



Module 5 – Associative Memory

NEUROPEDAGOGY

2020-1-PL01-KA203-081740

Associative Memory

Self-evaluation for the platform users

1. Memory refers to:
 - a) acquire, retain and retrieve information
 - b) store, retain and retrieve information
 - c) acquire, store, retain and retrieve information**
 - d) acquire, store and retain information

2. Sensory memory is:
 - a) the earliest stage of memory**
 - b) the medium stage of memory
 - c) the last stage of memory
 - d) there is no such memory

3. Most of the information stored in short-term (active) memory will be kept for approximately:
 - a) 10 – 15 seconds
 - b) 20 – 30 seconds**
 - c) 1 – 5 minutes
 - d) 10 – 20 minutes

4. What is Associative Memory?
.....

5. How many types of Associative Memory we can distinguish?
 - a) 1 **b) 2** c) 3 d) 4

6. What are *episodic memories*?
 - 1) There is no such term
 - 2) Memories not important for us
 - 3) Not complete memories
 - 4) Recall of specific personal experiences**

Self – reflection (Questions to raise awareness)

1. Do you use Associative Memory in your daily life?
.....
2. How Associative Memory can be helpful for your study?
.....
3. How can you practice/improve your (Associative) Memory?
.....

Learning objectives to be defined for each module acc. To Bloom's taxonomy

1. Know the definition of (associative) memory and its types
2. Understand the definition of (associative) memory, its types
3. Know how to improve own (associative) memory
4. Practice own (associative) memory

Theory – how does it work?

➤ Definition of Memory

Memory refers to the processes that are used to acquire, store, retain, and later retrieve information. There are three major processes involved in memory: encoding, storage, and retrieval.

Human memory involves the ability to both preserve and recover information we have learned or experienced. As we all know, however, this is not a flawless process. Sometimes we forget or misremember things.

Definition according to Psychology Dictionary:

Memory is the ability to understand and then internalize information into the memory stores based on the processes of learning, encoding, retention and then retrieval and reactivation of a memory when stimulated. Research has implied that for every fact or memory, a new neuron is formed in the brain.

➤ Types of Memory

(based on Richard Atkinson and Richard Shiffrin theory)

- Sensory Memory

Sensory memory is the earliest stage of memory. During this stage, sensory information from the environment is stored for a very brief period of time, generally for no longer than a half-second for visual information and 3 or 4 seconds for auditory information. We attend to only certain aspects of this sensory memory, allowing some of this information to pass into the next stage: short-term memory.

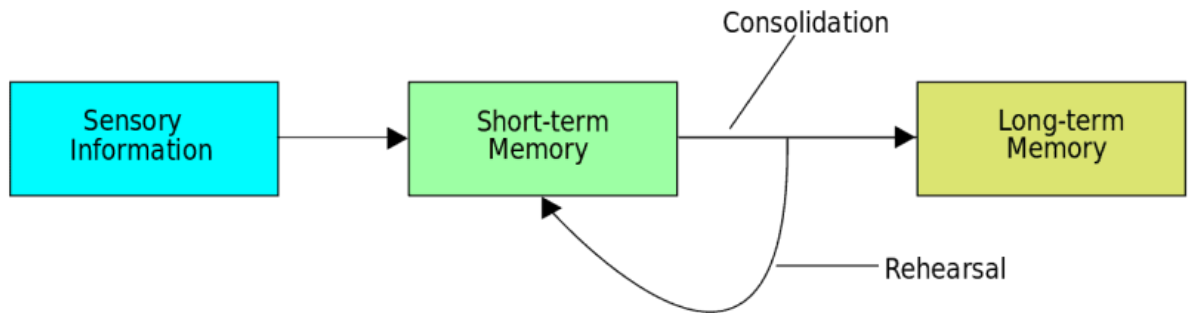
- Short-Term Memory

Short-term memory, also known as active memory, is the information we are currently aware of or thinking about. While many of our short-term memories are quickly forgotten, attending to this information allows it to continue to the next stage: long-term memory. Most of the information stored in active memory will be kept for approximately 20 to 30 seconds.

The term "short-term memory" is often used interchangeably with "working memory," which refers to the processes that are used to temporarily store, organize, and manipulate information.

- Long-Term Memory

Long-term memory refers to the continuing storage of information. This information is largely outside of our awareness but can be called into working memory to be used when needed. Some of this information is fairly easy to recall, while other memories are much more difficult to access.



Picture after: human-memory.net

➤ What is Associative Memory?

Associative memory is defined as the ability to learn and remember the relationship between unrelated items. It refers to the ability to remember relationships between concepts, and not just the individual concepts themselves. In humans, this relates to visual and verbal information, such as remembering how two words are related (e.g., man – women), or seeing an object and its alternate names (e.g., a guitar). Associative memory is thought to be mediated by the medial temporal lobe of the brain.¹

Definition according to Psychology Dictionary:

1. *a memory of a past event or place that may occur by recalling something associated with it.*
2. *retrieval of a memory of a stimulus or behaviour in relation to the presentation of an associated stimulus or response.*

➤ Types of Associative Memory

• Implicit Associative Memory

Physiological processes that are affected by implicit memory include the following: performance, arousal level, reaction time, habituation, and thalamic (in the brain) processing speed.

