Information Handout

Professional Version | US English

What Is Memory?

Description

In our daily lives we encounter all kinds of different information. Simple visual images, auditory signals, tastes and smells, as well as more complex experiences like conversations, cooking a meal or navigating a route to a new location. Memory is the ability to store, hold on to, and retrieve the information that we experience.

"Memory [is]... an array of interacting systems, each capable of encoding or registering information, storing it and making it available by retrieval. Without this capability for information storage, we could not perceive adequately, learn from our past, understand the present, or plan for the future"

(Baddeley, 2013, p.18)

In cognitive science, theories of memory have made several important distinctions between (Baddeley, 1997):

- **The modality of input:** visual, verbal/auditory, haptic, taste/smell and motoric.
- **The duration of storage:** sensory memory, short term memory / working memory, and long term memory.
- **Coherent bodies of knowledge that are learned or stored over a life-time:** explicit memory for episodic and semantic information, and implicit procedural memory.

Memory is comprised of three processes: encoding, storage, and retrieval.

Encoding

Information is perceived via the senses and held for a brief period in short term memory or working memory. For information to be stored over a longer period, it needs to be encoded into something more durable for long term storage (Baddeley, 2013). For example, the format of the information may be changed to facilitate encoding (e.g., verbally rehearsing a written telephone number to remember it) or a person may try to make semantic links to something they already know (e.g., linking a new person you meet to their partner, who you work with) (Craik & Lockhart, 1972).

Storage

This is the way information is held or retained. For information to be stored successfully it has to be organized in some way. Over shorter durations, such as when remembering a telephone number or completing mental arithmetic, storage is facilitated by maintenance strategies such as rehearsal and chunking information (Baddeley, 1997). For long term memory, it is broadly accepted that there are three coherent stores of information. Two kinds hold explicit, declarative knowledge that can be verbally described upon recall. Episodic memory, also known as autobiographical memory, stores incidents from your lived experience that have a time and place, such as your first day at school or a new job. Semantic memory stores generalized knowledge about the world, such as the capital of Germany, what a dog looks like or a recipe for scones. This knowledge is not tied to a specific place or time (Tulving, 1972). The third kind of memory is implicit, procedural memory, and it is closely tied to the motor system. This is memory for how to do something, like ride a bike or touch type. This knowledge can be enacted but it cannot be described easily.

Description

Storage of episodic and semantic information can be facilitated by using a 'deeper' level of processing, which aims to create a larger network of associations for a given memory. For example, actively recalling specific sensory qualities of your first day at school (the weather, what you were wearing) or linking the name of the capital of Germany with its location on a map. The storage of implicit, procedural memories is aided by practice of the skill itself (Baddeley, 2013).

Retrieval

Retrieval describes how people get stored information when they need it. Much of what they remember cannot be immediately recalled, but given the right cue they can access it (Baddeley, 2013). To be most useful, retrieval cues need to have been present when the information was encoded. For example, you might forget where you have left your glasses, but when you go back over your movements during the day, you remember that you left them on a shelf by the door when you got home. You might forget the name of someone you have met recently, but when you remember that it started with 's', this eventually helps you to recall 'Sarah'.

Perhaps unsurprisingly, retrieval is improved by retrieval practice. That is, the act of immediately recalling something will improve the chances that the information can be recalled again later. Retrieving information at regular and spaced intervals (e.g. once a day, and then once a week) will improve the chances that the information can be recalled long into the future (Linton, 1975). Retrieval practice has been found to help both normal, healthy adults and those who have suffered a traumatic brain injury (Sumowski et al, 2010; Baddeley, 2013).

Problems with memory

Like other aspects of cognition, transient difficulties with memory can be caused by stress or fatigue (e.g. DeLuca, 2005) and there is a documented decline in memory function as individuals become elderly (Spaan, Raaijmakers, & Jonker, 2003). Memory difficulties are frequently reported by individuals experiencing psychological problems. For example, individuals with anxiety consistently show poorer performance on working memory tasks (Moran, 2016), and those with depression are less able to recall positive or happy memories (as are healthy individuals who have a low mood induced experimentally; Baddeley, 2013).

