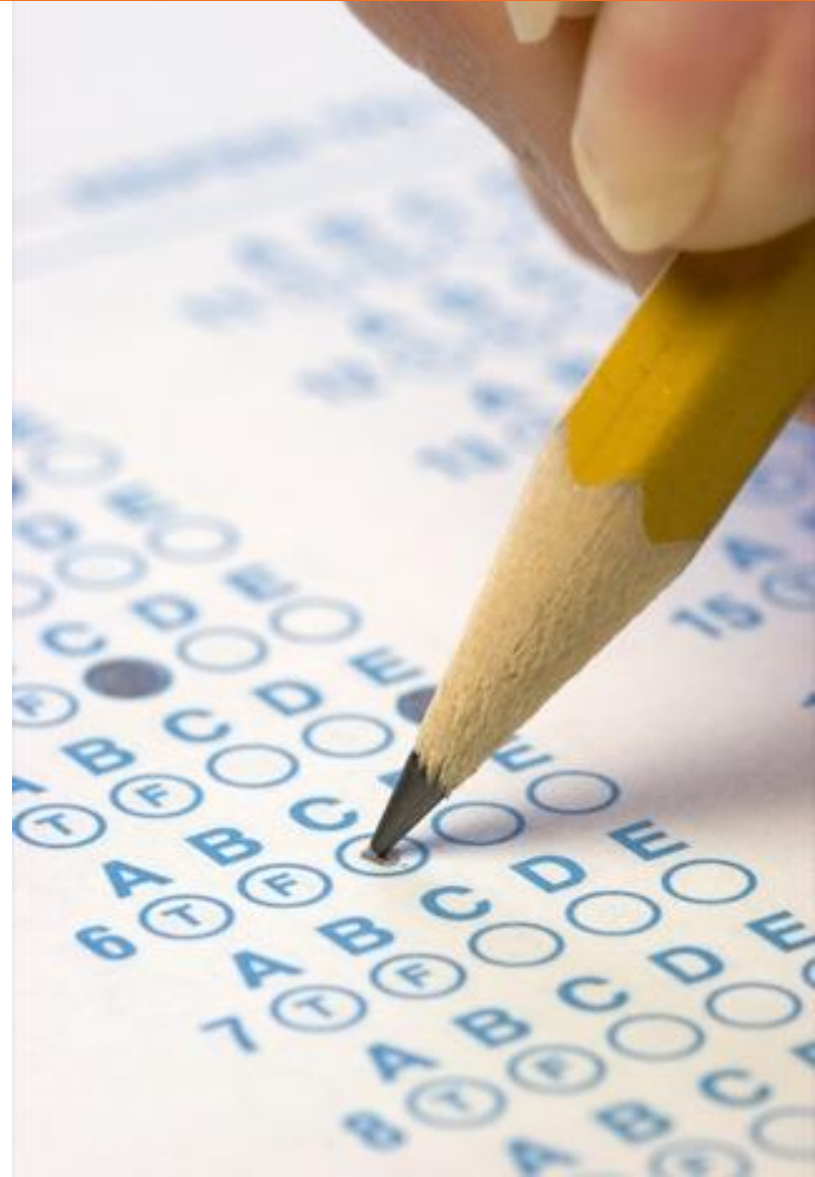


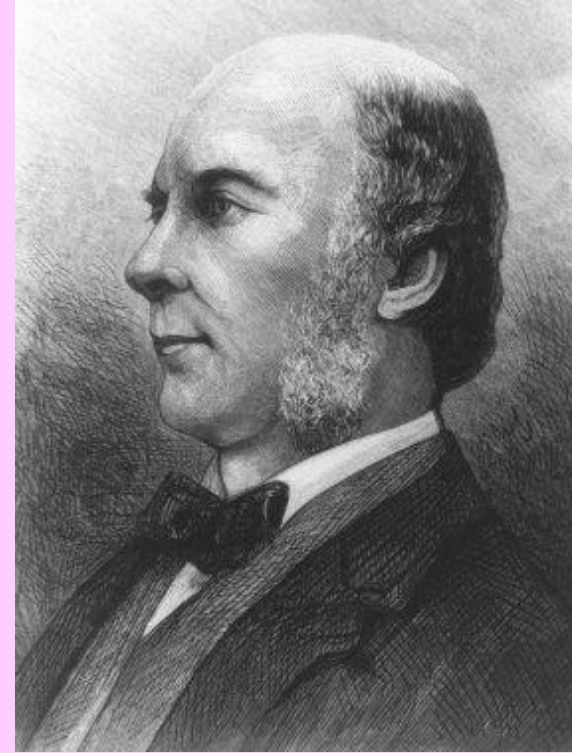
“Definition” of Intelligence

- **Intelligence** can be defined as “whatever intelligence tests measure.”
 - Your college entrance test measures how good you are at scoring well on that test.
- **Intelligence Tests** are a series of questions and other exercises which attempt to assess people’s mental abilities in a way that generates a numerical score, so that one person can be compared to another.



