

Mental abilities

Definition: the capacity to perform the higher mental processes of reasoning, remembering, understanding and problem solving

Psychologists have not reached a consensus on how best to define intelligence. Proposed definitions often focus on the role of intelligence in reasoning, problem solving, and dealing with the environment.

A brief history of IQ tests

- Binet developed a test of intelligence to identify children who needed special instruction. His test included questions that required reasoning and problem solving of varying levels of difficulty, graded by age.
- Terman developed a revision of Binet's test that became known as the Stanford-Binet test; it included items to assess the intelligence of adults as well as that of children and became the model of IQ tests.
- Wechsler tests remedied some of the deficiencies of the earlier tests. These tests are made up of subtests, some of which had little verbal content.

IQ tests today

- In schools the Stanford-Binet and Wechsler tests are the most often used. Both include subtests and provide scores for parts of the test as well as an overall score
- A person's intelligence quotient – IQ score – reflects how far that person's performance on the test deviates from the average performance by people in his or her age group. (the average performance produces an IQ of 100)

Evaluating IQ tests

- A person's IQ score is likely to change over the years of childhood, but this instability reflects changing abilities
- Otherwise, IQ tests are reliable tests, and they are good predictors for academic success and success in complex jobs
- However, IQ tests assess only some of the abilities that might be considered aspects of intelligence, and may favor those with middle-class culture.

Intelligence and the diversity of mental abilities:

- *The psychometric approach*
 - The psychometric approach attempts to analyze the structure of intelligence by examining correlations between tests and mental ability.
 - Because scores on almost all tests of mental ability are positively correlated, Spearman concluded that all of these tests measure a general factor of mental ability, called g-factor of intelligence.
 - Other researchers concluded that intelligence is not a single trait. It seems that g reflects a collection of subskills and mental abilities needed to succeed on any test of intelligence.
- *The information-processing approach*
 - The information-processing approach focuses on the processes by which intelligent behavior is produced
 - Small positive correlations were found between IQ scores and measures of the flexibility and capacity of attention, and between IQ scores and the measures of the speed of information processing.

- According to Sternberg, intelligent thinking involves three kinds of mental processes
 - Performance components – are the processes of perceiving stimuli, holding information in short-term memory, comparing values, retrieving material from long-term memory, and calculating sums and differences.
 - Knowledge-acquisition components – are processes used in gaining and storing new information.
 - Metacomponents – are the processes that control performance and knowledge acquisition components; they determine the problem solving strategies people use.
- Sternberg consider that metacomponents hold the greatest importance in intelligent cognitive activities
- Stenberg’s triarchical theory also holds that intelligence depends on the ability to profit from experience and to deal with the environment.
- *Multiple intelligences*
 - Gardner’s approach to intelligence is based not only on the result of mental tests and information-processing research but also studies of prodigies, human development, biology, and various cultures.
 - Gardner holds that biology equips humans with the raw capacities for several intelligences that can function with some independence and specifically:
 - Linguistic
 - Logical-mathematic
 - Spatial
 - Musical
 - Body-kinesthetic (demonstrated by the skills of dancers or athletes)
 - Personal (refers to knowledge and understanding of oneself and of one’s relations to others)

In review: Analyzing Mental Abilities

Approach	Method	Key findings
Psychometric	Define the structure of intelligence by examining factor analysis of the correlations between scores on tests of mental abilities	Performance on many tests of mental abilities is highly correlated, but this correlation, represented by g , reflects a bundle of abilities, not just one trait
Information processing	Understand intelligence by examining the mental operations involved in intelligent behavior	The amount of attentional resources available makes a significant contribution to performance on IQ tests. The speed of basic processes is somewhat less important
Sternberg's triarchical theory	Understand intelligence by examining the information processing involved in thinking, changes with experience, and effects in different environments	Thinking involves three components. High intelligence is shown in the effective organization of these components, in altering their use to deal with novel or familiar problems, and in adapting problem-solving strategies to different environments
Gardner's theory of multiple intelligence	Understand intelligence by examining test scores, information processing, biological and developmental research, the skills valued by different cultures, and exceptional people	Biology provides the capacity for six distinct "intelligences" valued by society: linguistic, logical-mathematical, spatial, musical, body-kinesthetic, and personal

