

# PSY504

## The Information Processing Approach

This approach compares human cognition to the functioning of a computer. It emphasizes how information is encoded, stored, and retrieved, describing cognitive processes in stages:

1. **Input (Sensory Memory):** Receiving stimuli from the environment.
  2. **Processing (STM/Working Memory):** Interpreting and organizing information.
  3. **Storage (LTM):** Saving information for future use.
  4. **Output:** Responses or decisions based on processed information.
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## Cognitive Neuropsychology

Cognitive neuropsychology studies the relationship between brain function and cognitive processes by examining individuals with brain damage. It helps to identify brain areas responsible for specific cognitive abilities like language, memory, and attention.

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## Visual Sensory Memory Experiments

These experiments focus on *iconic memory*, a brief storage of visual information lasting milliseconds. One notable study by **Sperling** used a grid of letters, revealing that participants retained more information than they could report, indicating a fleeting visual memory store.

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## Attention

Attention is the cognitive process of focusing on specific stimuli while ignoring others.

- **Selective Attention:** Focusing on a particular stimulus (e.g., filtering background noise).
  - **Divided Attention:** Managing focus on multiple tasks simultaneously.
  - **Sustained Attention:** Maintaining focus over time.
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## Automaticity

Automaticity is the ability to perform tasks without conscious thought due to repeated practice. For instance, reading becomes automatic for experienced readers, freeing up cognitive resources for other tasks.

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## Pattern Recognition

Pattern recognition involves identifying patterns in sensory input and matching them to stored information. It's crucial for understanding language, recognizing objects, and learning.

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### Pattern Recognition: Feature Analysis

This model proposes that patterns are recognized by analyzing distinct features (e.g., lines, curves). The brain combines these features to form a complete representation.

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### Pattern Recognition: Gestalt Theory of Perception

Gestalt principles suggest the brain perceives objects as whole patterns rather than separate components. Key principles include:

- **Proximity:** Grouping objects close to each other.
  - **Similarity:** Grouping similar objects together.
  - **Closure:** Filling in gaps to see a complete image.
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## Object Perception

Object perception involves recognizing and identifying objects based on visual input and context. It integrates information from sensory memory, pattern recognition, and attention.

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## Attention & Pattern Recognition

Attention plays a critical role in pattern recognition by filtering relevant stimuli from irrelevant ones. Without focused attention, identifying patterns becomes challenging.

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## Pattern Recognition: Neural Networks

Neural network models simulate the brain's structure, processing information through interconnected nodes. These models demonstrate how patterns are learned and recognized by adjusting connections between nodes.

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## Pattern Recognition: Effects of Sentence Context

Sentence context influences pattern recognition by providing clues that shape perception. For instance, ambiguous words are easier to recognize within meaningful sentences.

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## Memory: Short-Term Memory (STM)

STM temporarily holds information for immediate use (e.g., remembering a phone number). It has limited capacity, typically  $7 \pm 2$  items, and duration of about 20 seconds.

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## Memory: Chunking

Chunking organizes information into meaningful units, enhancing STM capacity. For example, remembering a phone number as "123-456-7890" rather than as 10 separate digits.

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## Memory: The Nature of Forgetting

Forgetting occurs due to:

1. **Decay:** Information fades over time.
  2. **Interference:** New or old information disrupts recall.
  3. **Retrieval Failure:** Inability to access stored information.
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## Memory: Long-Term Memory (LTM)

LTM stores information indefinitely with virtually unlimited capacity. Types of LTM include:

1. **Declarative (Explicit):** Facts and events (e.g., episodic, semantic memory).
  2. **Non-Declarative (Implicit):** Skills and habits (e.g., procedural memory).
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### Memory: Interference

Interference disrupts memory retrieval:

1. **Proactive Interference:** Old information blocks new information.
  2. **Retroactive Interference:** New information disrupts old information.
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### Memory: Recall vs. Recognition

- **Recall:** Retrieving information without cues (e.g., answering an essay question).
- **Recognition:** Identifying information when presented (e.g., multiple-choice questions).  
Recognition is often easier due to additional context.

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