Early Pioneers of Intelligence Testing

- Sir Francis Galton (British/1890s)
- Fascinated by measuring mental abilities with physical characteristics such as head size
- Founded the "eugenics" movement - encouraging only the smartest and fittest to reproduce (to him: well-born white men)



- France had just passed a law requiring all children to attend school
- **Alfred Binet (French/1900s)** was commissioned by the French government to determine children's abilities in school
- Set out to figure out a concept called a **mental age** (chronological age that corresponds to a given level of performance).
- Hoped they could use test to help children, not label them.

Early Pioneers of Intelligence Testing



What do scores mean?

- Lewis Terman, of Stanford University, began with a different assumption than Binet; Terman felt that intelligence was unchanging and innate (genetic).
- Later, Terman saw how scores can be affected by people's level of education and their familiarity with the language and culture used in the test.
- Used a Cross-Sectional study.

What to do if you score low on an IQ test?



Study, and develop self-discipline and attention span.

Remove your genes from the population (eugenics).



Early Pioneers of Intelligence Testing



- William Stern (German/1900s)
- Derived the term "**Intelligent Quotient**" (IQ)
- $$IQ = \frac{\text{mental age}}{\text{chronological age}} \times 100$$
- We don't use the IQ formula anymore, now it's standardized

Terman and his IQ Test

- A 8 year old has a mental age of 10, what is her IQ?
- A 12 year old has the mental age of 9, what is his IQ?
- A boy has the mental age of 10 and an IQ of 200, how old is he?
- Used Binet's research to construct the modern day IQ test called the Stanford-Binet Test.
- $$\text{IQ} = \frac{\text{Mental age}}{\text{Chronological age}} \times 100.$$

David Wechsler

- WAIS – Adult Intelligence Test
- Most widely used intelligence test
- WISC – Child Intelligence Test
- 11 Sections
- Either Verbal and Nonverbal Performance Skills

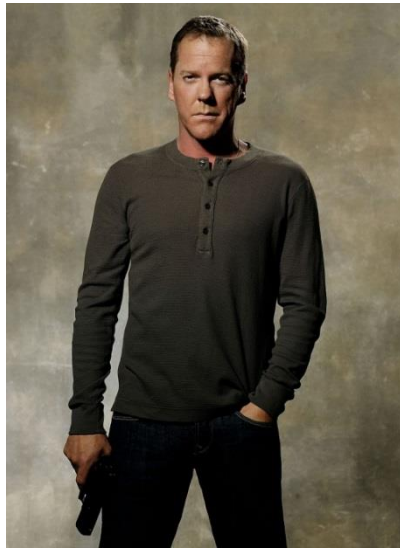
General Intelligence, also known as *g*

Charles Spearman (1863-1945) performed a **factor analysis*** of different skills and found that people who did well in one area also did well in another. Spearman speculated that these people had a high “*g*” (**general intelligence**).

Spearman would most likely be the biggest supporter of a single intelligence score.

***Factor analysis** refers to *a statistical technique that determines how different variables relate to each other; for example whether they form clusters that tend to vary together.*

Is intelligence one thing or several different abilities?



Jack Bauer is good at torturing, bomb defusing, shooting, figuring out evil plots and saving the country. Is there anything he cannot do?

- To find out scientists use **FACTOR ANALYSIS**:

A statistical procedure that identifies clusters of related items

Charles Spearman used FA to discover his *g* or **(general intelligence)**.

Raymond Cattell

- Used different types of tests for the different types of intelligences he identified.
- **Fluid Intelligence** – refers to a person's ability to reason speedily and abstractly. Declines as you age.
- **Crystallized Intelligence** – refers to intellectual ability that is accumulated over life. Increases as you age.
- Used a longitudinal study.

