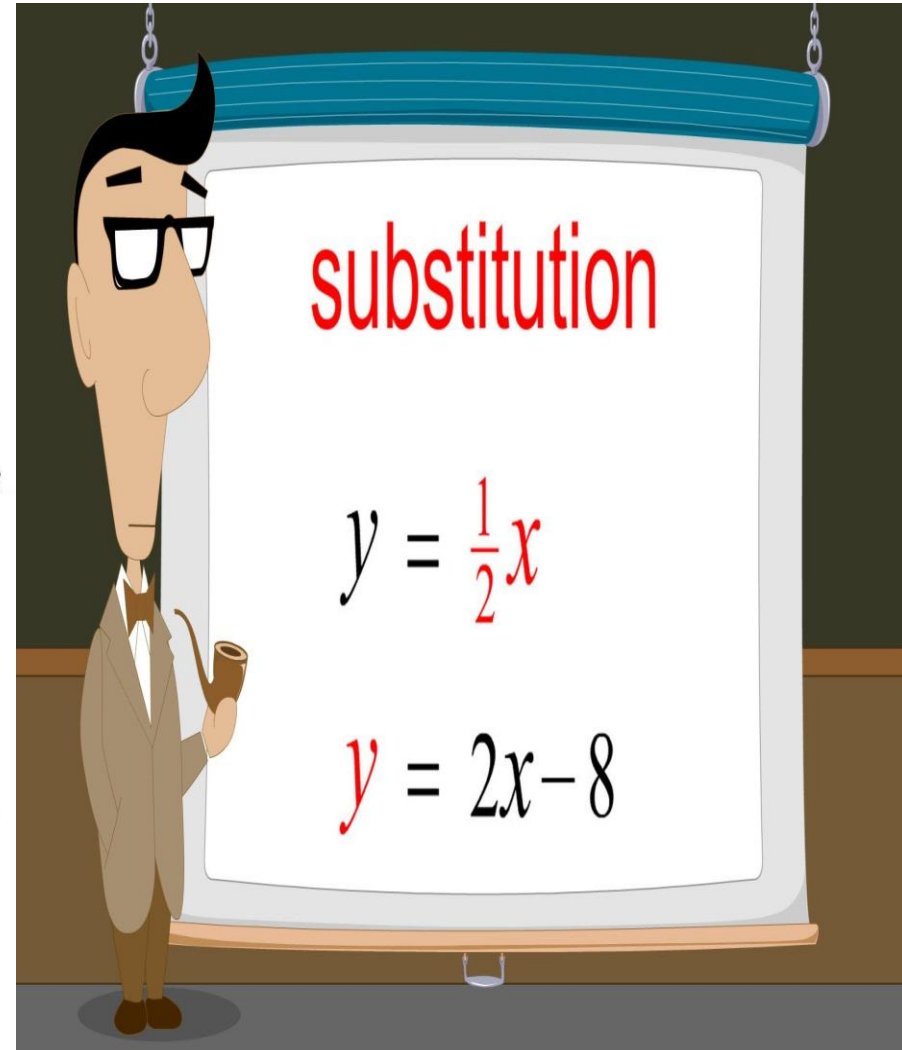


# *CATTELL'S THEORY OF INTELLIGENCE*

Mitika Kanwar

# WHO IN YOUR EYES IS MORE INTELLIGENT?

Someone who can speak languages or someone who can do algebra ->



- Is intelligence about getting good marks?
- Is intelligence about being able to sell a good deal to someone?

The answer is that Intelligence is not just one thing or just the general factor as proposed by Spearman. But a combination of all these.

