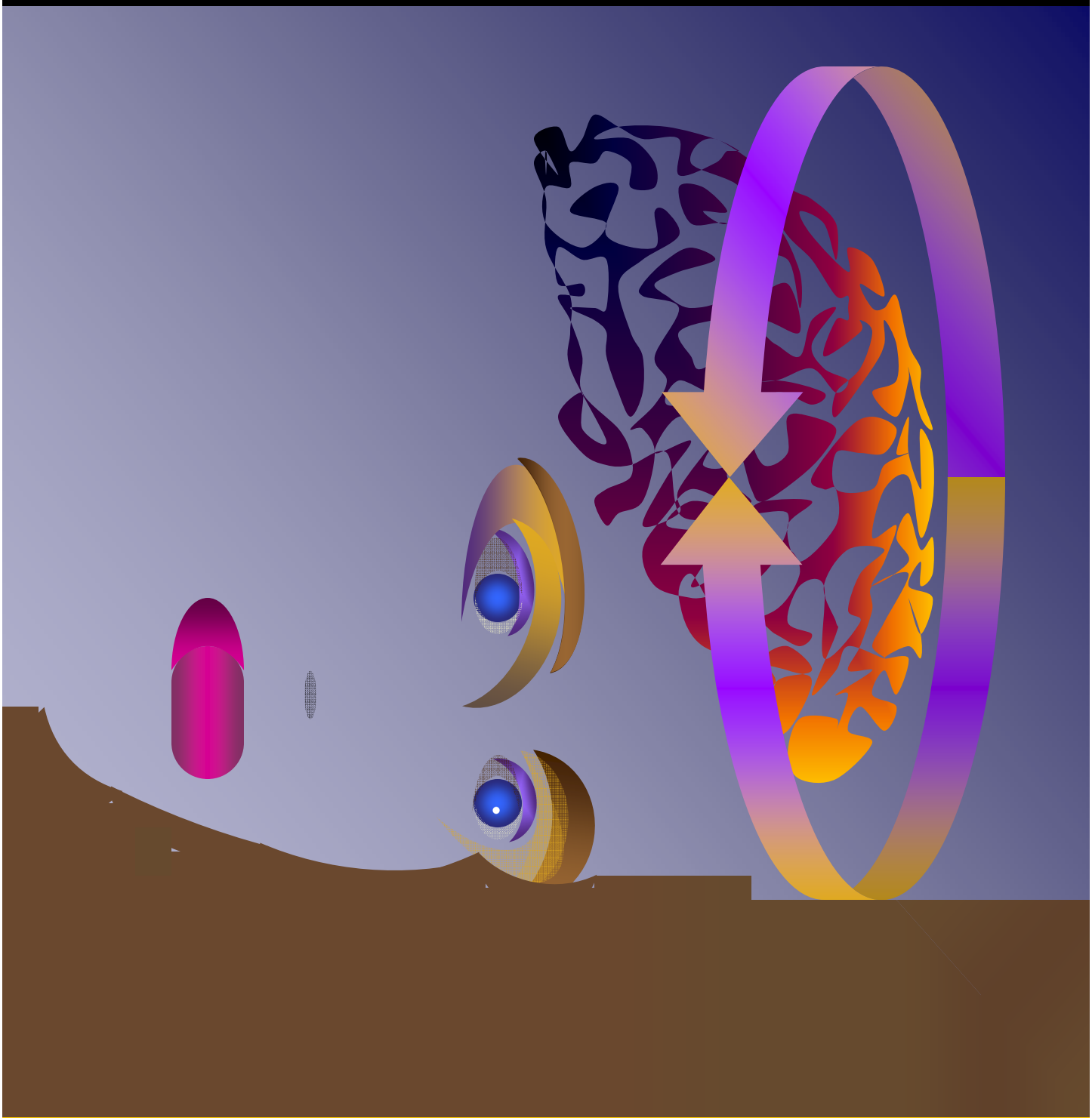
Human Intelligence Lecture 1

DR RACHEL KANG'ETHE

Lecture Outline

- What is intelligence
- Approaches to intelligence
  - Psychometric
  - Information-processing
  - Theory of Multiple Intelligences
- Assessing intelligence
- IQ testing
- Heredity and Intelligence
- The Extremes of Intelligence

INTELLIGENCE



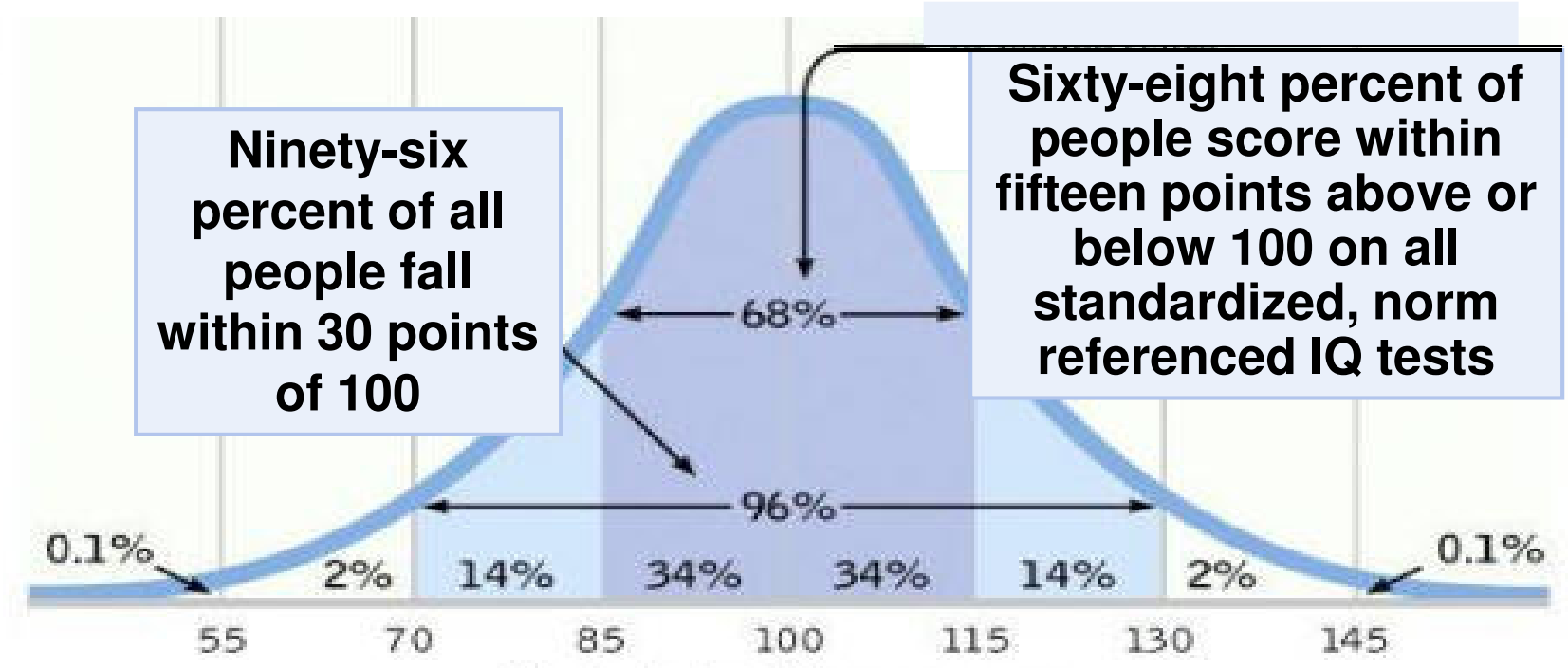
INTELLIGENCE

What is “intelligence”?

- No agreed upon definition
- Some attempts:

- Ability to think abstractly? (too narrow)
- Ability to learn? (scores on tests not related the rate/speed of learning new things)
- Ability to adapt to environment? (too broad)

Intelligence can be defined as a combination of mental competencies and potentialities that includes the ability to (a) learn from experience and to (b) apply this knowledge, (c) formulate new understandings, and (d) construct solutions to novel problems encountered in new and challenging situations (Vessels, 2004).



