INFORMAL REASONING AND STUDENTS EXPERIENCING CULTURALLY INFLUENCED ACADEMIC DELAYS

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LICENSED SPECIAL EDUCATION DIRECTOR
CAN I HAVE A VOLUNTEER?
LEARNING TARGETS TODAY

• Learn about formal/informal reasoning and how it impacts learning.
• Learn about local study and supporting research
• Learn how this can impact a student in the classroom.
• Learn hypothetical ways to identify formal and informal reasoning in our cognitive assessments.
• Learn about how to build new interventions and proactive instructional supports for these at-risk students.
• Learn methods for stronger progress in special education.
SOME BACKGROUND

- In the Minnesota, the USA, and abroad, our immigrant, ELL, refugee, and low SES students struggle.
- Low progress in General Education
- Low progress in Special Education
- Low Progress in ELL
- Why?
<table>
<thead>
<tr>
<th></th>
<th>School 1 53% EL</th>
<th>School 2 34% EL</th>
<th>School 3 71% EL</th>
<th>Statewide</th>
</tr>
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<tbody>
<tr>
<td>Math</td>
<td>36%</td>
<td>34%</td>
<td>46%</td>
<td>60%</td>
</tr>
<tr>
<td>Reading</td>
<td>22%</td>
<td>32%</td>
<td>36%</td>
<td>59%</td>
</tr>
<tr>
<td>Science</td>
<td>33%</td>
<td>25%</td>
<td>24%</td>
<td>54%</td>
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</table>

(Minnesota Department of Ed., 2017)
NOT NECESSARILY

<table>
<thead>
<tr>
<th></th>
<th>Chinese Immersion</th>
<th>German Immersion</th>
<th>Spanish Immersion</th>
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<tbody>
<tr>
<td>Reading</td>
<td>75%</td>
<td>80%</td>
<td>79%</td>
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<tr>
<td>Math</td>
<td>88%</td>
<td>77%</td>
<td>76%</td>
<td>59%</td>
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<tr>
<td>Science</td>
<td>78%</td>
<td>84%</td>
<td>76%</td>
<td>54%</td>
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</tbody>
</table>

(Minnesota Department of Ed., 2017)
ANSWER WITH A SIMPLE HYPOTHESIS

• Culture = Patterns of living and learning passed from one generation to the next (Schein, 1992).

• Some living and learning styles support the highly formalized system of education in the United States (Marshall & DeCapua, 2014).

• Some living and learning styles do not, to a degree (Marshall, 1998; Marshall & DeCapua, 2014).

• CIAD (Culturally Influenced Academic Delay) – A significant academic delay or difficulty attributed to cultural patterns of living and learning that do not predicate the educational system by which one is academically taught and measured. (Romstad & Xiong, 2017)
WHAT IS REASONING?

One’s ability to think about and understand information, discriminate between different types of information and execute a plan or strategy based on that same information.

(Salmon, 1991)
HOW IS REASONING RELATED TO I.Q.?

• Reasoning dictates how we think, interpret, and act on stimuli in front of us.

• Good general intelligence and/or fluid intelligence are strong indicators of good reasoning, and vice versa.

• General intelligence and fluid intelligence - one’s ability to use deductive and inductive reasoning, abstract think, categorize, and generalize free from previously acquired knowledge and are central to human cognition.

(Ferrer, O’hare, & Bunge, 2009; Perkins, Farady, and Bushy, 1991)
TWO TYPES OF REASONING

• Formal processing/reasoning
  - Decontextualized
  - Deductive in nature (Solving a math problem, syllogism - A is B, C is A, therefore, C is B.)
  - Mathematical, logical, higher abstract nature
  - Belief Mode (truth, proof, certainty)

• Informal processing/reasoning
  - Contextualized
  - Situationally Contingent
  - Performed in non-deductive situations (Making a general conclusions based on what is being observed)
  - Design Mode (pragmatism, strengths vs weakness)

(Voss, Perkins, & Segal, 1991)
THE PRODUCT OF ONES REASONING ABILITIES IS ONES LEARNING ABILITIES.