- Raymond Cattell was one of the first psychologists to describe intelligence as being comprised of multiple constructs.
- He gave two forms of intelligence: FLUID INTELLIGENCE AND CRYSTALLISED INTELLIGENCE

# TWO TYPES OF INTELLIGENCE

## Fluid

- Ability to solve new problems, use logic in new situations and identify patterns
- Involves Critical thinking
- Street smarts – adapt to a situation on the spot
- Flexible minded
- We need some amount of fluid intelligence to manifest crystallized intelligence

## Crystallized

- Ability to use learned knowledge and experience
- Ex. Learning in this class at college
- Book smarts – such as knowledge of Vocabulary,
- Theories
- General rules of grammar
- Gets more stable over time – like a crystal
- Crystallized intelligence is influenced by culture, learning, experience, wisdom, comprehension

# FLUID INTELLIGENCE

- Fluid intelligence gets its name from the non-linear nature of thought processes, which are ever changing, just as the nature of fluid is always changing to adapt to the shape of its container.
- Fluid intelligence requires a sense of awareness and open-mindedness, neither of which are necessarily required of crystallized intelligence.

# FLUID INTELLIGENCE

- People who possess high levels of fluid intelligence are people who are good at solving problems and spend time thinking outside the box
- Its called fluid because it is like water or fluid and can change according to the situation at hand.

# CRYSTALLIZED INTELLIGENCE

- Crystallized intelligence is what Cattell referred to as the ability to make use of acquired information or knowledge.
- Crystallized intelligence is generally long-lasting and commonly improves with experience.
- Examples of crystallized intelligence would be things such as knowledge of facts and possessing a foundation of knowledge on a specific topic.



Quiz! guess whether these abilities are a part of fluid intelligence or crystallised intelligence?

- “I am good at math and finding directions in a new city”
- “I can program a computer”
- “I can learn new words very fast”
- “I can make a piece of art out of raw or wasted material”

- Answer:

- Fluid
- Fluid
- Crystallized
- Fluid

# EXAMPLES OF FLUID INTELLIGENCE

- Inventing facebook
- Inventing airplanes
- Raven's progressive matrices
- MAIER STRING  
PROBLEM (next page)

Imagine that you are standing still with a string hanging down from the ceiling on either side of you, one just to your left and another just to your right. The strings are far enough apart that you cannot reach them both at the same without moving your feet. There is also a table on your right side that has a pair of pliers on it that is within your reach. Your task is to tie the two strings together without moving your feet. What are you going to do?