MAJOR FIGURES IN INTELLIGENCE THEORY & INTELLIGENCE TESTING

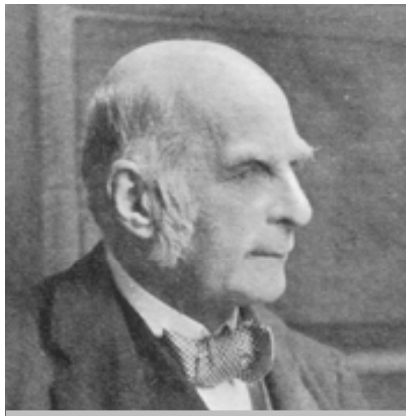
Alan Kaufman
WISC-R, WISC-III,
K-ABC, KABC-II

Charles Spearman
G Factor & specific
abilities in intelligence

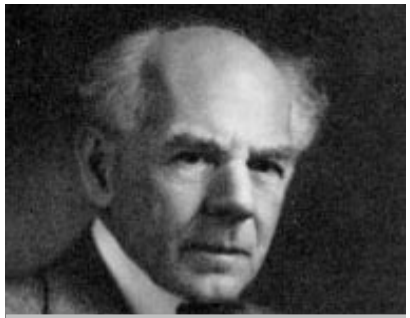
E.L. Thorndike
CAVD IQ Test; Abstract,
Mechanical, Social

Robert Thorndike
Cognitive Abilities Test
Stanford-Binet

Alfred Binet
Binet-Simon
Intelligence Scale



Francis Galton



James M. Cattell
Psychological Corporation
Mental Tests and
Measurements

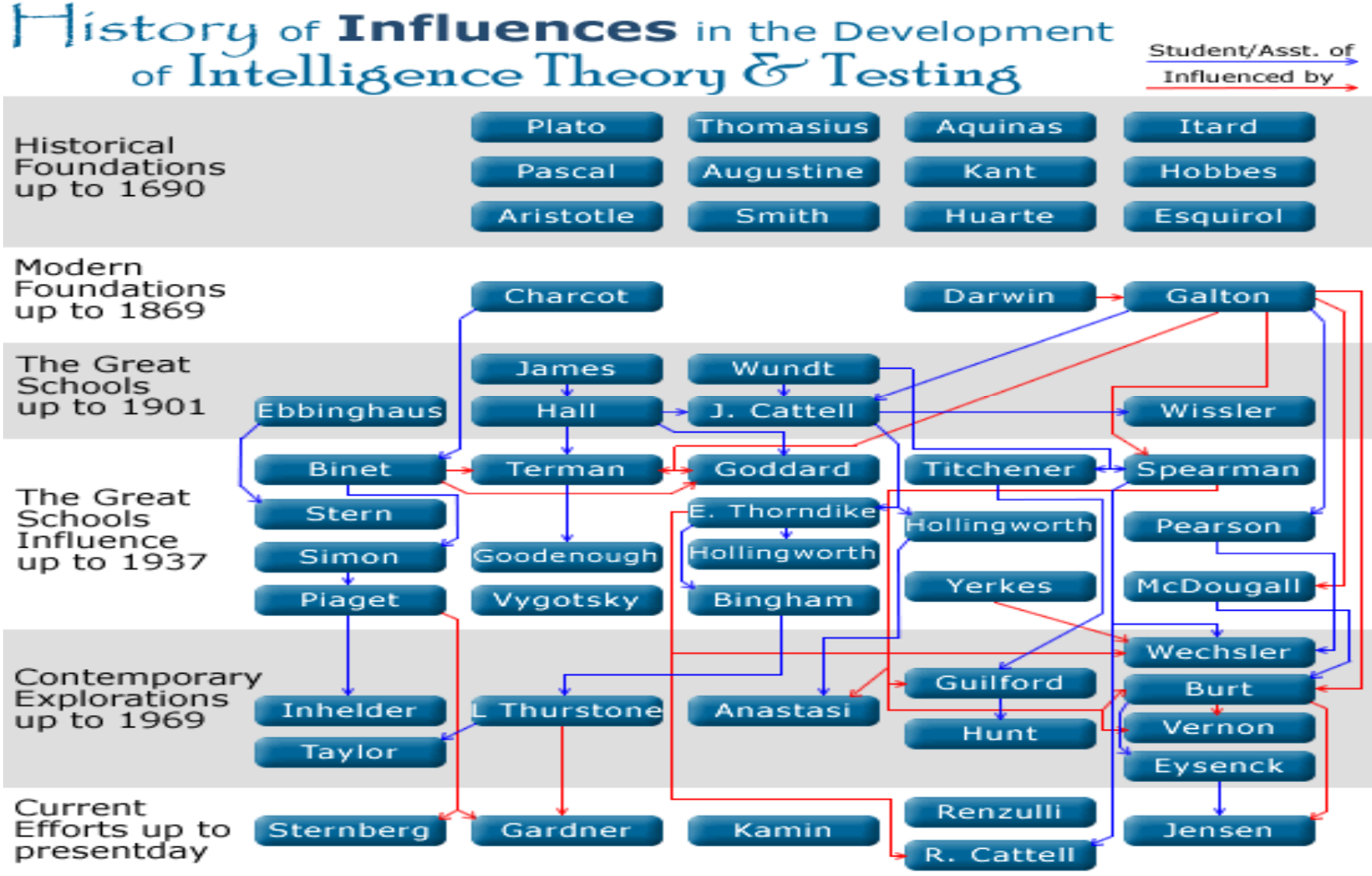
David Wechsler
WISC, WISC-R,
WISC-III, WISC-IV

Robert Sternberg
Sternberg Triarchic
Abilities Test

Howard Gardner
Multiple Intelligences
Theorist

Lewis Terman
Stanford-Binet
Intelligence Scale

HISTORY OF INFLUENCES IN THE DEVELOPMENT OF INTELLIGENCE THEORY AND INTELLIGENCE TESTING



Intelligence

- Although we all wish to think intelligently, *intelligence* is hard to define. Some theorists believe that a general ability (*g factor*) underlies the many specific abilities tapped by intelligence tests, whereas others do not.
- The traditional approach to intelligence, the *psychometric approach*, focuses on how well people perform on standardized *aptitude tests*. The *intelligence quotient*, or *IQ*, represents how a person has done on an intelligence test, compared to other people.

Psychometric Approach

- A theoretical perspective that portrays intelligence as a train (or set of traits) on which individuals differ; psychometric theorists are responsible for the development of standardized intelligence tests.

Dissecting Intelligence: The Cognitive Approach

- In contrast to the psychometric approach, *cognitive approaches* to intelligence emphasize several kinds of intelligence and the strategies people use to solve problems, not merely whether they get the right answers.

Intelligence

- Intelligence is a set of cognitive abilities
- What comprises intelligence varies with culture
- Theories of intelligence vary widely
  - Spearman: single general ability (g)
  - Multiple cognitive abilities
    - Cattel: two types of intelligence
      - Fluid: ability to gain new knowledge and solve problems
      - Crystallized: accumulated knowledge
    - Thurstone proposed that intelligence is a function of seven cognitive abilities
    - Sternberg proposed three aspects of intelligence
    - Gardner argued for eight distinct types of intelligence

Charles Spearman

- Noted that when children were subjected to several different cognitive test, there were moderate correlations in their performance. Spearman speculated that there must be a general mental factor that explained the consistent performance (g).

- Spearman also noted that there are certain inconsistencies regarding performance in certain areas. He speculated that there were specialized traits that denoted this occurrence (s).

Spearman's Intelligence

- **g-factor** – intelligence consists of general intelligence
- **s-factors** – intelligence consists of specific, cognitive skills

Louis Thurstone

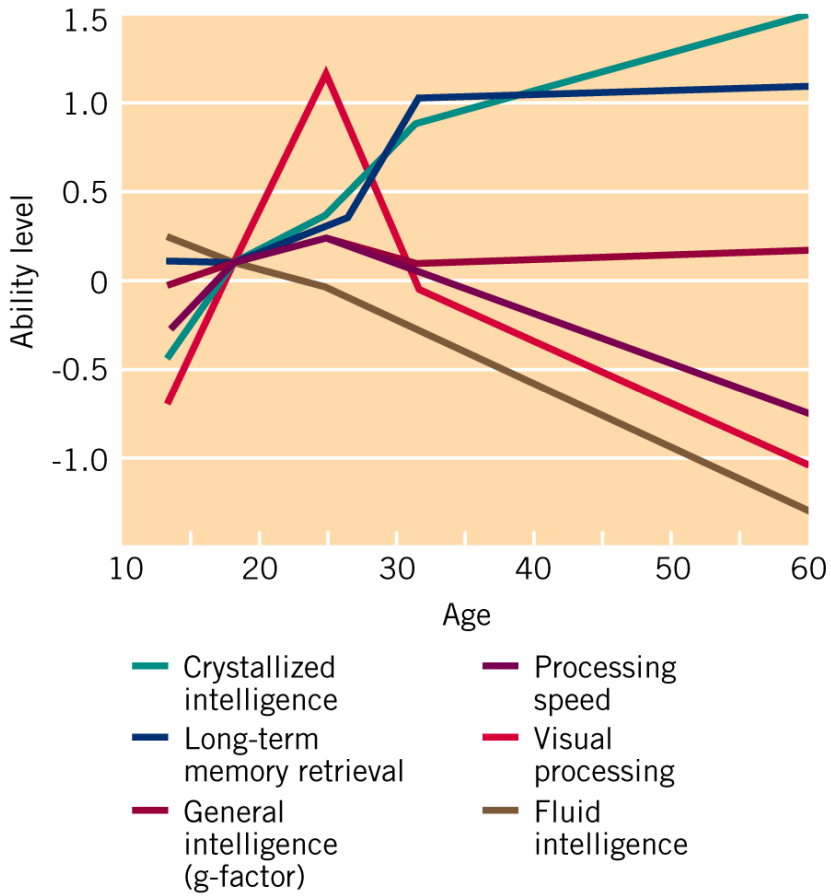
- Expanded Spearman's theory.
- Analyzed 50 mental tests administered to eight-graders and college students. As a result, he came up with seven factors called Primary mental abilities which made up Spearman's g:
- **Thurstone Primary Mental Abilities**
  - Spatial
  - Perceptual Speed
  - Number
  - Verbal Meaning
  - Word Fluency
  - Memory
  - Inductive Reasoning

