

Review Sheet for Exam 1

Cognitive Processes (PSYCH 316)

For each of the exams in this class, you will need to have an understanding of the theories and the experiments that were discussed in the book and in class. Unless otherwise mentioned, anything talked about in class and/or in the book may appear on the exam.

While it is a good idea to try to keep the theories and the experiments in perspective by having some idea of their relative time frame, you **WILL NOT** need to know specific dates for this exam. Also, you **WILL NOT** need to know the anatomy of the eye or the ear. What you do need is to develop an understanding of the approaches, the theories, and the experiments. With regard to theories, try to understand the underlying logic. With regard to experiments, know why a given experiment was done, what it was testing, and what the results either mean or were taken to mean at the time that it was done. Also, while it would probably be helpful for you to associate specific experiments with the names of the experimenters, any exam questions involving names of experimenters will contain other information as well (see example question below).

BRIEF OUTLINE OF TOPICS COVERED (Chapters 1-3)

Unless otherwise indicated below, you are expected to know **ALL** of the theories and **ALL** of the research falling under the topics listed below. This includes information from class as well as the book. (Note: this is not a detailed outline; it is meant only to guide you in your studying).

Ch. 1 HISTORY OF COGNITIVE PSYCHOLOGY

1. Cognitive Psychology = the field of psychology concerned with the study of how the mind works
2. History leading up to establishment of Cognitive Psychology as a field
 - A. Philosophy
 - B. Scientific Revolution
 - C. Founding of Psychology
 - Method of Introspection
 - D. Behaviorism
 - E. Verbal Learning Approach
 - What Ebbinghaus had to do with it and where he fell into the picture (what era)
 - F. The Cognitive Revolution
 - The Information Processing Approach (& the role of the computer in this)
 - Theorizing & the use of abstract constructs

Ch. 2 METHODS OF COGNITIVE SCIENCE

- 1st Behaviorally measuring mental processes (objectively):
 1. Accuracy Measures (e.g., Recall Performance)
 2. Reaction Time Measures
- 2nd Methods of Cognitive Neuroscience—relating brain activity to cognition
 1. Basics of Brain Functioning
 - b. Micro-level: Neuron-level
 - c. Macro-level: Brain-level
 - i. Structures of importance (4 lobes, hippocampus)
 - ii. Important principles of functioning
 1. Contralaterality
 2. Cerebral Lateralization (functional asymmetry)
 2. Neuropsychological Methods (Methods of relating brain activity to cognition)
 - 3 Categories:
 1. Physical techniques
 - a. Direct stimulation (Penfield)
 - b. Lesions
 1. Animal studies (controlled lesions)
 2. Human studies (uncontrolled lesions—patients with brain damage)

Examples:

- a. "Split-brain" patients
- b. Amnesic patients (hippocampal damage)

3. Temporary Lesions (Transcranial Magnetic Stimulation)

2. Behavioral techniques

-- Capitalizing on principles of cerebral lateralization & contralaterality

- i. Stick balancing experiment
- ii. Finger tapping experiment
- iii. Contralaterality in vision & Reaction Time

3. Neuroimaging techniques

- a. PET & fMRI methods of brain scanning, advantages & limitations, example finding (i.e., imagery study)
- b. ERP methods of exploring the brain, advantages & limitations, example finding

3rd Modeling cognitive processes (e.g., PDP modeling) What are the basics? The 2 types of representation?

1. You don't need to know the section on "A process model" (pp. 44-46). We'll discuss this later on in the semester.

2. You don't need to know about dissociations yet (pp. 53 – 55)—we'll get to this later on.

3. We haven't talked about the "revised info processing model" on pp. 51, so don't worry about this yet. For now, you only need to know the old Atkinson & Shiffrin model of information processing that was discussed a number of times in class.

Ch. 3 PERCEPTION AND PATTERN RECOGNITION

I. Visual Perception

A. At the level of the eye, you ONLY need to know:

--saccadic movements

*(In other words, don't memorize the diagram of the eye)

1. Visual Sensory Memory (VSM, a.k.a. Iconic Memory)

--e.g., George Sperling's work, partial vs. whole report

2. Visual Pattern Recognition

A. Template matching vs. feature-detection

B. Selfridge's pandemonium model

C. Beiderman's recognition-by-components theory

D. Distinction between bottom-up & top-down processing (a.k.a data-driven & conceptually-driven processing)

E. McClelland & Rumelhart's Connectionist/PDP/Neural Network model of pattern recognition

II. Auditory Perception

1. Auditory Sensory Memory (ASM, a.k.a. Echoic Memory)

2. Auditory Pattern Recognition

--Distinction between bottom-up & top-down processing

Chapter 4: ATTENTION

1. Before attention can be studied, it must first be defined. There are different ways of defining attention. Your book lists several.

2. The three conceptions focused on in class were:

i. **Attention as a selective filter:**

--The dichotic listening technique has been used to study attention from this perspective. How? From it, does selection appear to occur based on physical characteristics?

Meaning? Both?

--Know the logic behind the different studies described and how the various

theories of selective attention evolved: e.g., Broadbent's filter theory, Treisman's attenuation theory, Norman's pertinence mode

1

_____Material for Exam 1 Stops here_____

& Johnston & Heinz's research in favor

of a multimode approach; how does the Johnston & Heinz study relate to ii below?)

ii. **Attention as a spotlight:**

--LaBerge study of visual selective attention (widening vs. narrowing the spotlight).

iii. **Attention as a limited capacity resource:**

--The dual task/divided attention technique has been used to study attention from this perspective. Understand the logic underlying this approach.

--Understand the distinction between automatic and controlled processing. What does it have to do with divided attention & the view of attention as a limited capacity resource? What is the role of practice? What is an example of a process that starts out controlled, then becomes automatic? What is the STROOP effect?

--Schneider and Shiffrin did a study of automatic vs. controlled processing using their VISUAL SEARCH PARADIGM. Understand this study (e.g., the difference between varied mapping & consistent mapping & how practice affects performance in these two conditions). Variations of this study were presented in class.

1. Possible Multiple Choice Question:

Darwin et al.'s (1972) research using the "three-eared man" paradigm is most similar to which of the following?

- A) Biederman's research on the Recognition-By-Components model
- B) Selfridge's work with the Pandemonium model
- C) Sperling's research on visual sensory memory
- D) Haber's criticisms regarding the ecological validity of iconic memory

2. Possible Short-Answer Question (to be answered in a few sentences)

In Selfridge's Pandemonium model, what is the role of the feature demons (what do they do)?