

## Chapter 8: Thinking, Language & Intelligence

---

---

---

---

---

---

---

---

### Truth or Fiction?

- You are most likely to find the answer to a frustrating problem by continuing to plug away at it.
- Only humans can use insight to solve problems.

---

---

---

---

---

---

---

---

### Truth or Fiction?

- If a couple has five sons, the sixth child is likely to be a daughter.
- People change their opinions when the opinions are shown to be wrong.

---

---

---

---

---

---

---

---

**Truth or Fiction?**

- Crying is an early form of language.
- Young children say things like “Daddy goed away” and “Mommy sitted down” because they *do* understand rules of grammar.

---

---

---

---

---

---

---

---

**Truth or Fiction?**

- “Street smarts” are a sign of intelligence.
- Creative people are highly intelligent.
- Highly intelligent people are creative.

---

---

---

---

---

---

---

---

**Truth or Fiction?**

- Two children can answer exactly the same items on an intelligence test correctly, yet one child can be above average in IQ, and the other can be below average.
- Intelligence tests measure many things other than intelligence.
- Head Start programs have raised children’s IQ.

---

---

---

---

---

---

---

---

**Preview of Chapter Eight**

- Thinking
- Language
- Intelligence
- Nature and Nurture in Intelligence

---

---

---

---

---

---

---

---

**Thinking**

---

---

---

---

---

---

---

---

**Thinking**

- What is thinking?
  - Attending to information,
  - Representing it mentally,
  - Reasoning about it, and
  - Making judgments and decisions about it

---

---

---

---

---

---

---

---

### Concepts

- Mental categories used to group objects, relations, events, abstractions or qualities that have common properties
- Hierarchies
  - Used to categorize concepts
- Prototypes
  - Good examples of a category of concept
    - Overextension

---

---

---

---

---

---

---

---

### Problem Solving

- Features of understanding a problem
  - Parts relate to one another in a meaningful way
  - Elements correspond to the elements of the problem in the outer world
  - Storehouse of background knowledge

---

---

---

---

---

---

---

---

### Elevator Problem



PLAY VIDEO

---

---

---

---

---

---

---

---

### Algorithms

- Specific procedure for solving a type of problem
  - Yield correct answers if the right formula is used
- Systematic random search
  - Each possible solution is tested according to a particular set of rules

---

---

---

---

---

---

---

---

### Heuristic

- Shortcuts, mental rules of thumb, used to solve a problem
- Means-end analysis
  - Evaluate difference between the current situation and goal
- Analogies
  - Refer to a previous problem to solve a new problem

---

---

---

---

---

---

---

---

### Elevator Solution



PLAY VIDEO

---

---

---

---

---

---

---

---

**Video Connections: Problem Solving**

- Can you think of times you have engaged in divergent thinking? Give examples.
- What are the roles of divergent thinking and convergent thinking in problem solving?

---

---

---

---

---

---

---

---

**Factors that Affect Problem Solving**

- Expertise
  - Experts use parallel processing; novices use serial processing
- Mental Sets
  - Tendency to use an approach that was previously successful with similar problem
- Insight
  - Sudden perception permitting the solution

---

---

---

---

---

---

---

---

**Factors that Affect Problem Solving**

- Incubation
  - Stand back from a problem for a while; solution may come in a flash of insight
- Functional Fixedness
  - Tendency to think of an object in terms of its familiar function

---

---

---

---

---

---

---

---

**Heuristics in Decision Making**

- Representativeness heuristic
  - Make judgments about events according to the population of events that they appear to represent
- Availability heuristic
  - Estimate of probability is based on examples of relevant events

---

---

---

---

---

---

---

---

**Heuristics in Decision Making**

- Anchoring and adjustment heuristic
  - First estimate serves as an anchor
  - With new information we make adjustments but remain in the proximity of the first estimate

---

---

---

---

---

---

---

---

**Factors that Affect Decision Making**

- Framing effect
  - Context in which information is presented affects decision making
- Overconfidence
  - Unaware of flimsiness of assumptions
  - Work to bring about results that fit our judgments

