

Understanding and improving attention and information processing in MS

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Overview

- A follow up to previous presentation on memory strategies
- Aim is to provide explanation for:
 - Attention and processing speed as cognitive and neurological processes
 - Effects of MS on attention and processing speed
 - How these changes impact memory and overall cognitive functioning
 - Strategies to assist in managing these changes
- Case example to illustrate use of strategies from the two sessions

Attention

- The ability to focus selectively on a particular stimulus, sustain that focus, and to shift it at will
- As defined by William James (1890), attention "is the taking possession by the mind in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought...It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state."
- Analogy of attention as a highlighter pen – allows you to focus and tune out irrelevancies

Attention

- Attention is limited
 - Capacity
 - Duration
- Attention affected by interest
- Attention is selective
 - Focus on a stimulus/filtering out distractions
 - Both are active processes
 - Often done quickly and automatically
- Attentional reflexes, e.g.:
 - Smell of smoke
 - Sound of an alarm

Attention

- Considered vital to a person's ability to efficiently manage and handle information in the environment
- Basic attention (e.g. repeating numbers) is often not majorly affected by MS
- Complex and sustained attention represents a very common cognitive problems in MS

Attention

- Complex attention refers to a person's ability to maintain information in their mind for a short time and to manipulate that information
- Example: mental arithmetic
- Difficulties with complex attention and processing speed interact:
 - As the demands on attention increase, performance slows down and information is less able to be held in mind
 - Experienced as information overload

Attention

- Problems with attention result in:
 - Difficulty focusing on conversations
 - Difficulty filtering out unwanted information
 - Difficulty with 'prospective' memory, i.e. remembering to remember something later on
 - Inefficient memory for new information

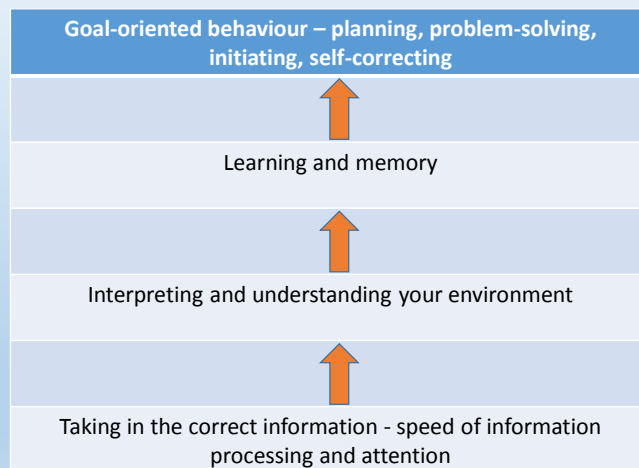
Processing speed

- Defined as the ability to perform cognitive tasks quickly and fluently
- Refers to our ability to absorb and manage information in an effective and time-efficient manner
- Is a measure of a person's general cognitive efficiency
- Reduction to processing speed is the most common cognitive problem detected in samples of people with MS

Processing Speed

- Slowed of processing can be associated with:
 - Difficulty keeping up with conversations
 - Difficulty understanding instructions
 - Difficulty learning new tasks
 - Needing longer to complete tasks
 - Inefficient memory for new information

Attention and processing speed

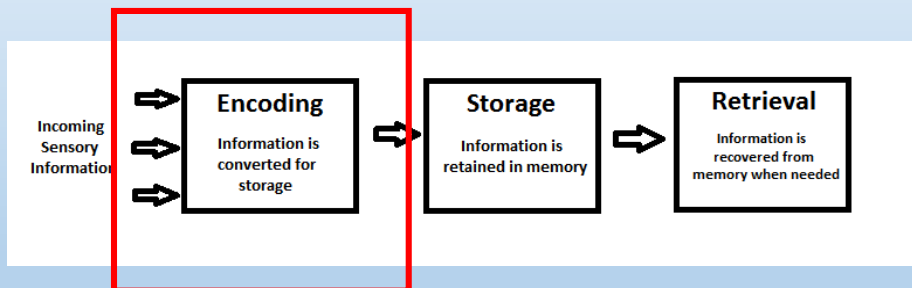


Attention and processing speed

- The white matter changes in MS can reduce a person's capacity to pay attention and process information efficiently, i.e. **it is not a matter of effort**
- Problems with attention and speed act as a bottleneck that affect subsequent processes, such as memory

Impact on memory

- Most common reason for memory problems in MS is inefficiency at the first stage because of reduced speed and attention:

