

Cognitive Changes Following Stroke

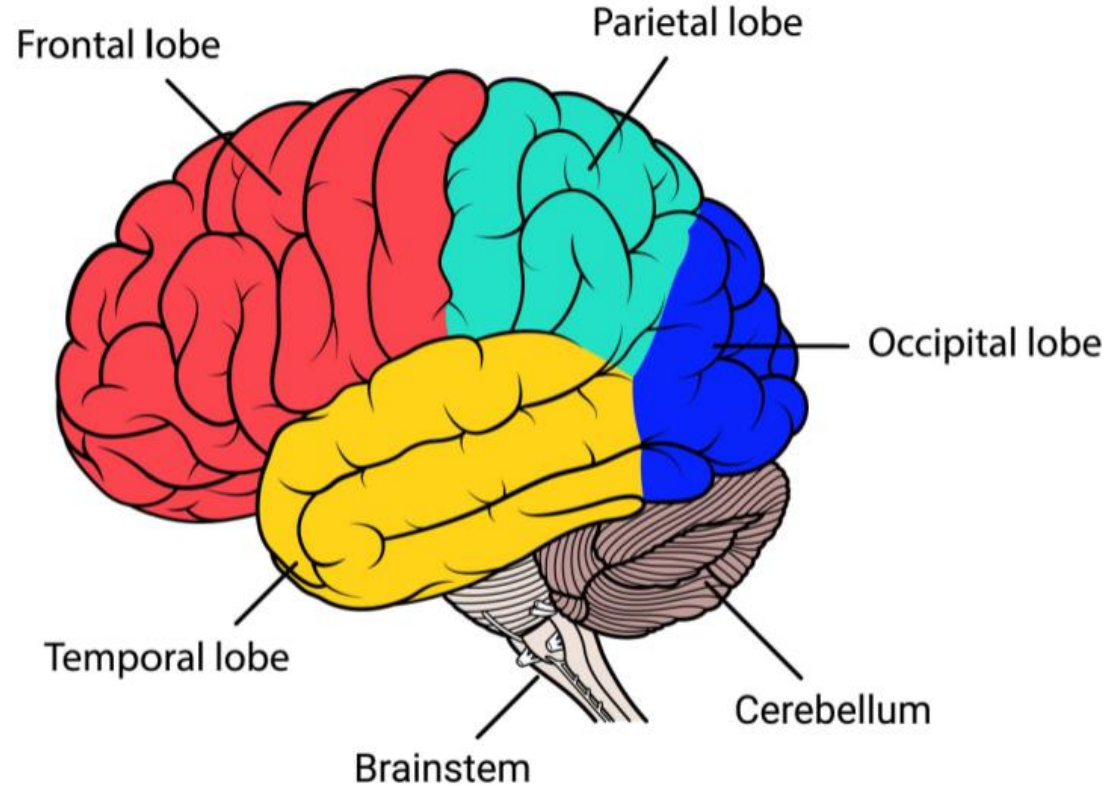
And what to do about them!

Cognitive Changes after Stroke

Key Concepts

- Neuroanatomy 101
- Common cognitive changes following stroke
- (Spontaneous) recovery
- Assessing cognitive functioning

