Cognition

Thinking

Language

Cognition

- Cognition & Metacognition
- Concepts
- Problem-Solving
- Obstacles to Problem-Solving
- Cognitive Biases
- Intuition
- Creativity

Cognition

- all the mental activities associated with thinking, knowing, and remembering

Metacognition

- thinking about how you think or solve problems
- becoming aware of your own mental processes

Concepts

- Mental groupings of similar objects
  - <u>Prototype</u>: most typical example of a concept
- Organization
  - <u>Hierarchies</u>: systems in which concepts are arranged from more general to more specific
  - <u>Schema</u>: preexisting mental frameworks which enable us to organize and interpret new information
    - Scripts are schemas for events

Problem-Solving

- <u>Trial and Error</u>: trying possible solutions and discarding those that do not work
- <u>Algorithms</u>: problem-solving strategies that involve a slow, step-by-step procedure that guarantees a solution to many types of problems
- <u>Heuristics</u>: mental shortcuts or "rules of thumb;" don't *guarantee* answers; quicker than algorithms

Problem-Solving

- <u>Insight</u>: sudden and novel realization of the solution to a problem; "Aha!" moment
  - Köhler's studies with chimpanzees
- <u>Inductive Reasoning</u>: reasoning from specific to general
- <u>Deductive Reasoning</u>: reasoning from the general to the specific
- Scientific method really involves using both ways of thinking

Obstacles to Problem-Solving

- <u>Fixation</u>: inability to look at a problem from a fresh perspective
  - <u>Functional Fixedness</u>: failure to use an object in an unusual way or outside of its typical uses
  - <u>Mental Set</u>: tendency to approach problems in the same way that has been successful in the past
- <u>Framing</u>: how an issue is posed can significantly affect perceptions, decisions, & judgments (even without varying info)

Obstacles to Problem-Solving

- <u>Availability Heuristic</u>: estimating probability of certain events in terms of how readily they come to mind

- <u>Representativeness Heuristic</u>: new situation is judged by how well it matches a stereotypical model or a particular prototype

- <u>Anchoring Heuristic/Effect</u>:tendency to be influenced by a suggested reference point, pulling a response towards that point

Cognitive Biases

- <u>Belief Perseverance</u>: tendency to hold on to a belief after the basis for the belief has been discredited

- <u>Belief Bias</u>: preexisting beliefs distort logical reasoning, making illogical conclusions seem valid or logical conclusions seem invalid

- <u>Hindsight Bias</u>: tendency to falsely report that we could have correctly predicted the outcome of an event

Cognitive Biases

- <u>Confirmation Bias</u>: tendency to search for and use information that supports our preconceptions & ignore info that refutes them

- <u>Overconfidence Bias</u>: tendency to underestimate the extent to which our judgments are erroneous
  - overestimate how correct we are
  - think we make errors less often than other people

Cognitive Biases

- <u>False Consensus Effect</u>: tendency for a person to think his/her own views are representative of a general consensus

Intuition

- Effortless, immediate, automatic feeling or thought
- Enables us to react quickly and adaptively
- "Gut reactions" without logical thinking
- Does not always help to find the best solution

Creativity

- Ability to think about a problem or idea in new & unusual ways, to come up with unconventional solutions
  - <u>Convergent Thinking</u>: use problem-solving strategies directed toward one correct solution to a problem
  - <u>Divergent Thinking</u>: produces many answers to the same question; characteristic of creativity
  - <u>Brainstorming</u>: generating many ideas without evaluating them

Language

- Structure of Language
- Language Development
- Language Acquisition Theories
- Linguistic Relativity Hypothesis
- Brain & Language

Structure of Language

- Phonemes
  - basic sound units
  - approx. 100 worldwide
  - 42 in the English language
- Morphemes
  - smallest meaningful units of speech
  - simple words, prefixes, suffixes

Structure of Language

- <u>Grammar</u>: system of rules that determine how sounds and words can be combined and used to communicate meaning
  - <u>Syntax</u>: rules that regulate *order* for words to be combined into grammatical sentences
  - <u>Semantics</u>: rules that enables us to derive *meaning* from morphemes, words, sentences
    - Denotation/surface structure (particular words & phrases)
    - Connotation/deep structure (underlying meaning)

Language Development

- **Babbling**
  - Starts about 4 months
  - not limited to the phonemes the baby is exposed to
  - around 10 months, the baby is limited to familiar phonemes, demonstrating awareness of home language

Language Development

- **One-Word Stage**
  - Starts about 1 year
  - speak in holophrases (one word) to convey meaning
  - One-word phrases can be actual words or simple representations of words

Language Development

- **Two-Word Stage**
  - Starts at about 2 years
  - use telegraphic speech (noun + verb)
  - <u>Overgeneralization/Overregularization</u>: overuse of grammatical rules when communicating

Language Acquisition Theories

- **Behaviorism**
  - B. F. Skinner
  - Nurture argument
  - Humans learn language through operant conditioning & observational learning

Language Acquisition Theories

- **Nativist Theory**
  - Noam Chomsky
  - Nature argument
  - Humans are born to learn language and have a natural aptitude for grammar because of a language acquisition device

Language Acquisition Theories

- **Statistical Learning & Critical Periods**
  - Babies can learn certain statistical probabilities in speech
  - if language ability isn't cultivated before adolescence, the ability to learn language will be lost

Linguistic Determinism

- **Linguistic Relativity/Determinism**
  - Benjamin Whorf
  - Different languages cause people to view the world differently
  - Language determines how humans think
  - Bilingual people asked the same questions in different languages may answer differently depending on which language was used, showing the influence of language on thinking

Brain & Language

- <u>Aphasia</u>: impaired use of language resulting from damage to any one of several cortical areas

- Broca's Area
  – Controls language expression
  – Directs muscle movements involved in speech

- Wernicke's Area
  – Interprets auditory code
  – Language comprehension/understanding

Brain & Language

- Motor cortex enables muscles to pronounce words
- Visual cortex perceives written words
- <u>Angular gyrus</u>: transforms visual representations into auditory code (to be understood by Wernicke's area)