

## UNDERSTANDING MEMORY: THE CENTRAL FORCE IN LEARNING

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Courage to Risk Conference  
January 15, 2010

## MEMORY

The mental capacity or faculty of retaining and reviving impressions, or of recalling or recognizing previous experiences.

The Random House Dictionary of the English Language; Unabridged Edition

## DEVELOPMENTAL CHANGES

- Improvement in Retrieval vs. Recognition
- Increased Central Learning
- Greater Application of Strategies
- Systematic Retrieval Plans
- Metamemory

## BASIC TYPES OF MEMORY

- SENSORY
- MOTOR
- VISUOSPATIAL
- LANGUAGE/VERBAL



## The RAM and the Hard Drive

- Short-term Memory
  - “Working Memory”
  - Lasts for several minutes or hours
- Long-term Memory
  - Relatively permanent store of information
  - Declarative and Procedural

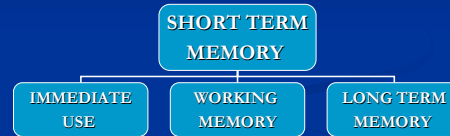
## DECLARATIVE MEMORY FUNCTIONS

- EPISODIC MEMORY
  - The ability to recall details about events in our lives
- SEMANTIC MEMORY
  - Allows for the retention of facts and every day functions, of categories of events, objects, and spatial knowledge
  - The system of recall for impersonal knowledge such as the meaning of words, grammatical rules, syntax

## PROCEDURAL MEMORY

- First to develop
- Memory for Skills and Habits
- Not easily verbalized
- Implicit

## DOWN MEMORY LANE



## YOU ONLY GET OUT WHAT YOU PUT IN

The fundamental role of memory in learning requires students with learning disorders to be especially **intentional** in the strategies they use to create memories and to access stored information. Such strategies need to incorporate the fundamental building blocks involved in creating and retrieving specific memories.

*Carol Stockdale, Ed.D., ARK Institute of Learning*

## BUILDING BLOCKS

- DISTINCTIVE FEATURES
- IMAGE
- LANGUAGE

## S/W: PROCESSING & RECALL

FORMAT	DESCRIPTION	EXAMPLE
Visual/Spatial	Visual configuration or pattern	Letter & number shapes, charts, maps, geometric forms, faces
Language-based	Spoken or written language	Reading, verbal directions, class discussions
Sequential or Procedural	Temporal or linear order is critical	Math steps, phone number, days, recipe

## The Division Family

Dad says **D**ivide

Mom says **M**ultiply

Sister says **S**ubtract

Brother says **B**ring down

## “DIVISION SPEAK”

1. How many 8's are in 1496? Dad says divide 8 into 1; can't, so divide into 14 = 1.
2. Mom says multiply.  $1 \times 8 = 8$ .
3. Sister says subtract.  $14 - 8 = 6$ .
4. Brother says bring down the 9.
5. Now, back to Dad: Divide 8 into 69 = 8
6. Mom says multiply  $8 \times 8 = 64$ .
7. Sister says subtract  $69 - 64 = 5$ .
8. Brother says bring down the 6
9. Back to Dad to divide 8 into 56 = 7.
10. Mom says multiply  $7 \times 8 = 56$   
The answer is 187

$$\begin{array}{r} 8 \overline{) 1496} \\ \underline{8} \phantom{00} \\ 69 \phantom{0} \\ \underline{64} \phantom{0} \\ 56 \phantom{0} \\ \underline{56} \\ 00 \end{array}$$

## CONSOLIDATION

- Association  
The more the better
- Seriation  
The order of the alphabet
- Categorization  
The advantages of a class system
- Relational Imagery  
I see what you mean

## LOCKING INFORMATION IN

- Multisensory Pathways
- Pattern
- Elaboration
- Order of Subjects
- Distributed Practice
- Sleep

## ACTIVE WORKING MEMORY



## ESTIMATED PREVALENCE

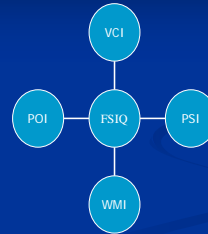
- Approximately 10% of population
- 15 TO 20% of LD students
- 1/3 of LD Young Adults
- Core difficulty in ADHD
- Dyslexic students vulnerable to ST and WM memory weaknesses with phonological and verbal information

## MARTIN A CLINICAL EXAMPLE



- Strengths:
  - Highly Verbal
  - Excellent reading skills
  - Persuasive Debater
- Weaknesses:
  - Organizational skills
  - Math
  - Written Expression

## WAIS-III Framework



## WCJ COGNITIVE CLUSTERS

- ORAL EXPRESSION 110 11A
- ACADEMIC KNOWLEDGE 110 11A
- FLUID REASONING 112 11A

## WCJ CLUSTERS ...cont.

- SHORT TERM MEMORY 85 1A
- WORKING MEMORY 82 1A
- BROAD ATTENTION 84 1A

## THE CONTRAST

- ↓ ■ SHORT TERM MEMORY
- ↑ ■ FLUID REASONING

## ACTIVE WORKING MEMORY WEAKNESS: SYMPTOMS

- Place keeping difficulties
- Trouble with tasks requiring storage and processing
- Appear inattentive but not hyperactive
- Forget content in reading
- Problem with organization of ideas when writing
- Reserved in group situations

## STRATEGIES

- Active Reading Strategies
  - Underline, write key words, picture notes, highlight first sentence, re-read/summarize at bottom
- Post-it stickers
- Visualize

## STRATEGIES, cont.

- Reduce “mental math”
- Organize
  - Routines
  - Materials
  - Key words
- Verbalize
- Note-taking

## ACCOMODATIONS & MODIFICATIONS

- Written outline
- Questions on Transparency
- Extended Time on Tests
- Reduce copying
- Calculators and Word Processors
- Allow use of procedural notes

## COMBATTING STRESS

- Relaxation Techniques:
- Deep Breathing
  - Progressive Muscle Relaxation
  - Slumping
  - No Thinking!!
- The “hat trick”
- Pretesting and practice testing
- Understanding

## Demystification Strategies

- Understanding vs Remembering
- Memory process
- Normalize
- Identify memory strengths as well as weaknesses
- Muscle analogy
- Reinforce hope with information

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