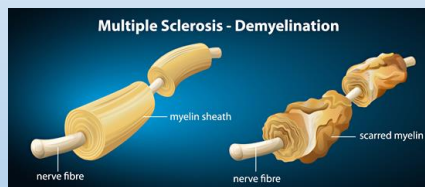


MS and cognition

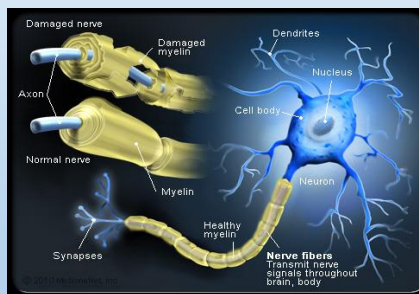
- MS is a disease of the white matter, so tends to affect cognitive processes that particularly rely on effective communication between multiple areas of the brain
- Severe cognitive impairment is rare but milder changes are common, i.e. between 40 and 70% of people when assessed properly
- Much research over the past 30 years has identified areas of cognition that are more and less likely to be affected by MS
- Significant individual variation

MS and myelin

Inflammation leads to demyelination

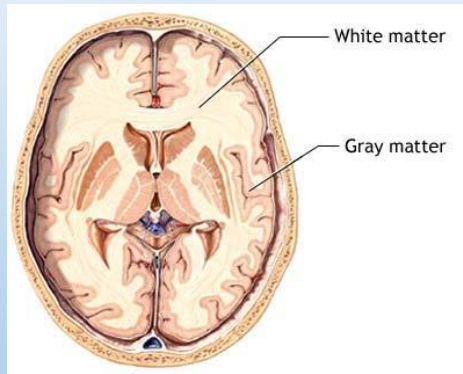


Demyelination leads to transmission problems within the brain

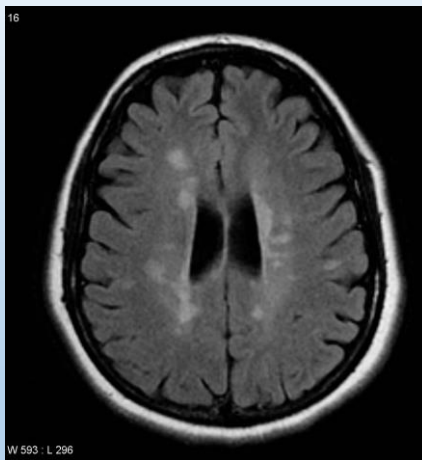


White matter

- The way in which information is taken from one neuron to another
- Critical to effective communication between regions of the brain
- Is white because axons are coated in a fatty substance called 'myelin'
- 'White matter tracts' are made up of huge numbers of axons travelling together



MS changes on MRI



Other Factors Affect Cognition

- Fatigue
 - Possibly the most common symptom of MS, i.e. reported in over 90% of people
 - Decreased performance seen over time, i.e. harder to sustain effort
- Mood and Anxiety
 - Well known in studies of non-MS populations to be associated with reduced attention and memory
 - Symptom improvement can lead to cognitive improvement
- Problems with fatigue and mood are known to impact a person's speed and ability to pay attention

Fatigue

- Everyone experiences cognitive inefficiency when fatigued
- A particular problem for people with MS – reported to be the most common symptom, i.e. affecting over 90% of people
- Important to acknowledge this symptom and make allowances:
 - reduce commitments to a manageable level
 - allow regular breaks
- Important to pace yourself

Fatigue

- Be aware of what is in your schedule and allow sufficient time, i.e. preparation time, travel time, activity time, rest time
- Organise to complete more complex tasks at times of the day when fatigue is less likely, i.e. in the morning, after a break
- Monitor for times of day when commonly fatigued and try to plan breaks or less demanding activities then
- Try not to compromise on planned breaks, i.e. these are essential to optimal functioning and not a sign of laziness

Attention and processing speed



"You don't mind distractions as much as me, so I didn't think you'd mind if my kids played in your office today."

Everyday situations can be full of distractions:

- Television
- Radio
- Emails
- Background conversations
- Children
- Worries/thoughts

Attention and processing speed

- Strategies:
 - turn off distracting devices when needing to concentrate
 - ask people to repeat information or simplify
 - write things down:
 - opportunity to re-process information and there to see later
 - carry a notebook or diary at all times and develop a habit of using it regularly, even for incidental information
 - try not to rush (so plan ahead) and better to stop and calm self down if flustered, rather than rushing on and making mistakes

Executive effects

- Because of their impact on the bottom-up flow of information, reductions to speed and attention can impact higher-level 'executive' cognitive processes
- 'Executive function' is an umbrella term that includes:
 - problem-solving
 - planning and organising
 - initiating behaviour
 - self-monitoring performance
 - self-correcting and thinking flexibly
 - reflecting