L.L. Thurstone

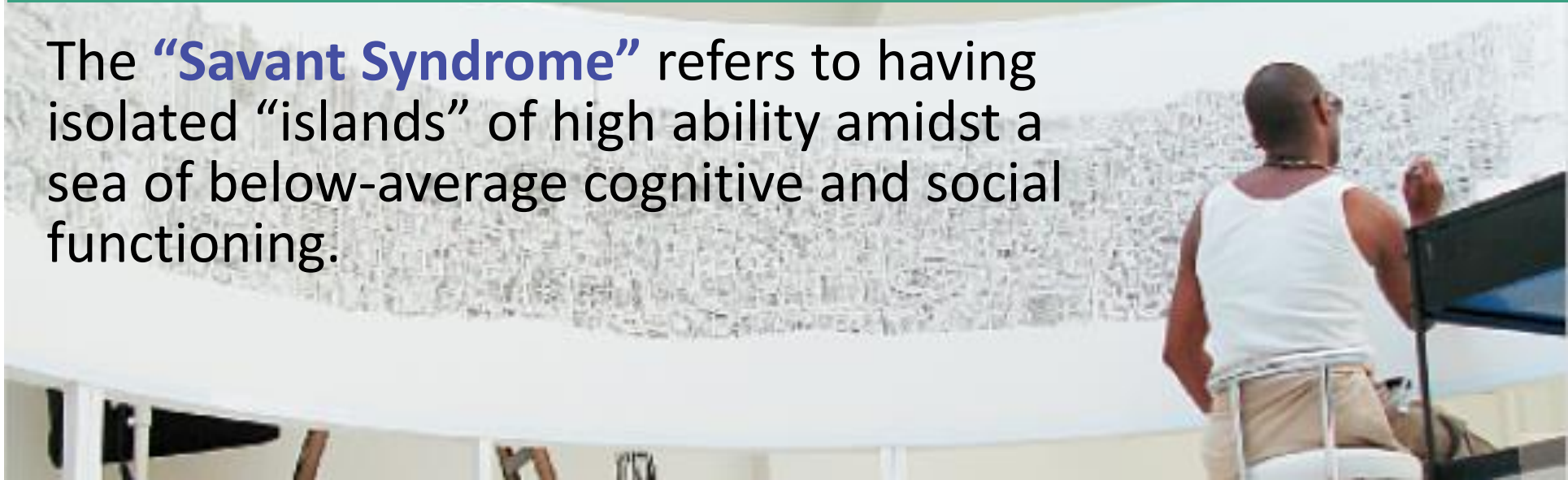
- Stated that intelligence is made up of 7 Primary Factors or Mental Abilities
 - Memory
 - Numerical Ability
 - Word Fluency
 - Verbal Comprehension
 - Spatial Ability
 - Perceptual Speed
 - Inductive Reasoning

Howard Gardner's Eight Intelligences



Multiple Intelligences

The “**Savant Syndrome**” refers to having isolated “islands” of high ability amidst a sea of below-average cognitive and social functioning.