Raymond Cattell and John Horn

- Proposed Spearmans g and Thurstone's primary mental abilities can be reduced to two major dimensions of intellect: Fluid and Crystallized
- **Fluid intelligence**. The ability to perceive relationships and solve relational problems of the type that are not taught and are relatively free of cultural influences.
- **Crystallized intelligence**. The ability to understand relations or solve problems that depend on knowledge acquired from schooling and other cultural influences

Fluid versus Crystallized Intelligence

- Fluid: Refers to mental processes rather than specific information (declines with age)
- Crystallized: a persons knowledge base (increases with age)



(Figure adapted from J. Horn & J. Knoll (1997) Human Cognitive Abilities: Gf-Gc theory. In D.P. Flanagan, J.L. Gershaft, & P.L. Harrison (Eds). Contemporary Intellectual Assessment, New York: Guilford, p. 72)

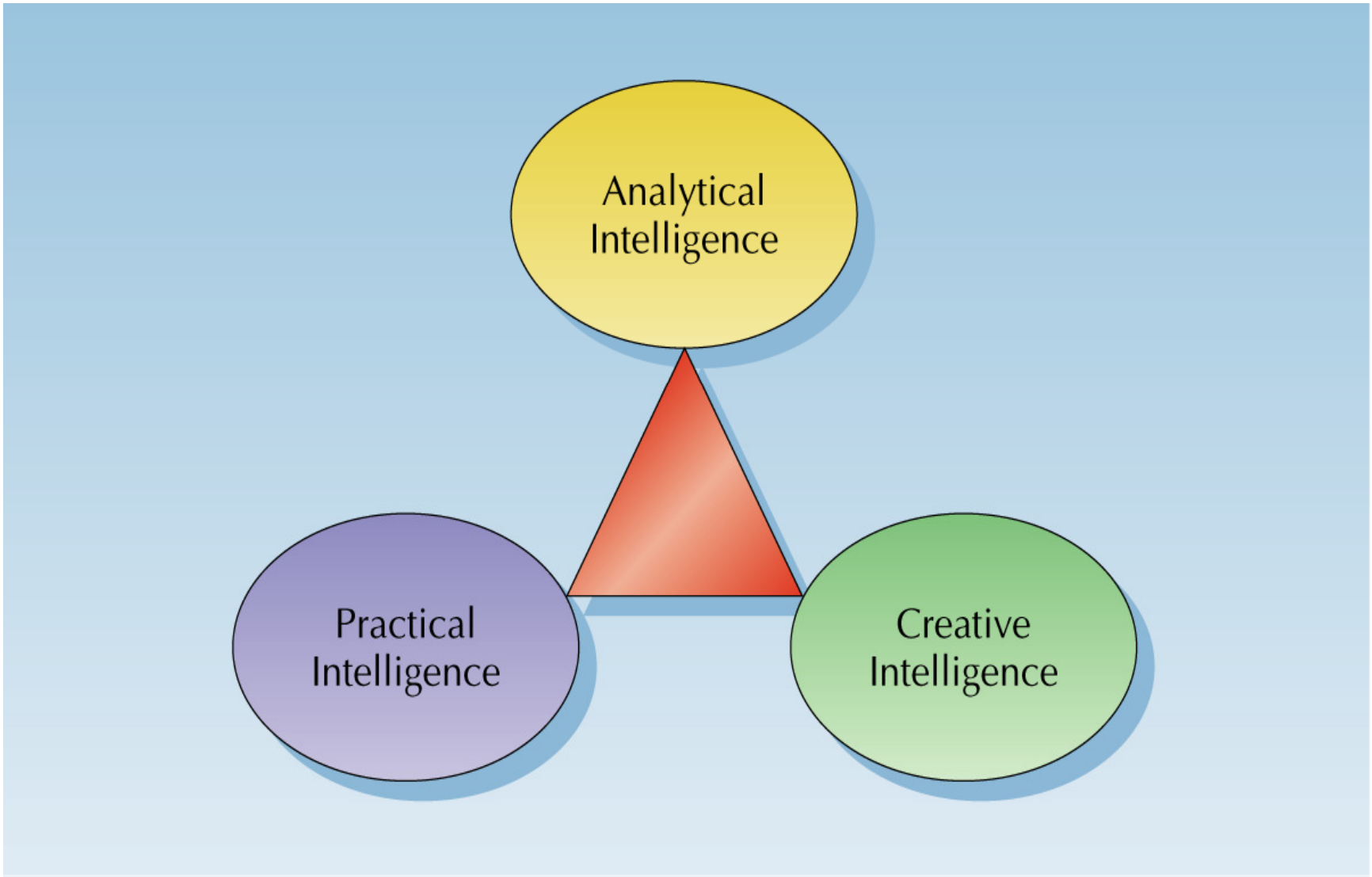
Sternberg's *triarchic theory of intelligence*

- Sternberg's ***triarchic theory of intelligence*** proposes three aspects of intelligence: *componential* (including *metacognition*), *experiential*, and *contextual*.
- Contextual intelligence allows you to acquire tacit knowledge, practical strategies that are important for success in your personal life, at school, and on the job.
- The theory also emphasizes the importance of *tacit knowledge*, which is important in an individual's personal and occupational success.

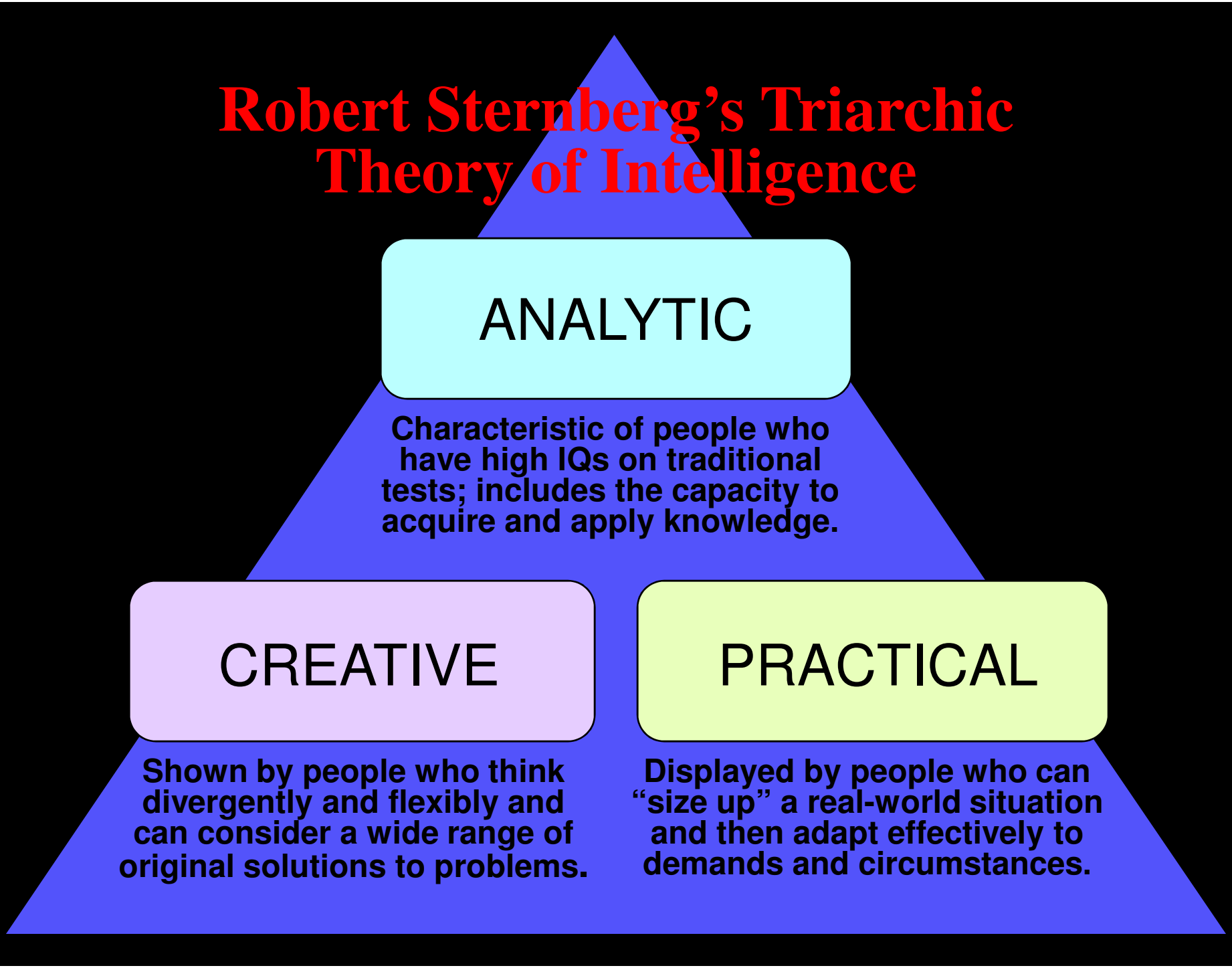
Theories of Multiple Intelligence: Sternberg's Triarchic Model

