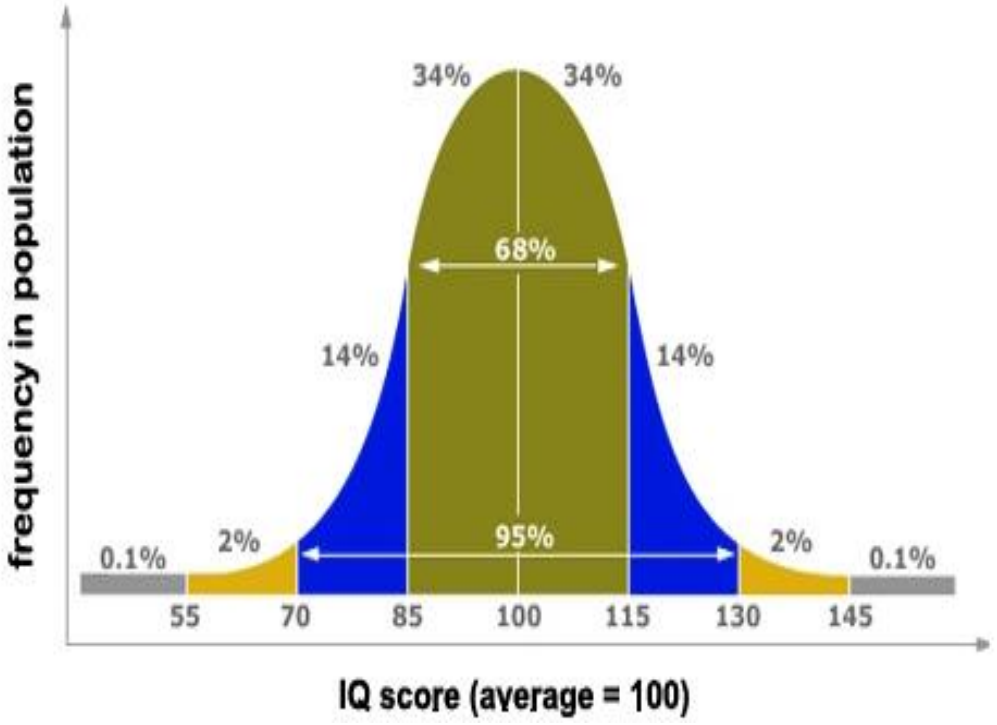
A single ability?

- People tend to have more or less similar scores on different tasks
- This suggested a single underlying ability
  - Intelligence, ‘g’,

- One definition of Intelligence: “Ability or abilities to **acquire** and use knowledge for **solving problems** and **adapting** to the world” (Woolfolk et al. 2008, p.131).

Measuring IQ

- Original measure was ‘mental age’/ ‘actual age’ X 100 (Intelligence Quotient or IQ)
  - Average score is 100
  - Standard Deviation is 15



Stern Scoring Method

Key Features of Intelligence

- Related to school attainment
- Measured using pencil and paper tests and one-to-one interviews
- Measure range of learning and problem solving skills
- Attempts to circumvent language issues (‘Culture-free’ tests)
- Properties are emergent from statistical tests
- Scored based on the norm for a population

Single or multiple

- 2 components (Cattell)
  - Fluid (Raw processing)
  - Crystalized (Learned learning & solving skills)

- Maybe three levels (Carroll)
  - General
  - Broad
    - Auditory perception, Visual Perception Memory, Retrieval, Speed of processing…
  - Specific

Ability or abilities?

