PSYC 332
COGNITIVE PSYCHOLOGY I

Session 1 – ORIGINS OF MEMORY RESEARCH

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Session Overview

- This section introduces you to the historical antecedents of the field of Memory research and that will provide you with a useful framework to follow contemporary research. You will realise that as a result of intense effort by many cognitive psychologists to refine and advance knowledge in the area of memory, our understanding of this complex subject has increased dramatically.

Session Objectives

- At the end of the session, the student will be able to

- Describe the roots of memory research tracing it from the classical Greek philosophers

- Identify the influential researchers in the field of memory

- Understand the uses and functions of memory

- Show how contemporary researchers emerged and the future of the discipline

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Session Outline

The key topics to be covered in the session are as follows:

- Topic One: Origins of Memory Research

- Topic Two: Functions and Importance of Memory

- Topic Three: Uses of Memory

- Topic Four: Constructionist Position

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Reading List

- Ashcraft, M. H. (2006). Cognition (4th edn.), London: Pearson Education Int.

- Galotti, K. M. (2004). *Cognitive Psychology: In and out of the laboratory* (3rd Edn.). Belmont, CA: Wadsworth.

- Hunt, R. R. & Ellis, H. C. (1999). *Fundamentals of Cognitive Psychology* (6th edn.), New York: McGraw-Hill.

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Topic One

ORIGINS OF MEMORY RESEARCH

Origins of Memory Research

- Historically, it has been the **record-keeping metaphor** that has dominated the thinking about human memory (Roediger, 1980).

- The ancient Greek philosopher Plato, in the ***Theaetetus dialogue*** likened memory to a wax tablet on which experiences leave their impressions.

- He likened the process of **retrieval** to trying to capture birds in an aviary, sometimes we capture the one we seek and other times we miss or hit another bird.

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Origins of Memory Research

- Others like **St. Augustine** (A.D. 354-430), an important Christian theologian and **John Locke** (1631-1704) a British empiricist famous for his claim that there are no innate ideas at birth, subscribed to the idea that memory is a storehouse containing records of the past (*tabular rassa*).

- Cognitive psychologists have used concepts like the following as *metaphors* for memory.

  - Libraries (e.g., Broadbent, 1971),
  - Tape recorders (e.g., Posner & Warren, 1972),
  - Stores (e.g., Atkinson & Shiffrin, 1968, Best, 1998), and
  - File systems (e.g., Anderson & Milson, 1989)

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Ebbinghaus's Contribution

- Contemporary research on memory is usually said to have begun with the publication of **Herman Ebbinghaus**'s *Uber das Gedachtnis (On Memory) in 1885.*

- *Ebbinghaus* presented himself lists of arbitrarily ordered words or syllables and counted the number of recitations it took him to recall the list perfectly.

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Ebbinghaus's Contribution

- In some other experiments he attempted to relearn those lists. The reduction in number of trials to learn the list the second time constituted another, more indirect, measure of memory (called savings).

- From years of conducting these experiments, Ebbinghaus established several important principles of memory.

- One important principle, referred to as **Ebbinghaus forgetting curve**, is that: Most forgetting takes place within the first few hours and days of learning.

- After a few days, the rate at which information is lost from memory is very slow and gradual.

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Ebbinghaus's Contribution

- He also demonstrated that as the **number of syllables on a list increased, the number of trials to learn the list increased exponentially.**

- He did not spend much time on developing theories about the nature of memory.

  - His concern was to demonstrate that:

- human memory is an orderly and measurable phenomenon that can be described with similar precision as biological phenomena.

