

Ch. 8: Language and Thought
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- I. Language and Thought
 - a. Cognition: thinking, it refers to the mental processes involved in acquiring knowledge
 - 1. Cognitive psychology
 - b. Language: Turning thoughts into words
 - 1. A language consists of symbols that convey meaning, plus rules for combining those symbols that can be used to generate an infinite variety of messages
 - 2. 4 key properties
 - A. Language is symbolic
 - B. Language is semantic
 - i. Symbols are meaningful but arbitrary
 - C. Language is generative
 - i. Can combine symbols to generate novel messages
 - D. Language is structured
 - i. Symbols are put together w/ specific rules
 - 3. The Structure of Language
 - A. Phonemes: The smallest speech units in a language that can be distinguished perceptually
 - i. units of vocal sound that do not have meaning
 - ii. 100 basic sound for all languages
 - iii. different languages use different groups of 20 to 80 phonemes
 - B. Morphemes: smallest unit of meaning in a language
 - i. Root word, prefix, suffix
 - C. Word
 - i. Semantics: area of a language concerned w/ understanding the meaning of words and word combination
 - ii. Syntax: a system of rules that specify how words can be arranged into sentences
 - D. Phrase
 - E. Sentence
 - c. Problem Solving: In Search of Solution
 - 1. Problem Solving: active efforts to discover what must be done to achieve a goal that is not readily attainable
 - 2. Types of Problems
 - A. Problems including structure: discover relations among #'s of, words, symbols, or ideas
 - B. Problems of arrangement: arrange the parts of a problem in a way that satisfies some criterion
 - C. Problems of Transformation: carry out a sequence of transformations in order to reach a specific goal
 - 3. Barriers to effective problem solving
 - A. Irrelevant info
 - B. Functional Fixedness: tendency to perceive an item only in terms of its most common sense
 - C. Mental Set: people persist in using problem solving strategies that have worked in the past
 - D. Unnecessary constraints: people assume that constraints that don't exist are present
 - 4. Approaches to problem solving: problem space refers to the set of possible pathways to a solution considered by the problem solver
 - A. Trial & Error: trying possible solutions and discarding those that are in error until one works (random)
 - B. Algorithm: a methodical, step-by-step procedure for trying all possible alternatives in searching for a solution to problem
 - C. Heuristics: a guiding principle or "rule of thumb" used in solving problems or making decisions
 - i. Forming sub goals
 - ii. Working backward
 - iii. Searching for analogies: use solution to a previous problem for a new one
 - iv. Changing the representation for a problem: can represent a problem in different ways, like verbally, mathematically, or spatially
 - d. Decision making

1. Involves evaluating alternatives and making choices among them
2. Are the decisions that people make normally rational and optimal?
3. Simon, an economist, purposed that people often make irrational decisions that are less than optimal
4. Simons's theory of bounded rationality asserts that people tend to use simple strategies in decision making that focus only a few facets of a variable of options and often result in "irrational decisions" that are less than optimal
5. How do cognitive biases, which are ways of thinking, distort people's decision making and lead to irrational decisions?
6. Making choices about preferences: how people select among alternatives
 - A. Additive Strategy: list various attributes that influence decision. Then rate alternatives based on each attribute
 - B. Elimination by aspects: alternative choices are eliminated by evaluating them on each attribute or aspect in turn
 - C. When people have few options with a few alternatives they tend to use additive strategy, when more options they tend to use elimination by aspects
 - D. When alternatives are similar, people tend to delay their decisions
7. Taking Chances: factors involved in making risky decision
 - A. Why do people do such things as gamble and play the lottery even though they know their chances of winning are low?
 - B. perhaps the most rational way to decide to make a risky decision is to determine the expected value of the decision
 - i. Expected value: probability of gaining or losing
 - C. However people often make decisions that are consistent w/ expected value
 - D. Why do people decide on things that are against their odds?
 - i. Subjective utility: what an outcome is personally worth to a person
 - ii. Subjective Probability: people may not know actual probabilities but instead rely on their personal estimates of probabilities
8. Heuristics, mental short-cuts that people use in gambling
 - A. Availability heuristics: basing the estimated probability of an event on the ease w/ which relevant instances comes to mind
 - B. Representativeness Heuristics: basing the estimated probability of an event on how similar it is to the typical prototype of that event
 - C. Because of the above people often ignore the base rate, which is the actually probability of the event when making decisions
9. Conjunction Fallacy: occurs when people estimate that the odds of two uncertain events are happening together are greater than the odds of either even happening alone.
10. Alternative outcomes effect: occurs when people's belief about whether an outcome will occur changes depending on how alternative outcomes are distributed, even though the summed probability of outcome is held at a constant
11. Evolutionary analysis of flaws in human decision making
 - A. Say human decision making is more rational than believed and only seems irrational because psychologists have been studying the decision in the wrong way
 - B. Human mind is wired to think in terms of raw frequencies rather than base rates and probabilities
 - C. Humans' reasoning largely depends on "fast & frugal heuristics"