

**WORKING MEMORY
CHAPTER 4**

**ATKINSON-SHIFFRIN MODEL
COMPONENTS OF MODEL**

- Structural features
 - sensory store
 - STM
 - LTM
- Control processes

Working Memory (AKA STM)

CHARACTERISTICS:

- Actively process stimulus
- Limited Capacity (George Miller, 1956): The Magical Number 7 ± 2 .
 - Chunk:
 - fragility of storage
- Importance of **elaborative rehearsal**: making material meaningful (encoding for meaning).

TRADITIONAL METHODS USED IN CLASSIC WM RESEARCH

- **Brown/Peterson & Peterson Technique (1959)**:

TRADITIONAL METHODS USED IN CLASSIC WM RESEARCH

- **Serial Position Effect:** (Rundus, 1971)
 - Method
 - Primacy Effect:
 - Recency Effect:
 - STM dump
 - Effect of delay on recency effect

TRADITIONAL METHODS USED IN CLASSIC WM RESEARCH

Digit Span Measures

- **George Miller's (1956) “Magical Number Seven” (7 + or – 2):**
 - Capacity of working memory
 - Chunk:

FACTORS AFFECTING THE CAPACITY OF WM

- **Pronunciation Time**
 - Baddely et al. (1975): length of country name.

Semantic Similarity of the Items in WM

- **Proactive Interference (PI):**
- **Release from Proactive Interference:**
- **Retroactive Interference (RI):**

FACTORS AFFECTING THE CAPACITY OF WM

Other factors affecting WM span

- nature of distractor task
- individual differences:

CODE OF WORKING MEMORY

- **Acoustic code:**
 - Wickelgren (1965):
- **Visual code:**
- **Semantic code:**

ALAN BADDELEY'S MODEL OF WORKING MEMORY

- **Working Memory** - is a multi-part system that temporarily holds and manipulates information as we perform cognitive tasks
 - central executive
 - visuospatial sketchpad
 - episodic buffer
 - phonological loop
- Emphasis on **active** manipulation of information in working memory

CENTRAL EXECUTIVE

- **Central Executive:** integrates information from the phonological loop, the visuospatial sketchpad, the episodic buffer, and from long-term memory.
- **Characteristics of the Central Executive**
 - plans and coordinates, but does not store information executive supervisor
 - decides which issues deserve attention
 - selects a strategy
 - limited capacity to perform simultaneous tasks
- transferring information to LTM
- initiating retrieval and initiating decision processes
- integrating information coming into the system
- coordinating behaviors

BADDELEY'S MODEL OF WORKING MEMORY PHONOLOGICAL LOOP

- Definition:
- Components of Phonological Loop:
 - Phonological store:
 - Subvocal rehearsal process:
- Evidence for:
 - Pronunciation time studies
 - Wickelgren (1965)
 - Brown-Peterson Task
 - Brain imaging studies: subvocal rehearsal is associated with activation of the frontal lobe areas involved in speech.
 - Other Uses for the Phonological Loop

BADDELEY'S MODEL OF WORKING MEMORY VISUO-SPATIAL SKETCH PAD

- Stores visual and spatial information for a short period of time.
- Visual imagery tasks.
- Spatial and visual search tasks
- Executive's resources are drained if imagery or spatial task is difficult.
- People will use visual code when acoustic code is suppressed.

VISUO-SPATIAL SKETCH PAD: EVIDENCE FOR

- Brandimonte and colleagues (1992):
 - Control Group:
 - Task 1:
 - Task 2:
 - Results:

- **Brandimonte and colleagues (1992):**
 - **Experimental Group:**
 - **Task 1:**
 - **Task 2:**
 - **Results:**
- **Other Uses for the Visuospatial Sketchpad**

EPISODIC BUFFER

- **Episodic Buffer:** serves as a temporary storehouse where we can gather and combine information from the phonological loop, the visuospatial sketchpad, and long-term memory.

How is WM capacity related to verbal fluency?

- **Rosen & Engle (1997)**
 - They tested college students working memory capacity.
 - Tested the Verbal Fluency of Ps that scored in the bottom & top 25th percentile of WM
 - Verbal Fluency Test
 - **Results:**

How is WM capacity related to other cognitive skills?

- Working memory is correlated with people's ability to:

Individual Differences: Major Depression and Working Memory

- Christopher and MacDonald (2005)
 - phonological loop
 - visuospatial sketchpad
 - central executive
- difficulty concentrating
- unwanted negative thoughts

How can the theory of WM explain extraordinary memory ability (experts)?

- **K. Anders Ericsson** has been studying memory experts for years.
- **Ericsson & Delaney (1998, 1999):**
 - Highly skilled people can overcome capacity limitations of WM.
 - **Long-term working memory:**

APPLICATIONS OF WM RESEARCH

Serial Position Effect

- Costabile & Klein (2005): Recency Effects In Juror Judgments.
- Bruine de Bruin (2006): Serial position effects in figure skating judgments.

Counterfactual Thinking

- **Imagining various ways that events might have been different.**
- Goldinger, Kleider, Azuma, Beike, (2003): **[Blaming the victim" under memory load.](#)**