Neuroanatomy 101



“Lateralisation” of the Brain

Motor

Right side of the body

Language/Speech

Expressive and receptive speech

Memory

Verbal memory – words, stories

Auditory Processing

Language/speech sounds

Visual Processing

Right visual field
Printed letters/words



Motor

Left side of the body

Language/Speech

Prosody of speech

Memory

Visual memory – faces, spatial location

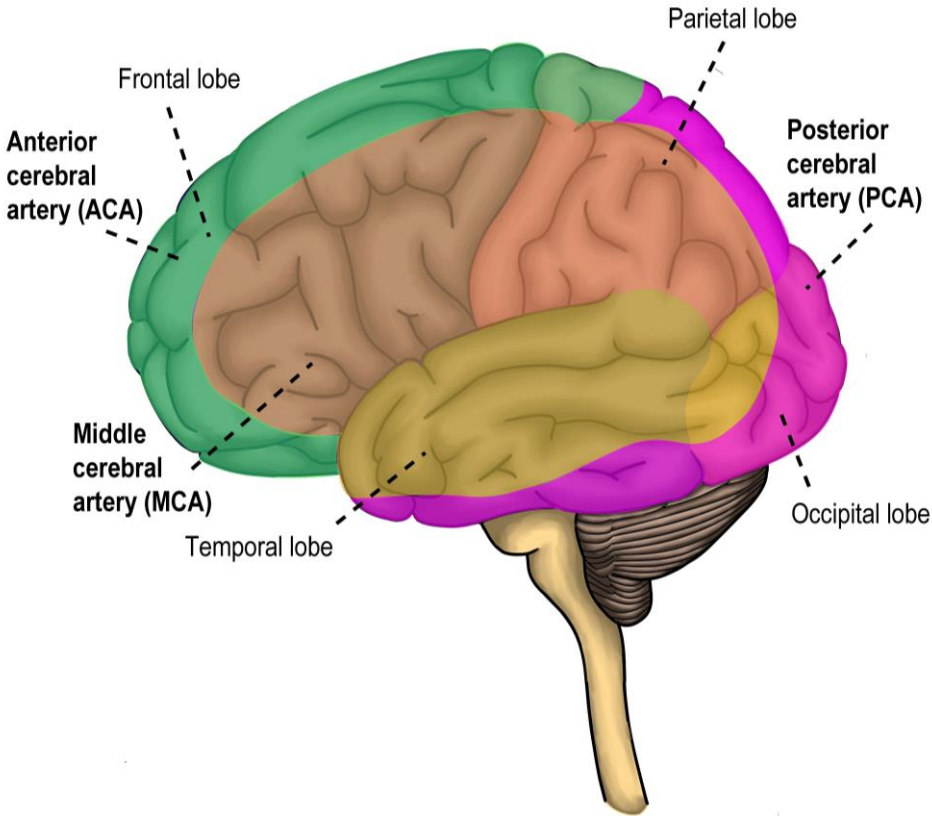
Auditory Processing

Music
Nonlanguage sounds

Visual Processing

Left visual field
Faces
Geometric patterns
Spatial orientation

Cerebral Blood Supply



Common Cognitive Changes Following Stroke

Left ACA

- Expressive language difficulties
- “Executive” dysfunction
- Apathy

Left MCA

- Aphasia
- Gerstmann’s syndrome
- “Executive” dysfunction
- Material specific memory impairment

Left PCA

- Visual agnosia
- Alexia
- Material specific memory impairment

Right ACA

- “Executive” dysfunction
 - Apathy
- Reduced social insight

Right MCA

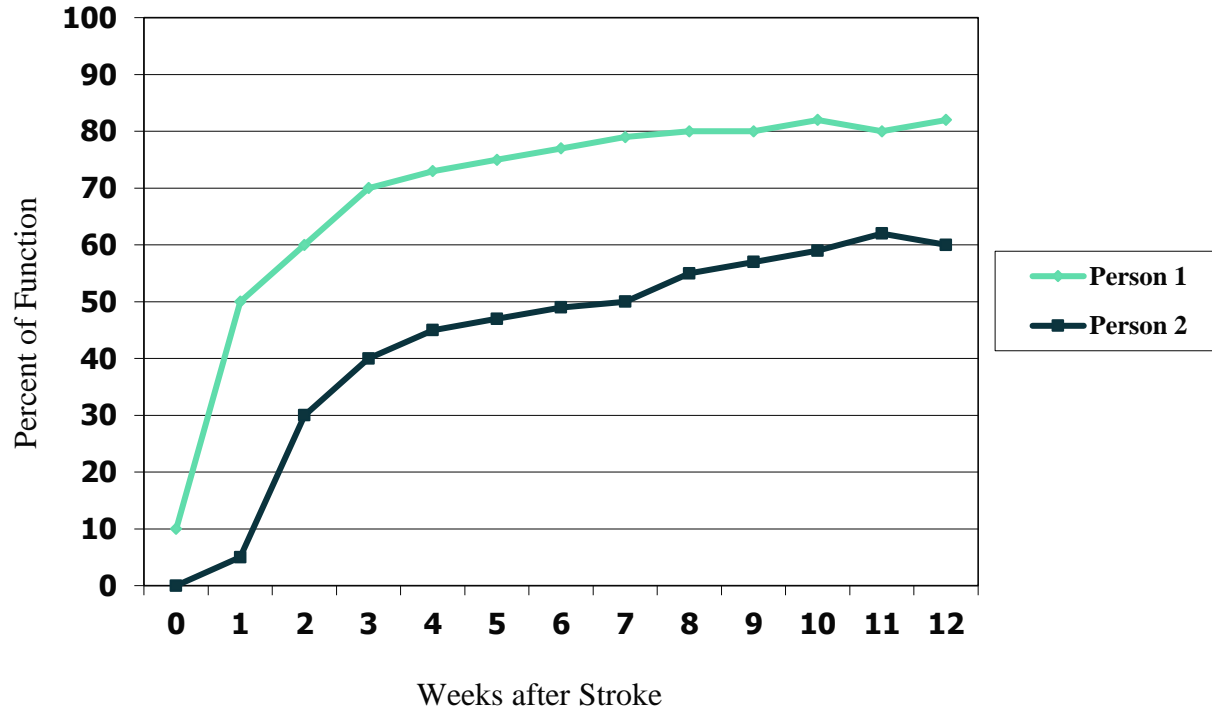
- Visuospatial difficulties (including neglect)
- “Executive” dysfunction
- Material specific memory impairment

