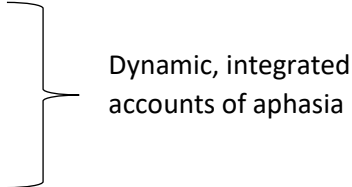


Week 8:

- Differentiate between modular and dynamic/integrated accounts of aphasia.
- Explore the resource allocation theory of aphasia.
- Outline principles of neuroplasticity and the implications of these for rehabilitation and speech pathology
- Aphasia Definitions, Cause, Types, Symptoms, Level and nature of breakdown

Theories of aphasia:

- Classical, localization views of aphasia
 - Cognitive neuropsychological views of aphasia
 - Connectionist views
 - **Resource allocation theory of aphasia**
 - Working memory theories of aphasia
 - Capacity theories of aphasia
 - Distributed Systems & Dynamic Systems theory
 - **Neural Multifunctionality**
- 
- Dynamic, integrated accounts of aphasia

Resource Allocation of Aphasia

The clinical management of aphasia depends critically on the assumptions of “loss” vs. “interference or access deficits” of language performance. There is evidence that aphasia can be defined and conceptualised as a linguistic performance disorder, NOT a linguistic competence disorder. **Believes language is intact but performance is impaired somehow – looks at attention.**

- Aphasia can be transient
- Persons with aphasia are stimulable
- Persons with aphasia are variable

An Attention Framework of Aphasia

- Many principles of attention theory seem to explain aspects of aphasic behaviour that are not accounted for by other theoretical approaches.
- Relationship between attention, arousal & language processing units
- Shared attention among cognitive domains
- Unequally distributed attention
- Inefficient allocation of attention
- Threshold of activation
- This also may explain why people with aphasia are influenced by cognitive or processing load, task complexity and other external demands.

Sustained and focused attention (or selective attention)

- Tested by looking at ability to maintain a consistent behavioural response during repetitive task
- Ability to respond to certain stimuli / targets and ignore irrelevant stimuli

Divided attention

- Ability to divide attention between two or more tasks (e.g. to attend to two or more messages, perform two or more cognitive operations successfully)

Default Mode Network (DMN)

- Responsible for internally focused attention, which supports internally directed (self-referential) cognitive processing, e.g. ‘wakeful rest’, daydreaming, mind-wandering, remembering past, planning future, thinking of others (theory of mind), moral reasoning etc.

Resource Allocation Theory: Attention & Effort

Gopher and Sanders (1984) refer to the cognitive mind as consisting of: Information processing machinery (power supply – the ‘fuel’ within the system) – attentional capacity. Control structure that directs and monitors the operation of the structures – the ‘controller / conductor’. Deficits are thought to occur in either the machinery or in the control mechanism.

Processing Requirements

Message generation & self-monitoring are “controlled activities”. As such, they require the speakers attention / cognitive resources, such as:

- ☐ Capacity to store information
- ☐ Capacity to integrate information
- ☐ Capacity to be flexible in light of novel or incongruous information
- ☐ Adequate speed of processing to avoid “timing out” (comprehension more difficult if person talking too slow or too fast to understand)
- ☐ Ongoing capacity to self monitor & revise if required

Two basic assumptions made about the attentional capacity pools:

- ☐ Within our attentional system there exists one or more pools of attentional or processing resources that are fixed in quantity. Exceed capacity > breakdown in performance.
- ☐ Although limited, our attentional capacity can be flexibly, efficiently and simultaneously allocated to one or more activities.

The control structure or executive is thought to allocate attention

- Need situational knowledge (need to know what stimulus is important to attend to, e.g. focus mainly on lecture and pay less attention to phone vibrate)

Amount allocated depends on the task demands - amount of attention (fuel) needed to fulfil the task demands: Equates to the degree of effort or energy required.

The amount of attention allocated to a task can also be affected by many factors:

- ☐ The novelty of the task or input (e.g. automatically attending to objects that suddenly move).
- ☐ Intent to attend to specific input or channel (e.g. reading difficult text, listening for a lotto number, scanning for your name on an important list) SALIENCE / RELEVANCE (depending on how important it is to remember a piece of information will influence the attention we allocate)
- ☐ Arousal level: low (fatigue) and high (e.g. time pressure).