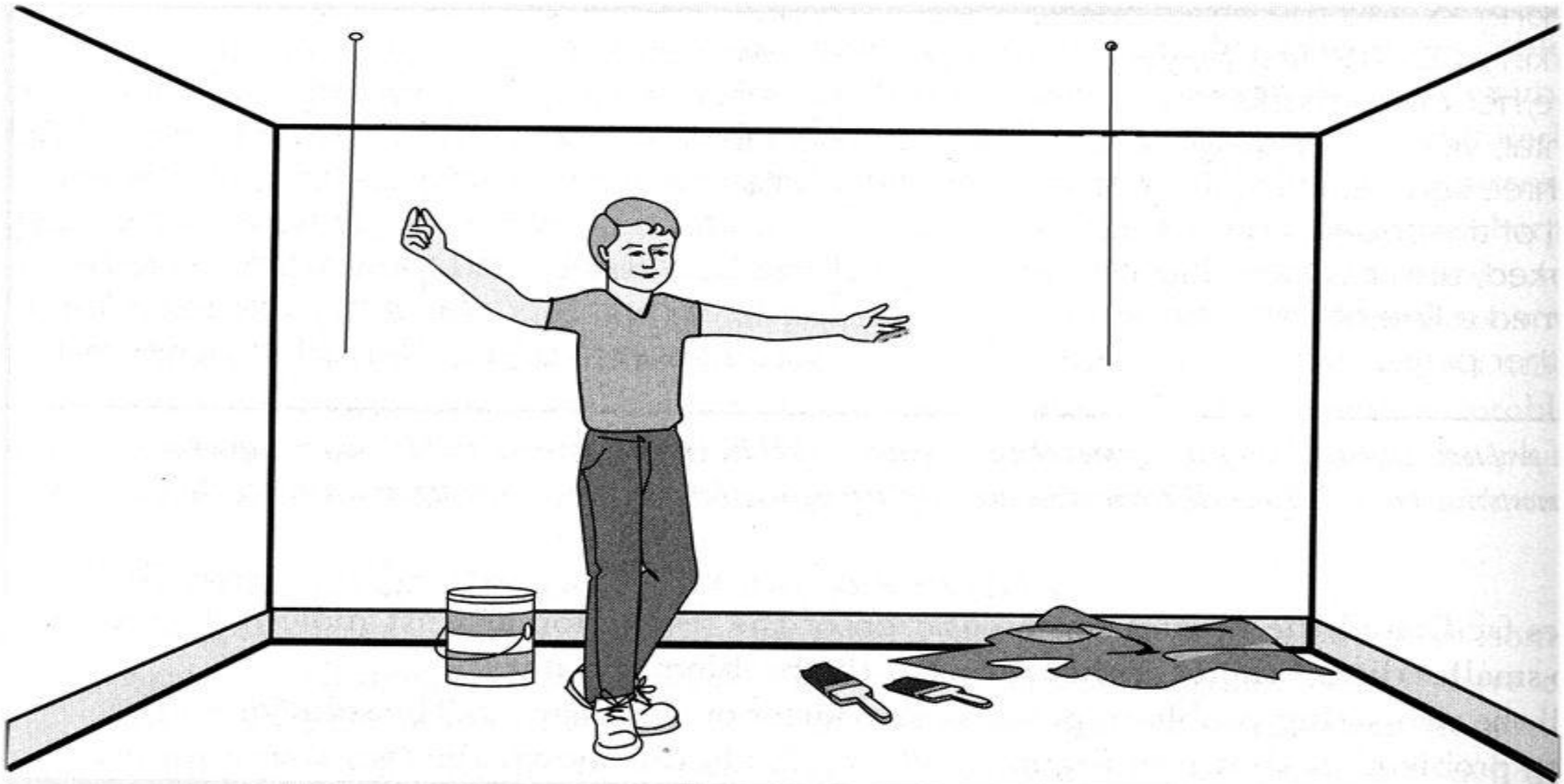
## Rigidity in problem solving: Functional Fixedness



Maier's (1931) two-string problem

# ?? SOLUTION ?? 😊

Rigidity in problem solving: Functional Fixedness



Maier's (1931) two-string problem

# EXAMPLES OF CRYSTALLISED INTELLIGENCE

- Knowledge required by the airplane pilot to operate it
- Knowledge of English literature books
- Knowledge of classical music songs
- Financial knowledge
- It is Acquired over time and experience

# Fluid intelligence and its relationship with age

- Fluid intelligence is much less stable
- Young children show increased fluid intelligence
- They need fluid int. in order to make sense of the world
- It grows till late adolescence
- Peaks at mid 20's and then slows down rapidly
- It begins to decline from early to older adulthood
- Reason being that Neurons begin to shrink with age
- Protective layer around neurons begins to erode
- All these biological changes lead to decline in fluid intelligence
- One becomes less flexible
- Less able to adapt to new situations