Right PCA

- Prosopagnosia
 - Left neglect
- Material specific memory impairment



(Spontaneous) Cognitive Recovery Post-Stroke

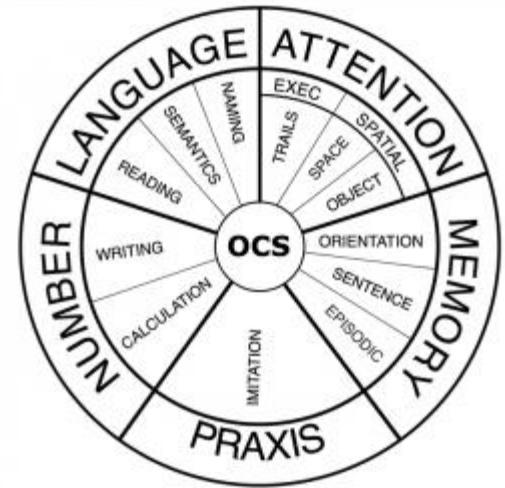


Assessment of Cognitive Changes in Stroke

- Cognitive impairments in the acute stages can be an important predictor of longer-term recovery, as well as quality of life
- Cognitive difficulties can also interfere with rehabilitation (e.g., difficulties with attention, poor comprehension, difficulties recalling instructions, etc.) if appropriate modifications are not made
- However... comprehensive neuropsychological assessment is often not appropriate in the acute or subacute inpatient setting
- Many common screening tools are also not appropriate
 - Not stroke-specific (e.g., largely developed for screening of dementia)
 - Often heavily language-dependent – issues with interpretation if person has aphasia
 - Visual neglect can also confound some tasks
 - Domains known to be affected by stroke often not included
- Unitary view of cognition is not particularly useful in context of stroke (use of “Pass/Fail” cut-off scores)

Oxford Cognitive Screen

- Domain specific screening tool - delivers a cognitive profile on 5 different domains
- Provides a visual/ “at a glance” representation of persons strengths and weaknesses
- Stroke specific
 - Assesses domains that we know are often affected post stroke
- Aphasia friendly
 - Can validly assess people with expressive aphasia
- Neglect friendly
 - Reduces confounds of neglect
- Provides domain specific scores to help direct rehabilitation

