



64<sup>TH</sup> CONFERENCE ON EXCEPTIONAL CHILDREN

**WORKING TOGETHER**  
TO ACHIEVE STUDENT SUCCESS

**Processing and Short Term  
Memory Difficulties**

*Strategies for Teachers*  
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PUBLIC SCHOOLS OF NORTH CAROLINA  
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"Imagine going to work and not being able to do your job. Now imagine that you can't leave your job. Imagine having to do that every day. This is what life is like for children with learning disabilities."

-- Dr. David Urion  
Director, Neurology and Learning Disabilities Program,  
Children's Hospital, Boston  
<http://www.pbs.org/wgbh/misunderstoodminds/resources.html>

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**What does it mean to have difficulty with short term memory?**

Ever lose something you just had in your hands?  
Where are those keys?

Fun memory fact: you don't actually remember events; you remember the last time you remembered the event.

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### Short term or 'working' memory

Baddeley (1999) describes working memory as related to, or a type of short term memory, that we actively use and work on.

For example in order to follow memorized directions such as:  
(Go straight through the traffic lights, take the second left and the building is on the right opposite the church)

We need to have a working picture of the information in our head that we can modify and compare our memory of the verbal directions with our experience (i.e. appearance of the church)

The same is true of typical math word problems.

Hence there is a strong association between the memory, and the processing of it.

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### What is slow processing speed?

It takes longer to organize and make sense of visual and auditory information.

Language processing - difficulty processing written and oral linguistic information (holding and processing information and attaching meaning to it)

-diagnosed by an SLP

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Auditory processing - difficulty understanding what is heard despite having normal hearing function. (phonemic awareness, ability to process information with background noises, etc..)

- diagnosed by an Audiologist

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Processing when reported on the WISC-IV - **Visual-Motor Processing**- impacted by attention issues, visual motor coordination, and personality traits (meticulous - often see with AIG students)  
 Visual and auditory processing effect language processing.

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**Common diagnoses with working memory and processing difficulties:**

- Down's syndrome
- Fetal Alcohol Spectrum Disorders
- Learning Disabilities
- Attention Deficit Hyperactivity Disorder (ADHD)
- Acquired Brain Injury

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**VERBAL COMPREHENSION** Subtest Meanings Scaled Score

Similarities Logical, abstract verbal reasoning 11

Vocabulary Word knowledge from experiences 11

Information General factual knowledge 12

**PERCEPTUAL REASONING** Subtest Meanings Scaled Score

Block Design Analysis, formation of abstract design 10

Matrix Reasoning Visual information processing; abstract reasoning 11

Visual Puzzles Nonverbal reasoning; analysis and synthesis 11

**WORKING MEMORY** Subtest Meanings Scaled Score

Digit Span Attention; sequencing; short-term memory 7

Arithmetic Short and long-term memory; attention; 9

Numerical reasoning ability

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PROCESSING SPEED Subtest Meanings Scaled Score  
 Symbol Search Visual discrimination; processing speed 7  
 Coding Processing speed; visual-motor coordination 8  
 (Scaled Score of 10, 3 Standard Deviation)  
 Standard Score Percentile Range  
 VERBAL COMPREHENSION INDEX 107 68 Average  
 PERCEPTUAL REASONING INDEX 104 61 Average  
 WORKING MEMORY INDEX 79  
 PROCESSING SPEED INDEX 76  
 (Mean of 100, Standard Deviation of 15)

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**What do they look like in the classroom?**  
 "...poor academic progress, difficulties following multi-step instructions, failing to complete common classroom activities that require large amounts of information to be held in mind, problems keeping their pace in demanding and complex activities such as writing, and high levels of inattentive and distractible behaviour" (Holmes, 2012)

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**Walk a mile...**  
<http://www.pbs.org/wgbh/misunderstoodminds/experiences/readexp2b.html>

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**Walk another mile...**

<http://www.pbs.org/wgbh/misunderstoodminds/experiences/attexp1b.html>

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**One more mile....**

<http://www.pbs.org/wgbh/misunderstoodminds/experiences/attexp2b.html>

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**Neuropsychological model**

Ylvisaker & Gioia (1998) discuss the integration of:

- Domain specific processes (e.g. memory)
- Goal oriented regulatory processes (e.g. processing)
- Environmental influences
- Academic achievements

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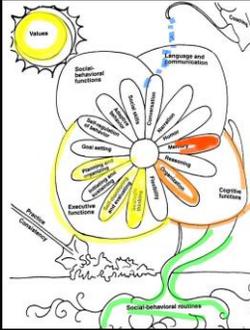
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The distance to the beach is fifty miles more than twice the distance to the mountains. If  $m$  represents the distance to the mountains, which expression represents the distance to the beach?

- A  $50m$
- B  $2m + 50$
- C  $50m + 2$
- D  $100m + 50$




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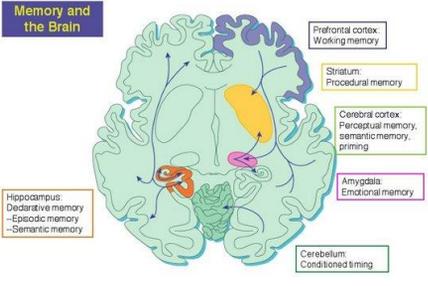
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### Memory and the Brain




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## Now what do I do to help?!

Bring on the strategies!

Two approaches to increasing learning outcomes with children that have decreased working memory capacity.

Change the environment    Target/Train WM functioning

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### Change the Environment

“...children benefit from working within their own working memory limits with greater success...”

### Train the Brain

Drills, practice and compensatory strategies to increase memory capacity.

Holmes, 2012

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#### Challenges:

Following directions in class

Remembering new vocabulary

Keeping Pace

#### Strategies:

Provide visuals, prompt for rehearsal, teach note taking, read the room

Pair words with movement, music, word mapping

Magic Readers, active engagement in reading materials, chunking

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#### Challenges:

Distracted

Here one day gone the next

#### Strategies:

Breaks, chunking, alternate between pencil paper and hands on activities

teach, reteach, act it out, play a game, and reteach again, student makes a presentation and teaches.  
Flashcards, writing it down  
paraphrasing  
Practice doing things faster, breaking tasks down and reorganizing

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**Challenges:**

High memory demands

**Strategies:**

Chunking, re-teaching information, using memory aids (such as flash cards, pneumatic devices, note taking, visuals, etc.), fostering an environment in which students feel able to ask if they have forgotten what they should be doing.

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Spion Kop held a commanding view of the surrounding veldt and smaller koppies. The Boer commandos under Potgieter and Erasmus had a commanding view of the terrain and an almost ideal position for their "Lang Piets", captured at Colenso. To further add to Buller's predicament, the sappers had failed to provide adequate depth to the defalated infantry positions.

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On December 19, 1777, when Washington's poorly fed, ill-equipped army, weary from long marches, struggled into Valley Forge, winds blew as the 12,000 Continentals prepared for winter's fury. Grounds for brigade encampments were selected, and defense lines were planned and begun. Within days of the army's arrival, the Schuylkill River was covered with ice. Snow was six inches deep. Though construction of more than 1,000 huts provided shelter, it did little to offset the critical shortages that continually plagued the army.



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## References

Baddeley, A. (1999). *Essentials of Human Memory*. Hove, England: Psychology Press.

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Ylvisaker, M. and Gioia, G.A. (1998) Cognitive Assessment. In M. Ylvisaker (Ed.) *Traumatic Brain Injury Rehabilitation: Children and Adolescents* (2nd Edition) Boston: Butterworth-Heinemann

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