Crystalized
Vs
Fluid
Intelligence

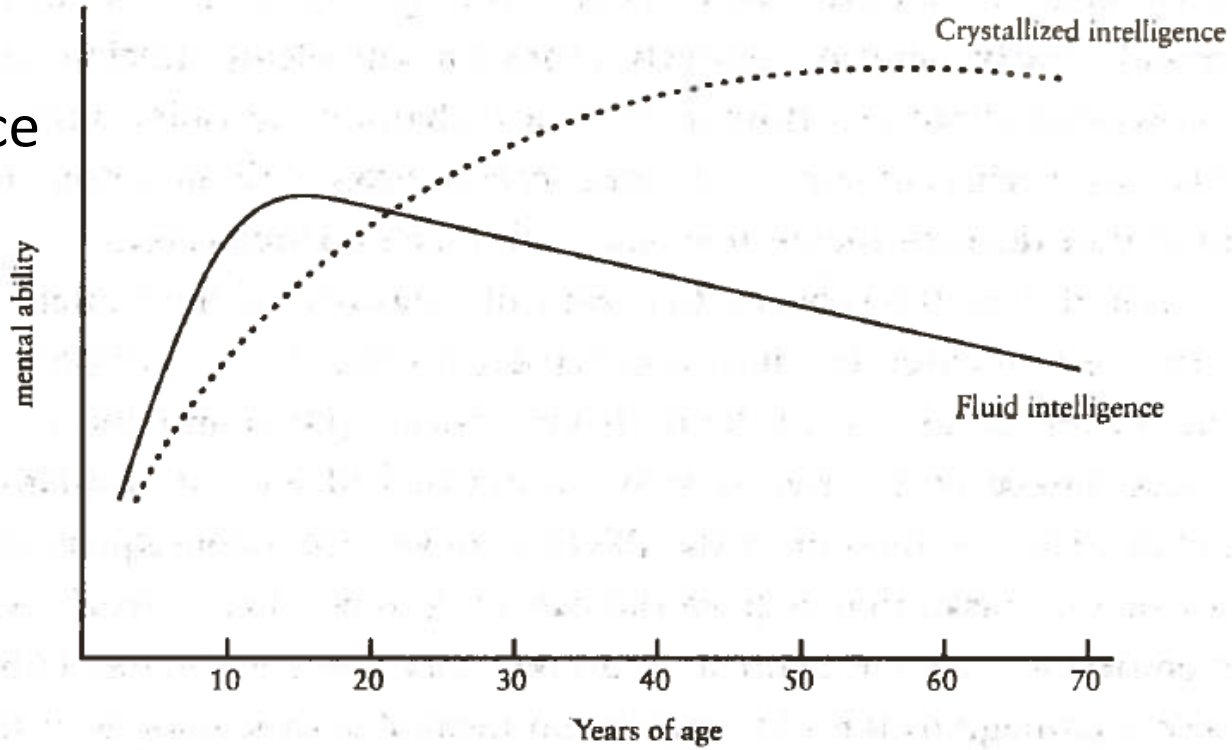


Figure 1.2. Schematic rendering of fluid intelligence and crystallized intelligence over the life span. From Cattell (1987).

Does it explain who does well in school?

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- "Intelligence tests…do in fact predict school performance fairly well; the correlation between IQ scores and grades is about 0.50…Note, however, that correlations of this magnitude account for only about 25% of overall variance" (Neisser 1996, p. 81)
  - *Intelligence: Knowns and Unknowns* Ulric Neisser et al. 1996, American Psychologist
- http://www.gifted.uconn.edu/siegle/research/Correlation/Intelligence.pdf

Is intelligence genetic?

- Minnesota Twins Reared Apart Study
  - Compare identical and non-identical twins raised separately

- The same person tested twice - 87%
- Identical twins reared together - 86%
- Identical twins reared apart - 76%
- Fraternal twins reared together - 55%
- Biological siblings reared apart - 26%

- But, are the educational experiences of twins reared apart all that different?

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Intelligence controversies

- Are their 'racial' differences in IQ? Sex differences?
  - Is this a function of what gets tested?
  - Can tests be 'culture-free?'

- Are we getting smarter? (Flynn effect)
  - Between 1947 and 2002, average scores on the Raven's matrices rose from 100 to 128
  - Could such a rapid change be biological?

Questions remain…

- How fair are these tests?
  - Mathematical knowledge and verbal knowledge are learned in school, not innate abilities
  - Words can mean slightly different things in different parts of the English speaking world

- Most now agree that there is some cultural bias in these tests that disadvantage those who are culturally not like those that design them

REVIEW

Review your learning

- What is the average IQ score in the population?
- Give a definition of intelligence?
- What is fluid intelligence?
- Are IQ tests culturally biased?
- What percentage of the variance in academic attainment is not explained by differences in intelligence?

How broad should intelligence be?