- Formal Learning
  - Individualized
  - Decontextualized
  - Literacy is key

- Informal Learning
  - Collective
  - Pragmatic/contextualized
  - Oral in nature

(Marshall & DeCapua, 2014)
BACKTRACK AND CONNECT TWO PARTS

• Good reasoning = good general intelligence and/or fluid intelligence
• Fluid intelligence and general intelligence = formal reasoning in definition
• Good reasoning = Formal reasoning?
• Does this mean informal reasoning is less than?

(Perkins, Farady, and Bushy, 1991)
WHO IS REASONING INFORMALLY?

• Our Hmong Students – Marshal, 1998; Romstad & Xiong, 2017
• Our inner-city African American students – Miller-Jones, 1991
• Non-literate Subjects and Luria’s Work – Marshall, 1998
• Non-Literate Indigenous Mayan Children – Cole, 2005

• It doesn’t stop there…. 
MILLER-JONES STUDY

- Inner-city African American Kindergarteners
- Four different classes of students
- Separated into high and low achievers based on three criteria:
  - Standford-Binet scores, Reading Readiness scores, Teacher interviews

*Socio-economic status was commensurate across students in the study

(Miller-Jones, 1991)
FINDINGS

• **High achievers:**
  - Rules and structure at home were enforced.
  - Less rules broken in school.
  - Problem solving – More deductive in nature, calculated, and scientific.
  - Adherence to the rules made them more successful in problem solving task, initially.

• **Low Achievers:**
  - Less rules at home and during play.
  - More rules broken in school.
  - Rules were broken more during play and were bent more at home.
  - Less adherence to rules made them less successful in problem solving, initially.
  - Solved problems and learned by doing using “hit or miss” strategy.
200 Hmong Students were administered I.Q. tests across three school settings.  
149 Kaufman Assessment Battery for Children – Second Edition  
51 Wechsler Intelligence Scale for Children – Fifth Edition  
Data gathered over five year span across grades K-12  
Compared to a sample of 51 Caucasian students.
WHY HMONG STUDENTS?


Culturally, Hmong people have been associated with more informal reasoning and learning as a group.
FINDINGS

- Overall performance across full scale indices was nearly one standard deviation below the mean on average.
- K-3rd graders had overall index scores over 1 SD below the mean.
- Caucasian sample were average across full scale indices. +/- 2 points below the mean of 100.
- Nonverbal assessments did not benefit the students more than verbally based ones.
- General Thinking tasks (Gv and Gf) that required more abstraction, categorization, and scientific reasoning = lower scores.
- General Thinking tasks (Gv and Gf) that required contextualized, pragmatic ‘here and now’ thinking, and that were low in abstraction = higher scores
EVEN MORE CONCERNING…

• K-3rd grade sample received overall index scores in the Below Average range on KABC-II.
• K-3rd grade are critical years for our students.
• Years preceding formal school also critical in development.
• Reasoning and Processing is forming in these years.

(Downer & Painta, 2006; Miller-Jones, 1991; Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan, & Yazejian, 2001; Romstad & Xiong, 2017)
WHAT DO THESE TWO STUDIES TELL US?

• Low achievers tended to show patterns of reasoning similar to informal reasoning (Miller-Jones, 1991).

• High achievers were more adherent to rules and showed problem solving behavior that indicated formal reasoning was driving their cognition (Miller-Jones, 1991).

• Hmong students showed patterns in processing and reasoning on two nationally standardized assessments that were indicative stronger informal reasoning abilities vs. formal (Romstad & Xiong, 2017).

• Culture seems to drive how the students in these studies reason and problem solve.
IN SHORT…

• Our students reason and learn in two different ways.
• Formal reasoning favors formal schooling.
• If our culture does not affirm our learning environment in school do we still label the student as LD? DCD? EBD?
• If culture is a reason for low grades or I.Q. scores, can we use them to qualify?
• If ones culture impacts reasoning, and reasoning impacts learning, then any delay in learning may be a result of Culturally Influenced Academic Delay, not a true learning disability or cognitive impairment.
WHERE DO WE GO NOW?

• No new Intellectual assessments to answer this need.
• Formal reasoning is king, no compromise will likely be made.
• Local samples and local solutions.
• RTI/MTSS is one way we can go; however….
WHERE ARE WE NOW?