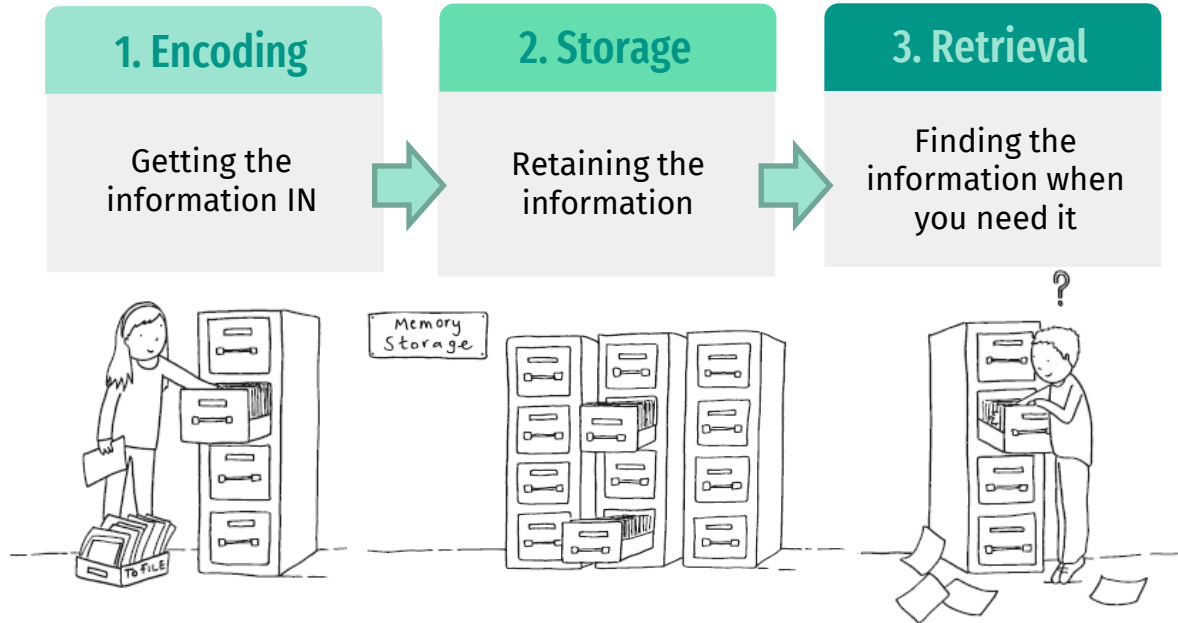


How Memory Works

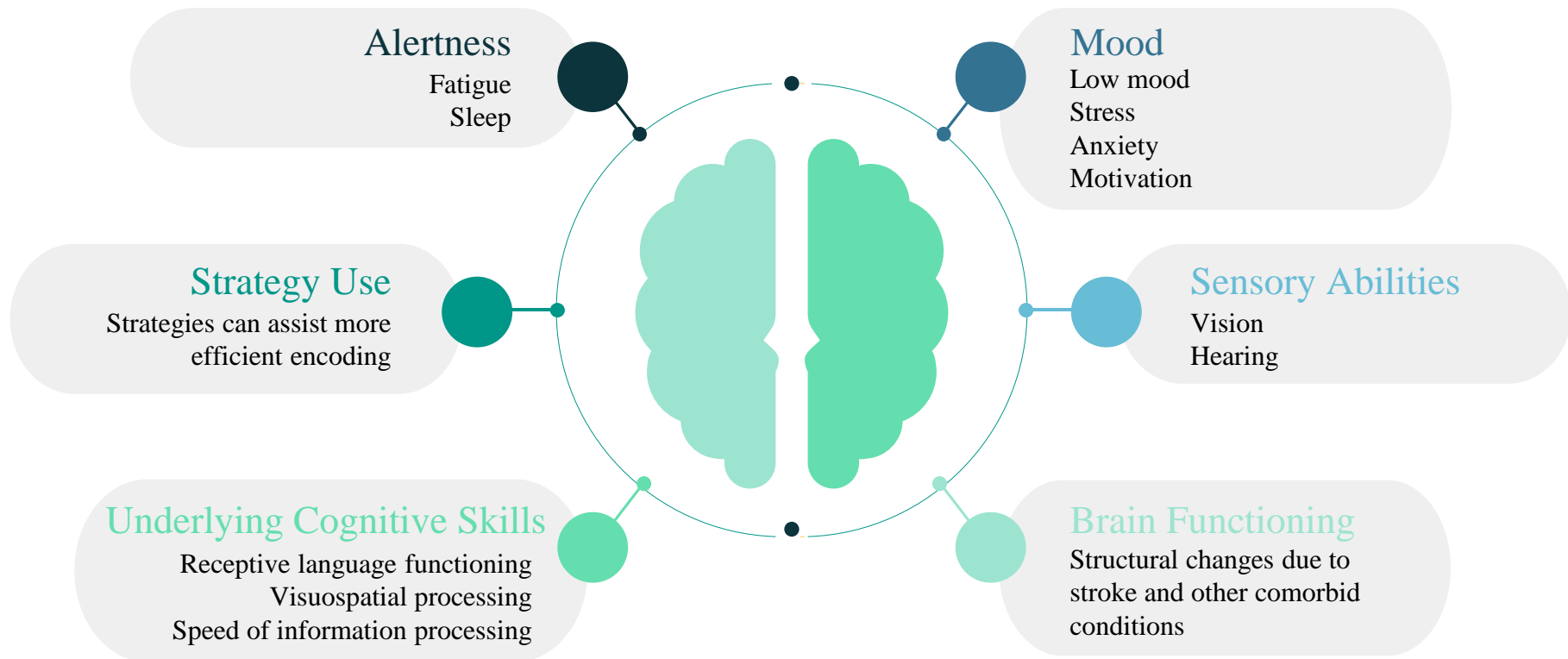
And how stroke can impact memory functioning