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Ebbinghaus's Contribution

FIGURE 1.
The forgetting curve
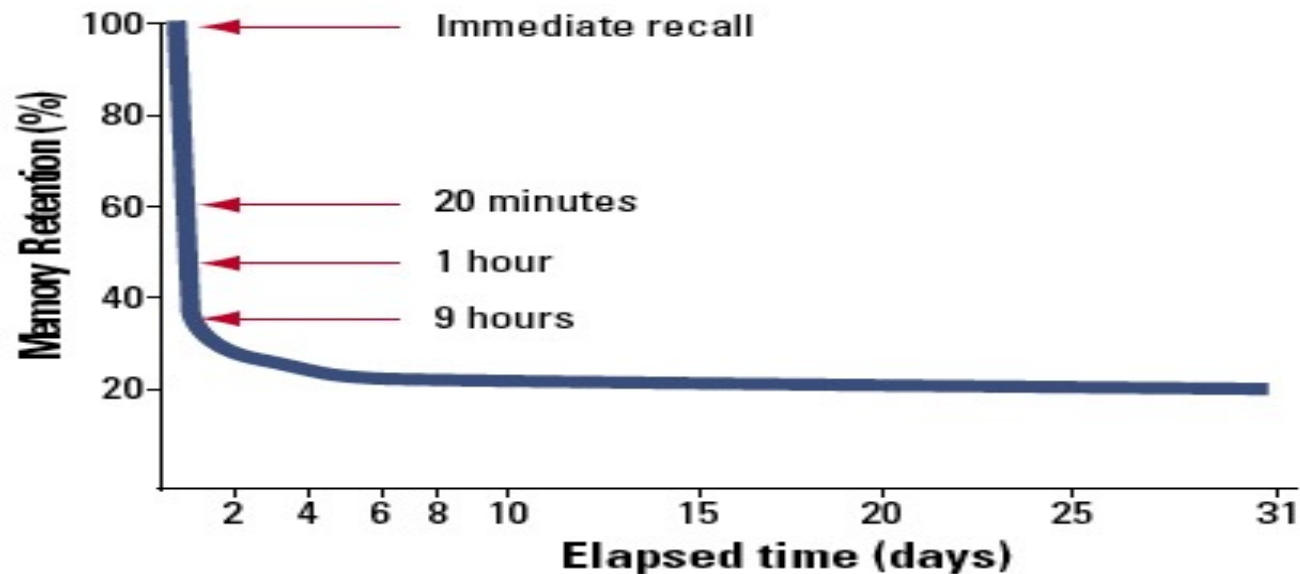
The "forgetting curve" was developed by Hermann Ebbinghaus in 1885. Ebbinghaus memorized a series of nonsense syllables and then tested his memory of them at various periods ranging from 20 minutes to 31 days. This simple but landmark research project was the first to demonstrate that there is an exponential loss of memory unless information is reinforced.

Stahl SM, Davis RL, Kim D, et al. *CNS Spectr*. Vol 15, No 8. 2010.

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Contemporary Views

- After Ebbinghaus, Memory researchers have continued to adopt experimental methodologies that require subjects to memorize list of stimuli, such as unrelated words or sentences (nonsense).

- In terms of retrieval or recall, researchers commonly use:

  - *free recall tests* (e.g., recall all the words on a list in any order),
  - *cued recall tests* (e.g., what word was paired with the to-be-remembered word on the list?),
  - *recognition tests* (e.g., Did a particular word appear on the list? Normally about something you have learnt already) and
  - *serial recall* (ability to recall items or events in the order in which they occurred).

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Contemporary Views

- Another development that encouraged research into human memory was the invention of the **digital computer**.

- Many theorists, especially apostles of information processing approach to human cognition, have drawn an analogy between how a computer stores information and human memory *the computer metaphor* (e.g., Anderson, 1976).

- Computers retrieve information either by scanning through the set of locations with amazing speed until the information is found.

Contemporary Views

- Note. Some theorists believe the computer's memory system seems a better metaphor for memory than do passive systems, like libraries and tape recorders.

- Such researchers believe that computers can manipulate and transform stored information, just as we do when we answer questions and draw inferences from previous experiences.

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Topic Two

FUNCTIONS AND IMPORTANCE OF MEMORY

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Functions and Importance of Memory

- Assuming you are preparing for exams next week but somehow the material will not "stick" in your memory. Then you wish that you had a better strategy to use in studying and memorizing.
  - What strategy will you use?
  - Is it possible to have a "better memory"?

