Lecture 17:
The Cognitive Approach

I. INTRODUCTION
A. Thought Experiment

- What would happen if aliens landed on Earth?
- How would we try to understand them?
  - What kind of information would we have
  - What kind of information would we want?
- What kind of explanation would we develop?
  - Intentional?
    - Provides little by way of predictions.
  - Physical?
    - We may not understand what they are made of.
  - Design?
    - We can model how they process information.

I. INTRODUCTION
A. Thought Experiment

- We can understand their behavior non-physically and non-intentionally.
  - We can model their processing of information
    - Perception and Sensation: What they detect and like in the environment
    - Memory and Retrieval: What they encode from the environment and remember of that environment
    - Problem-solving Thinking: How they analyze information. Draw inferences, make decisions etc.
- **We would treat them like the way we treat computers!!**

II INTRO TO COGNITIVE PSYCHOLOGY
A. MAY 12, 1997

- Can computers help us understand ourselves like they helped us understand aliens?
  - A remarkable event happened on May 11, 1997
  - Here is the <u>New York Times</u> headline and opening paragraph.

    IBM Chess Machine Beats Humanity's Champ
    NEW YORK -- In brisk and brutal fashion, the IBM computer Deep Blue unseated humanity, at least temporarily, as the finest chess playing entity on the planet on Sunday, when Garry Kasparov, the world chess champion, resigned the sixth and final game of the match after just 19 moves, saying, "I lost my fighting spirit."

II INTRO TO COGNITIVE PSYCHOLOGY
A. Human and Computer Analogy

- Computers can help us understand how best to play chess.
- Computers are also central in the Cognitive Approach in psychology
  - The *mind as a computer* is the central idea behind the cognitive approach.
  - Computer analogy central to understanding how our alien friends process information (that is, sense, perceive, store, remember, analyze, and interpret information)
- The Human – Computer analogy holds that:
  - there are similarities between the entities.
  - there are differences between the entities.

II INTRO TO COGNITIVE PSYCHOLOGY
A. Human and Computer Analogy

- 1. Differences: What differences exist between humans and computers?
    - Physical nature: Silicon vs. Carbon
    - Reproductive process.
    - Experience: Only humans actually feel pain, emotions etc., although computers can simulate it.
    - Consciousness: Only humans are aware of themselves as agents in the world (free-will).

II INTRO TO COGNITIVE PSYCHOLOGY
A. Human and Computer Analogy

- 2. Similarities: What ways are they similar?
- Most of the similarities address the processing of information.
- Both Minds and computers…
  - *Input* information
  - *Output* information
  - *Access* information
  - *Store* information
  - *Retrieve* information
  - *Analyze* information

II INTRO TO COGNITIVE PSYCHOLOGY
A. Human and Computer Analogy

- So the Cognitive Approach denies that people are computers, only that people and computers both process information.
  - Information processing language lets us talk objectively about how the mind.
    - There is no "mental *state*" talk about the mind
  - In this view, the mind is full of dynamic and objective mental *processes*.
    - Use the same verbs when talking about the mind as when talking about computers.
    - The psychological question becomes how do we perform these operations.

II INTRO TO COGNITIVE PSYCHOLOGY
B. Cognitive Psychology

- Cognitive Psychology premised on human-computer analogy.
  - Consider how each of the following involves an account of how the mind processes information.

Last week
- **Sensation:** Processes for detecting information
- **Perception**: Processes for making meaning.

This week
- **Memory**: Processes for acquiring, storing, and retrieving information

Next week
- **Problem Solving**: Processes to determine actions to reach goal states.
- **Thinking**: Processes for manipulating information to understand phenomena.
- **Social Cognition**: Processes for manipulating information to understand self and others.