- Stages of memory
- Parts of the brain important for memory functioning
- Common memory difficulties following stroke

Stages of Memory



Step 1: Encoding



Step 2: Storage



Step 3: Retrieval

Effortful process
Usually easier with prompting or reminders

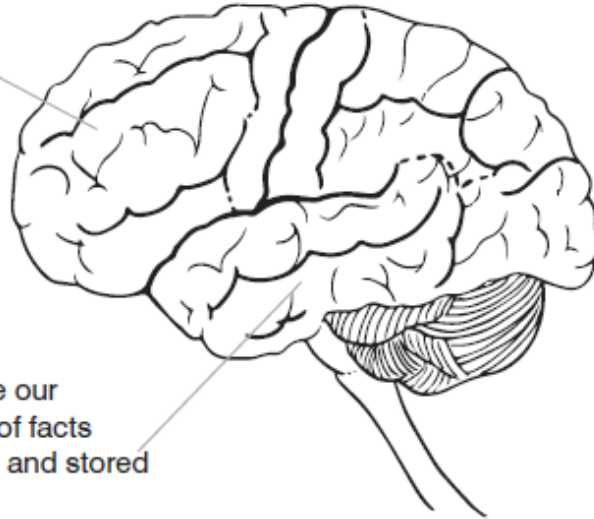
Can be impacted by strategies used

Can be impacted by brain functioning

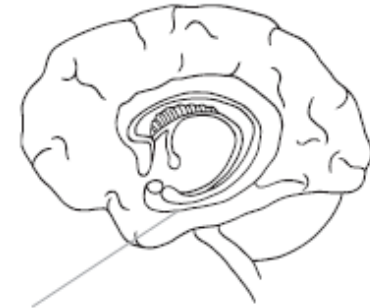


Parts of the Brain Important for Memory

Frontal lobe: involved in “working” memory and accessing information from long-term memory

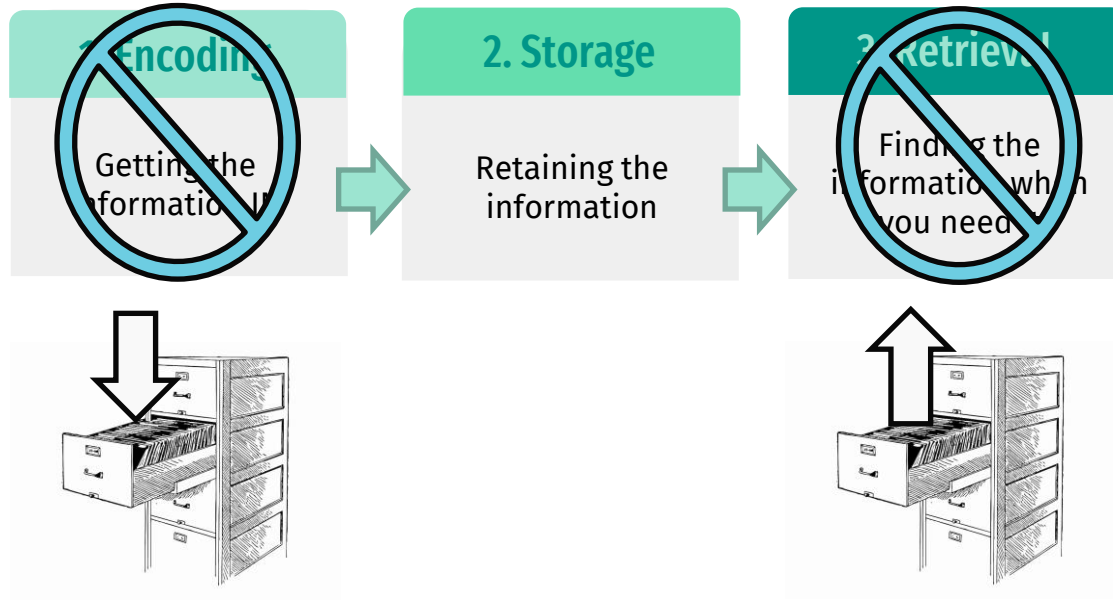


Temporal lobe: where our long-term memories of facts and events are made and stored