---

---

---

---

---

---

---

---



---

---

---

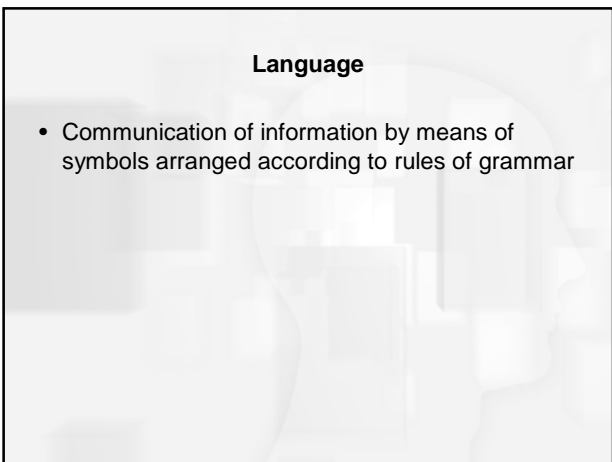
---

---

---

---

---



---

---

---

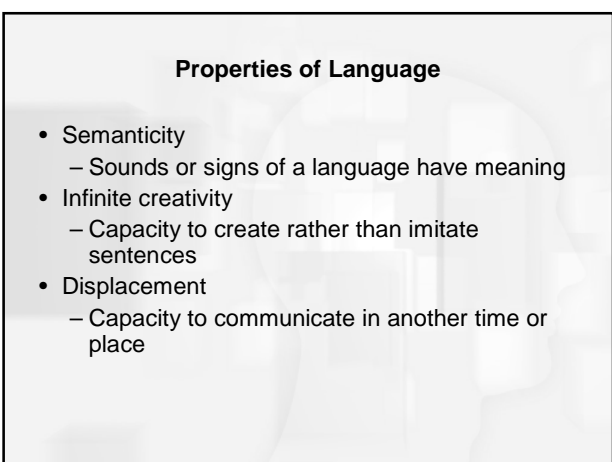
---

---

---

---

---



---

---

---

---

---

---

---

---

### Language and Cognition

- Language is not necessary for thinking
  - Although it allows use of symbols arranged according to rules of grammar

---

---

---

---

---

---

---

---

### Language and Culture

- Linguistic-relativity hypothesis
  - Language structures the way we perceive the world
- Cultural differences in terms of vocabulary for concepts
  - May be based on usefulness, not a cognitive limitation

---

---

---

---

---

---

---

---

### Language Development

- Prelinguistic vocalizations
  - Crying, cooing, babbling
    - All children babble the same sounds (even deaf children)
  - Do not represent objects or events
- First word is spoken about 1 year

---

---

---

---

---

---

---

---

**Development of Grammar**

- Holophrase
  - Single words that express complex meanings
- Telegraphic speech
  - Two-word sentences
  - Grammatically correct
  - Sequence of various kinds of two-word sentences is universal

---

---

---

---

---

---

---

---

**Development of Grammar**

- Overregulation
  - Application of regular grammatical rules to irregular verbs and nouns

---

---

---

---

---

---

---

---

**Nature and Nurture in Language Development**

- Learning Theory
  - Imitation and reinforcement
  - Parent serve as models
- Nativist Approach
  - Innate factors cause children to attend to and perceive language in certain ways

---

---

---

---

---

---

---

---

**Nature and Nurture in Language Development**

- Psycholinguistic theory
  - Language acquisition involves interaction of environmental influences and inborn tendency to acquire language
- Language acquisition device (LAD)
  - Represents the inborn tendency
  - Prepares nervous system to learn grammar
    - Universal grammar

---

---

---

---

---

---

---

---

**Intelligence:  
The Most Controversial  
Topic in Psychology?**

---

---

---

---

---

---

---

---

**Intelligence**

- The underlying ability to understand the world and cope with its challenges
- Provides the basis for academic achievements

---

---

---

---

---

---

---

---

### Factor Theories of Intelligence

- Intelligence is made up of a number of mental abilities (factors)
- Spearman's g factor
  - General intelligence
  - s factor represents specific intelligence
- Thurstone's nine specific factors
  - Primary mental abilities

---

---

---

---

---

---

---

---

### Gardner's Theory of Multiple Intelligence



---

---

---

---

---

---

---

---

### Triarchic Theory of Intelligence

- Robert Sternberg
  - Analytical
    - Academic ability
  - Creative
    - Ability to cope with novel situations and generate multiple solutions to problems
  - Practical
    - "Street smarts"

---

---

---

---

---

---

---

---

### Emotional Intelligence

- Intrapersonal and interpersonal skills
- Self-insight and self-control
- Allows for coping with stress, depression, and aggressive behavior

---

---

---

---

---

---

---

---

### Creativity and Intelligence

- Creative people
  - Do things that are novel and useful
  - Take risks
  - Defy limits
  - Appreciate art and music
- Relationship between intelligence test scores and standard measures of creativity is only moderate.

