CHAPTER 1: COGNITION AS THE STUDY OF

INFORMATION PROCESSING

***Learning Objectives***

* Describe cognitive science as a multidisciplinary approach to understanding cognition
* Recall the work done by some of the early researchers to understand cognitive processes
* Identify the challenges to standard behaviorist explanations that led to the emergence of cognitive psychology
* Report the modern approaches to understanding cognition after the decline of the behaviorist theory

***Chapter Outline***

1. What Is Cognition?
2. An Interdisciplinary Perspective

# Psychology B. C. (Before Cognitive Psychology)

## Psychophysics

1. Structuralism
2. Functionalism

## Behaviorism

## Laying the Foundation for Cognitive Psychology

### Ebbinghaus’ Pioneering Experiments on Memory

### Bartlett’s Memory Research

* 1. Gestalt Psychology

# The Emergence of Cognitive Psychology

## S-R Explanations, *S*eriously w*R*ong?

#### Learning Without Responding

#### Learning Without Reinforcement

#### Cognitive Maps

#### Failure to Explain Complex Behavior

1. Failure to Explain Language
2. Technological Influences
3. Communications Engineering
4. Computer Science
5. Psychology A. D. (After Decline of Behaviorism)

## Behaviorism Reconsidered

## Information Processing and Cognition

1. Connectionism and Cognition

## The Brain as More than a Metaphor

#### The Neuron

#### The Brain

1. The Tools of Cognitive Neuroscience

#### Brain Trauma and Lesions

#### Encephalographic Techniques

#### Transcranial Magnetic Stimulation

#### Imaging Techniques

### Cognitive Neuroscience and the Future

## Ecological Considerations and Current Trends

### The Problem of Meaning

### Dualism and Its Aftermath

#### Embodied Cognition

1. Emotion

#### Culture and Individual Differences

***Elaborating on the Text/Journals***

**Thinking about Thought Processes**

To get students thinking about the everyday and applied nature of thought processes, it’s useful to have them introspect a bit on the thought processes they use to accomplish everyday tasks. One interesting variation might be to have students reflect on how their thought processes occasionally misfire, and to reflect on which types of errors (i.e., attention, memory, etc.) seem to be most common.

**Comparing Cognitive Psychology to Its Forerunners**

An explicit comparison between the approach and major ideas from philosophy and the approach and emerging questions of cognitive psychology can be a useful one. Points that can be raised include the fact that the basic questions that underlie cognitive psychology are largely philosophical ones, while the method used by cognitive psychologists are more in the spirit of physiology.

**Cognitive Processes—Conscious or Unconscious?**

One of the difficulties in reflecting on and truly understanding the approach of cognitive psychology is that so many of the processes comprising cognition are unconscious. Have students reflect on the everyday cognitive processes they use (attention, memory, object recognition, decision making) and the degree to which they are aware of the process(es). This will no doubt lead them to the realization that some of these processes occur rapidly and completely outside of conscious awareness. You might discuss the difficulties associated with investigating processes that occur quickly and unconsciously and the methods that are necessitated by these problems (e.g., RT studies).

**Considering Cognition’s Historical Influences**

Students will be reading about many historical influences and forces from which the scientific study of cognition emerged. This journal invites them to compare and contrast these influences and what each of them contributed, comparing their relative contributions and influences. Which do students think is the most important or formative? This would serve as conversation starter requiring students to think closely about the various historical influences that led to the development of a science of cognition. Reasons for the choices will provide for some interesting class discussion.

***Discussion Starters***

**Everyday Cognition**

One useful way to introduce the field of cognitive psychology on the first day of class is to simply ask students about the cognitive processes in which they engage every day. Which processes are especially salient? Which processes are especially proficient? What processes seem to be particularly difficult and prone to error? How do the contexts of thinking (internal and external) impact thinking?

**Introspecting**

Having students engage in the task of introspection always serves as an entertaining and informative diversion. Bring something edible to class (e.g., a cookie, gum, candy, etc.) and ask for a volunteer, whose task it will be to introspect upon the experience of eating it.

**Research Sampler**

Students enter their cognition class with little or no idea about the kind of research done in the field. To give them some idea, bring in the table of contents from a leading journal (e.g., *Journal of Experimental Psychology: Learning, Memory, and Cognition*) and highlight the range of topics investigated.

**Can Computers Think?**

In conjunction with a discussion of the information-processing approach, and the influence of the computer as a model for cognition, start a conversation with students about whether computers might be considered “conscious“ or “thinking.” There are some obvious ways in which they could be (i.e., processing information) and some obvious ways in which they aren’t (i.e., expressing emotions). Most students will claim that computers can do nothing that they aren’t programmed or “told” to do. Counter this by arguing that the same could be said of humans.

**Research Sampler Redux**

This extension of the research sampler (see above) involves providing students with a contrast between laboratory and ecological approaches to cognition. To do this, you might provide students with some sample titles and/or abstracts from the journals listed above, along with titles from more applied journals such as *Applied Cognitive Psychology*.

**Brain Investigation Techniques**

One way to give students a glimpse of the different brain investigation techniques would be to have them search via PsycNET or an Internet search engine for the various techniques mentioned in the chapter and to take note of what they’re used to investigate. They might also note what techniques are used in combination.

***Internet Resources***

History of Psych Website

http://elvers.us/hop/

Today in the History of Psychology

http://www.cwu.edu/%7Ewarren/today.html

Cognitive Science Society

http://cognitivesciencesociety.org/index.html