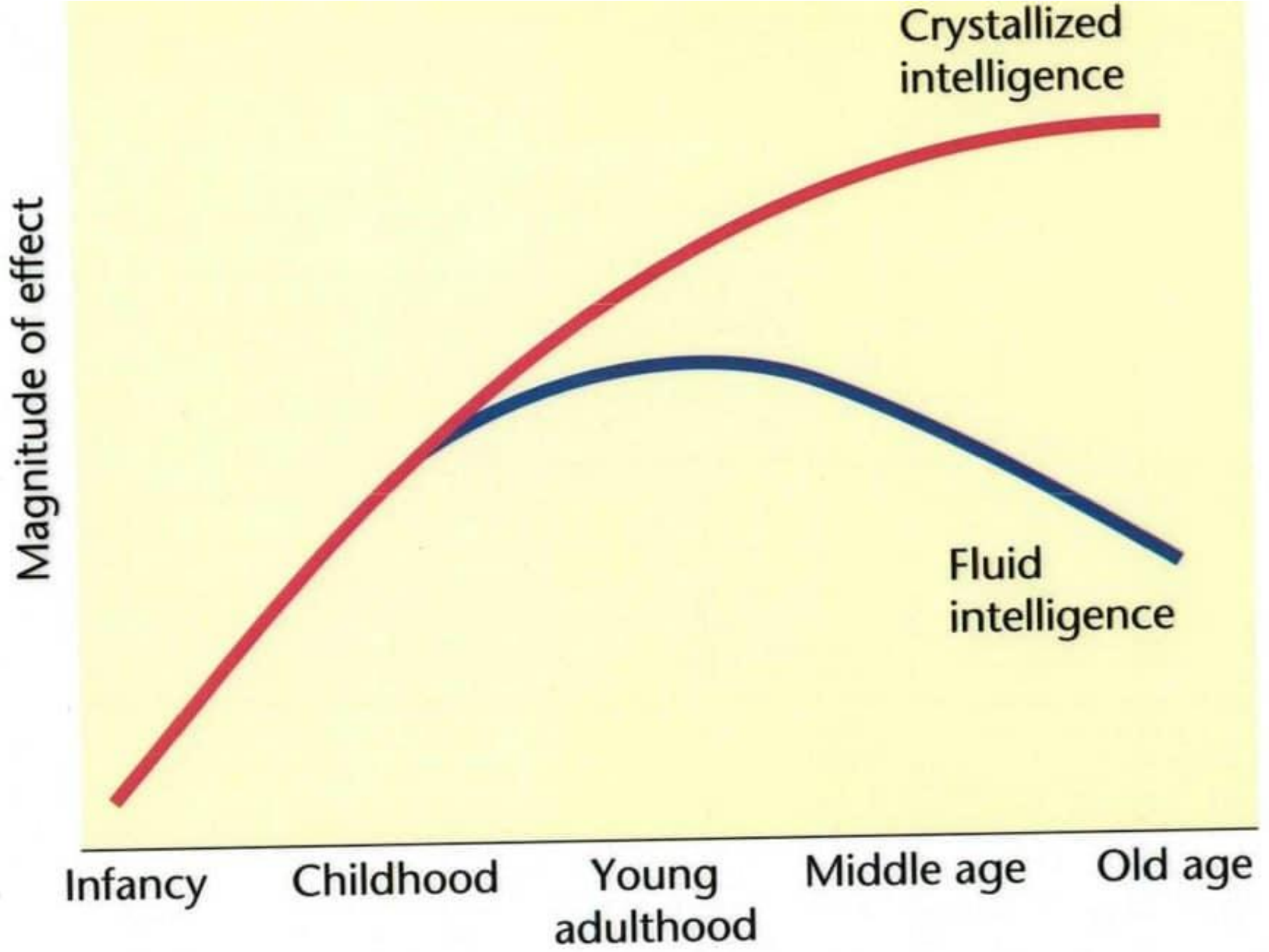
# Crystallized intelligence and its relationship with age

- It relies more on long term memory and reflects the ability to use knowledge
- Increases throughout young adulthood and middle adulthood and then remains stable in old age
- Develops through personal experience and therefore, shares positive relationship with wisdom and age