Attention Allocation Breakdown: Failure to complete a task (or ‘error’) may arise if:

- Task demands exceed available capacity (insufficient capacity)
- Capacity is inappropriately allocated (misdirect resources)
- Capacity is inefficiently allocated (slow mobilisation of resources)

Capacity limitations have real-life importance & relevance as we are required to multi-task & carry out challenging, complex processing all the time!

- Having a conversation while cooking or driving a car
- Talking to a customer while taking money & remembering their order
- Writing an email while watching television
- What about doing each of the above when you’re really tired or stressed...

During dual tasks, performance reduction on one or both tasks should only occur if the tasks share the same pool of resources – competing for attention or fuel.

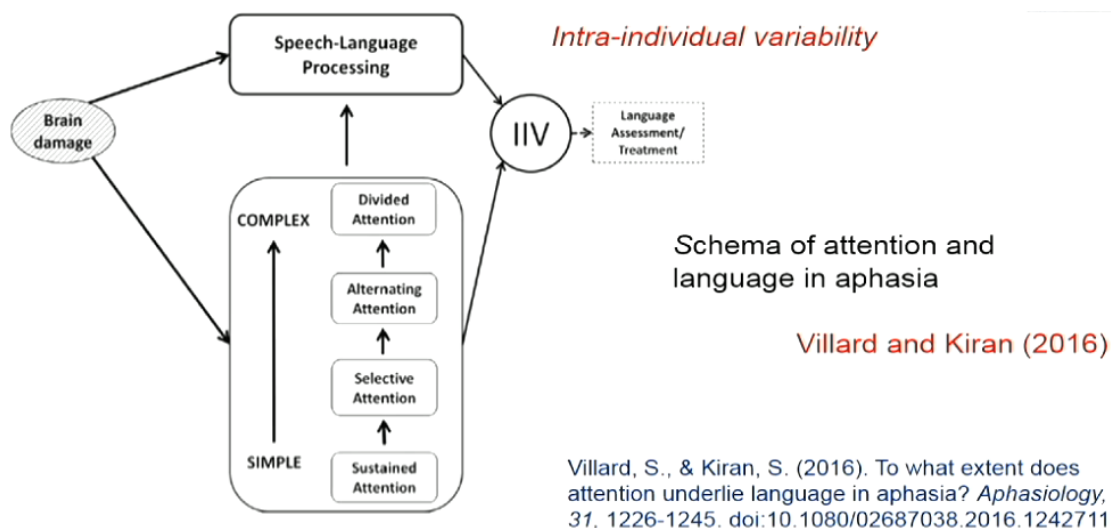
The more the tasks overlap and share resources... the more competition (or interference) you will see under increased cognitive load.

Neurological structures involved

- ☐ Research has focused on selective attention.
- ☐ No single area responsible.
- ☐ Contribution from different areas of the brain particularly the *frontal lobe, thalamus and the reticular activating formation* – attention employs a widely distributed system.
- ☐ Distributed networks are often more vulnerable to brain damage. Seen with almost all people with aphasia, even mild cases.

Aphasia as a resource allocation deficit

- Strongest form: spared linguistic representations but impaired mechanisms that activate, select and inhibit language
- Weaker form: some aspects of language are more vulnerable to attention deficits



Increasing attentional demands in assessment: Assess performance on language tests (e.g. confrontation naming of pictures, describing pictures, following commands, recalling stories etc) in a variety of conditions or contexts to consider the impact of attentional factors:

- ☐ Single word tasks to discourse
- ☐ Untimed vs. timed performance
- ☐ Quiet clinic room vs. busy cafeteria vs. noisy ward vs. OT kitchen while making a cup of tea
- ☐ Manipulate complexity of the topic / stimulus / task demand
- ☐ Single vs. dual tasks (e.g. procedural narrative while sorting cards into groups)
- ☐ Consider rating / coding attention behaviours during task performance (e.g. tired easily, distracted, missed important details).

Comparing the different paradigms

Modularity • Decontextualised language tasks to isolate pure processes • Phoneme discrimination • Picture naming • Word fluency • Sentence construction • Accuracy and reaction time measures to capture processing competence