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The Long and Short of Memory Deficits in Dementia

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Did you ever hear someone refer to a person as having poor short term memory and intact long term memory? I hear it all the time from patients, caregivers, nurses, physicians and even other psychologists. Unfortunately, it's not correct. In all my years doing geriatric evaluations, I am yet to have a patient with poor short term memory and intact long term memory.

So how can this be? It's a terminology problem. Short term memory (STM) is intended to be just that → short term. It does not last for much more than 20 seconds. It tends to be limited to 7 bits of information, give or take 1 or 2 bits. Nowadays, it is also referred to as 'working memory'. Given all the confusion about short term memory, it was easier to come up with a different term altogether.

To remember something any more than 7 bits or longer than 20 seconds requires some saving or consolidating into long term memory (LTM). Now there is the problem for people with Alzheimer's or related Dementia. It gets harder and harder to do that saving into LTM. They may be able to repeat the phone number right after they hear it (STM), but then can't remember it again 2 minutes later (LTM).

Okay, but what about this idea that people can remember what they had to eat at their wedding reception, but can't remember what they had for breakfast this morning? Both are actually cases of LTM. We usually talk here about remote (wedding) vs. recent (breakfast) memory. The difference is that the consolidation into LTM occurred 50 years ago for the wedding meal and today for breakfast. Alzheimer's affects peoples' ability to make new memories (breakfast). The old and already stored memories (wedding meal) remain relatively intact, at least until the later stages of the disease when all cognitive functioning is more grossly impaired.

There are a lot of other technical terms for describing various types of remembering and forgetting. I've tried to lay them out in the accompanying chart to reflect their spatial place in time. The X in the middle provides a reference point in time. For those of you with some computer knowledge, I've added the computer analog to make the terms more understandable.

Looking at the chart, you'll see that STM is just after the X reference point. On a computer, it's comparable to so-called 'random access memory' (RAM) which is how much memory the computer has available while it's on to deal with complex software and interactive games. If you turn off the computer without saving anything (or you have an unexpected power failure!), you'll lose everything and need to start over again. You save things so you can go back to them the next time you turn on the computer. That's the same as consolidating information into LTM!