Hippocampus: involved in new learning

Aspects of Memory Typically Impacted by Stroke



Memory Strategies

Tips and tricks

- Setting the scene for optimal cognitive functioning
- Internal memory strategies
- External memory aids

Organising a “Memory System”

What do I need to remember?	What strategies am I currently using?	Are my current strategies effective?	If strategies are NOT effective, what other strategies could I try? Consider WHY current strategies are not working.
<i>E.g. “To take my medication at 7.00am”</i>	<i>E.g. MedMinder electronic pill dispenser with phone alerts + family alerts function enabled</i> <i>Leave pill dispenser next to/under toothbrush</i>	<i>E.g. Yes</i>	-
<i>E.g. “To refill my pill dispenser every month”</i>	<i>E.g. arrange pre-filled pill dispenser at local pharmacist</i> <i>Set event in phone calendar app with notifications 1 day before and on the day to pick up pill dispenser from pharmacy every month</i> <i>Share calendar event in phone app with family member</i>	<i>E.g. Yes</i>	-
<i>E.g. “Appointments and events”</i>	<i>E.g. calendar on fridge</i> <i>Phone calendar</i> <i>Hard copy diary</i> <i>Post it notes</i>	<i>E.g. No</i>	<i>E.g. too many aids in place becoming difficult to keep track of them all and keep them updated. Try condensing aids to one only – phone – using Cozi Family Organizer app (“Gold” subscription) so that I can receive multiple reminders before events and so that my family can also see my appointments and remind me as well</i>

Setting Your Brain Up for Optimal Performance

- Optimise the physical environment
 - Keep noise to a minimum
 - Remove unnecessary distractions
 - Have a set place for all items
- Plan your day
- Allow ample time to process information
- Lifestyle modifications to optimise cognition
 - Cardiovascular exercise at least 30 minutes 3x per week (in consultation with your medical team)
 - Get enough sleep
 - Fuel your brain (in consultation with a dietician and/or your medical team)
 - Optimise mood

Internal Memory Strategies - Encoding

“Chunking”

Un-chunked List

Bread
Ice cream
Milk
Tomatoes
Eggs
Butter
Apples
English muffins
Frozen vegetables
Bagels
Lettuce
Cream
Banana