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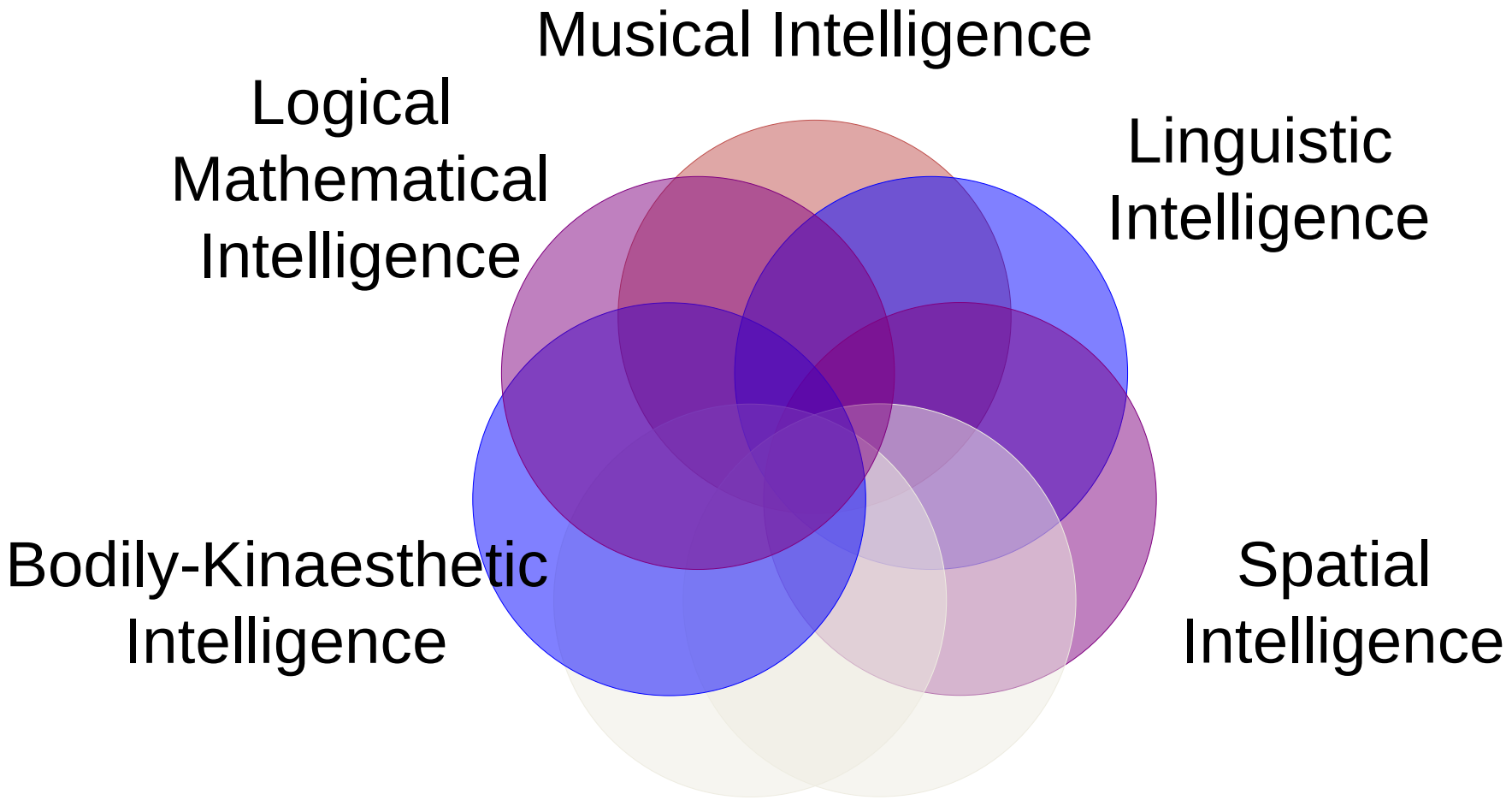
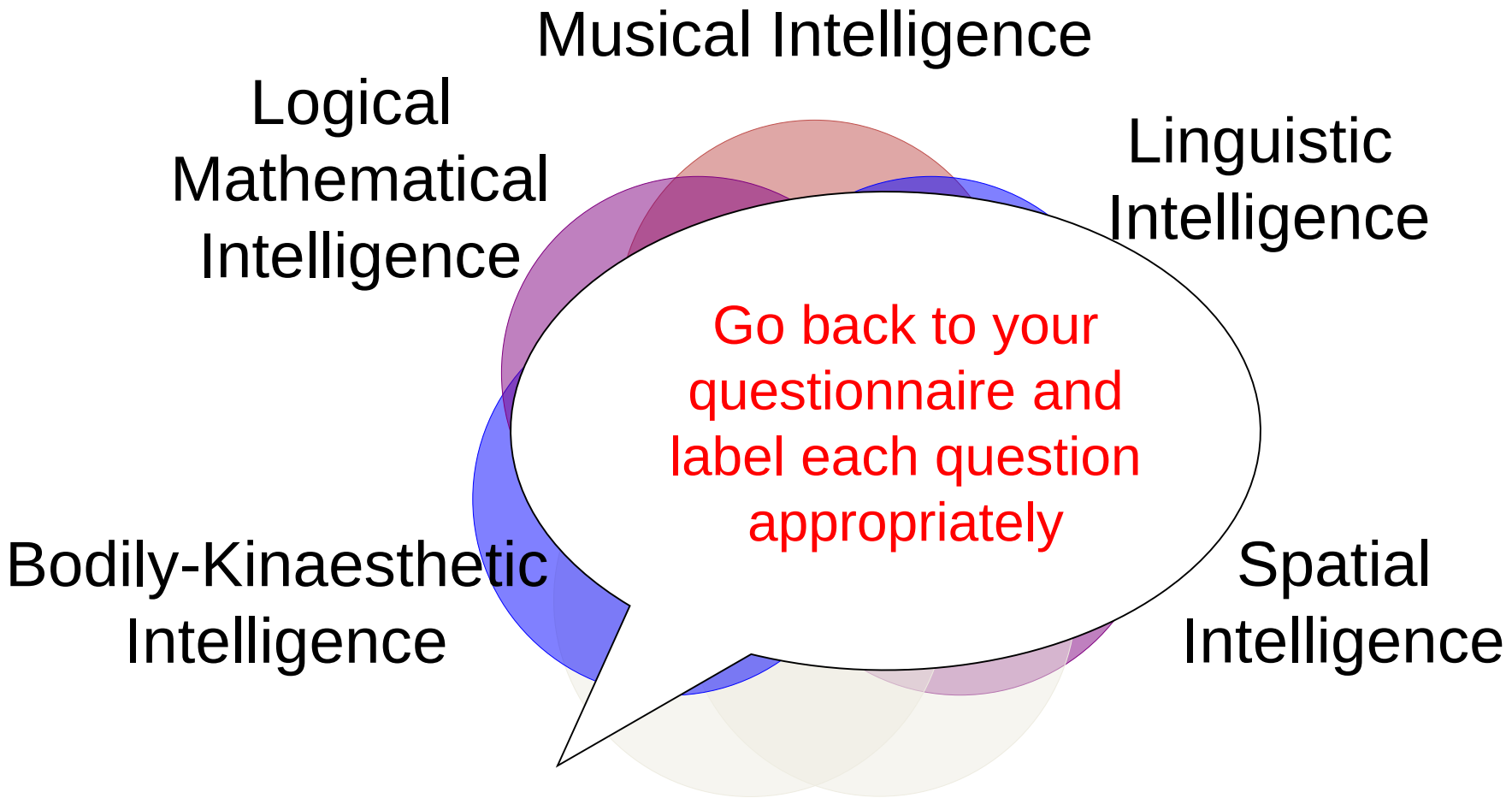
- Howard Gardner – Harvard University
  - Intelligence means:
    - Cognitive ability that is valued,
    - that has a basis in the biology of the brain
  - We do not have one General Intelligence ('g')
  - We have Multiple Intelligences (MI)