• Reactive Academic support - Interventions
• Proactive Cognitive support – Help build academic ways of thinking
# THE THREE SCHEMATA

- **Linguistic** – The language in which one must use
- **Content** – The subject matter that is being addressed
- **Formal** – The type of task that must be performed

<table>
<thead>
<tr>
<th>Schemata</th>
<th>Description</th>
<th>Example</th>
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</thead>
<tbody>
<tr>
<td><strong>Linguistic</strong></td>
<td>The language in which the activity is presented and the student must respond</td>
<td>First language; second/dialect language</td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>The subject matter the activity is asking the student to address</td>
<td>Schools subjects at grade level; basic education competencies; Vocational/technical knowledge; culture-based information</td>
</tr>
<tr>
<td><strong>Formal</strong></td>
<td>The type of task that the activity requires the student to perform</td>
<td>Assessment formats; true/false, matching, multiple choice; critical thinking skills: defining, summarizing</td>
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(Marshall & DeCapua, 2014, p.35)
SCENARIO

- 3rd grade - Student A, is having a hard time in reading class and does not speak the primary language of instruction. This student is in bilingual education currently and both bilingual and primary teachers are concerned that the student is in need of elevated supports.

- When asked to read an assignment on his own, student seems to stare off into space at times. Student does read out loud when group reading is assigned, however.

- Student has related to stories in the past about topics in the story.

- At times, student will put his head down in class and not respond.

- Student speaks English well enough converse with peers and follow directions.

- When asked to compare and contrast two stories, make a short summary of a story he has read, and/or identify a general idea of a story, he turns in a picture of what he read about or a factual statement about one part of the story.
STEP 1. IDENTIFY THE THREE SCHEMATA

• Language – Can the student speak the language and read in the language presented? Info from this scenario seems to verify this.

• Content – Is the student familiar with the content? Is the student at grade level? Info seems to confirm familiarity. Grade level abilities cannot be officially determined based on class room assignments. No state prof. data.

• Formal – When assessed can the student demonstrate competency in the form of assessment administered? Student is not doing this in a satisfactory way.
DETERMINE ALTERNATIVE MEANS OF KNOWLEDGE DEMONSTRATION.

- Verb identification - Tell me what he was doing in the story.
- Key word identification - Tell me some words that were big in the story.
- Key noun identification - Tell me some people places and things that were in the story.

The student can demonstrate knowledge of the story but in a different way than summarization.

- Answers to these questions can be measured.
EXAMPLE 2

- 2nd grade - Student B is having a hard time demonstrating knowledge in math class. Addition and subtraction are difficult for her.

- Teacher has tried repetition and drilling of math facts and giving extra time for assignments but the student seems to forget the principles of math shortly after and cannot demonstrate satisfactory understanding or application of knowledge.

- Student struggles in regular ed and bilingual education in math.

- Student is able to name colors and shapes easily and is able to understand basic quantification concepts such as more and less at the same level as her peers.

- Student can also count out loud at the same rate of her peers and identify numbers.

- What do we do?
STEP 1. IDENTIFY THE THREE SCHEMATA

- **Language** – Can the student speak the language and read in the language presented? Info from this scenario seems to verify this. Student can identify numbers and can count at the rate of peers in English.

- **Content** – Is the student familiar with the content? Is the student at grade level? No state data yet. Student seems to be struggling in this area which is making the next section seem problematic as well.

- **Formal** – When assessed can the student demonstrate competency in the form of assessment administered? Currently, student cannot complete assignments in this area; however, student completed formal assignments previously demonstrating an understanding of more and less, shapes and colors, and basic math concepts.
DETERMINE ALTERNATIVE MEANS OF KNOWLEDGE DEMONSTRATION.

• Rather than show the student mathematical concepts such as adding and subtracting on paper, use a different approach.

• These skills require cognitive abilities that still may be developing or may have developed differently due to child's informal culture (abstraction, generalization, independent memory, and independent long-term storage and retrieval.)

• Measure knowledge of math through use of word problems read aloud to the student.

• In conjunction with word problem, use an abacus to demonstrate numerical value.

• Demonstrate subtraction and addition through use of the abacus.