- Sternberg proposes that intelligence is comprised of three fundamental aspects:
  - Factors related to the "internal world" of the individual (e.g. executive processes, performance components as in sensory functioning, and problem solving or knowledge acquisition components);
  - Factors relating to the "external world" (e.g. how we adapt to the external world, how we shape our environment to suit our needs, how we select new environments);
  - Factors related to "experience" (e.g. difficult tasks may become easy with practice, so experience shapes intellectual functioning

Sternberg's Triarchic Intelligence Theory



Robert Sternberg's Triarchic Theory of Intelligence



Gardner's View of Intelligences

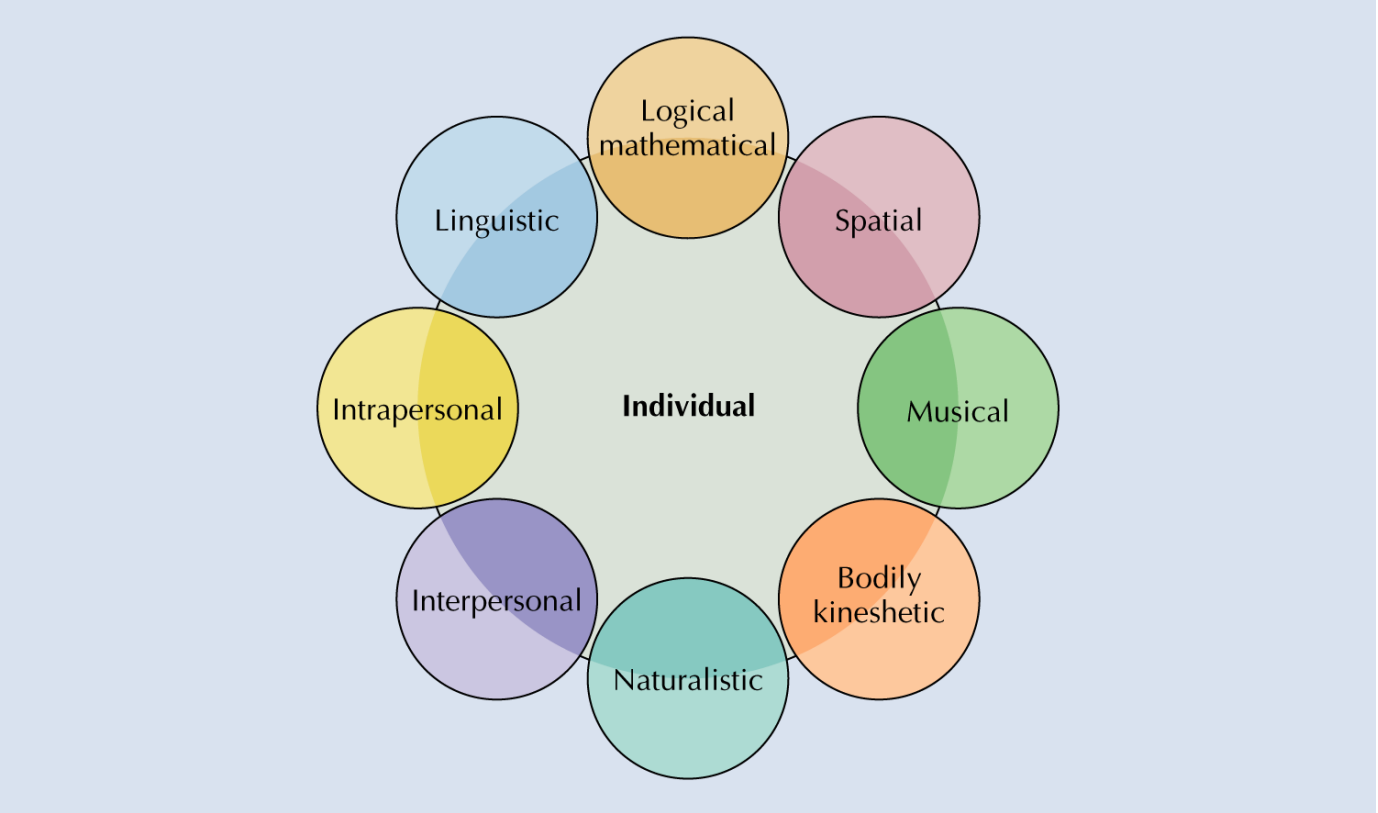
- Gardner argues for at least 7 different intelligences
  - Musical
  - Bodily/kinesthetic
  - Spatial
  - Verbal
  - Logical/mathematical
  - Intra-personal
  - Social

Howard Gardner's Eight Intelligences

Type of Intelligence	Description
Linguistic intelligence	"word smart"
Logical-mathematical intelligence	"number/reasoning smart"
Spatial intelligence	"picture smart"
Bodily-Kinesthetic intelligence	"body smart"
Musical intelligence	"music smart"
Interpersonal intelligence	"people smart"
Intrapersonal intelligence	"self smart"
Naturalist intelligence	"nature smart"

Gardner's Multiple Intelligences

- People vary in their profile of 8 distinct forms of intelligence:



Gardner's Multiple Intelligences Model

Gardner's criteria for acceptance as a distinct form of intelligence:

- Potential localization in the brain via brain damage cases;
- Existence of individuals who display the form of intelligence to an exceptional degree;
- An identifiable set of core operations such as the detection of relationships among musical tones;
- A regular developmental progression by way of experience beginning with novice and resulting in mastery;
- An evolutionary history wherein increases in intelligence can be associated with better adaptation to the natural environment;
- Supportive evidence from psychometric tests showing intelligence systems or clusters of abilities (e.g. visual spatial vs. verbal skills);
- Supportive evidence from cognitive psychology showing cross-task performance strengths or information processing strengths (e.g. mental rotation, recall of visual spatial images);
- Possible or actual encoding in a symbol system (e.g. linguistics, math, dance, athletics, music).

Information Processing Viewpoint

- Argue that the psychometric focuses only on what the individual knows (intellectual content) rather that the processes by which this knowledge is acquired, retained, and used to solve problems.

- In addition, traditional intelligence researchers do not measure other attributes we commonly think of as intelligence (common sense, social and interpersonal skills, and talents that underlie creative accomplishments in music, drama, and athletics).

Measuring Intelligence

- **Franz Gall**
  - Proposed that measurements of the size and shape of an individual's skull could be used to estimate an individual's intelligence; this proposal failed
- **Sir Francis Galton**
  - Measured intelligence through reaction times
  - Initiated the debate over measure of intelligence and whether it is predominantly the result of heredity or the environment

Intelligence tests

general mental abilities. They are intended to measure intellectual potential.