One of the most widely-used tests for implicit associative memory is priming, which was developed by Kutas & Hillyard in 1980². Priming is used to test whether a word or image influences how the subject responds to another stimulus, thus indicating that they have previously encountered the word or image before.

An example of priming is when a person is shown a picture of a car, and then asked to identify a second picture that is related in some way (e.g., another car). If they are able to identify the correct match faster than if they had never seen the first picture, then it is considered evidence that the first picture primed the person to recognize the second.

• Explicit Associative Memory

¹ Mayes A, Montaldi D, Migo E. Associative memory and the medial temporal lobes. *Trends Cogn Sci.* 2007;11(3):126-135. doi:10.1016/j.tics.2006.12.003

² Kutas M, Hillyard SA. Event-related brain potentials to semantically inappropriate and surprisingly large words. *Biol Psychol.* 1980;11(2):99-116. doi:10.1016/0301-0511(80)90046-0

Explicit associative memory relies on conscious recollection of information or events. There are two types of explicit associative memory: episodic and semantic³.

- Episodic memories are the recall of specific personal experiences, such as a wedding anniversary
- Semantic memories refer to facts about the world, such as knowing that Paris is in France.

➤ **Impact of Associative Memory**

The value in developing associative memory capabilities has far-reaching implications for your daily life.

Establishing associations helps you to remember information more easily, such as names of people and places, phone numbers, birthdays and anniversaries. This may help you to recall other related information about them (e.g., someone's birthday might remind you that he or she has a party planned for that evening).

It also helps you to remember things in an efficient manner by recalling information that is useful for specific tasks. For example, you might form associations between the things that you need to do and the people who can help you accomplish them.

➤ **Pitfalls of Associative Memory**

Associative memory is not always a perfect science. Below are some ways that associative memory might connect in ways that you don't intend when a bad memory is brought back to your mind or a random association is created.

- *You associate your kindergarten teacher with a monkey because she had one on her desk.*
- *A smell brings back an event, like the apple pie that your mom would make when you were sick.*
- *Your favourite movie or tv show reminds you of someone in it, and then immediately makes you think of them in a new way (in a different context).*
- *The school bully draws out the memory of an embarrassing event you had when you were around that person.*
- *A song reminds you of your first kiss or some other memorable event in your life, and in doing so makes it harder for you to get "that" song out of your head.*

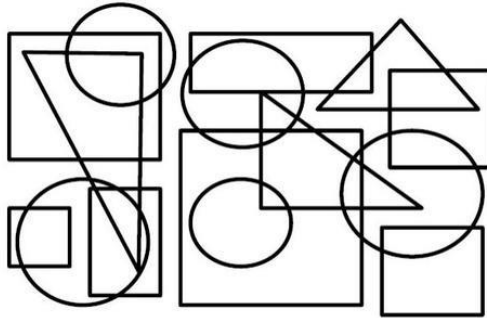
Interactivities – suggestions on how to implement it?

<https://h5p.org/content-types-and-applications>

➤ **Brain training - exercises to improve memory and concentration**

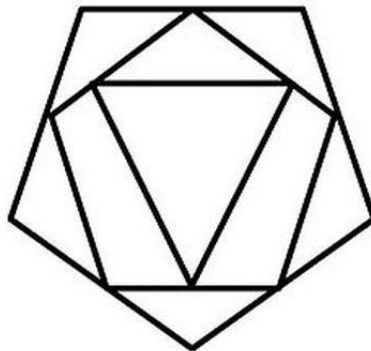
- **Count rectangles (Type: Collage ???)**

³ Renoult L, Irish M, Moscovitch M, Rugg MD. From Knowing to Remembering: The Semantic-Episodic Distinction. Trends Cogn Sci. 2019;23(12):1041-1057. doi:10.1016/j.tics.2019.09.008



(picture after: <https://www.poradnikzdrowie.pl/psychologia/rozwj-osobisty/trening-umyslu-czyli-cwiczenia-na-dobra-pamiec-aa-mBpT-qKuE-qxcU.html>)

- **Playback of a sequence of pictures or photos**
Look at the picture for a moment (for example 5 seconds) and try to redraw it (Type: Collage ???)