• Allow student to demonstrate math knowledge using abacus.
WHAT IF THE STUDENT IS ALREADY IN SPECIAL ED?

• Schemata can be used with any lesson
• Is the student making progress in special education?
• In some cases, ELL status is used to explain lack of progress in special education.
About Me
By: [Name]

Tell me your name, how old you are, and where you were born. *Write in full sentences. Use pronouns and possessive pronouns.

My name is [Name] and I am 14 years old.

I was born in [City].

Tell me about your friend. What is their name? What do you like about them? *Write in full sentences. Use pronouns and possessive pronouns.

I do not have a friend. I do not know their name. I do not like them.

Tell me about your brother, sister, mom, or dad. What is their name? What do you like about them? *Write in full sentences. Use pronouns and possessive pronouns.

They like to play soccer. My sister likes makeup. My mom likes to go to the mall. My dad likes to fix cars.
MAIN GOAL OF USING THE SCHEMATA TO MODIFY OR BUILD INTERVENTION

- Identify area of concern for student.
- Modify the area of concern to make the intervention applicable for student.
- Help to determine if the lack of academic progress is a result of lack of familiarity with formal learning and demonstration.
- Measure progress using more informal techniques.
- Help in transition informal schema to formal.
ACADEMIC WAYS OF THINKING – REASONING AND PROCESSING ABILITIES

- When we limit our classroom interventions to academics we limit the support we are giving.
- Even if we find success after altering an assignment to a less formal style, we need to teach formal thinking, reasoning, and processing.
- Propagation of academic ideas and ways of thinking is key.
- Making formal reasoning as important as formal academics.
- RTI pyramid for cognition?
HOW CAN WE PROMOTE ACADEMIC WAYS OF THINKING???

- Flood the students day with the basics – Time, structure, abstract thinking, generalization and categorization, etc.
- Try to create time to build on thinking abilities:
  - Matching Games (Numbers, pictures, ideas, etc.) *(Visual Spatial Reasoning, Fluid Reasoning.)*
  - Noticing differences in things. *(Fluid Reasoning, Long Term Storage and Retrieval.)*
  - Visual Memory games. *(Short Term Memory, Visual Spatial Reasoning)*
- Build and promote attention to detail in ALL tasks and assignments. *(Visual Spatial Reasoning, Fluid Reasoning, Visual Processing Speed)*
- Daily ‘Think aloud’ activities to walk students through problems step by step. *(Crystallized Abilities, Fluid Reasoning)*
- Games of logic (Chess, Connect Four, Hi-Ho Cherrio, Battleship, Uno) *(Fluid Reasoning, Quantitative Reasoning)*
EXAMPLES RIGHT UNDER OUR NOSE

Simultaneous and successive processes are influenced by cultural experiences such as poems, rules of games, and songs (Naglieri, Das, & Goldstein, 2012).

School house rock – Figure Eight
https://www.youtube.com/watch?v=a-B8W-gHn3c&list=PLiPvdQYIqbnkuqc_cnpKNtEDKriAVlhBh&index=9

Sesame Street – Three of these things belong together
https://www.youtube.com/watch?v=gCxrkl2igGY
https://www.youtube.com/watch?v=Ect-kgxBb4M

You don’t need to look too far to start building more academic ways of thinking
<table>
<thead>
<tr>
<th>Fluid Reasoning (Gf)</th>
<th>Characteristics</th>
<th>Academic Difficulties</th>
<th>Interventions</th>
</tr>
</thead>
</table>
| **Gf** is the ability to reason, form concepts, and solve problems that are unfamiliar. Involves inductive and deductive reasoning. | • Difficulty following sequences  
• Inability to recognize cause and effect relationships  
• Inability to make decisions and solve problems  
• Difficulty organizing and classifying ideas  
• Difficulty seeing implication for the broader application of learned rules  
• Difficulty developing new solutions  
• Difficulty solving logic puzzles  
• Difficulty transferring or generalizing learning | **Reading**  
• Drawing inferences  
• Determining main idea | • Use demonstrations to externalize the reasoning process  
• Use daily Think Alouds to model the thinking process for answering questions and solving problems  
• Address all levels of Bloom’s taxonomy to teach thinking and questioning skills  
• Review problem solving process  
• Guided practice  
• Targeted feedback  
• Cooperative Learning  
• Compare new concepts to previously learned information  
• Provide daily practice of reasoning skills by using real-life questions and problems  
• Provide a graphic organizer  
  - Story Maps  
  - Story Sequence  
• Provide writing organizers/text patterns  
  - Way to sort information  
• Use Planning Strategies  
  - Paragraph labeling  
  - QTIPS (math problem solving)  
  - U R TOPS (Responding to open ended questions)  
  - Procedural Self Talk  
  - Step Sheet  
  - Classificatory Writing |