Chunked List

Frozen foods
Ice cream
Frozen peas

Diary

Milk
Eggs
Cream
Butter

Bakery

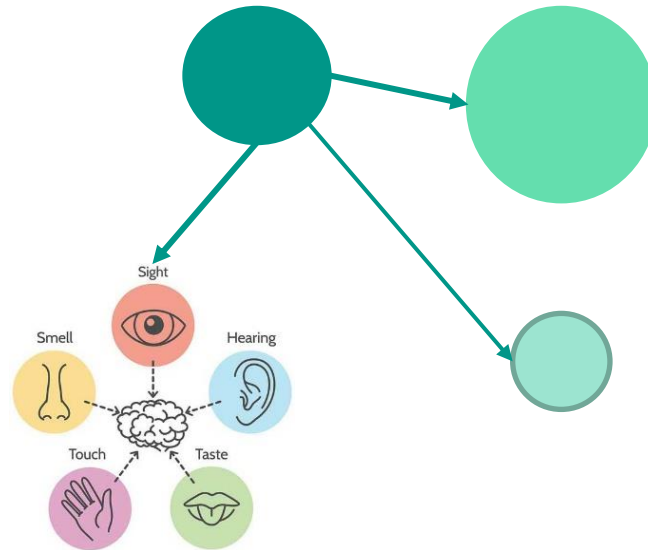
English muffins
Bread
Bagels

Fruits and Vegetables

Lettuce
Banana
Tomatoes
Apples

Internal Memory Strategies - Encoding

Association



Internal Memory Strategies - Encoding

Repetition

Repetition

Repetition

Repetition

Repetition

Repetition

Internal Memory Strategies - Retrieval

Using Context

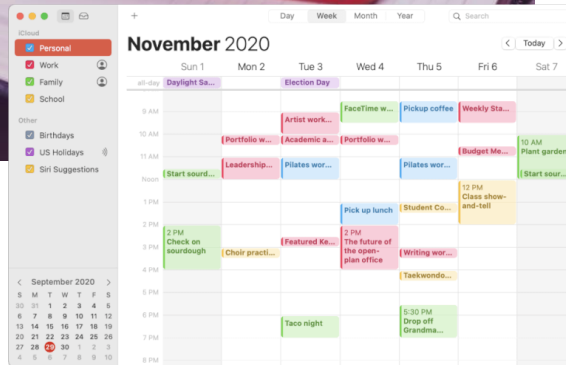


External Memory Aids



External Memory Aids

Diaries/Calendars



General Diary + Calendar Tips

- Select wisely – not all diaries are suitable for everyone!
 - Consider size, layout, durability
- Carry it with you
- Write things in immediately
 - Consider how you will also carry a pen
- Refer to it daily
 - Consider ways to integrate this into an existing daily routine...?
- Consider syncing calendars if you have multiple electronic calendars in use (e.g. home, work)
- Avoid using *too many* calendar and diary systems – this will ultimately increase cognitive burden
- Integrate principles of pacing into your daily scheduling

External Memory Aids

Smart Phones



General Phone Tips

- Losing your phone?
 - Install tracking apps like Find My iPhone
 - Use the Tile system
- Phone running out of battery often so you can't rely on it as a memory aid?
 - Get into a routine of charging your phone every night (you could set an alarm to remind yourself to do this!)
 - Keep a spare charger in your car, at work, and in your bag
 - Consider purchasing a battery case as a back-up
- Finding it difficult to learn to use your phone?
 - Find your phone's "User Guide" online for step-by-step instructions for different apps
 - YouTube videos
 - Look into your community options for classes (e.g. Telstra's "Tech Savvy Seniors" classes)

External Memory Aids

Smart Phones

Audio Recordings

- *TIP – consider apps that connect to your calendar to allow audio recordings to be linked to specific events*
- *TIP – consider software that allows for audio to text transcription*
- Apps include Otter.ai, Dragon Dictation, and Noteability

Maps

- *TIP – iPhone users - if your car has Apple Carplay, plug your phone in every time you drive. Your Maps app will sync with Carplay and automatically save the location of your parked car.*
- Apps include Apple Maps, Google Maps, Waze, Park Me

Health + Wellbeing

- Apps include Pace It, PaceMyDay, Chemist Warehouse App for prescriptions

Calendars

- *TIP – consider syncing your calendars with a family member or friend*
- Apps include iCalendar (iPhone), Google Calendar, Cozi Family Organiser, Visual Schedule Planner (iPad)

To-Do Lists, Reminders, + Alarms

- *TIP – try to find a reminder app that does not stop showing the notification until you have actually marked the task as complete*
- *TIP – use the “place” option as well as “time” for reminders*
- Apps include TalkingAlarm, Google Keep, Out of Milk

Notes

- *TIP – try to keep notes organised with clear headings and dates*
- *TIP – consider using mind-maps rather than written notes*
- Apps include Google Keep, Notion, Roam Research, SimpleMind

External Memory Aids

Electronic Pill Boxes



General Tips for Remembering Medications

- Webster-Paks can be very useful to organise medications and to be able to check whether you have already taken your medication or not
- Remembering to take medications can still be difficult, even with a range of external aids in place (e.g., alarms, calendar, apps) and trying to link medication use with your routine (e.g., with meals)
- Electronic pill boxes are a useful option if other strategies are not working – they can be extremely costly (price ranges greatly depending on extent of features), but can be covered by NDIS

