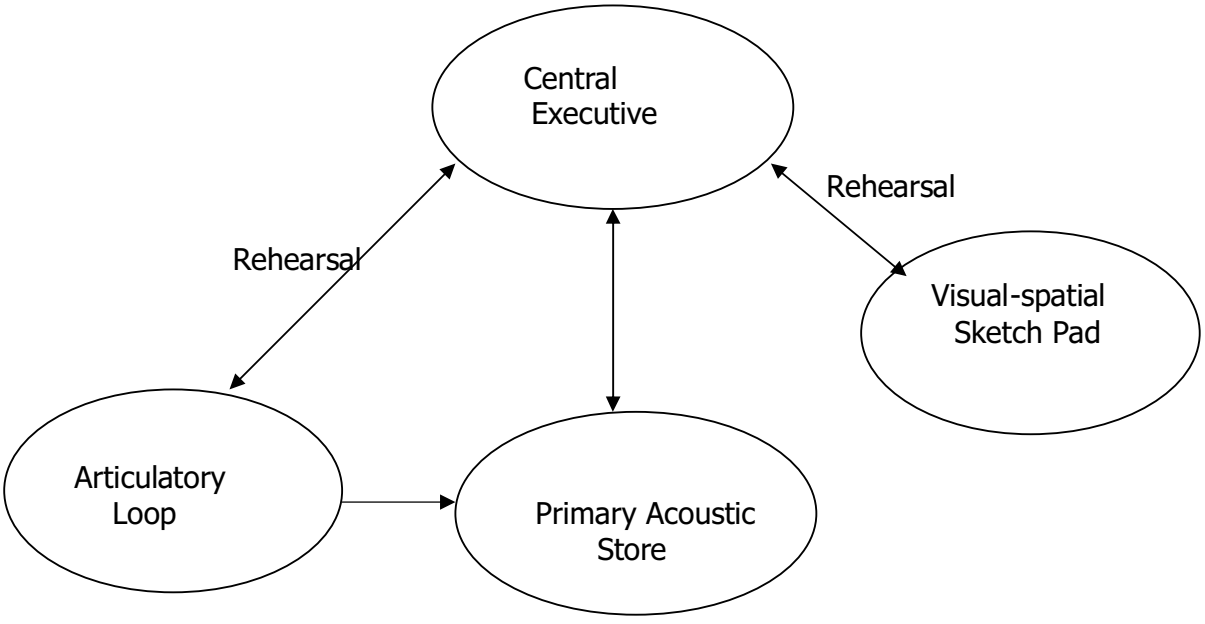
Lisa Stuart – 02016028

Describe and evaluate a modern theory of memory.

Memory is so basic to human functioning that we take it for granted. Consider the last time you performed the seemingly simple task of remembering a friend's phone number. Did you bring to mind a visual image (a picture of the number), an auditory 'image' (pronouncing a series of numbers out loud in your mind) or simply a pattern of motor movements as you punched the numbers on a phone? How did you bring to mind this particular number, given that you likely have a dozen other numbers stored in your memory? Once the number was in your mind how did you know it was the right one? And were you aware as you reached for the phone that you were remembering at that very moment how to use a phone, what phones do, how to lift an object smoothly to your face, how to push buttons and who your friend is? This example suggests how complex the simplest act of memory is. Memory involves taking something we have observed, such as a written phone number, and converting it into a form we can store, retrieve, and use.

Memory is generally thought to be made up of three parts: sensory register (your senses), short-term memory and long-term memory. Both short-term memory (STM) and long-term memory (LTM) are studied in terms of their ability to encode information, capacity and duration.



In 1974, Alan Baddeley and Graham Hitch challenged the view of a single all-purpose working memory by presenting subjects with two tasks simultaneously, one involving recall of a series of digits and the other involving some kind of thinking, such as reasoning or comprehending the meaning of a sentence. They reasoned that if working memory were a single

system, trying to remember seven or eight digits would fill the memory store and eliminate any further capacity for thinking.

Baddeley and Hitch did find that performing STM and reasoning tasks simultaneously slowed down subjects' ability to think; in one study, holding a memory load from four to eight digits increased the time participants took to solve a reasoning task. However, a memory load of three items had no effect at all on reasoning speed, despite the fact that it should have consumed at least three of the 'slots' in STM. Further, performing the two tasks simultaneously had no impact on the number of errors subjects made on the thinking task, suggesting that carrying out processes such as reasoning and rehearsal does not compete with storing digits for 'workspace' in a short-term store.

These and other data led Baddeley and his colleagues to propose that storage capacity and processing capacity are two separate aspects of working memory. Processes such as rehearsal, reasoning, and making decisions about how to balance two tasks simultaneously are the work of the central executive system that has its own capacity; independent of the information it is storing or holding momentarily in mind. Other researchers have found that working memory as a whole does seem to have a limited capacity – people cannot do and remember too many things at the same time – but working memory capacity varies across individuals and is probably related to their general intellectual ability.

Most contemporary models of working memory distinguish between at least two kinds of temporary memory: a visual store (also called the visuospatial sketchpad) and a verbal store. The visuospatial sketchpad is like a temporary image the person can hold in mind for 20 or 30 seconds. It momentarily stores visual information such as the location and nature of objects in the environment, so that for example, a person turning around to grab a mug at the sink will remember where she placed a teabag a moment before. Images in the visuospatial sketchpad can be mentally rotated, moved around, or used to locate objects in space that have momentarily dropped out of sight.

The verbal store is the familiar short-term store studied tasks such as digit span. Verbal working memory is relatively shallow: Words are sorted in order, based primarily on their sound (phonology), not their meaning. Researchers learned about this 'shallowness' of verbal memory by studying the kinds of words that interfere with each other in free-recall tasks. A list of similar-sounding words is more difficult to recall than a list of words that do not sound alike. Similarity of meaning does not similarly interfere with verbal working memory, but it does interfere with LTM. This suggests that verbal working memory and LTM have somewhat different ways of storing information.

Several lines of evidence suggest that visual and verbal storage are indeed distinct components of working memory. For example, researchers have reported cases of brain-damaged individuals who have normal verbal working memory but impaired visual working memory; others can store visual information but have difficulty with verbal storage.