(Rodriguez & Dickinson, 2015)
### G Definition

Visual Processing

<table>
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<tr>
<th>Characteristics</th>
<th>Academic Difficulties</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty differentiating mathematical signs</td>
<td>Orthographic coding (using visual features of letters to decode)</td>
<td>Provide oral explanation for visual concepts (e.g. explain graphs and charts)</td>
</tr>
<tr>
<td>Trouble remembering how a whole word looks</td>
<td>Sight-word acquisition</td>
<td>Use multisensory teaching techniques</td>
</tr>
<tr>
<td>Trouble remembering letter sequences</td>
<td>Using charts and graphs</td>
<td>Capitalize on students’ phonemic skills for decoding</td>
</tr>
<tr>
<td>Spelling approach over-rely on phonology</td>
<td>Comprehension of text using spatial concepts</td>
<td>Teach orthographic strategies for decoding</td>
</tr>
<tr>
<td>Uneven spacing of letters and numbers</td>
<td>Math</td>
<td>- Cover-Copy-Compare</td>
</tr>
<tr>
<td>Inaccurately reading maps, pictures, charts or graphs</td>
<td>Number alignment</td>
<td>- Word length</td>
</tr>
<tr>
<td>Unable to accurately judge speed and distance</td>
<td>during computation</td>
<td>- Shape of word</td>
</tr>
<tr>
<td>Poor spatial planning of page</td>
<td>Reading and interpreting graphs</td>
<td>- Read naturally</td>
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<tr>
<td>Difficulty seeing visual patterns</td>
<td>Writing</td>
<td>- RAVE-O</td>
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<tr>
<td>Difficulty tracking and scanning</td>
<td>Spelling sight words</td>
<td>- Great Leaps Reading</td>
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<td></td>
<td>Spatial planning during writing</td>
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<td></td>
<td>Formation of letters</td>
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(Rodriguez & Dickinson, 2015)
<table>
<thead>
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<tbody>
<tr>
<td>Comprehension-Knowledge</td>
<td>• Difficulty acquiring vocabulary and knowledge</td>
<td>Reading</td>
<td>• Prior to and after reading, have the student relate an event or character in the story to his/her own life</td>
</tr>
<tr>
<td></td>
<td>• Difficulty comprehending written and spoken language</td>
<td>• Decoding</td>
<td>• Frequent practice with and exposure to words</td>
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<tr>
<td></td>
<td>• Difficulty with fact based/ informational questions</td>
<td>• The words the student is attempting to decode is not in his vocabulary</td>
<td>• Research word origins to enhance meaning</td>
</tr>
<tr>
<td></td>
<td>• Use of simplistic sentence structures and lack of variety in language</td>
<td>• Comprehending due to vocabulary</td>
<td>• Include supportive modalities (e.g. visuals, gestures) to increase understanding</td>
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<tr>
<td></td>
<td>• Difficulties with synonyms, antonyms and analogies</td>
<td>Math</td>
<td>- Picture It</td>
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<tr>
<td></td>
<td>• Difficulty identifying similarities and differences</td>
<td>• Understanding math terminology</td>
<td>- Sentence Pantomime</td>
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<td></td>
<td>• Difficulty using context clues</td>
<td>• Understanding vocabulary in word problems</td>
<td>• Teach morphology</td>
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<tr>
<td>Writing</td>
<td>• Grammar</td>
<td>Writing</td>
<td>• Provide a language-enriched environment</td>
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<td></td>
<td>• Lack of development of ideas &amp; descriptive elaboration</td>
<td>• Vocabulary Word Map</td>
<td>- KWL strategy</td>
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<tr>
<td></td>
<td>• Awkward phrasing and unconventional grammar</td>
<td>• Semantic Map</td>
<td>- Use a variety games and activities for vocabulary reinforcement</td>
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<tr>
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<td></td>
<td>• Describe a Picture</td>
<td>- Interactive word walls</td>
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<td></td>
<td>• Words in Context</td>
<td>• Work on vocabulary building</td>
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<td>• Sketching for Vocabulary</td>
<td>- Vocabulary Word Map</td>
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<td>• Vocabulary Journal</td>
<td>• Use a variety games and activities for vocabulary reinforcement</td>
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<td>• Relate new information to student’s own experiences</td>
<td>• Use of graphic organizers</td>
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<td>• Record multiple real life examples of vocabulary words</td>
<td>- Word Webs</td>
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<td></td>
<td>• Use instructional materials to build lexical knowledge</td>