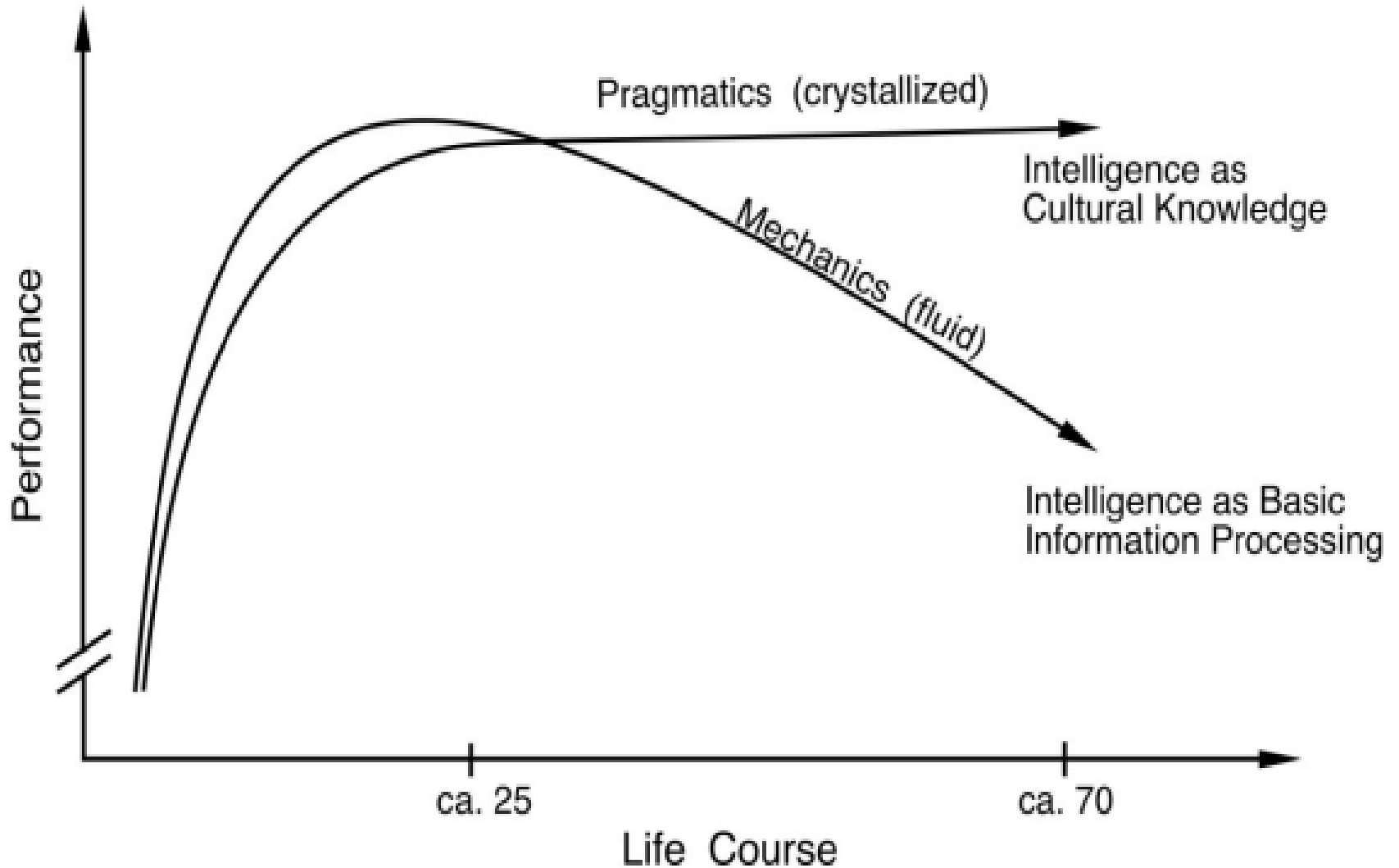


Transparency 102  
Changes in "Fluid Intelligence" and "Crystallized Intelligence"