Additional Resources

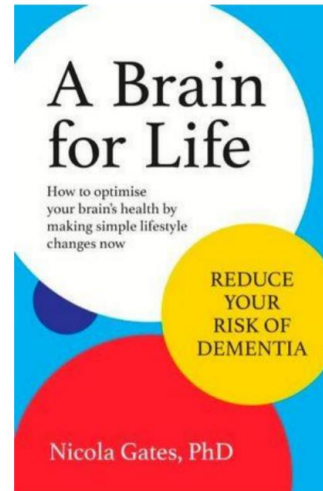
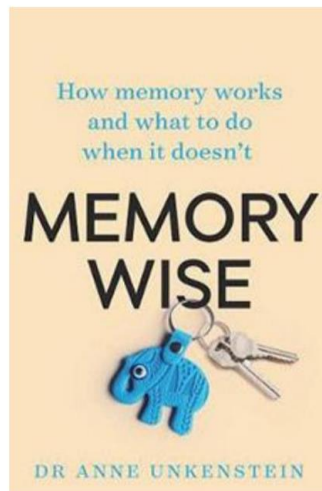
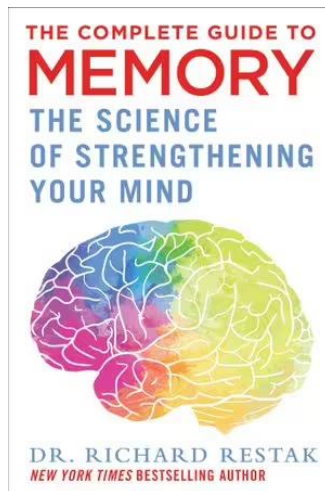
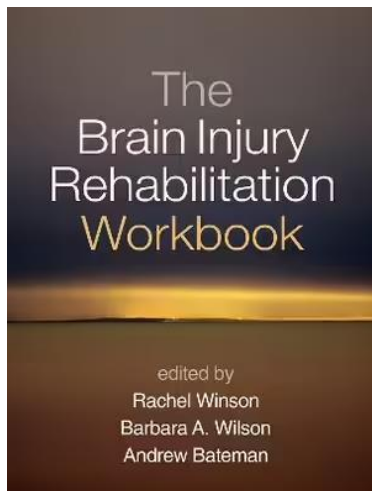
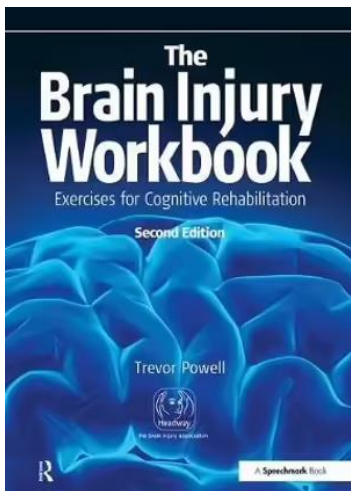
Where to find further help

- Books
- Websites
- Memory rehabilitation programs

For Health Professionals

- American Congress of Rehabilitation Medicine –
 - Trexler, L. E., Cicerone, K. D., Haskins, E. C. (2012). Cognitive Rehabilitation Manual: Translating Evidence-based Recommendations Into Practice. United States: ACRM Publishing.
 - Cognitive rehabilitation training - <https://acrm.org/meetings/cognitive-rehab-training/>
- Australasian Society for the Study of Brain Impairment –
 - Treatment resources to purchase - <https://www.assbi.com.au/Treatments-to-Buy>
 - Professional development - <https://www.assbi.com.au/Professional-Development>
- Oxford Cognitive Screening –
 - Assessment tools + publications - <https://www.ocs-test.org/>
- Toglia, J., Foster, E. R. (2021). The Multicontext Approach to Cognitive Rehabilitation: A Metacognitive Strategy Intervention to Optimize Functional Cognition. United States: Gatekeeper Press.
- Evidence Based Review of Stroke Rehabilitation –
 - Evidence reviews – [Evidence Reviews | EBRSR - Evidence-Based Review of Stroke Rehabilitation](#)
 - Clinician’s handbooks – [Clinician's Handbook | EBRSR - Evidence-Based Review of Stroke Rehabilitation](#)
 - Educational modules – currently under review

For Stroke Survivors + Family



For Stroke Survivors + Family

- Headway UK - <https://www.headway.org.uk/about-brain-injury/individuals/information-library/>
- Stroke Foundation - <https://strokefoundation.org.au/>
- Stroke Engine - <https://strokengine.ca/en/resources/for-patients-and-families/#living-with-stroke>
- Happy Neuron - <https://www.happy-neuron.com/>
- Making the Most of Your Memory program or MEMO program
 - <https://www.memorehab.com.au/> for more information
 - Speak to your treating medical professionals regarding possible referrals to the public or private sector (it may take some searching to find a service offering these programs)
- National institute of Neurological Disorders and Stroke (USA) - <https://www.ninds.nih.gov/health-information/patient-caregiver-education/brain-basics-know-your-brain>
- AcademicTips.Org - [Memory Techniques, Memorization Tips, How To Improve Memory | AcademicTips.org](#)

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