<td>- Semantic Grid to show relationship</td>
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<td>- Cause and Effect</td>
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<td>- Venn Diagram or T chart</td>
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<tr>
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<tr>
<td>Long-Term Retrieval</td>
<td>Reading</td>
<td>- Accessing phonological skills in order to decode</td>
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<td></td>
<td>Math</td>
<td>- Memorizing math facts</td>
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<td></td>
<td>Writing</td>
<td>- Retrieving vocabulary</td>
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<td>- Note-taking</td>
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<td>- Generating ideas</td>
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<td>- Remembering mechanics of writing</td>
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<td>- Limit the number of facts, words, concepts presented in one session</td>
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<td>- Use mnemonic strategies to encourage memory and retrieval for new or complex information</td>
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<td>- Teach “chunking” strategies</td>
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<td>- Repeated practice with and review of newly presented information</td>
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<td>- Build in wait time for student with fluency of retrieval is an issue</td>
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<td>- Provide overlearning, repetition, and review of concepts</td>
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<td>- Prime memory prior to teaching</td>
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<td>- Use of graphic organizers</td>
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<td>- Use different teaching modalities</td>
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<td>- Vocabulary Cartoons</td>
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<td>- Sentence Pantomime</td>
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<td>- Giving directions in multiple formats</td>
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<td>- Rehearsal strategies</td>
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<td>- Repeated rehearsal</td>
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<td>- Peer help with rehearsal</td>
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<td>- Rehearse information immediately after learning it</td>
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<td>- Teach student to rehearse information with parents</td>
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<td>- Rehearse in different ways (e.g., writing, acting, speaking)</td>
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<td>- Have a student paraphrase information read (e.g., Read-Ask-Paraphrase)</td>
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<td>- Method of Loci</td>
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<td>- Visualization</td>
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<td>- Imagining yourself in the scene</td>
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<tr>
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<td>- Using locations to remember information</td>
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(Rodriguez & Dickinson, 2015)
### Short-Term Working Memory

**Characteristics**
- Difficulty following directions with multiple steps.
- Difficulty repeating information.
- Difficulty remembering information.
- Difficulty remembering the order of information.

**Reading Difficulties**
- Difficulty with comprehension.
- Difficulty with phonemic awareness.

**Academic Difficulties**
- Difficulty with math.
- Difficulty with spelling, multisyllable words, and writing.

**Interventions**
- Use music or rhythm.
- Use visual, verbal, examples, and demonstrations.
- Teach chunking strategies.
- Teach the student to use different formats to process information.
- Teach the student to use mnemonic devices.
- Teach the student to use visual aids.
- Teach the student to use the method of loci.
- Teach the student to create mental pictures.

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*Rodriguez & Dickinson, 2015*
"It is perhaps possible now, with the coming of postmodern thought that the cleansing science of values, insisted on by those who see science as beyond the influence of historical rhetoric, can be over. To see the rhetorical nature of psychology is to put psychology into a different historical narrative than the modern one of self-correcting, universal, and objective science. It is time to revise our theory. I wonder if good clinicians have not always known this” (Keen, 2001, p. 239).

In short: Times have changed, people have changed, the country has changed... We must change as well.
REFERENCES

REFERENCES CONT.