(picture after: <https://www.poradnikzdrowie.pl/psychologia/rozwj-osobisty/trening-umyslu-czyli-cwiczenia-na-dobra-pamiec-aa-mBpT-qKuE-qxcU.html>)

- **In the following sequence of letters, please find the hidden words (Type: find the words)**
Alecheeselegantxyetigerenergyalacellawfullongwcutextensiongoingreatrust
ationextrayellowerroralsometimespecialyricspecialboxygenerally

- **Arrange the names of the professions from the letters below (Type: Drag the words)**

ubrmpel ...plumber ...
aedgrner
troac
rabke
motnacsou

- **Memory Game (Type: Memory Game)**
- **Meditation/Relaxation**
- **Tips how to Improve Associative Memory (Type: Course Presentation)**

1. Create a network of associations. This means associating yourself with people who are able to recall many things (or who say they are good at recalling things). By watching them and modeling their actions, you can improve your own ability to recall items by overlearning.
2. Associate one person or thing to another in some way, such as using a rhyme, sentence or phrase. The association can be general (e.g., "grass is green") or specific (e.g., "the doctor is in the house").
3. Create a story with many associations to make it more memorable and to help you recall details. If you have trouble recalling information, then practice recalling it again and again, and note where you are having problems.
4. Practice remembering items in a serial list by creating associations to things at the beginning of the list (as opposed to holding these items in short-term memory). The goal is to make it easier to remember the first item, which will help you recall the rest of the items.
5. Use the method of loci to remember lists or other materials by associating them with locations that you are familiar with (e.g., rooms in your home). This is related to space-coding techniques used by pilots to remember flight paths and procedures, and it works best if you create a visual image of each location.
6. Use imagery to remember a list, an event or other materials by creating mental pictures and/or using props (e.g., if you are remembering the items on your grocery list, then picture them in your mind when you are at the store).
7. Create associations that show how things are alike or different from one another. For example, if you want to remember the steps in a process, then associate them somehow so that they make sense to you (e.g., "take out" is similar to "out of").
8. Use memory-triggering devices (e.g., cues), which are items or actions that prompt recall of information that is easy to forget. You can use a memory-triggering device by tying it to anything you want to remember, such as setting an alarm or writing down the information.
9. Associate people with words (or situations) in some way, and then try to recall the person's name by recalling the word (e.g., the word "green" might trigger the name of your friend, "Jenny").

10. Use a method that suits you best. Everyone is different, and some people find it easier to create music or phrases to help them remember things.

Additional Resources

➤ Research articles

<https://academic.oup.com/acn/article/28/4/348/4775> Developmental Aspects of Working and Associative Memory

<https://psycnet.apa.org/fulltext/2018-08555-001.html> Age-Related Differences in Associative Memory: Empirical Evidence and Theoretical Perspectives

<https://www.sciencedirect.com/science/article/pii/S0896627301001994> Cognitive Association Formation in Human Memory Revealed by Spatiotemporal Brain Imaging

➤ You tube videos

<https://www.youtube.com/watch?v=-o8pcWC81Xc> – Memory and Models of memory

<https://www.youtube.com/watch?v=KCLdryjDI6E> - Memory techniques - Your secret weapon in the information age | Simon Reinhard | TEDxTUM

<https://www.youtube.com/watch?v=hh2Z2hSgFIY> - Improving working memory capacity | Torkel Klingberg | TEDxNorrköping

<https://www.youtube.com/watch?v=2tcEggTWbxQ> - Top 10 Tips to Keep Your Brain Young | Elizabeth Amini | TEDxSoCal

https://www.youtube.com/watch?v=_gA2lcNWloU - Memory fit - How I learnt to exercise my memory | Anastasia Woolmer | TEDxDocklands

<https://www.youtube.com/watch?v=9ebJlcZMx3c> - How to become a memory master | Idriz Zogaj | TEDxGoteborg

<https://www.youtube.com/watch?v=gj3ZnKIHqxl> - How to draw to remember more | Graham Shaw | TEDxVienna

<https://www.bing.com/videos/search?q=associate+memory+psychology&docid=607987259837733828&mid=4C06AC252EB93876D6BB4C06AC252EB93876D6BB&view=detail&FORM=VIRE>

<https://www.bing.com/videos/search?q=associate+memory+psychology&&view=detail&mid=33889E97D4484600D44233889E97D4484600D442&&FORM=VRDGAR&ru=%2Fvideos%2Fsearch%3Fq%3Dassociate%2520memory%2520psychology%26%26FORM%3DVDVXX>

➤ Other Links

<https://www.psychologistworld.com/memory/association> - Memory and Association

<https://www.betterhelp.com/advice/memory/an-overview-of-associative-memory/>

<https://www.sciencedirect.com/topics/medicine-and-dentistry/associative-memory>

References

1. A. Cuncic, What Is Associative Memory? <https://www.verywellmind.com/what-is-associative-memory-5198601#citation-6>
2. <https://psychologydictionary.org/associative-memory/>
3. K. Cherry, What is Memory? <https://www.verywellmind.com/what-is-memory-2795006>
4. <https://www.poradnikzdrowie.pl/psychologia/rozwoj-osobisty/trening-umyslu-czyli-cwiczenia-na-dobra-pamiec-aa-mBpT-qKuE-qxcU.html>

5. Checklist according to implementation in the classroom