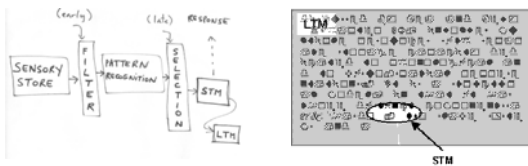


STM vs. LTM: 1 System or 2?

- Older View
- 2 Systems w/Distinct Characteristics
- Newer View
- Different States in a Single System



STM vs. LTM: 1 System or 2?

- Capacity
- Duration
- Forgetting
- Coding
- Retrieval

Working Memory (Baddely)

- Central Executive
 - Modality Free
 - Resembles Attention
- Phonological Loop (aka Articulatory Loop)
 - Holds Speech-Based Info
- Visuospatial Sketchpad
 - Spatial and Visual Coding

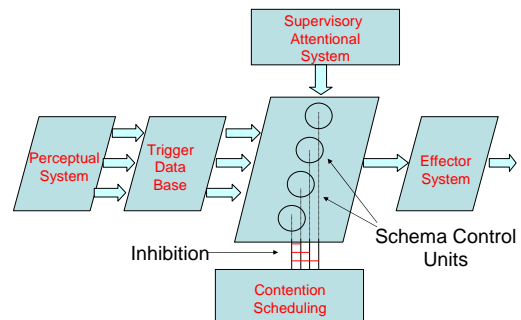
Central Executive

- Limited Capacity
- Various Jobs
 - Trouble-shooting
 - Planning, Decision-Making
 - Poorly Mastered Response Sequences
- Allocate Jobs to Slave Systems

The Central Executive

- Most complex and least understood component of WM
- "In some ways the central executive functions more like an attentional system than a memory store" - Baddeley (1997)
- "our initial specification of the CE was so vague as to serve as little more than a ragbag..." Baddeley (1996).
- Model suggests CE coordinates the activity of the two slave systems
- Other potential roles for the CE include coordinating retrieval strategies, selective attention, temporary activation of long term memory, suppression of habitual responses.
- Baddeley suggests that a model of action control developed by Norman and Shallice (1980,1986) may serve as a model of the central executive

Norman and Shallice (1986) model of attentional control



Evidence for the CE

Dual task performance and DAT:

- Pursuit rotor and digit span tasks were adjusted so that individual performance was identical in DAT and matched controls
- Combining the two tasks caused greater costs in the DAT patients than the controls - CE impaired in DAT

Random number generation:

- Ss required to generate random sequences of letters make more repetitions and stereotyped responses the faster the task
- Dominant schema (ABC, ITV etc) must be constantly inhibited by the SAS and novel schema activated.

Evidence for the CE

Neuropsychological evidence: - Dysexecutive Syndrome

Original Norman and Shallice model developed to account for behaviour of patients with frontal lobe lesions.

Perseveration - patients have lost ability to interrupt ongoing schemas

Catatonia - patients can remain motionless and speechless for hours - unable to initiate schemas.

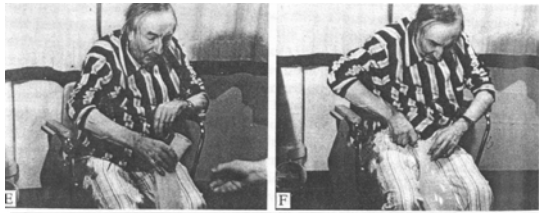
Distractibility - schemas easily "captured" by external/internal stimuli

Utilisation behaviour - Lhermite (1983)

Utilisation Behaviour

Utilisation behaviour:

The tendency to grasp common objects when presented, and perform the function commonly associated with the object
E.g Lhermite (1983)



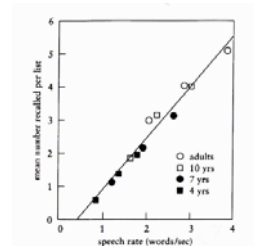
Phonological Loop

- Maintaining WM Activation Requires Rehearsal
- Silent Speech Recruits the Phonological Loop
- Capacity Limitations
 - Difficulty Rehearsing Multiple Items to Keep them Active
- Spinning Plates Analogy

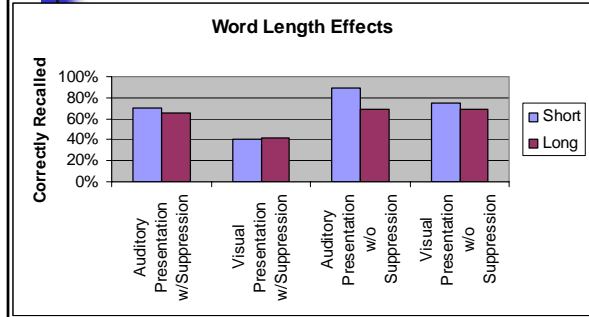
Word Length Effect

- | | |
|----------|------------------|
| ■ Chad | ■ Czechoslovakia |
| ■ Burma | ■ Somaliland |
| ■ Greece | ■ Nicaragua |
| ■ Cuba | ■ Afghanistan |
| ■ Malta | ■ Yugoslavia |
| ■ 4.17/5 | ■ 2.8/5 |

Speech Rate & Serial Recall



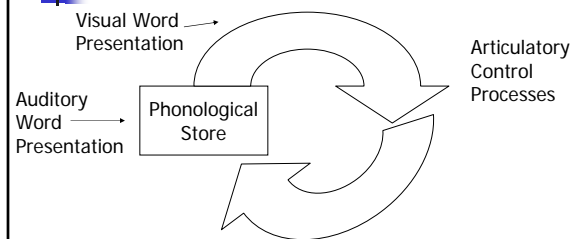
Word Length Effect Depends on Articulatory Loop



Phonological Loop: Take 2

- Passive Phonological Store
 - Speech Perception
- Articulatory Processes
 - Linked to Speech Production
 - Gives Access to Phonological Store

Phonological Loop: Take 2



Visuospatial Sketchpad

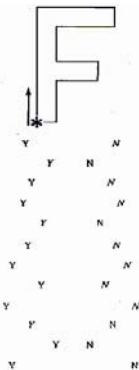
"a system especially well adapted to the storage of spatial information, much as a pad of paper might be used to work out a geometric puzzle."
-- Baddely

- Geographical Orientation
- Planning Spatial Tasks
- Visual Imagination
 - Engineering
 - Architecture

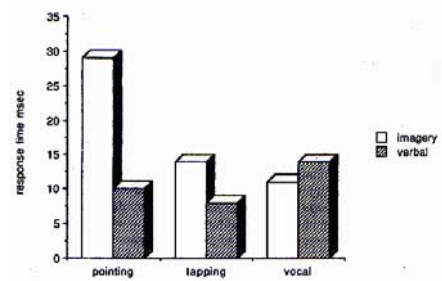
Brooks

The cow jumped over the moon.
(no, yes, no, no, no, yes)

- Verbal Response
- Pointing Response
- Tapping Response



Brooks' Data



Fun Facts about WM

- Items in WM defined by a high level of activation
- If unattended, items in WM decay
- Items maintained in WM via rehearsal to keep them in activated state

(more) Fun Facts about WM

- Number of items one can maintain in WM is limited
- Limitations of WM depend on rehearsal capacity
- As items in WM decay, activation level and access speed go down

Working Memory

- Executive Processor
- Visuospatial Sketchpad
- Phonological Loop
- Continually interacting w/perceptual, motor, and different components of LTM system

