

Epilepsy & Memory

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Memory is one of the most important functions of our brain, as it links our past and present, and gives us a sense of continuity in time. Lapses in memory are a frequent occurrence for most people. Forgetting where we left the remote control, the house keys, a person's name, and not getting all the items on the shopping list is a cause of great frustration. However, memory difficulties can also result in debilitating effects on social, occupational and daily life. People with epilepsy are at high risk of memory difficulties. There are many different components of memory, so how does epilepsy affect memory, and how can you make the most of what you have?

Types of memory

Short-term (working) memory

This type of memory allows you to process information from the start of this sentence to the end. Similarly, when mentally calculating 23 times 7 in your head, you will need to remember the numbers involved, visualize the calculation, and hold the numbers in your head before you come up with the answer (161). This requires a lot of temporary storage, and once you have come up with the answer, the other numbers involved in the calculation become irrelevant and are quickly forgotten.

When reading, listening and calculating, we need to be able to temporarily store information in order to complete a particular task (eg listening to directions, finding the right book on a shelf, playing chess or calculating how many days till a holiday). However, once it has been achieved, the supplementary or irrelevant information is no longer needed and is quickly discarded.

Long-term memory

When most people think of memory, they consider long-term memory. This is information that is stored for a long period of time. Remembering your name, where you lived as a child, what you did last year or even what you did a few minutes ago are examples of this type of memory.

Long-term memory can be further divided into two types: episodic memory which involves remembering events and incidents (eg going to the hospital), and semantic memory which involves knowledge about the world (eg the capital of Australia, or the meaning of a word, or the ingredients for a favorite recipe).

One theory is that information in memory never disappears, but instead becomes less and less accessible. Not being able to remember events from our past can be one of the most distressing aspects of memory difficulty, and a frequent problem for people with epilepsy.

How memories are made

Attending & encoding

Nothing is likely to get into long-term memory unless we attend to it. Attention is the critical first stage of the memory process. Having epilepsy can impact your ability to attend, slow your speed of information processing, and limit sustained attention over time. Some people can feel overwhelmed by the amount of stimuli (information) that is available. This can include visual and auditory information (eg following fast conversations, attending to relevant information on the computer, keeping up with school/lectures). Important facts may be missed (eg the last digits of a phone number or the third direction). When we have difficulty with this first stage, memory is affected because the information was not properly received.

Storage

The second stage involves the permanent storage of information in the brain. For some people with epilepsy, information may "go through one ear and out the other". This difficulty in consolidating new information is thought to be a problem of storage, and due to structural problems in parts of the brain responsible for memory which are commonly affected by epilepsy.

Retrieval

The final stage requires the brain to then find and recall information. Some people describe difficulty with this process as knowing the information is in there, but just being unable to get it out. Time pressure and being put 'on the spot' can negatively impact your ability to retrieve information quickly, however you may find that later in the day (often when you are thinking of something else) the answer may come to you. The correct context can also help with retrieval of information. It is difficult to remember information in isolation, however when given further details (eg description of a holiday) you may recognize and retrieve the information (eg name of the holiday resort) you are trying to recall.

How epilepsy can affect memory

Seizures

Seizures are believed to affect the storage of memory in a variety of ways. People with epilepsy (in particular temporal lobe epilepsy) may have difficulties remembering past information because major seizures can result in a period of retrograde amnesia (inability to access old memories). It is thought a longer history of seizures, including a high frequency of generalized seizures and the experience of status epilepticus can negatively affect memory function.

Following seizures (post-ictal)

After a seizure, you may feel confused, fatigued, have a headache, and/or process information slower than usual. It is not unusual that your ability to attend, encode, store and retrieve information will be affected at this time. This period of post-ictal confusion usually goes away once you have had time to recover. This time will vary from person to person. However, some people find that their memory is affected even after fully recovering from a seizure.

Anti-epileptic drugs

Anti-epileptic drugs (AEDs) have a number of well documented side-effects, including impairment of cognitive functioning. Some people may also experience sluggishness, lethargy, and/or depression etc. Although it is not yet understood how different AEDs specifically affect memory, the impact on attention and memory is well acknowledged. There is a higher chance you will experience memory

difficulties if you take high doses or more than one AED. In contrast, some people will find that taking medication will help with their memory. This may be because their seizures are better controlled, rather than the impact of the drug itself.

Surgery

Some people experience increased memory difficulties following temporal lobe surgery. Recent studies identify that the majority of people who are at high risk of post-operative memory decline can be reliably identified before the surgery. Preoperative counseling is an important component of ensuring you are aware of and understand the risks.

