

Chapter 7 (Part 1)

Units of Thought

- Thinking- manipulating mental representations for a purpose
- **Manipulating Mental Representations**
 - We usually think in words or images
 - Mental images- visual representations of a stimulus
 - Mental models- representations that describe, explain, or predict the way things work; include descriptions of the relations among elements
- **Concepts and Categories**
 - Categories- groupings based on common properties
 - Concept- mental representation of a category
 - Categorization- the process of identifying an object as an instance of a category, recognizing its similarity to some objects and dissimilarity to others
 - Defining Features
 - Defining features- qualities that are essential, or necessarily present, in order to classify an object as a member of a category
 - Well-defined concepts- concepts that have properties clearly setting them apart from other concepts (ex: salt, water, triangle)
 - Prototypes
 - Prototype- a particularly good example of a category; includes most important common features of the objects; abstraction
 - When people judge similarity in visual tasks, they rely on shape
 - When judging verbally, they rely on characteristic/prototypical features, which are qualities typically found in members of a category
 - Exemplar- particularly good example of the category
 - Hierarchies of Concepts
 - Basic level- level of categorization to which people naturally go; objects share distinctive common attributes
 - Subordinate level- level below the basic level in which more specific attributes are shared by members of a category
 - Superordinate level- more abstract level in which members of a category share few common features
 - Superordinate > basic > subordinate
 - Ex: clothing > shirt > dress shirt

- One person's basic level may be another person's subordinate (ex: psychologists use more scientific terms when describing patients rather than saying "nut" or "has problems")
- Can also change in setting/situation

Reasoning, Problem Solving, and Decision Making

- **Reasoning**
 - The process by which people generate and evaluate arguments and beliefs
 - Inductive Reasoning
 - The process of reasoning from specific observations to general propositions
 - Ex: people that had casual contact with HIV patients did not get it, people that had sex with them did; therefore HIV must be transmitted sexually
 - Deductive Reasoning
 - Logical reasoning that draws a conclusion from a set of assumptions or premises
 - Starts with idea rather than observation
 - Induction starts with specifics and draws general conclusions; deduction starts with general principles and makes inferences about specific instances
 - Ex: All dogs have fur; Barkley is a dog; therefore, Barkley must have fur
 - Unlike inductive reasoning, deductive reasoning leads to certain rather than probable conclusions
 - Reasoning by Analogy
 - Analogical reasoning- process by which people understand a novel situation in terms of a familiar one
 - Influenced by the similarity of situations, the ease of mapping their elements, and the reasoner's goals
- **Problem Solving**
 - The process of transforming one situation into another that meets a goal
 - Goal is to move from initial state (current unsatisfactory state) to goal state (state in which problem is solved)
 - In order to get from initial to goal state, person uses operators, mental and behavioral processes aimed at transforming the initial state until it reaches the goal
 - Well-defined problems- initial state, goal state, and operators are easily determined

- Ill-defined problems- initial state, goal state, and operators are vague
- Steps for solving a problem:
 - 1. Compare initial state with goal state to identify precise differences between the two
 - 2. Identify possible operators and select one that seems most likely to reduce differences
 - 3. Apply operator, responding to challenges or roadblocks by establishing subgoals (mini-goals on the way to achieving a broader goal)
 - 4. Continue using operators until all differences between initial and goal state are eliminated
- Problem-Solving Strategies
 - Techniques used to solve problems
 - Algorithms- systematic procedures that inevitably produce a solution to a problem
 - Mental simulation- problem-solving strategy in which people imagine the steps to problem solving mentally before actually undertaking them
- Problem Solving Gone Awry
 - Functional fixedness- tendency to ignore other possible functions of an object when one already has a function in mind
 - Confirmation bias- tendency for people to search for information that confirms their expectations
- **Decision Making**
 - The process by which people weigh the pros and cons of different alternatives in order to make a choice among two or more options
 - Consider two things:
 - Utility (value to them) of outcomes of different options
 - Probability (estimated likelihood) of each outcome
 - Weighted utility value- combined measure of the importance of an attribute and how well a given option satisfies it
 - Expected utility- a combined assessment of the value and probability of different options

Implicit and Everyday Thinking

- Explicit cognition- thinking that involves conscious manipulation of representations
- **How Rational Are We?**
 - Heuristics
 - Cognitive shortcuts or rules of thumb; allow people to make rapid, efficient, but sometimes irrational judgments