

1 **Chapter 8: Thinking, Language & Intelligence**

2 **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.

3 **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.

4 **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.

5 **Truth or Fiction?**

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

6 **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.

7 **Preview of Chapter Eight**

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

8 **Thinking**

9 **Thinking**

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

10 **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

11 **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

12 **Elevator Problem**

13 **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

14 **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

15 **Elevator Solution**

16 **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?

17 **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

18 **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

19 **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

20 **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

21 **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

22 **Language**

23 **Language**

- Communication of information by means of symbols arranged according to rules of grammar

24 **Properties of Language**

- Semanticity
 - Sounds or signs of a language have meaning
- Infinite creativity
 - Capacity to create rather than imitate sentences
- Displacement
 - Capacity to communicate in another time or place

25 **Language and Cognition**

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

26 **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

27 **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

28 **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

29 **Development of Grammar**

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

30 **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

31 **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

32 **Intelligence:**

The Most Controversial Topic in Psychology?

- 33 **Intelligence**
- The underlying ability to understand the world and cope with its challenges
 - Provides the basis for academic achievements
- 34 **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
- 35 **Gardner's Theory of Multiple Intelligence**
- 36 **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"
- 37 **Emotional Intelligence**
- Intrapersonal and interpersonal skills
 - Self-insight and self-control
 - Allows for coping with stress, depression, and aggressive behavior
- 38 **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.
- 39 **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
- 40 **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
- 41 **Variations in IQ Scores**
- 42 **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
- 43 **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
- 44 **Sample Items from Cattell's Culture-Fair Intelligence Test**
- 45 **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
- 46 **Nature and Nurture in Intelligence: Where Does Intelligence Come From?**
- 47 **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
- 48 **Findings of Studies of the Relationship between IQ Scores and Heredity**
- 49 **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
- 50 **Genetic Influences on Intelligence**
- Adoption Studies
 - Stronger relationship between IQ scores of adopted children and their biological parents than between children and adoptive parents
- 51 **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
- 52 **Sex Differences in Intellectual Functioning**
- Brain hemispheres in males may be more specialized
 - Woman appear more able to use both hemispheres
- 53 **Environmental Influences on Intelligence**
- Home Environment
 - Important predictor of IQ scores - ages 3 to 8
 - Parenting Styles
 - Education
 - Enriched early environments (Head Start)