For individuals with neurological disorders, memory is one of the most frequently reported cognitive impairments. A third to a half of individuals will experience memory difficulties post-stroke (Evans et al, 2020), and almost all individuals with moderate to severe traumatic brain injury demonstrate impairments on measures of memory function (Levin et al, 1987; Mathias & Mansfield, 2005). For those with progressive neurological disorders, impairments in memory can be part of the diagnostic criteria (e.g., in the dementias; WHO, 1993) or a frequent to near universal experience (e.g., in Multiple-Sclerosis; DeLuca, 2005). There are weak to moderate positive associations between depression and anxiety scores and self-reports of memory problems for individuals post-stroke, so it is important to consider and treat mood disorders; these may contribute to memory difficulties for individuals with neurological conditions (and vice-versa; Evans et al, 2020).

Description

For a client who is experiencing memory difficulties, psychoeducation about memory, memory processes, and how memory fails can serve multiple functions. It can help to normalize the experience of memory difficulties, especially when memory impairments are a common occurrence for a given diagnosis. Normalization helps to reduce anxiety and distress, and to situate symptoms in a framework that the client understands. Psychoeducation will help the client to understand why they are having memory difficulties, as well as to develop awareness of memory failures and why they may be occurring (Mateer & Sira, 2006). Awareness of difficulties will influence motivation for and engagement with therapeutic activities.

The *What Is Memory?* information handout is designed to introduce your client to the three central processes of memory function (encoding, storage, and retrieval). It can be also be used to introduce and highlight a particular memory process that may be relevant for a particular client or symptom. The 'filing cabinet' metaphor for memory is used to give a concrete referent for memory processes. The design and language have been kept simple so that the handout can be used with a wide range of clients, including those with neurological conditions.

Instructions

This is a Psychology Tools information handout.
Suggested uses include:

- Client handout – a psychoeducation resource.
- Discussion point – to provoke a discussion and explore your client's beliefs.
- Therapist learning tool – to improve your familiarity with a psychological construct.
- Supervision tool – to develop formulations and knowledge.
- Teaching resource – a learning tool during training.

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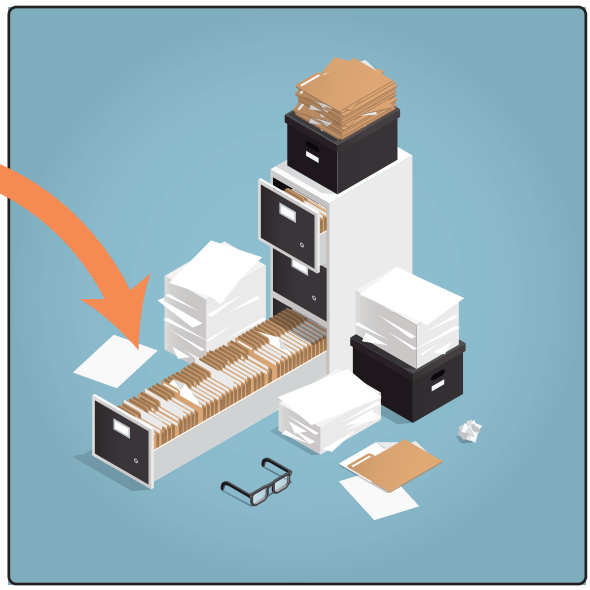
What Is Memory?

Memory is how you hold onto knowledge over time, and is how your brain stores information so that you can find it again and remember it. There are three parts to memory.
Imagine it is a filing cabinet.

1

Putting information into your brain.

This is **encoding**.



2

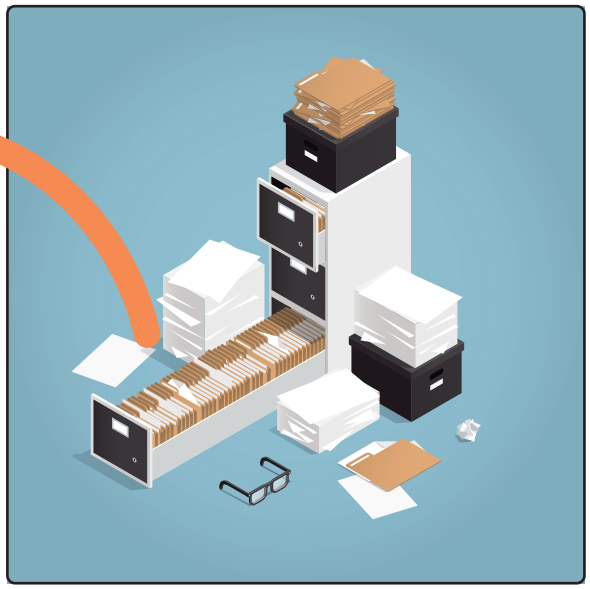
Keeping information in your brain over time.

This is **storage**.

3

Getting information out of your brain when you need it.

This is **retrieval**.



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