Approaches to Intelligence

- Psychometric approach: statistical techniques are used to define intellectual skills and abilities
- Information-processing: examine mental processes
- Multiple intelligences: notion that intelligence is a function of multiple systems

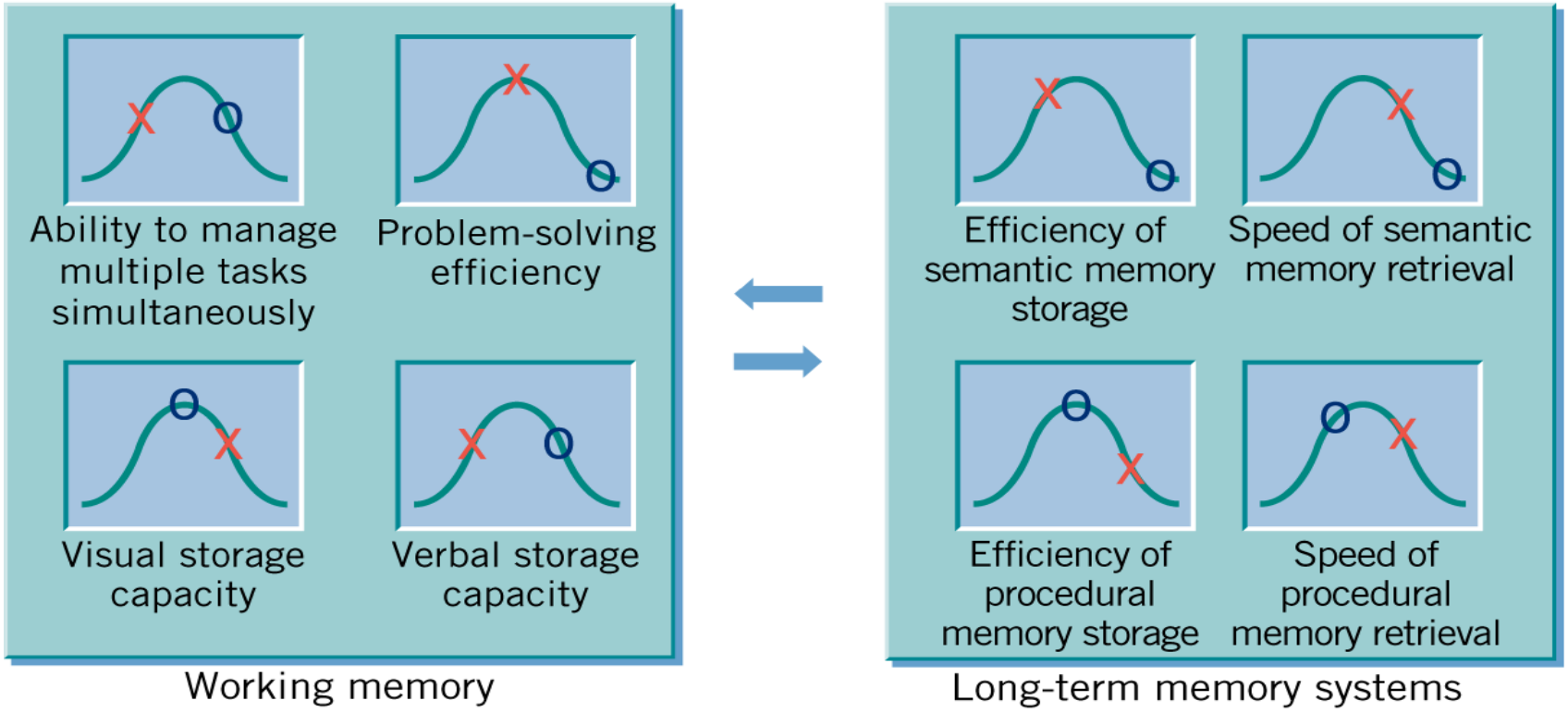
Intelligence Testing

- Psychometric approach: devise tests to measure a person's cognitive level relative to others in a population
  - First popularized by Sir Francis Galton
    - Mass testing at an exposition
    - Galton devised correlation procedure to examine relation between simple measures of intelligence
      - Did not correlate with social class
  - Binet and Simon devised a test to measure intellectual development in children
    - Devised "mental age" concept": MA = average age at which children achieve an actual score

Information-Processing Approach

- Examines the processes that underly intelligent behavior
  - Speed of processing: how rapidly a person can perform a mental task
    - Is a strong correlate of IQ scores
  - Knowledge base: persons with a strong knowledge base in an area are better able to perform a mental task
  - Ability to apply mental processes: can a person acquire and use new mental strategies?

The Information-Processing Approach to Intelligence Assessment



Factor Analytic Approach to Intelligence testing

- Statistical approach in which test items are examined using factor analysis
  - Looks for items that correlate together (are a common factor)
- How many factors?
  - Thurstone: one common factor “g”
  - Spearman: two factors:
    - “g” for general intelligence
    - “s” for specific intelligence

Intelligence Quotient

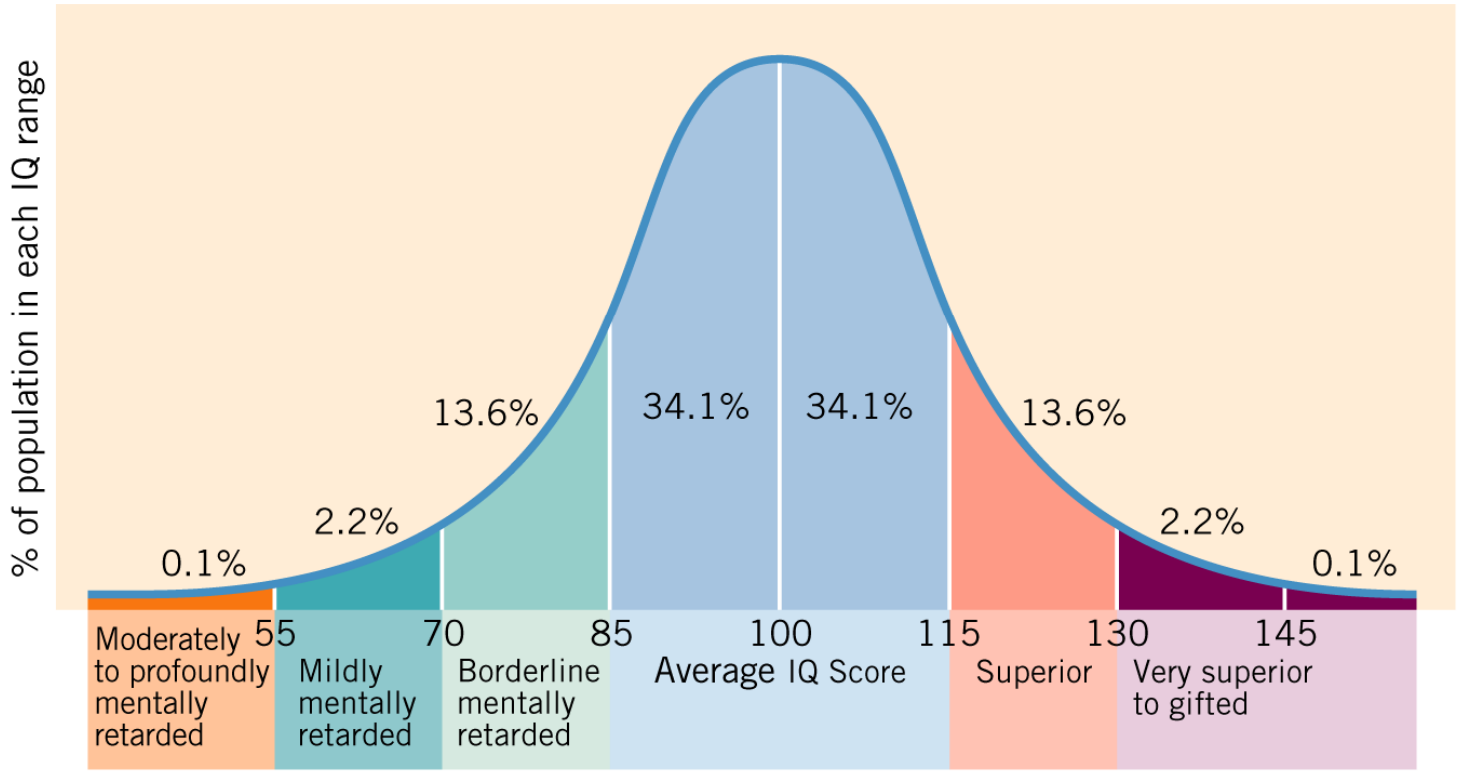
- To allow for comparison of test scores among persons, L. Terman devised the concept of intelligence quotient (IQ):

$$IQ = (MA/CA) \times 100$$

MA = mental age

CA = chronological age

Frequency Distribution of IQ Scores



(Figure adapted from Anastasi & Urbina, 1997)

Intelligence Tests

- The Stanford-Binet test was devised in 1916
  - Intelligence quotient (IQ) score is defined as the ratio of (mental age to actual age) times 100
    - The norms for IQ scores:
      - Mean = 100
      - Standard deviation = 16
      - 68% of persons have an IQ score within one SD of the Mean (84 to 116)
- IQ scores predict school achievement
- The Wechsler Adult Intelligence Scale measures verbal and nonverbal abilities

Commonly Used Intelligence Tests

- Stanford-Binet Intelligence Scale
- WAIS: Weschler Adult Intelligence Scale (over age 18)
- WISC: Weschler Intelligence Scale for Children (ages 6-17)
- WPPSI: Weschler Preschool and Primary Scale of Intelligence (ages 4-6)

IQ (traditional sub-tests)

Wechsler scales

VERBAL IQ

- **Information**
- **Similarities**
- **Arithmetic**
- **Vocabulary**
- **Comprehension**

PERFORMANCE IQ

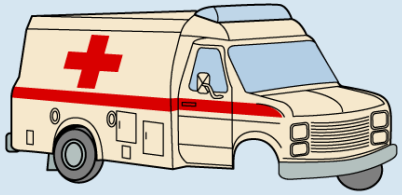
- **Picture Completion**
- **Picture Arrangement**
- **Block Design**
- **Object Assembly**
- **Coding**

IQ (new sub-tests)

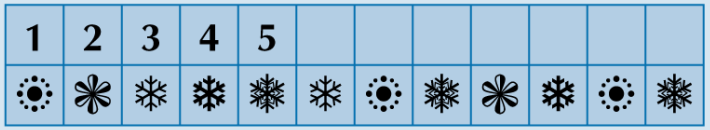
1. Block Design*
2. Similarities*
3. Digit Span*
4. Picture concepts*
5. Coding*
6. Vocabulary*
7. Letter-number* sequencing
8. Matrix reasoning*
9. Symbol Search*
10. Picture completion
11. Cancellation
12. Information
13. Arithmetic
14. Comprehension*
15. Word Reasoning

Examples of IQ Test Items

Picture Completion
What is missing from this ambulance?