Executive-level strategies

- Problems with higher-level thinking processes can manifest in a number of ways and make difficult the completion of complex or non-routine tasks
- Problems include disorganisation, becoming side-tracked, distractibility, confusion about what to do next, problems initiating
- Important to manage expectations of self and others – may need to complete fewer tasks, be given extra time, or complete a simpler version of the same task
- Tasks can be broken down into component parts which can then be completed sequentially

Executive-level strategies

- Example of breaking down a complex process – getting kids to school and self to work

• Shower/dress self	7.00am	<input type="checkbox"/>
• Kids up and dressed	7.15am	<input type="checkbox"/>
• Breakfast	7.30am	<input type="checkbox"/>
• Make lunches	7.45am	<input type="checkbox"/>
• Pack school/work bags	8.00am	<input type="checkbox"/>
• Clean teeth/final check	8.10am	<input type="checkbox"/>
• Leave for school	8.30am	<input type="checkbox"/>
• Arrive at work	9.00am	<input type="checkbox"/>

- Important to complete a stage once started
- Use of verbal prompts, e.g. “what comes next?”
- Allow sufficient time to complete each step
- Practice until routine and need for external prompting reduces

Quick recap of last time's memory session

- Strategies for what people say:
 - Notepad use
 - Voice recorder
- Strategies for what needs to be done:
 - Calendar
 - Diary
 - Phone calendar
 - Whiteboard
- Strategies for where things are:
 - Reduce clutter
 - Single location

Case example of strategy use

- Julie has been worked in an office for the past 3 years but has recently noticed changes to her cognitive functions and become aware of the following problems at work:
 - increasingly fatigued by mid-afternoon
 - difficulty concentrating in open-planned office
 - forgetting to follow-up assigned tasks
 - poor recall for conversations in meetings
 - difficulty learning a new email system

Case example of strategy use

- Where possible, useful to discuss issues with management to determine scope for flexibility
- Fatigue management:
 - build in regular 15-minute breaks in which a quiet, solitary activity occurs
 - where possible, have meetings at the beginning of the day or following a break
 - possibly adjust working hours

Case example of strategy use

- Management of distraction:
 - open planned office is large and noisy in her section – neighbouring colleague makes numerous phone calls and regularly plays music at desk
 - relocated to a corner of the office where neighbouring colleagues mainly use computer rather than phone
 - continued checking of email distracts from other tasks – set aside two periods of time per day where emails are checked and responded to
 - phone set to voicemail at times when more complex work being done to avoid distraction
 - work areas kept free from unnecessary clutter

Case example of strategy use

- Forgetting to follow up on tasks:
 - more efficient use of a diary
 - introduction of a *to do* list which is written on a different coloured piece of paper to stand out
 - *to do* list prepared at the start of each day with items listed in order of priority
 - information from diary and email transferred to list
 - items crossed from *to do* list once they are completed

Case example of strategy use

- Reduced recall of conversations from meetings:
 - agreement with colleagues that brief minutes kept which highlight action needing to be taken
 - colleagues to flag with Julie if they are commencing discussion of an issue to which she needs to pay particular attention
 - more complex information pertaining to Julie able to be tape recorded by her to allow subsequent review if necessary

Case example of strategy use

- Mastery of new email system:
 - time allotted where Julie shown new features in depth by a colleague
 - Julie to take written notes, have the opportunity to practice, and subsequent trouble shooting sessions available with the colleague
 - instructions made practical and simple to understand

Impact by stress and distress

- Evidence from mild brain injury research that the degree to which an individual complains of functional problems is more closely related to their subjective level of distress than it is to measures of their cognitive problems
- Highlights the complex interaction between cognitive and emotional problems and the way in which a person functions
- MS frequently first occurs when people are young, so may still be studying, establishing vocational skills, so challenging to compensate

Impact by stress and distress

- Can be great stress associated with physical and cognitive changes which can lead to problems with self-esteem, depression, anxiety, loss of roles, etc.
- Feelings of not coping can lead to anxiety, distress, insecurity, low mood
- These types of psychological difficulties can further impact the types of cognitive change seen in MS which can then exacerbate the situation further
- There is good evidence for the efficacy of psychiatric and psychological intervention in improving these problems

Accessing help from MSA

- If changes to cognition seem to be impacting important areas in your life, contact MS Australia about options for assessment and assistance
- Occupational therapists are skilled at helping implement strategies that can improve a person's functioning
- Psychological assistance is available in the community