- *Creativity*

- Tests of divergent thinking are used to measure differences in creativity
 - Divergent thinking is the ability to think along many paths to generate many solutions to a problem

- Divergent thinking tests are scored by counting the number of different but plausible responses that a person can list for each item.
- In contrast, IQ tests require convergent thinking
 - Convergent thinking is the ability to apply logic and knowledge in order to narrow down the number of possible solutions to a problem.
- Although creativity and IQ scores are not highly correlated, creative behavior requires intelligence.
- More specifically, the emergence of creativity requires expertise in a creative field, skills at problem solving and divergent thinking, and motivation to pursue a creative endeavor for its own sake.
- *Changes in mental abilities*
 - Cross-sectional and longitudinal studies are used to examine age-related changes in mental abilities
 - IQ scores remain relatively constant throughout most adulthood, until the age of about sixty or seventy.
 - In old age some aspects of crystallized intelligence continue to grow, but fluid intelligence may decline
 - Crystallized intelligence – depends on retrieving information and facts about the world from long-term memory
 - Fluid intelligence – involves rapid and flexible manipulations of ideas and symbols

Motivation

Definition: Motivation refers to the influences that govern the initiation, direction, intensity, and persistence of behavior.

Sources of motivation:

Four categories:

- Biological factors – for example the need for food, water, temperature regulation
- Cognitive factors – people often behave in a certain way because of what they think is possible and because of how they anticipate others will react
- Emotional factors – panic, fear, anger, love, and many others emotions can be crucial to behavior ranging from selfless giving to brutal murder
- Social factors – people react to parents, siblings, friends, teachers, television and other forces. The combined influence of these social factors has a profound effect on virtually every aspect of human behavior.

In one way or another, motivational theorists have recognized the importance of each of these factors.

Types of motives:

First we distinguish innate motives (mainly biological and emotional factors) versus learned motives (mainly cognitive and social factors)

Second we distinguish intern motives (biological, cognitive and emotional factors) versus extern motives (social factors)

Third we distinguish unconscious motives (biological and emotional factors) versus conscious motives (cognitive and social factors)

Theoretical perspectives of motivation:

Each theory emphasized one of the four sources of motivation. No single theory provides a complete explanation of why humans behave as they do.

- *Instinct theory* – postulates innate fixed-action patterns that are automatically elicited by the presence of some stimulus (biological factors).
 - Example of instincts: self-assertion, reproduction, gregariousness
- *Drive reduction theory* – holds that when homeostasis is upset, a need is created, which produces a drive to restore homeostasis. Biology creates the primary drives, but people are also motivated by secondary drives that are learned.
 - Sequences according drive-reduction theory:
Unbalanced equilibrium → Need (biological disturbance) → Drive (psychological state that provides motivation to satisfy need) → Behavior (satisfy need and reduces drive) → Equilibrium restored
- *Arousal theory* – people are motivated to maintain an optimal level of arousal. People generally feel best and perform best when they are at their own optimal level.
 - Diagram: relation between the efficiency of performance and the level of arousal
- *Incentive theory* – people are motivated to perform behaviors when they expect those behaviors to have outcomes that they value highly.
- *Opponent process theory*: Two assumptions underlie this theory:
 - first: any reaction to a stimulus is followed by an opposite reaction
 - second: with repeated exposure to a stimulus the initial reaction weakens and the opponent process becomes stronger.

- Example: addictive behavior: the first exposure to heroin produces an intensely pleasurable rush, followed by a mild unpleasant feeling of withdrawal associated with a craving for another dose. After continued drug use, the initial reaction becomes less intense, and the withdrawal reaction occurs more quickly, becomes more intense, and lasts longer.