Source: J. L. Horn & Donaldson, 1980



# Related concepts – cognitive mechanics and cognitive pragmatics

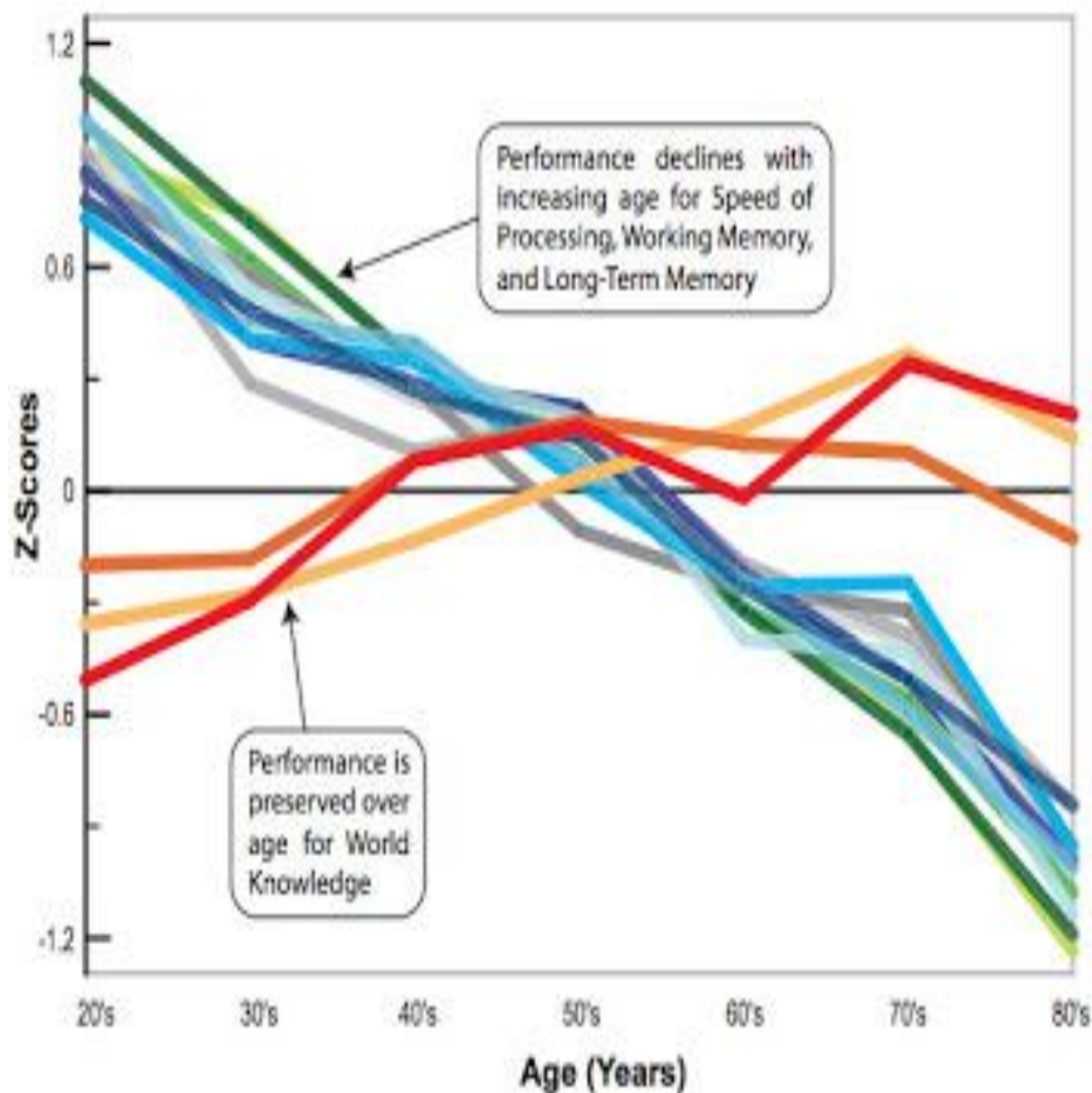


# COMMONLY MEASURED ASPECTS OF FLUID INTELLIGENCE (*Gf*)

- Deductive reasoning (e.x. Fred is taller than Joe but shorter than Ben. Who's the tallest?)
- General Verbal Reasoning
- Inductive reasoning (e.g. Odd one out, matrix test)
- Quantitative reasoning (e.g. number series)

# COMMONLY MEASURED ASPECTS OF CRYSTALLIZED INTELLIGENCE ( $G_c$ )

- School grades
- Job performance, particularly high skilled jobs



### Speed of Processing

- Digit Symbol
- Letter Comparison
- Pattern Comparison

### Working Memory

- Letter Rotation
- Line Span
- Computation Span
- Reading Span

### Long-Term Memory

- Benton
- Rey
- Cued Recall
- Free Recall

### World Knowledge

- Shipley Vocabulary
- Antonym Vocabulary
- Synonym Vocabulary