  - See Multiple Intelligences, Ch. 1: 'In a Nutshell' (on google books)



7 Multiple Intelligences



7 Multiple Intelligences

Strengths and Weaknesses

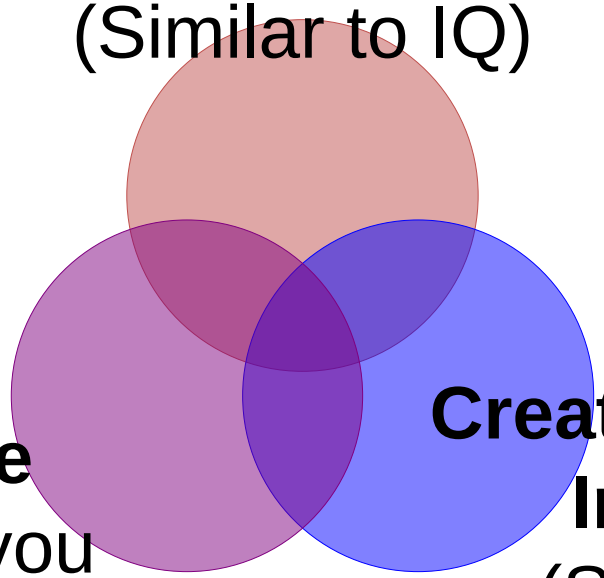
- Values more types of skills than traditional intelligence does but
- Doesn't limit to things that can be measured using paper and pencil tests but
- Are there more than 7, such as Naturalist? Sexual? Humour? Moral? Religious?
- does it value things that aren't intelligence but skills/ talents?
- if things can't be measured like that then are they intelligence?
- Is 7 too many?

A different view…

- Robert Sternberg – Yale (now Oklahoma State University)
- Intelligence means underlying mental abilities used to solve **real-life** problems

A different view…

Analytical Intelligence
(Similar to IQ)



Practical Intelligence
(Using what you know to solve problems)

Creative/ Synthetic Intelligence
(Seeing things In original ways)

Triarchic (3) Intelligences

Strengths and Weaknesses

- Strengths:
  - Values more types of skills than traditional intelligence does, but they look more like traditional 'intelligence' than Gardner's do
  - Uses pen and paper tests

- Weaknesses:
  - Tests available do not (yet) meet the criteria for being accepted as psychological tests
  - Ideas have not been as widely applied as Gardner's

REVIEW

Review your learning

- Without checking your notes, fill in this chart:
- Which of Gardner's and Sternberg's Intelligences are like 'g'?
- Which intelligence model addresses solving problems in specific contexts?