Cognitive Psychology

- THE STUDY OF HUMAN MENTAL PROCESSES AND THEIR ROLE IN THINKING, FEELING, AND BEHAVING.

- INFORMATION PROCESSING—THE MIND IS ANALOGOUS TO THE SOFTWARE OF A COMPUTER AND THE BRAIN TO ITS HARDWARE.

Metaphors, Models, Theories & Perspectives

Theories attempt to explain some aspect of a process

- Used to test hypotheses
- Can be supported or disproven

Perspectives guide scientists' research questions and evaluation of their findings

- Information processing
- Neuroscience
- Computer science
- Evolutionary psychology

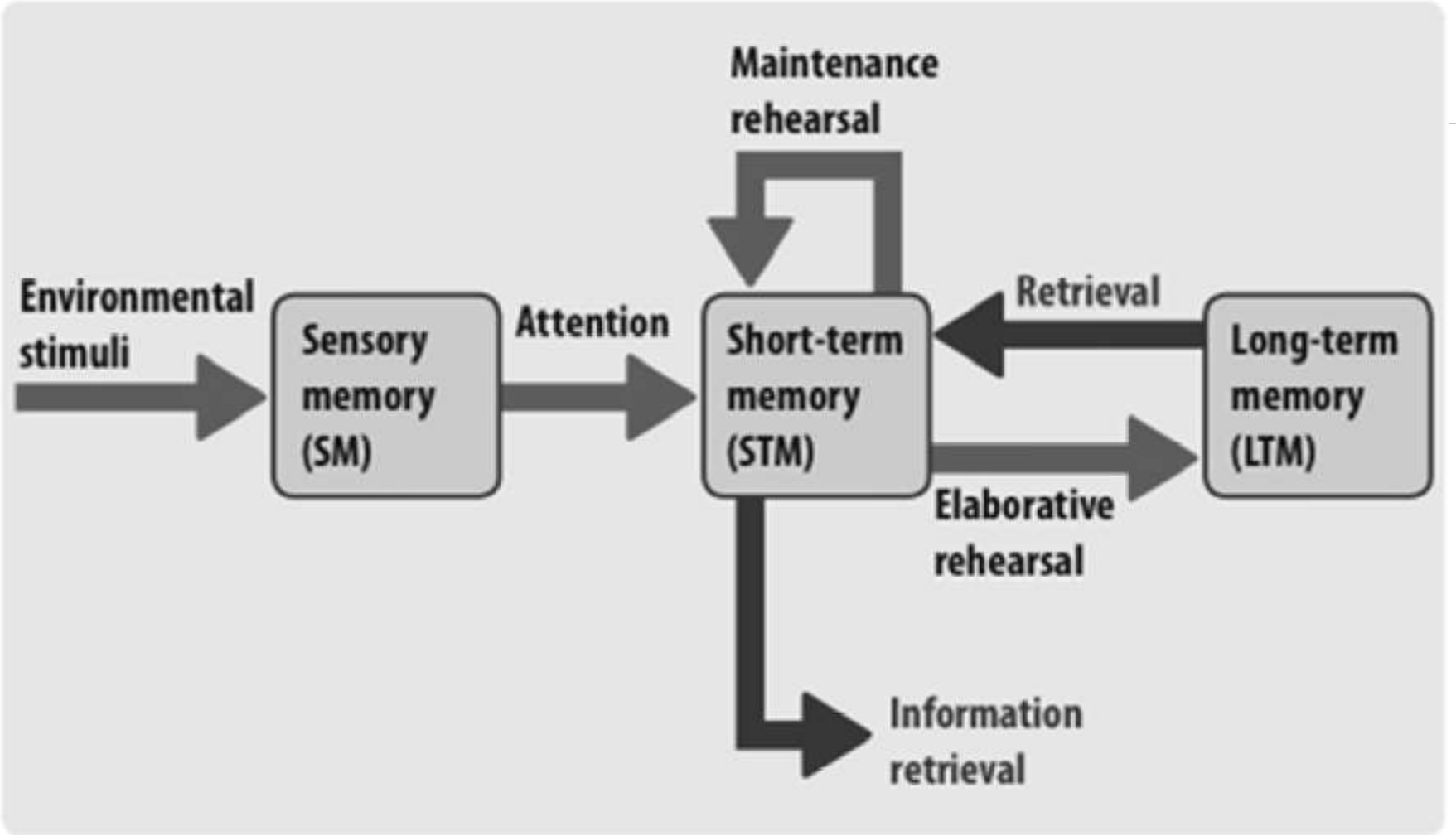
Information-Processing

The information processing perspective is generally related to a time-ordered sequence of events.

Three assumptions

- Cognition can be understood by analyzing it into a series of (mostly) Sequential stages
- At each stage unique processes take place on incoming information
- Each stage receives and passes on information

The researchers who follow this approach assume that the information is processed in stages and that it is then stored in specific places while being processed


Maintenance
rehearsal
Environmental
stimuli
Sensory
memory
(SM)
Attention
Short-term
memory
(STM)
Retrieval
Long-term
memory
(LTM)
Elaborative
rehearsal
Information
retrieval

Neuroscience

Focuses on brain structure and function that produces cognitive experience

Localization vs. distributed processes

Neurosurgeons findings during World War I. Particular areas of brain were responsible for particular psychological functions

Karl Lashley lesioned specific parts of the brains of rats after they had learned to run a maze. He demonstrated that maze-running performance declined according to the total amount of the brain destroyed.

Both are correct!

Computer Science

Brain as a computer

Modeling brain function

Computer scientist took what they knew about neural networks in the brain and created computers with artificial neural networks.

Not only is the brain interconnected, the brain sends excitatory and inhibitory signals within the network.

Excitatory signals tell neurons to pass on the information. Inhibitory signals tell neurons not to pass on the information.

Computer Science

Parallel Distributed Processing. These PD models assume that information processing takes place through the interactions of large number of simple processing elements called units, each sending excitatory and inhibitory signals to other units.

E.g. the brain does not store memory in any single neuron or probably even in any local set, but it does store memory in an entire ensemble of neurons distributed throughout several parts of the brain. If two neurons are simultaneously activated, the bond (the excitatory or the inhibitory nature of the connection) between them is strengthened. On the other hand, if one is activated and another inhibited, the bond is weekened.

Information is stored in multiple locations throughout the brain in the form of networks of connections, called ‘Nodes’. In this model, cognition is basically thought of as a network of connections among a number of simple processing units.

Each unit is connected to other units in a large network, and has some level of activation at a given moment of time. This level of activation is dependent on the input that the unit receives, both from the environment as well as from the other units to which it is connected.

Thus, according to the Connectionistic framework, the various cognitive processes are a result of the different levels of activation, and a central processor is not required to direct the flow of information from one process or storage area to another.

Evolutionary Psychology

Cognition can be understood from a functionalist perspective

What function does a particular cognitive process serve in the context of physical and social evolution?

Cognitive processes as adaptive

Eg. If memory exists (has not been selected out), it must have a function (William James)

Ability to recognize other faces was so important that a specific area of the brain was designated for that function and process.

A major premise of evolutionary perspective is the supposition that there are universal human cognitive attributes and these common and widely shared attributes of mind are a result of evolved psychological mechanisms.