

THE PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
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1. Introduction to Human Cognition

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Introduction:

Human cognition refers to the mental processes involved in thinking, remembering, and solving problems. Cognitive psychology is the field that studies these processes, helping us understand how our brains allow us to interact with the world. There are several approaches to studying human cognition, each focusing on different aspects of how we think and process information. In this reading, we will explore four key branches: cognitive psychology, cognitive neuropsychology, cognitive neuroscience, and computational cognitive science.

1. Cognitive Psychology

Cognitive psychology focuses on how people think, remember information, and solve problems. It studies mental processes like attention, memory, perception, and decision-making. This field looks at how we take in information, process it, store it, and retrieve it when needed. For example, when you memorize a phone number, you might repeat it a few times in your head. This involves short-term memory, which can only hold information for a short period. If you need to remember it for longer, you might use chunking—breaking the number down into smaller, more manageable parts (like 123-456-7890).

Cognitive psychology also studies how we make decisions. When you're deciding what to wear, your brain quickly considers factors like the weather, your plans for the day, and what clothes are available. This quick mental process is an example of decision-making, one of the many areas cognitive psychology examines.

2. Cognitive Neuropsychology

Cognitive neuropsychology looks at how brain damage affects thinking, memory, and behavior. By studying patients with brain injuries or disorders, scientists can learn which parts of the brain are responsible for specific cognitive functions. For example, some people may have difficulty speaking after a stroke, while others might lose the ability to recognize faces.

A famous case in this field is that of Phineas Gage, a railroad worker who survived an accident that drove an iron rod through his skull. Although Gage physically recovered, his personality changed drastically. Before the accident, he was responsible and hardworking, but afterward, he became impulsive and rude. This case helped scientists understand the role of the frontal lobe in personality and decision-making.

Another key area of study is memory loss. If a person suffers damage to their hippocampus—a part of the brain involved in forming new memories—they might be unable to create new memories, even though they can remember events from before the damage.

3. Cognitive Neuroscience

Cognitive neuroscience is the study of how the brain functions during cognitive tasks. This field focuses on understanding the neural mechanisms behind mental processes by looking directly at brain activity. Using tools like fMRI (functional magnetic resonance imaging) and EEG (electroencephalography), scientists can see which areas of the brain are active when people think, speak, or solve problems. For example, when you read, specific regions of your brain involved in language processing are activated. Cognitive neuroscientists can use brain scans to

4. Computational Cognitive Science

Computational cognitive science involves creating computer models that simulate how the human mind works. These models help scientists understand cognitive processes by mimicking how we think, learn, and remember. This branch often overlaps with the development of artificial intelligence (AI), which uses algorithms designed to process information in ways similar to the human brain. One common example is virtual assistants like Siri or Alexa. These AI programs learn from patterns in data to "understand" and respond to requests, simulating the way humans use language and make decisions. While these programs

aren't as complex as human brains, they give us insights into how cognition might be modeled computationally.

Another example of computational cognitive science is the modeling of face recognition. Computer systems can be programmed to recognize faces by learning patterns, much like how our brains do. These models help scientists understand how we process visual information and remember familiar faces.

Conclusion

In this reading, we have covered four important branches of cognitive psychology:

- **Cognitive Psychology:** The study of thinking, memory, and problem-solving.
- **Cognitive Neuropsychology:** The study of how brain damage affects cognition.
- **Cognitive Neuroscience:** The study of the neural mechanisms behind cognitive processes.
- **Computational Cognitive Science:** The use of computer models to simulate cognitive functions.

Each of these fields helps us understand different aspects of how our mind works. As you continue learning about cognitive psychology, think about how these concepts relate to your own experiences and the ways you think, remember, and solve problems every day.