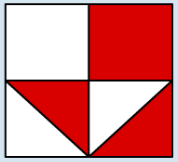


Coding
Write the appropriate number above each symbol.

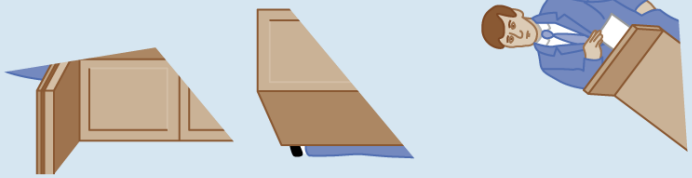


Picture Arrangement
Arrange these pictures in chrono-logical order.

Block Design
Copy this design with blocks.



Object Assembly
Assemble this small jigsaw puzzle.



Mental Ability, Intelligence Tests Used by Applied Psychologists Including School and Clinical Psychologists

Name of Test	Ages Tested	Description of abilities tested
Stanford-Binet Intelligence Scale, Fifth Edition (SBIS-V)	2 - 90+	In addition to providing a test composite score, this recent Revision of the SB assesses Fluid Reasoning, Knowledge, Quantitative Reasoning, Visual-Spatial Processing, and Working Memory as well as the ability to compare verbal and nonverbal performance. Not all subtests have to be administered in order to obtain composite scores.
Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV)	6 - 16	An update of the WISC-III, this test yields a Full Scale score and scores for Verbal Comprehension, Working Memory, Perceptual Reasoning, and Processing speed. This revision includes several new subtests and omits several from earlier versions.
Wechsler Adult Intelligence Scale (WAIS-Revised)	16 – 89	An IQ test for teens and adults, the WAIS provides a Verbal, Performance and Full Scale score as well as scores for verbal comprehension, perceptual organization, working memory, and processing speed. The structure is very similar to the WISC-IV and was developed by the same people. There is also the WPPSI-R that is designed for children six and below.
Comprehensive Test of Nonverbal Intelligence (CTONI)	6 - 18	The CTONI is designed to assess children who may be at a disadvantage on traditional tests that put a premium on language skills. It is made up of six subtests that measure different nonverbal intellectual abilities.
Universal Nonverbal Intelligence Test (UNIT)	5 - 17	Also created to assess children who may be at a disadvantage on traditional tests that put a premium on language skills, this test is completely nonverbal in administration and response style. It may or may not reflect general intellectual ability for each subject.
Kaufman Assessment Battery for Children (KABC-II)	2 - 16	This test measures simultaneous and sequential processing skills, and has subscales that measure achievement as well. It is an intelligence-theory-based test based on the work of Das and Lurie.

Assumptions Made By IQ Tests

(and why they are problematic)

(See Furth Article in *Think!* pg.292)

1. Age is a Valid Criterion for Measuring Intelligence
2. People Have a Standard Environment
3. Performance is a Sufficient Measure of Intelligence
4. Scholastic Validity
5. IQ Measures are Sufficiently Complete
6. All The Sub-Tests Measure The Same Underlying Ability
7. The Test Taking Abilities of People are Equal.

Measurement Issues

- Intelligence tests require
  - Standardization
    - Norms indicate where in the distribution a score lies (below, at, or above the mean)
    - Testing procedures are formalized
  - Reliability: consistency of measurement
  - Validity: assesses what the test actually measures
    - Criterion-related: the correlation between a test score and some criterion

Validity Issues for IQ Tests

- IQ test scores predict ability to succeed in school (valid use)
- IQ tests are often criticized because of:
  - Minimal theoretical basis (no underlying construct was used to devise tests)
  - Cultural bias
    - Scores depend on language, cultural experiences
      - Immigrants from Europe were deemed mental defectives because they had poor test scores
      - Tests were administered in English to non-English-speaking immigrants…..

Human Intelligence Lecture 2

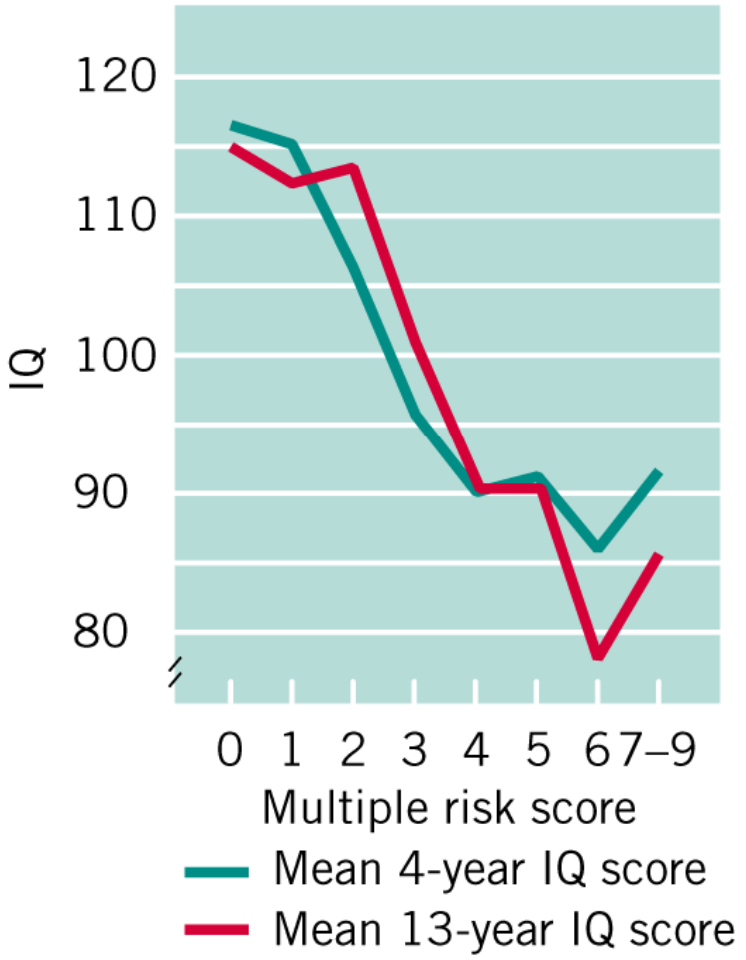
DR RACHEL KANG'ETHE

IQ Issues

- IQ scores are influenced by:
  - Socioeconomic status: middle class kids tend to do better than lower class kids
  - Language status: children from the dominant culture tend to do better
  - Age: IQ scores on timed tests tend to decline with age
  - Heredity: IQ scores of identical twins raised apart are quite similar

The Nature-Nurture Controversy

- What are the factors that influence IQ?
  - Environmental: factors such as parental education, mental status, nutrition
    - Risk factors are associated with reduced IQ scores
  - Genetic: notion that intelligence can be inherited



(Figure adapted from Sameroff et al., 1993, p. 89)

Heritability of IQ

- Asks whether genetic variation can explain variation in IQ scores
- Research strategies:
  - Twin studies: compare IQ scores in MZ and DZ twins
  - Adoption studies: compare similarity of IQ scores of adopted children with adopted family and with biological family
- Results suggest a heavy influence of genetics on individual IQ scores

Race and IQ

- Issue: although there is a heavy genetic component for *individual* IQ scores, is there a similar genetic component that would explain *group* differences in IQ scores?
  - Is the 15 point average difference in IQ scores between US blacks and whites a genetic or environmental issue?
    - Nutritional issues
    - Economic deprivation (adoption study)
    - No relation between ancestry and IQ scores

Culture & IQ

•IQ tests have been criticized for being biased in favor of white, middle-class people. However, efforts to construct ***culture-free*** and ***culture-fair*** tests have been disappointing. Culture affects nearly everything to do with taking a test, from attitudes to problem-solving strategies. Negative stereotypes about a person's ethnicity, gender, or age may cause the person to suffer *stereotype threat*, a burden of doubt about his or her own abilities, which can lead to anxiety or "disidentification" with the test.