---

---

---

---

---

---

---

---

### Convergent and Divergent Thinking

- Convergent thinking
  - Process that zeroes in on the single best solution to a problem
  - Best used in intelligence testing
- Divergent thinking
  - Process that attempts to generate multiple solutions to problems
  - Best used in measuring creativity

---

---

---

---

---

---

---

---

### Measurement of Intelligence

- Stanford-Binet Intelligence Scale (SBIS)
  - Binet-Simon - produced child's mental age
  - SBIS yields an intelligence quotient (IQ)
- Wechsler Scales
  - Separate subscales – verbal and performance
  - Deviation IQ

---

---

---

---

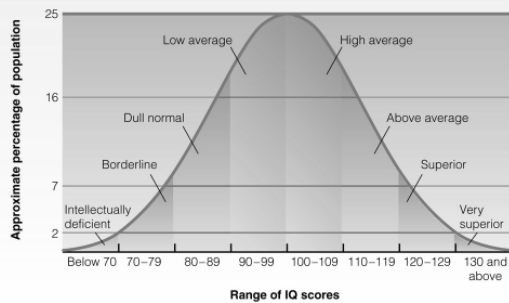
---

---

---

---

### Variations in IQ Scores



© 2007 Thomson Higher Education

---

---

---

---

---

---

---

---

### Differences in Intellectual Functioning

- Socioeconomic and Ethnic Differences
  - Lower-class US children obtain IQ scores 10 - 15 points lower than middle- and upper-class
  - Asian American children outscore European American children
  - European American children outscore African American and Latina/Latino American children

---

---

---

---

---

---

---

---

### Do Intelligence Tests Contain Cultural Biases?

- Tests may measure familiarity with dominant middle-class culture
- Culture-free Intelligence Tests
  - Cattell's Culture-Fair Intelligence Test
  - Goodenough's Draw-A-Person test
- European American children outperform African American children on "culture-free" test

---

---

---

---

---







---







---

---

### Sample Items from Cattell's Culture-Fair Intelligence Test

What comes next? Choose one

Series:  1  2  3  4  5  Answers

Matrices:  1  2  3  4  5 

© 2007 Thomson Higher Education

---

---

---

---

---

---

---

---

### Sex Differences in Intelligence Tests

- Girls superior to boys in verbal ability
- Boys excel in visual-spatial ability
- Boys tend to score higher on math tests
  
- Group scores represent greater variation in scores within the group than between the groups

---

---

---

---

---

---

---

---

## Nature and Nurture in Intelligence: Where Does Intelligence Come From?

---

---

---

---

---

---

---

---

### Genetic Influences on Intelligence

- Kinship studies
  - IQ scores of identical twins are more alike than for any other pairs (even when twins are reared apart)
  - Moderate correlations between fraternal twins, siblings and parents and their children
  - Weak correlations between children and their foster parents and between cousins

---

---

---

---

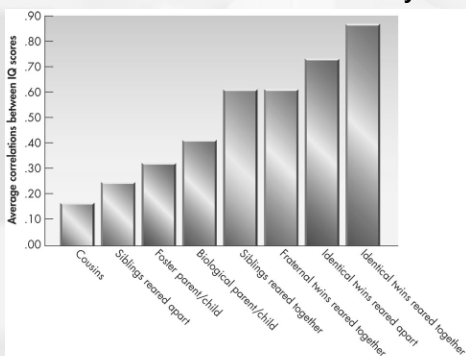
---

---

---

---

### Findings of Studies of the Relationship between IQ Scores and Heredity



---

---

---

---

---

---

---

---

**Genetic Influences on Intelligence**

- Twin Studies
  - IQ scores of identical twins are more alike than for any other pairs (even when twins are reared apart)
  - IQ scores for fraternal twins were about same as that between other siblings

---

---

---

---

---

---

---

---

**Genetic Influences on Intelligence**

- Adoption Studies
  - Stronger relationship between IQ scores of adopted children and their biological parents than between children and adoptive parents

---

---

---

---

---

---

---

---

**Heritability of Intelligence**

- Heritability is between 40% and 60%
  - About half the difference between your IQ score and the IQ scores of other people can be explained by heredity
- IQ scores of identical twins raised together were higher correlations than similar identical twins raised apart

---

---

---

---

---

---

---

---

### Sex Differences in Intellectual Functioning

- Brain hemispheres in males may be more specialized
- Woman appear more able to use both hemispheres

---

---

---

---

---

---

---

---

### Environmental Influences on Intelligence

- Home Environment
  - Important predictor of IQ scores - ages 3 to 8
- Parenting Styles
- Education
  - Enriched early environments (Head Start)

---

---

---

---

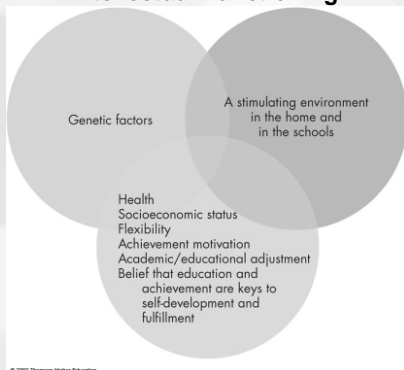
---

---

---

---

### The Complex Web of Factors That Affect Intellectual Functioning



---

---

---

---

---

---

---

---