

Human Working Memory

Human working memory

There are various, more or less similar definitions of the working memory, like¹⁾:

- *"short-term memory applied to cognitive tasks"*,
- *"multi-component system that holds and manipulates information in short-term memory"*, or
- *"use of attention to manage short-term memory"*.

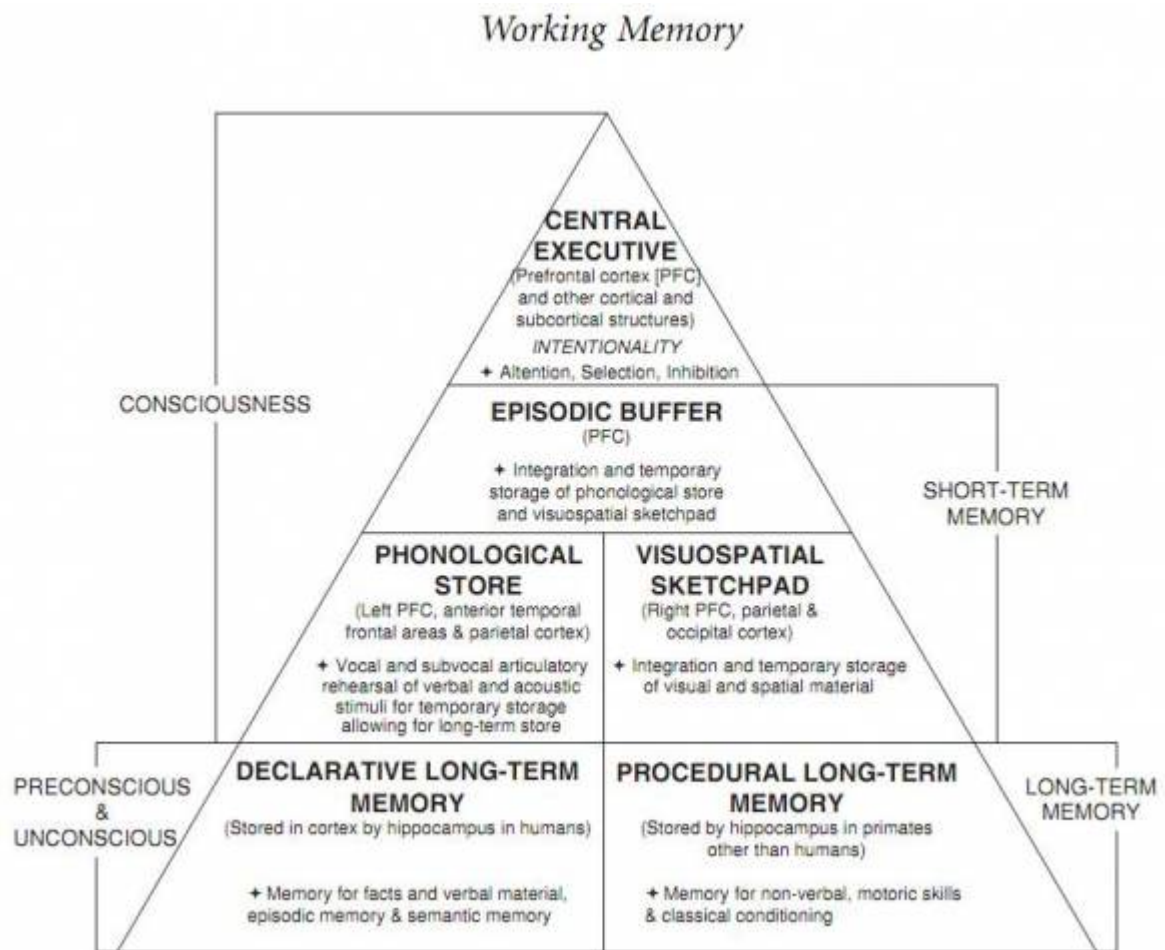
What is mostly common to them is that they address working memory as the system which manipulates information from STM, and sometimes even LTM. As this system is one of the key components in the process of knowledge acquisition, the most commonly discussed working memory models of Baddeley and Cowan will be briefly discussed here.

