

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

# Problem-Solving

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

# Problem-Solving

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

# Obstacles to Problem-Solving

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



# Obstacles to Problem-Solving

- Availability Heuristic: estimating probability of certain events in terms of how readily they come to mind
- Representativeness Heuristic: new situation is judged by how well it matches a stereotypical model or a particular prototype
- Anchoring Heuristic/Effect: tendency to be influenced by a suggested reference point, pulling a response towards that point

# Cognitive Biases

- Belief Perseverance: tendency to hold on to a belief after the basis for the belief has been discredited
- Belief Bias: preexisting beliefs distort logical reasoning, making illogical conclusions seem valid or logical conclusions seem invalid
- Hindsight Bias: tendency to falsely report that we could have correctly predicted the outcome of an event

# Cognitive Biases

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

- False Consensus Effect: 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
  - Convergent Thinking: use problem-solving strategies directed toward one correct solution to a problem
  - Divergent Thinking: produces many answers to the same question; characteristic of creativity
  - Brainstorming: 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

- Grammar: system of rules that determine how sounds and words can be combined and used to communicate meaning
  - Syntax: rules that regulate *order* for words to be combined into grammatical sentences
  - Semantics: 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)
  - Overgeneralization/Overregularization:  
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

- Aphasia: 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
- Angular gyrus: transforms visual representations into auditory code (to be understood by Wernicke's area)