- You have been introduced to a lady at a party but minutes later you realize to your embarrassment that you have forgotten her name or telephone number. So you ask:
  - Why do we forget?
  - What sort of things are we likely to forget?
  - What are we likely to remember?

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How important is memory to normal human function?

- One way to appreciate the importance of memory is to imagine we were without it!

- We will not recognise anyone or anything as familiar.

- We would not be able to talk, read or write because we will remember nothing about language.

- There will be nothing like experience because it would have thought us nothing.

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Topic Three

USES OF MEMORY

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Uses of Memory

- ***We use memory for an impressive variety of purposes:***

  - . It enables us to keep track of conversations
  - . To remember telephone numbers, keep track of time
  - . Write essays in examinations
  - . To make sense of what we read, see and hear.
  - . To recognize our bearings, people and images

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Uses of Memory

- Memory is so rich in its function which suggests to psychologists that there is more than one single memory system.

- In general, *the ultimate goal of memory research for the cognitive psychologists is to*:

  - **Produce theoretical accounts of memory** which are of practical use. E.g., it will be of value if the memory problems suffered by amnesiacs and others could be reduced by means of the application of psychological principles.

  - By understanding our memory processes and limitations, we could **learn of ways to enhance learning and recall**.

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Definition of Memory

- ***Definition of memory could refer to any of the following:***

  - The mental function of retaining information about stimuli, events, images, ideas, etc. after the original stimuli are no longer present.

  - The hypothesized "storage system" in the mind/brain that holds this information.

  - The information so retained.

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Diverse Usage of Memory

- As a result of its diverse usage, the term memory is used almost invariably in psychology with some adjectives preceding it to set limits on the kind of memory processes under discussion e.g.,

    - ***Associative memory*** *(learning by association)*
    - ***Echoic memory*** *(sound content of memory)*
    - ***Iconic memory*** *(visual content of memory)*
    - ***Episodic memory*** *(LTM - specific time tagged events)*

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Sample Question

- Why is it important to study memory?

- Why do we consider memory to be record-keeping?

- What are some of the principles of memory defined by Ebbinghaus?

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Summary

- Memory is one of the most reliable systems of the human being. Our existence and recollections of who we are and our knowledge are all possible because of memory.

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Topic Three

CONSTRUCTIONIST POSITION

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Constructionist Position

- The record keeping metaphor has dominated psychology with impressive history and support, there is another metaphor – **constructionist** counter-tradition.

- The constructionist view was prevalent continental European view in the 1800s (Brewer, 1984).

- For example, Sigmund Freud held to a constructionist approach, writing frequently on how *people falsify and reconstruct their past experiences* in the course of trying to recollect them *(repressive and regressive instances).*

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Constructionist Position

- The constructionist approach to memory was introduced to Anglo-American psychology by Frederic Charles Bartlett in his 1932 book *Remembering.*

- Bartlett's concluded that remembering is a form of reconstruction in which various sources of knowledge are used to infer past experiences.

- Another historically influential event in the development of   the constructionist tradition was the publication of Ulric Neisser's Cognitive Psychology in 1967.

- In this book, Neisser opposed the idea that past experiences are preserved and later reactivated when remembered.

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Constructionist Position

- Instead, he claimed that remembering is like problem solving, a matter of taking existing knowledge and memories of previous reconstructions to create a plausible rendition of some particular past event *(re-enactment).*

- A final source of inspiration for a constructivist approach to memory comes from research on the neurophysiology of memory and cognition (Carlson, 1994).

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Constructionist Position

- This research has revealed that there is no single place in the brain where past experiences are stored.

- Instead, memory reflects changes to neurons involved in perception, language, feeling, movement, and so on.

- Based on this development, there is therefore no dedicated neural tissue responsible only for storing a record of each experience. We will explore this later in Session 13.

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Summary

- Constructionist position argues that memory is a matter of construction based on our general knowledge of the world.

- It argues that it is so difficult to study memory in laboratory as postulated by the record-keeping metaphor.

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Sample Question

- Trace the history of memory research from the constructivist perspective.

- What are some of the researches that provided support for the constructivist perspective?

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