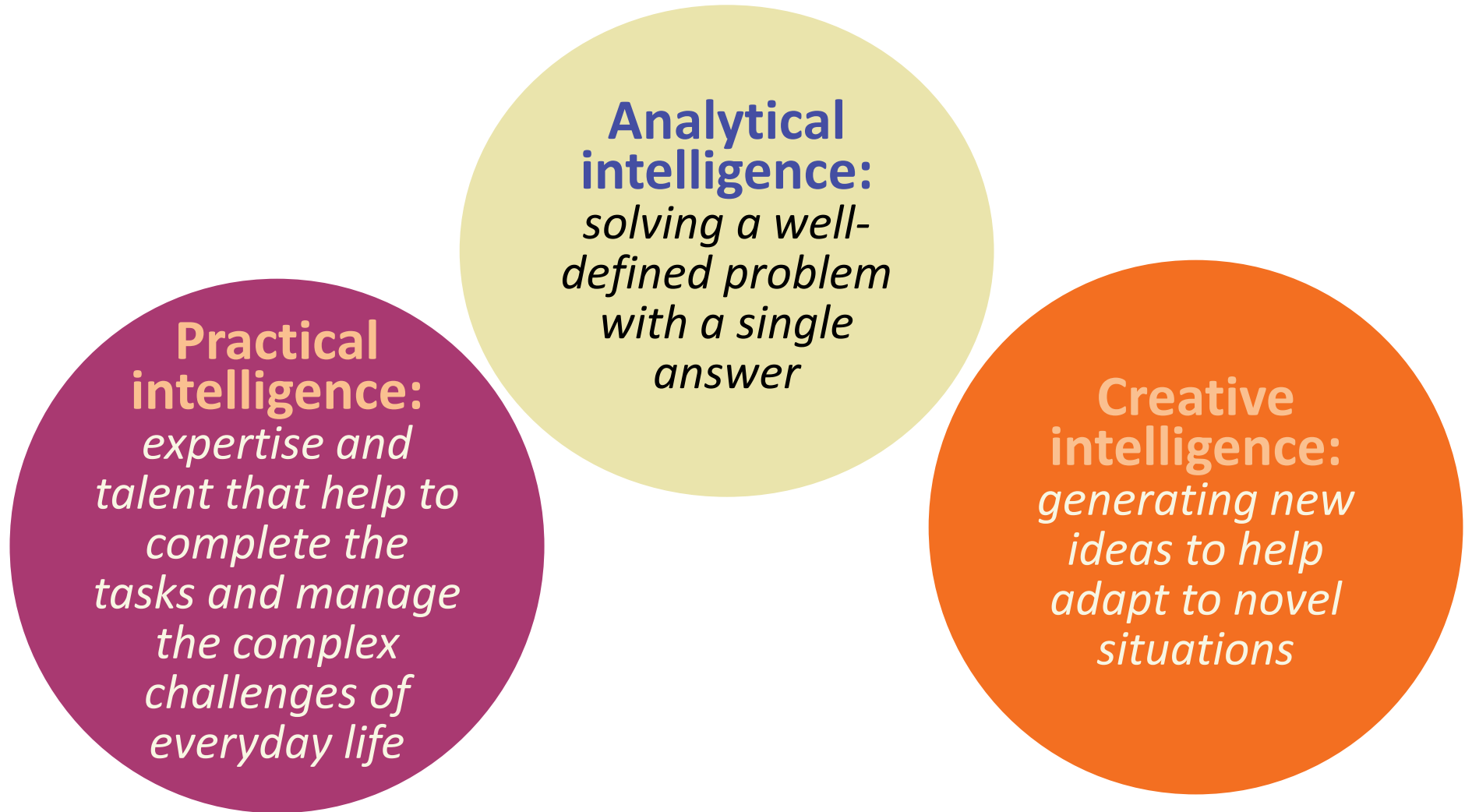


Howard Gardner's Multiple Intelligences

- Howard Gardner (b. 1943) noted that different people have intelligence/ability in different areas.
- Research and factor analysis suggests that there may be a correlation among these intelligences.

Sternberg's Intelligence Triarchy

Robert Sternberg (b. 1949) proposed that “success” in life is related to **three** types of ability.



Robert Sternberg's Five Components of Creativity



Components of Emotional Intelligence

Perceiving emotions

- Recognizing emotions in facial expressions, stories, and even in music

Understanding emotions

- Being able to see blended emotions, and to predict emotional states and changes in self and others

Managing emotions

- Modulating and expressing emotions in various situations

Using emotions

- Using emotions as fuel and motivation for creative, adaptive thinking

Benefits of Emotional Intelligence

People with high emotional intelligence often have other beneficial traits, such as the **ability to delay gratification** while pursuing long-term goals.

The level of emotional intelligence, including the skill of reading the emotions of others, correlates with **success in career and other social situations.**

Intelligence and Brain Anatomy

“Genius” seems to correlate with:

- overall brain size.
- the size of some brain regions such as the parietal lobe.
- high brain activity in the frontal and parietal lobes.
- extra gray matter (brain cell bodies, seen as more brain surface area/convolutions).
- extra white matter (axons) leading to high connectivity among different regions.

Intelligence and Brain Functioning

Intelligence in action seems to involve:

- activity of the front part of the frontal lobes to organize and coordinate information

- “being in shape”; using less energy to solve problems than the brains of “normal” people.

Assessing Intelligence

Assessment refers to the activity and the instruments used to measure intelligence.

The challenge is to make these instruments **valid** (measure what they are supposed to measure) and **reliable** (yielding the same score if administered again, even if administered by someone else).

Why Try to Measure Intelligence?

- to study how (and why) people differ in ability
- to match strengths and weaknesses to jobs and school programs
- to help the “survival of the fittest” process; trying to select the people who have the greatest abilities. This was the position of eugenicist Francis Galton (1822-1911).

Intelligence: Single or Multiple?

Is intelligence one general ability or several specific abilities?

Charles Spearman	general intelligence [<i>g</i>]
Howard Gardner	7-10 (depending on the test) intelligences
Robert Sternberg	3 intelligences
Emotional intelligence	4 components