

The Basic Cognitive Functions

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Abstract

The basic question of cognitive psychology is how a person acquires knowledge. On this issue, her basic position is that the input and processing of information, which leads to learning and knowledge, follows a process similar to that of the processing of food during the digestive process. With this processing knowledge is transformed and stored, to be activated when we need it. This means that in order to transform information into knowledge, not only the senses mediate, which filter external stimuli, but also some processing processes which transform data into knowledge. These processes are determined by cognitive functions, i.e. perception, memory, language, thinking and problem solving.

Keywords: cognitive psychology, cognitive functions, perception, memory, language, thinking, problem solving.

Introduction

The basic question of cognitive psychology is how a person acquires knowledge. On this issue, her basic position is that the input and processing of information, which leads to learning and knowledge, follows a process similar to that of the processing of food during the digestive process. With this processing knowledge is transformed and stored, to be activated when we need it. This means that in order to transform information into knowledge, not only the senses mediate, which filter external stimuli, but also some processing processes which transform data into knowledge. These processes are determined by cognitive functions, i.e. perception, memory, language, thinking and problem solving. Cognitive psychology considers that in order to study learning we must study in detail the transformation of information into knowledge, i.e. the phases of cognitive information processing, and places its weight on the study of specific cognitive functions. It contributes significantly to the interdisciplinary field of cognitive science while sharing the same object of study, from a different perspective, with artificial intelligence.

The Cognitive functions

Mind is the psychic energy or process of acquiring knowledge and understanding through thought, experience, and the senses [1]. It includes processes such as knowledge, attention, memory, judgment and evaluation, logic and problem solving and decision making, comprehension and production of language, etc. The human cognitive function is conscious and unconscious, solid or abstract, as well as intuitive (such as language knowledge) and conceptual (as a model of a language). Cognitive processes use existing knowledge and produce new knowledge.

Perception

Perception (from the Latin perceptio, percipio) is the organization, recognition, and interpretation of sensory information in order to represent and understand the environment [2]. Perception includes signals of the nervous system which are the result of physical or chemical stimulation of the sense organs [2]. For example, vision includes light hitting

the retina of the eye, smell is mediated by odor molecules, and hearing includes pressure waves. Perception is not the passive reception of these signals, but is shaped by learning, memory, expectation, and attention [2]. Perception can be divided into two processes. First, the processing of sensory information, which converts this low-level information into higher-level information (eg, extracting shapes from memory to recognize objects). Second, the processing is related to the concepts of the individual, his expectations (knowledge) and his selective mechanisms (attention) and their influence. Perception depends on its complex functions nervous system, but subjectively it seems mostly effortless, because this processing takes place outside the conscious consciousness [2]. Psychologists usually distinguish between sensation and perception. The senses are inexplicable sensory impressions created by the detection of environmental stimuli, while perception refers to the set of processes by which the senses make sense. Perception enables the individual to literally navigate through the world, avoiding risk, decision-making, and preparation for action. Visual perception has received the most attention from researchers, followed by speech perception [3].

Memory

Memory is the process by which information is encoded, stored, and retrieved. Coding allows information from the outside world to be detected in the form of chemical and physical stimuli. In the first stage, the information must be changed so that it can be put into the coding process [4]. Storage is the second stage of memory or process. This means that the information is kept for a short time. Finally, the third process is to recover the stored information. This information must be found and returned to consciousness. Some recovery efforts may be easy due to the type of information, as some other efforts to recover mortgaged information may be more demanding for a variety of reasons [4]. From the point of view of information processing, there are three main stages in the formation and recovery of memory:

- **Coding or recording:** receiving, processing and combining information received.
- **Storage:** creating a permanent file of encrypted information in short-term or long-term memory

• Retrieval, recall, or recollection: recalling stored information in response to a stimulus for use in a process or activity [4]

Neuroscientists consider memory, preservation, reactivation, and reconstruction of experience as independent internal representations. The term internal representation implies that this definition of memory includes two components: the expression of memory at the behavioral or conscious level, as well as theoretical physical neural changes (Kim & Linden, 2007). The last element is also called a mnemonic letter or mnemonic trace. Some neuroscientists and psychologists erroneously equate the concept of literacy and memory, generally perceiving the persistent after-effects of experiences as memory, while others argue against the notion that memory does not exist until it is revealed in behavior or thought [5].

Attention

Attention is the behavioral and cognitive process of selectively focusing on a distinct aspect of information, whether judged subjectively or objectively, ignoring other perceptual information. Attention has also been reported as the allocation of limited processing resources [6]. Attention remains an important area of research in education, psychology, neuroscience, cognitive neuroscience and neuropsychology. Areas of active research include identifying the source of sensory stimuli that produce attention, the effects of these stimuli and messages about the coordinating properties of sensory neurons, and the relationship between attention and other behavioral and cognitive processes such as memory and vigilance. A relatively new body of research, which extends to previous research within neuropsychology, is investigating the diagnostic symptoms associated with traumatic brain injury and their effects on attention. Attention also varies from culture to culture [6].

Language

Language is the ability of people to acquire and use complex communication systems. The scientific study of language is called linguistics. Human language has the properties of productivity, retrograde, displacement, and is based entirely on social contract and learning. The complex structure of human language gives a much wider range of expressions than any known animal communication system. Language is believed to have originated when prehistoric humans gradually began to create their own primary communication systems, gaining the ability to form a theory and a shared communication system deliberately. This development is sometimes thought to have coincided with an increase in brain volume, and many linguists view language structures as evolving to serve specific communicative and social functions [7]. The tongue is processed in many different places in the human brain, but especially in the Broca and Wernicke regions.

People acquire language through social interaction in early childhood, children generally begin to speak fluently when they are about three years old. The use of language is deeply rooted in human culture. Therefore, in addition to the strict communicative use of language, it also has many social and cultural uses, as it signals group identity, social stratification, as well as social care and entertainment [8]. The brain is the coordination center of all language activities that control the production of linguistic perception, meaning and the mechanisms of speech production. Nevertheless, scientific knowledge of the neurological basis of language is quite limited, although it has advanced considerably with the use of modern

imaging techniques. The discipline of linguistics dedicated to the study of the neurological aspects of language is called neurolinguistics [9].

Thought-Problem Solving

Problem solving consists of the use of general or ad hoc methods, in methodical ways, to find solutions to problems. Some of the problem-solving techniques developed and used in the fields of artificial intelligence, computer science, engineering, mathematics, or medicine are related to mental problem-solving techniques studied in psychology. Gestaltists' early experimental work in Germany marked the beginning of the problem-solving study (e.g., Karl Duncker in 1935 with his book *The Psychology of Productive Thought*). Later this experimental work continued until the 1960s and early 1970s with research conducted in simple problem-solving laboratory tasks [10]. By choosing simple problems / puzzles to solve in a specific way and in the short time available for solving, this method made it possible for researchers to identify the steps of the participants in the problem-solving process. Simple problems were used for convenience, with the expectation that generalized languages could be applied to more complex problems, problem solving would be possible. Other experts have shown that the principle of decomposition improves the problem-solving ability to make good judgment.

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