



WORKING MEMORY MODEL

Your previous handouts have outlined two contrasting approaches - the multi-store model of memory and the levels of processing theory. This handout describes a model that considers one part of memory - namely STM - & adopts a functional approach, arguing that we can get a far better impression of what STM is by considering what it is used for. In other words it is better to characterise it in terms of the particular functions it carries out rather than just as a staging post on the route to LTM. Baddeley & Hitch (1974) propose that STM should be reformulated as a **working memory** which can perform a number of different functions.

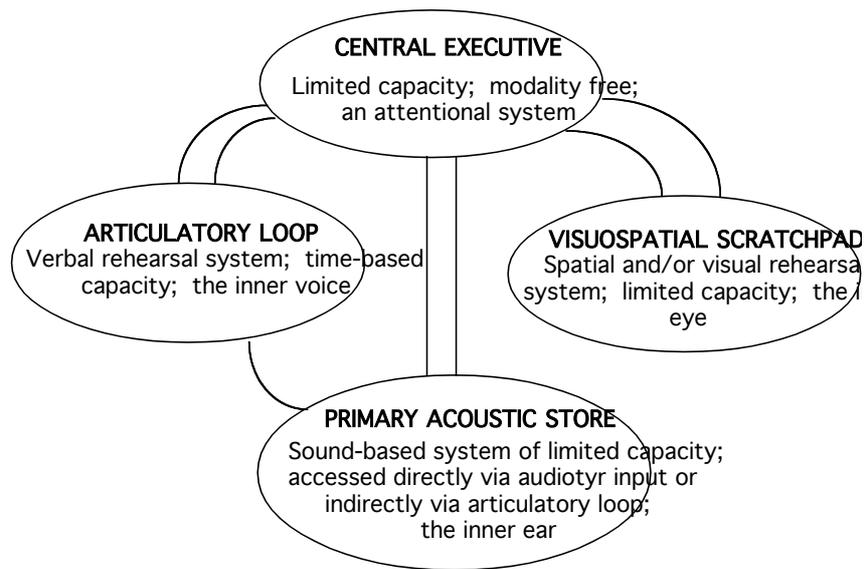
The Theory

The concept of the short-term store as a working memory store emphasises that it is an active store used to hold information which is being manipulated. Working memory is the focus of consciousness - it holds the information you are consciously thinking about now. Processes like adding and subtracting, reasoning or solving problems, or thinking about the meaning of what you hear or read, or carrying out a sequence of operations like making a cake, all involve carrying out operations on information while it is currently held in working memory. Note that working memory holds information that is derived from sensory inputs *and* information that has been retrieved from LTM. New inputs (such as the amount of butter you have just weighed for your cake) & old stored information (such as the recipe stored in LTM) come together in working memory.

On the basis of their experiments, Baddeley & colleagues suggested that working memory consists of several components. These components include three modality-based stores and a **central executive** which controls them. The three modality-based stores are

1. articulatory loop - stores verbal information represented in an articulatory (speech-based) code and it is used for verbal rehearsal. Like Atkinson & Shiffrin's STM it can hold around 7 items, but is also time-based.
2. visuo-spatial scratchpad - holds visuo-spatial information (e.g. where you can see something is located in space)
3. primary acoustic store - holds auditory inputs coded in terms of acoustic features (what something sounds like)

The working memory system is shown below:



The Evidence

Baddeley demonstrated the role of the articulatory loop in working memory by examining the effects of **articulatory suppression**. If people are made to mutter repeatedly some phrase or words, this will occupy and suppress the articulatory loop so that it cannot be used very efficiently to hold information in working memory at the same time. The experimental technique involves asking subjects to repeat a phrase continuously while simultaneously performing a task such as learning a list of words or reading. This is known as **concurrent verbalisation**. When performance on a task is impaired by concurrent verbalisation it shows that the task is one that utilises the articulatory loop. This is precisely what Baddeley showed - repeatedly saying the word “the” impaired processing of reading material such that subjects did not remember what they had read, suggesting the articulatory loop is involved with activities that involve verbal processing.

Conclusion

The working memory model is similar in many ways to early versions of STM, but is more detailed. The articulatory loop is used for rehearsal and holds about 7 items. Both the primary acoustic store and the articulatory loop are speech-based stores, where information is encoded in a verbal code and the visuospatial scratchpad stores visual information. The main differences are that working memory is active; its function is to carry out on-going tasks, not just to hold information passively; it has several components; and its operations are flexibly controlled by the central executive.