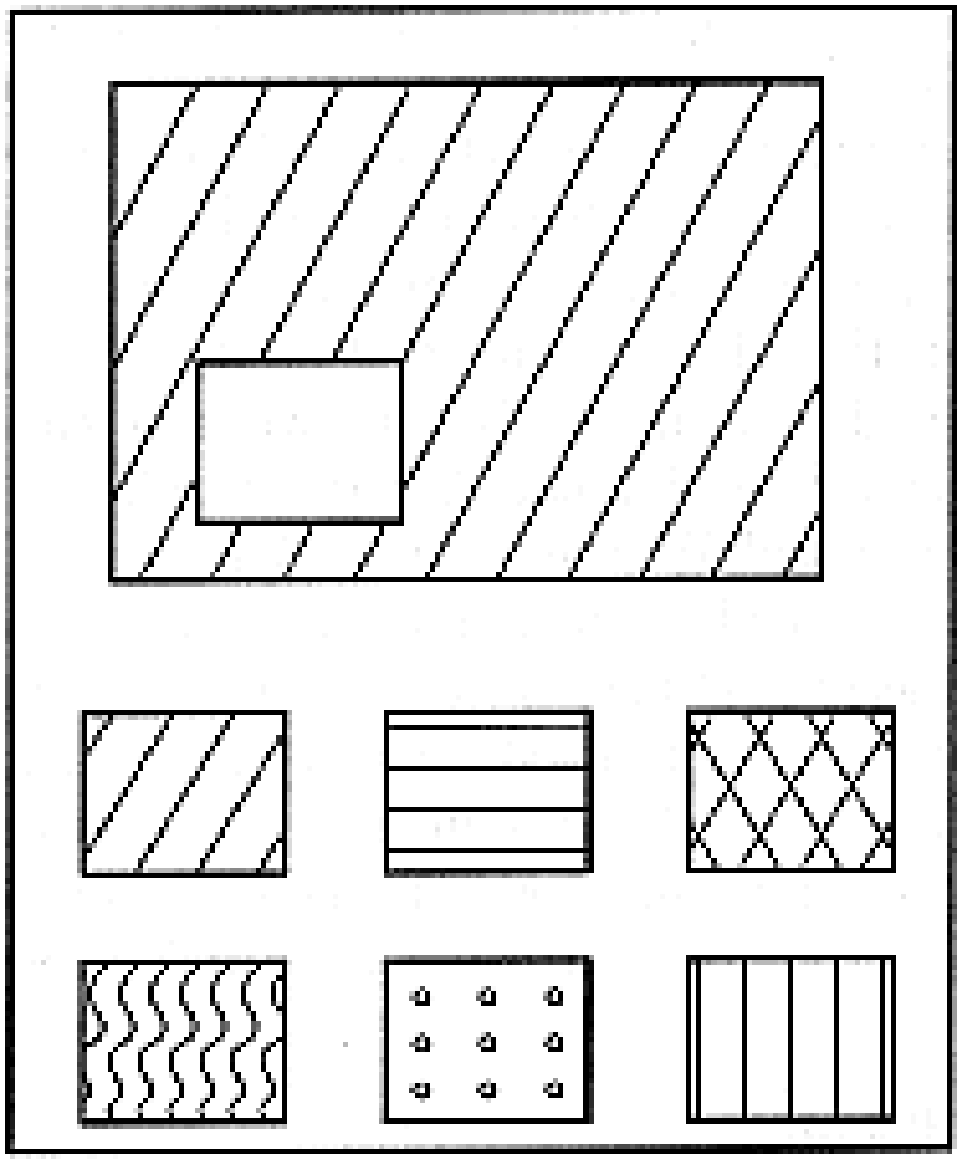
Problem: Cultural bias

- Different emphases on important components of intelligence (Rogoff, 1998, Serpell, 2000):
  - West: abstract thinking and logic
  - Kenya: responsible participation in life
  - Uganda: one who knows what to do and follows it through
  - Papua New Guinea: recall
  - Caroline Islands: navigation by stars
- Language barriers

Solution? Culture fair tests

- Ask fair questions - relevant to all
- Non-verbal tests:
  - Raven's Progressive Matrices Test
- Effective?
  - Not very
  - Cultural differences even in drawing (Anastasi & Urbina, 1996)

Raven's Progressive Matrices



(From Thornton, 2002)

Many social scientists consider IQ tests useful for predicting school performance and diagnosing learning difficulties, as long as test scores are combined with other information and used "intelligently."

But ...

critics would like to dispense with the tests because they are so often misused or misinterpreted.

Learning Disability Criteria

- Normal intelligence or above
- Difficulties in some academic, but not in others
- Not suffering from some other condition or disorder that could explain the problem

LEARNING DISABILITIES

- **Learning Disabilities, like IQ, are also a statistical construct.**

- **A learning disability is determined by subtracting a person's score on a standardized achievement test from her/his IQ score.**

- If the difference between the IQ score and the Standardized Achievement test score is greater than 15 (one standard deviation), the student is considered to be learning disabled.

Student A
IQ = 101
SA = 86
16
LD

Student B
IQ = 100
SA = 85
14
Not LD

Learning Disabilities

- Learning Disorders
  - Reading Disorder
  - Mathematics Disorder
  - Disorder of Written Expression
- Communication Disorders
  - Expressive Language Disorder
  - Phonological Disorder
  - Stuttering
- Motor Skills Disorder

Mental Retardation

- Sub-average intellectual and adaptive functioning is termed mental retardation (IQ score less than 70)
  - Causes include:
    - Genetic disorder: Down syndrome (extra 21st chromosome)
    - Environmental issues
      - Damage incurred during birth process
      - Head injury
      - In utero exposure to alcohol or cocaine

Vineland Adaptive Behavior Scales

Age, Years	Adaptive Ability
2	Says at least fifty recognizable words. Removes front-opening coat, sweater, or shirt without assistance.
5	Tells popular story, fairy tale, lengthy joke, or plot of a TV program. Ties shoelaces into a bow without assistance.
8	Keeps secrets or confidences for more than one day.
11	Uses the telephone for all kinds of calls without assistance. Watches TV or listens to radio for information about a particular area of interest.
16	Looks after own health. Responds to hints or indirect cues in conversation.

Classification of MR

- Mild Mental Retardation (50-55 to 70 IQ)
  - Able to maintain themselves in unskilled jobs
  - May need help with social or financial problems
- Moderate Mental Retardation (35-40 to 50-55 IQ)
  - Brain damage and other pathologies are frequent
  - Most live dependently within family or group homes
- Severe Mental Retardation (20-25 to 35-40 IQ)
  - Commonly have congenital physical abnormalities
  - May be able to perform very simple work under supervision
- Profound Mental Retardation (below 20-25 IQ)
  - Severe physical deformities and neurological damage
  - Very high mortality rate during childhood

Mental Giftedness

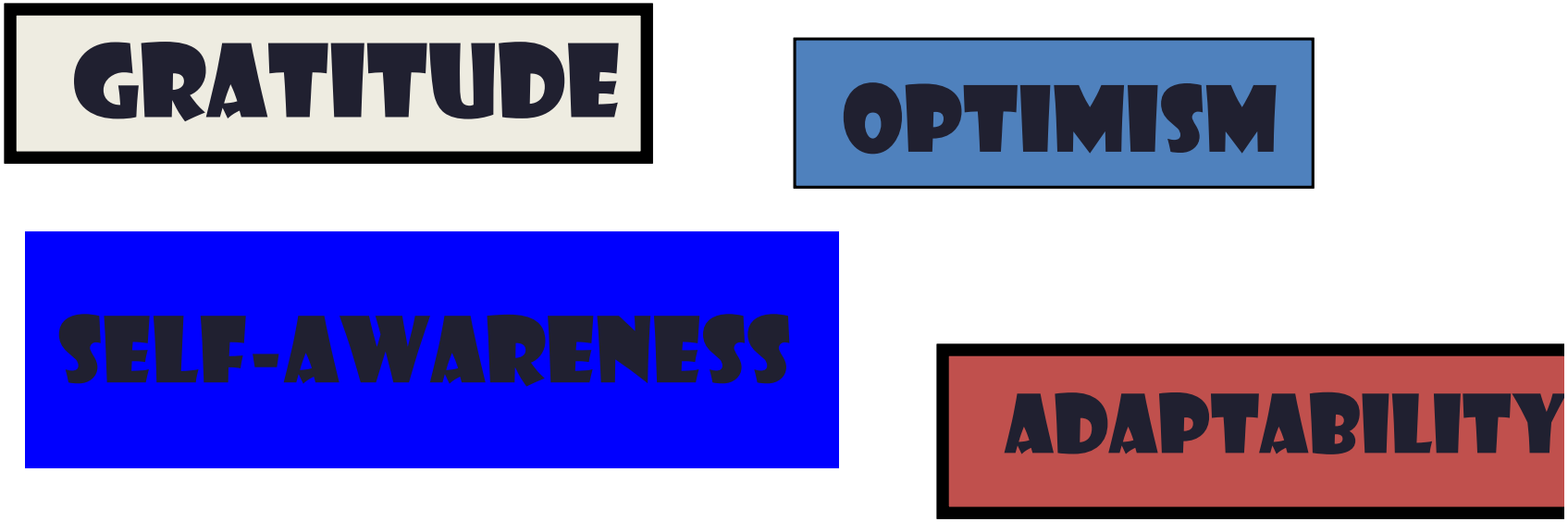
- "Gifted" refers to those persons whose IQ score is in the top 1% – 2%
- Terman's study of gifted students started with 1,500 children in 1921
  - By 1950, many of these students had achieved much in life
    - Were more likely to have professional careers
    - Were more likely to earn more money
    - Were happier and healthier