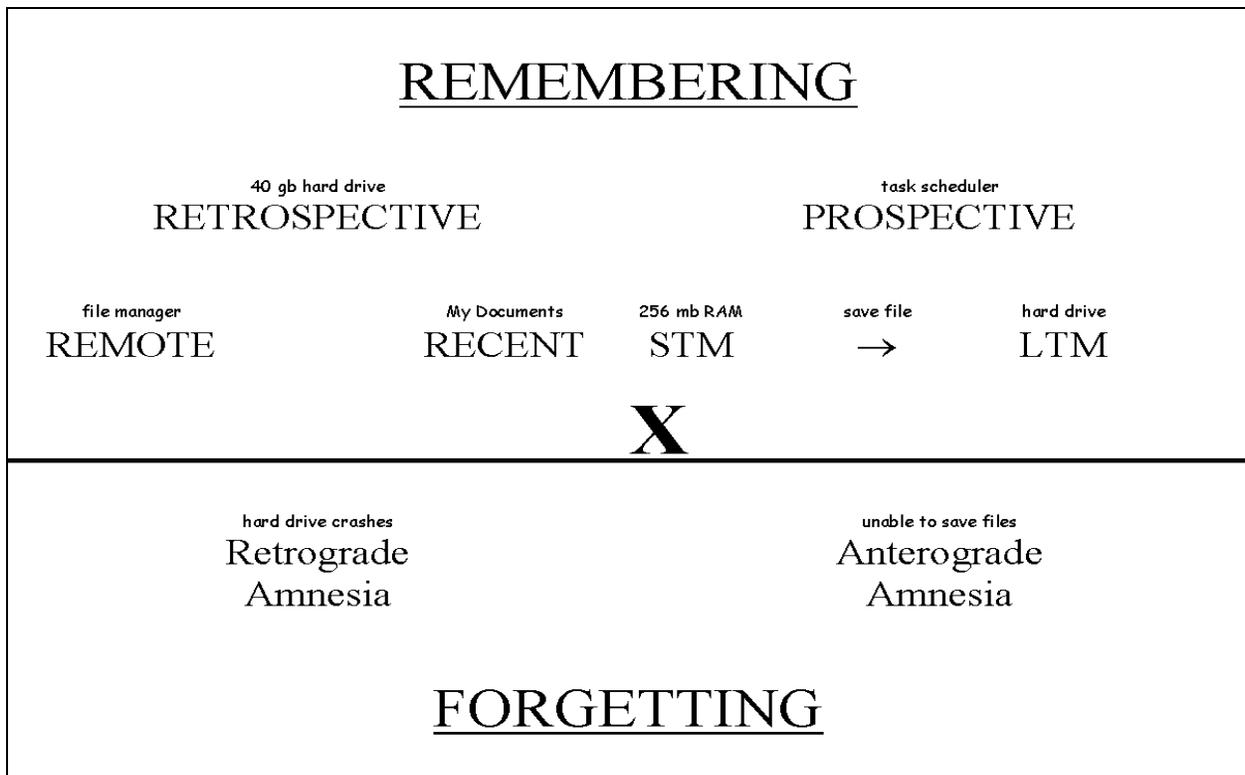
Recently stored information in LTM is more likely to be needed again. You might have that information also stored in the 'My Documents' folder of your computer for quick and easier access. That would be like recent memory. You are more likely to be asked about this morning's breakfast than your wedding meal. As the information gets older, you might move it out of My Documents and just leave it stored on your hard drive. With Alzheimer's, there are a lot fewer new memories to put into that My Documents folder. There's nothing there so just as well to go into the hard drive and reminisce about those more remote, but also more accessible and clearer, memories from the past.

It's good to have info stored in the hard drive, but it's only so big (40 gb on chart) and/or there's always a chance you'll lose it somehow → accidentally delete a file or, worse yet, the hard drive crashes or a virus infects the computer. The safeguard is to have some sort of back-up system to store the info some where else (on a floppy disk, tape drive, or now CDs or even DVDs). Backing-up files is like writing things down. The hard drive crashing might be like having a stroke and a virus more like getting Alzheimer's.

Losing information from short or long term memory is forgetting. It occurs by definition with STM (after those 20 seconds or so). When it involves something that was supposed to be in LTM and gets to be real problem, it's called 'amnesia'. You might have heard of retrograde vs. anterograde amnesia. Retrograde amnesia is the more common term. It really refers to excess forgetting of those recent or more remote memories. Anterograde amnesia is not remembering new information. It is the primary deficit in Alzheimer's and other Dementias → again that ability to save or consolidate information into LTM for later reference.

The one last term distinction on the chart is retrospective vs. prospective memory. Retrospective has been the focus of most of our research and testing of patients. Do you remember what I just said? (STM), what you had for breakfast this morning? (recent LTM), or what you had to eat at your wedding? (remote LTM). Prospective memory has received a lot less attention, but may be the most important. It's remembering to do something later. It's like the task scheduler on the computer or why Palm Pilots gained so much popularity. Prospective memory is another critical deficit in Alzheimer's and related Dementias. It's part of the reason people just sit there and seem not to know what to do. It's that very critical ability to remember to make and follow through on those "Things To Do" lists in your head.

So how should we describe the memory deficits in Alzheimer's and related Dementias? It's anterograde amnesia. It's a failure to remember new information after a delay. It's a failure to develop new long term memories.



REMEMBERING

40 gb hard drive

RETROSPECTIVE

task scheduler

PROSPECTIVE

file manager

REMOTE

My Documents

RECENT

256 mb RAM

STM

save file



hard drive

LTM

X

hard drive crashes

Retrograde
Amnesia

unable to save files

Anterograde
Amnesia

FORGETTING