Anxiety and depression

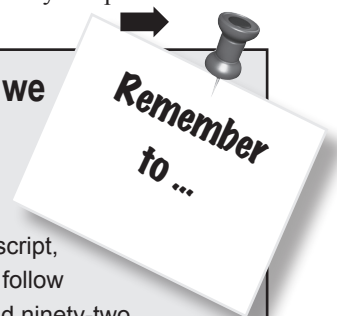
Your mood can impact your ability to attend to information, learn and recall. When we are feeling happy, we tend to be more open and alert, increasing our chances of learning and recalling information. The more anxious or depressed we feel, the harder it is to focus on information, which will negatively impact our ability to remember. For example, it is much more difficult to listen to and follow instructions when anxious that we are running late.

Stress/fatigue

How efficient your memory is also depends on the demands you place on it. If you are trying to perform many tasks at once with a high level of stress, fatigue and distraction, it is understandable that lapses in memory will occur. Alternatively, having a highly structured and ordered lifestyle with extensive use of memory aids will increase the chances of making fewer errors. Keeping to a healthy sleep/exercise

We can't change our memory but with these useful tips we can use what we have more effectively:

- ✓ Lists for tasks – eg shopping lists
- ✓ Displays – eg whiteboards, calendar, wall charts, post-it notes around the house
- ✓ Diary - write future activities such as what you are going to do tomorrow, and names of people you are likely to meet
- ✓ Keep a list of significant people, places and phone numbers on the fridge or notice board
- ✓ Label drawers and cupboards
- ✓ Explore technology – mobile phone alarms, wrist watch alarms, electronic organizers, computers, dictaphones, and PDAs (but remember – hi-tech isn't always better!)
- ✓ Ask for assistance – someone to prompt/remind you
- ✓ Arrange for cue phone calls before important events
- ✓ Timers and alarm clocks to remind you when to start/stop an activity (eg on oven, watch, mobile phone, TV, radio etc)
- ✓ Arrange the environment – eg keep medication in a visible location, keep keys and phone together, always carry pen and paper to jot down notes
- ✓ Break activities into small steps so that you don't have to remember lots of things at once
- ✓ Keep a regular routine
- ✓ Use a dosette box for medication
- ✓ Use prompts, such as a diagram or script, showing each of the steps you must follow
- ✓ Rhymes (eg "In fourteen hundred and ninety-two Columbus sailed the ocean blue" helps to remember the date 1492)
- ✓ The place method – items to be remembered are imagined in a series of familiar places. When you need to remember them, you 'look' at the familiar places.
- ✓ The story method – make up a story which connects items to be remembered in the correct order.
- ✓ The pegword method – "one is a bun, two is a shoe, three is a tree" etc as a method to remember lists of items in correct order.
- ✓ Turn numbers into letters – eg to remember phone numbers
- ✓ Alphabetical searching – go through the alphabet letter by letter to find the initial letter of a name (eg does a particular persons name begin with A...B...C...Yes! D for Donna...)
- ✓ Give yourself plenty of time to remember – don't hurry
- ✓ Combine a number of these strategies together



Remember, your lifestyle, interests and motivation will change over time – what is most helpful will vary.

routine is important for people with epilepsy to help maintain a balanced lifestyle, and manage stress/fatigue.

Mnemonics

One creative and effective technique for remembering lists of words is to use mnemonics.

There are two different forms, the first of which involves visual imagery. Visual imagery mnemonics can be performed by identifying ten locations in your home. Select them so that moving from one to another is logical (eg front gate to front door to hall to lounge to kitchen to backyard etc). Imagine yourself moving through your ten locations in a consistent pattern without difficulty. The next step is to think of ten items and imagine them in these locations. For example, if the first item is milk, you could imagine a large carton of milk sitting on top of the letterbox spilling milk over the street. If the second is an apple, you could imagine blocking the front door a large basket of apples, and so on. The same locations can be used repeatedly.

The second type is verbal mnemonics. Well used examples involve

Strategies to reduce stress

- Set realistic goals for what you can achieve
 - Take sensible regular exercise and maintain physical health
 - Develop regular leisure pursuits
 - Develop the habit of planning and listing tasks
 - Plan weekend and holiday breaks
 - Identify particular sources of stress
 - Learn and participate in structured relaxation (eg tai chi classes)
 - Find quiet environments
 - Ventilate feelings with a significant supporting person
 - Join a group to share feelings and experiences; invest in group processes
 - Obtain counseling, such as cognitive therapy
 - Develop a support system within the home
 - Develop a support system within the community
 - Identify humorous moments and invest in humour.
- (Rees, 2005)

remembering the acronym ROYGBIV (red, orange, yellow, green, blue, indigo, violet) to “Richard of York gains Battles in Vain”. Another when remembering the number of days in a month starts “Thirty days hath September, April, June and November. All the rest have thirty-one, except that...” finishing with

an odd section on February and leap years!

Determining your own verbal memory cues can be creative and effective – as long as you remember what the acronyms originally stood for!