Creativity

- Creativity refers to the ability to produce valued outcomes in a novel way
- Research strategies:
  - Study imminent people (e.g. Einstein)
  - Devise measures of creativity
    - Divergent thinking test
    - “How many uses for a brick?”

Emotional Intelligence

- Your attitude is the primary measure of emotional intelligence



IQ

- A weak predictor for
  - achievement
  - job performance success
  - overall success, wealth, & happiness
- Accounts for a major component of employment success according to numbers of studies covering career success; maybe as much as 20-25%.

More potent predictors of career success were

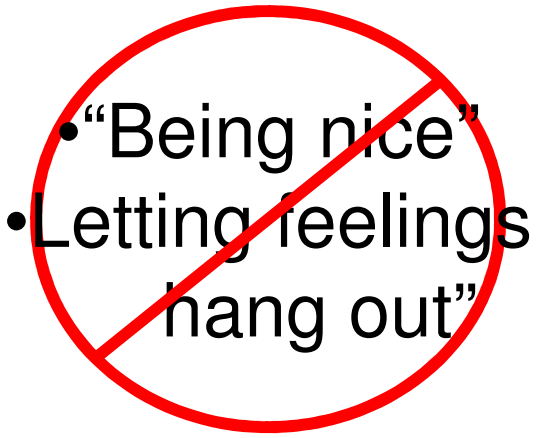
- Ability to handle frustrations
- manage own emotions
- manage own social skills

Do you know any highly intelligent people who aren't socially adept?

What is Emotional Intelligence (EI)?

The capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships.

- **a field in infancy**
- **fast-growing**
- **aspects harken to research of the 1940's**



Emotional Intelligence

The ability to…

- Understand the needs and feelings of oneself and other people
- Manage one's own feelings
- Respond to others in appropriate ways

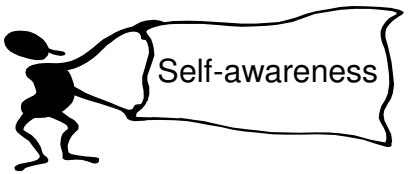
The 5 Components of EI

Emotional self-awareness

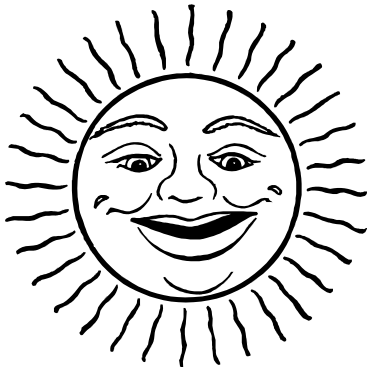
- The inability to notice our true feelings leaves us at their mercy.
- People with greater certainty about their feelings are better pilots of their lives

and have a surer sense about how they feel about personal decisions.

Stay open to our
emotional experience--
can we tolerate the entire bouquet?



Acknowledging your strengths and weaknesses without judgment is a key sign of emotional intelligence



The development of EI

- A genetic contribution is likely
- They are not destiny (timidity)
- Early expression of emotion by parents helps learning
- Early abuse hinders learning

- Poor ability to read others' emotion may lead to the development of poor social skills.

Social Competence

- Adaptable and Flexible
- Compassionate and Empathic
- Good Listener
- Appreciation of Diversity
- People Skills
- Leadership Qualities

Emotional intelligence requires you to take 100% responsibility for the outcome of all your relationships.

- Focus on changing yourself and not the other person.
- Disengage from antagonistic relationships

OR

- Use better communication or conflict resolution techniques

How to Increase Your EQ

- **Conduct a “personal inventory.”**
- **Analyze the setting & identify skills needed.**
- **Enlist trusted friends.**
- **Focus on a few competencies.**
- **Practice, practice, practice.**
- **Be observant and reflective.**
- **Don’t expect immediate results.**
- **Learn from your mistakes.**
- **Acknowledge your successes.**

Cognitive Intelligence

The ability to…

- Perceive and understand information
- Reason with it and arrive at conclusions
- Imagine possibilities
- Use intuition
- Make judgements
- Solve problems and make decisions

Spiritual Intelligence

The ability to…

- Understand that human beings have an animating need for meaning, value and a sense of worth in what they seek and do
- Respond to that need in appropriate ways

Moral Intelligence

The ability to differentiate right from wrong according to universal moral principles

Behavioural Intelligence (Skills)

- Behaving or acting appropriately according to situational needs
- Verbal communication – writing, speaking and active listening
- Body language
- Other physical behaviour

Does intelligence change over time?

- Infant intelligence
  - no verbal intelligence scales
  - more items measuring perceptual motor development and social interactional abilities
- Gesell (1925, 1928)
    - motor, language, adaptive, personal-social skills
- Bayley Scales of infant development
  - Bayley (1969; 1993)
  - 2 components:
    - motor scale (e.g. crawling, climbing stairs)
    - mental scale (e.g. response to sound, imitation, memory, problem solving, language comprehension and production)

Does intelligence change over time?

- NO correlation between infant and IQ test scores (Anderson, 1939).
- But scales measure different things
- Other infant measure correlate with IQ:
  - habituation experiments (Bornstein, 1989)
  - attention (Bornstein & Krasnegor, 1989)
- Stability over time?

Must Know Terms:

- **crystallized intelligence** Cognitive skills and specific knowledge of information acquired over a lifetime; it is heavily dependent on education and tends to remain stable over the lifetime.
- **emotional intelligence** The ability to identify your own and other people's emotions accurately, express your emotions clearly, and regulate emotions in yourself and others.

Terms continued...

- **heritability** A statistical estimate of the proportion of the total variance in some trait that is attributable to genetic differences among individuals within a group. IQ is 40-60% heritable.
- **intelligence** An inferred characteristic of an individual, usually defined as the ability to profit from experience, acquire knowledge, think abstractly, act purposefully, or adapt to changes in the environment

Terms continued...

- **fluid intelligence** The capacity for deductive reasoning and the ability to use new information to solve problems; it is relatively independent of education and tends to decline in old age.
- **g factor** A general intellectual ability assumed by many theorists to underlie specific mental abilities and talents.

Terms continued...

- **triarchic theory of intelligence** A theory of intelligence that emphasizes information-processing strategies, the ability to creatively transfer skills to new situations, and the practical application of intelligence.
- **Anderson's theory of intelligence** The theory that differences in intelligence result from differences in the "basic processing mechanism" that implements thinking, which in turn yields knowledge. Individuals vary in the speed at which basic processing occurs.

Terms continued...

- **Stanford-Binet Intelligence Scale** Stanford revision of the Binet test which measures the kinds of changes in intelligence ordinarily associated with growing older.
- **Wechsler Adult Intelligence Scale** A verbal scale and a performance scale that yield separate scores as well as a full-scale IQ.

Terms continued...

- **reliability** Yielding reproducible and consistent results.
- **validity** Measuring what is intended to be measured.

Terms continued...Validity

- **construct validity** The ability of a test or assessment instrument to confirm predictions of the theory underlying some theoretical concept or construct. Confirming results validate both the concept and the assessment instrument simultaneously.
- **criterion validity** The ability of a test or assessment instrument to predict the behavior it is designed to predict (syn. empirical validity).

Just What is Intelligence?

- **Boring** (1923) – “Intelligence is what the intelligence tests measure”

- **Weschler** (1975) – “The capacity of an individual to understand the world about him (or her) and his (or her) resourcefulness to cope with its challenges

Terms continued...Validity

- **Face Validity** --Does the test appear to be appropriate ?Not a statistical concept, entirely subjective.
- **Content Validity -** Does the test cover all of the domains to be measured ? Not a statistical concept, but an evaluation by an expert which is, hopefully, arrived at after careful study of the test objectives and wording, etc.