Baddeley's model of working memory

Alan Baddeley and **Graham Hitch** proposed a multi-component working memory model in **1974**²⁾. This model was very well accepted and later adjusted to new findings. In their experiments Baddeley and Hitch examined subjects' retention of series of numbers which were memorized before they had to judge simple logical statements. The results have shown that although both tasks required working memory capacity, the ability of remembering the number sequence wasn't strongly affected by judging logical statements. This led to an assumption that working memory is composed out of more than one component.

Baddeley and Hitch suggested working memory is composed of three parts: the **central executive**, a system that controls the **phonological loop** (a subsystem for remembering phonological information such as language by constant refreshing through repetition in the loop), and the **visuospatial sketch pad** (a subsystem for storing visual information).

This model was later revised and improved by Baddeley³⁾⁴⁾ but also contributed by other authors⁵⁾, which resulted in additional component of **episodic buffer**⁶⁾ in year **2000** and more detailed functions and analysis of other components, as described in table below.



Central executive

The active memory consists of parts of long-term memory needed to preform a cognitive task. Elements can be activated also voluntarily or involuntarily. The amount of simultaneously active elements is still an issue of debate, but without rehearsing, evidence show these elements remain active for about 10 - 20 seconds. Working memory holds all of these activated elements, but only about 4 ± 1 of them can be in focus, what is decided by voluntarily or involuntarily attention switching using the central executive.

Just like in Atkinson and Shiffrin model, the ingoing information is first stored in the sensory memory. Sensory information then activates certain elements inside the long-term memory. In his model, Cowan does not address the issue of processing information of different modality like Baddeley.

Bibliography

Coolidge, Frederick L., and Thomas Wynn. The Rise of Homo sapiens: The Evolution of Modern Thinking. Wiley-Blackwell, 2009.

Gruber, Thomas. Gedächtnis. VS Verlag, 2010.

Rončević Zubković, Barabara. Ustrojstvo radnog pamćenja i njegova uloga u jezičnom procesiranju. Psiholgijske teme 19, no. 1: 1-29. 2010.

Abbott, Bruce. Human Memory: Atkinson-Shiffrin Model. Indiana University-Purdue University Fort Wayne. Retrieved April 2, 2011.

Mizuno, Akira. Process model for simultaneous interpreting and working memory. *Meta* 50, no. 2: 739-752. 2005.

Read more

Miyake, Akira, and Priti Shah. Models of working memory: mechanisms of active maintenance and executive control. Cambridge University Press, 1999.

Baddeley, Alan D. Human memory: theory and practice. Psychology Press, 1997.

Cowan, Nelson. Working memory capacity. Psychology Press, 2005.

1)

Cowan, N. What are the differences between long-term, short-term, and working memory? *Progress in brain research* 169: 323-338. 2008.

2)

Baddeley, A. D., Hitch, G. J. Working Memory. In Bower, G.A. The psychology of learning and motivation: advances in research and theory. 8. New York: Academic Press. pp. 47-89. 1974.

3)

Baddeley, A. D. Is working memory still working? *American Psychologist*, 11:851-64. 2001.

4)

Baddeley, A. D. Working Memory, Thought, and Action. Oxford: Oxford University Press, 2007.

5)

See: Coolidge, Frederick L., and Thomas Wynn. The Rise of Homo sapiens: The Evolution of Modern Thinking. Wiley-Blackwell, 2009.

6)

Baddeley, A. D. The episodic buffer: A new component of working memory? *Trends in Cognitive Science*, 4:417-23. 2000.

From:

<https://learning-theories.org/> - **Learning Theories**

Permanent link:

https://learning-theories.org/doku.php?id=memory_models:human_working_memory&rev=1308297569

Last update: **2023/06/19 15:49**

