

## Strategic Interventions for Auditory Memory Training



Presented by: Beth Holland, M.A., CCC-SLP

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## Memory

- Memory impacts a person’s ability to perform almost any activity.
- Memory is how “knowledge is encoded, stored, and later retrieved.”
- Even mild memory deficits can impact a student’s success.

(Kandell, Schwartz, and Jessell, 2000)

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## Types of Memory



- Long-term memory
  - Short-term memory
  - Working memory
  - Auditory memory
  - Visual memory
- HearBuilder® Auditory Memory targets auditory memory and working memory by teaching students to use research-based strategies.

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## Auditory Memory

- The ability to take in information that is presented orally, process it, retain it in one’s mind, and then recall it.
- Auditory memory requires working memory.

(Bellis, 2003; Roeser & Downs, 2004; Stredler-Brown & Johnson, 2004) ©2012 Super Duper® Publications

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## Working Memory



- “The management, manipulation, and transformation of information drawn from short-term memory and long-term memory”

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## Models of Memory – 1960s

- Information Processing Model – memory is a key component of cognitive functioning. When new information is introduced, the likeliness of learning is directly related to the depth of processing.
- Atkinson-Shiffrin Model – memory consists of Sensory Memory (immediate memory), Short-term Memory, and Long-term Memory. Assumed to be linear.

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## A Model of Working Memory

- Baddeley and Hitch (1974) proposed the idea of a “working memory.”
- Working memory was a component of short-term memory.
- Three components to working memory
  - Central executive
  - Phonological loop
  - Visuo-spatial sketchpad



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## Working Memory Components

- *Central Executive* coordinates and shifts attention between the two systems.
- *Phonological Loop* is temporary storage that translates information into a phonological state and holds that information for a few seconds.
- *Visuo-spatial Sketchpad* is temporary storage of visual information.

(Dehn, 2008)

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## Working Memory Capacity

- Working memory is responsible for processing higher level linguistic information.
- Capacity of memory is affected by the complexity of the task.
- If the task is more complex, working memory spends more time processing.
- This will affect short-term memory capabilities.



(Daneman and Carpenter, 1980)

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## Development of Auditory Memory

- Infants use auditory memory to imitate speech.
- Age 4;0 can recall three digits, by age 12;0, six digits.
- Between 4;0-14;0 working memory and short-term memory increase by two to three times.
- As children become older use of memory strategies become more frequent, consistent, and complex.

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## Development of Working Memory



- Working memory increases in capacity and span, becoming more accurate, processing more quickly, and handling more information at a time.
- Short-term memory span is partially dependent on the efficiency of working memory.

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## Working Memory and Learning

- Memory is highly correlated with intelligence and achievement.
- Working memory capacity has significant relationships with
  - reading decoding
  - language comprehension
  - spelling
  - following directions
  - vocabulary development
  - note taking
  - GPA



(Engle, Tuholski, Laughlin, and Conway, 1999)

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# Auditory Memory Deficits

- Remembering multi-step directions
- Relating new information to prior knowledge
- Oral language comprehension
- Taking notes while listening
- Verbal fluid reasoning
- Written expression
- Oral expression



(Dehn, 2008)

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# Strategic Interventions

- Most people naturally develop and use strategies to improve their memory performance.
- Those with deficits and weakness need direct teaching which can improve working memory performance.

(Torgeson & Goldman, 1977)

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# Effective Strategy Teaching

- One-on-one brief, focused sessions over several weeks
- Teach one strategy at a time.
- Explain purpose and rationale.
- Explain and model the steps of the strategy.
- Provide plenty of practice and offer feedback.
- Teach cues to help remember the strategy.
- Provide positive reinforcement and data tracking.
- Encourage children to monitor and evaluate strategy use.
- Encourage generalization across sessions.

(Dehn, 2008)

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## Types of Strategies

- Verbal Rehearsal
- Elaborative Rehearsal
- Chunking
- Relational Strategies



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## Memory Strategies for Numbers

- Repeat It!** - Try saying the numbers over and over, like this: 2, 7, 5; 2, 7, 5; 2, 7, 5.
- Group It!** - Think of the numbers in groups. So if you hear 5, 3, 7, 2, 4, 6—think 5 3 7, 2 4 6.
- Chunk It!** - Try putting the numbers together. So if you hear 2, 4, 8, 3—think 24, 83.
- Sing It!** - Try putting the numbers to a rhythm or song, like: 5-8-6, 7-4-1.
- See It!** - Try picturing the numbers in your head as you hear them.

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## Memory Strategies for Words

- Repeat It!** - Try saying the words over and over, like this: *key, pig, hat; key, pig, hat; key pig, hat.*
- Sing It!** - Try putting the words to a rhythm or song, like this: *star-book-shoe-key.*
- See It!** - Try to picture the words in your head as you hear them, like: *moon, rug, book.*
- Say It!** - Try to make a simple sentence using the words you hear. If you hear dog, hat, bed, make a silly sentence like, *The dog found a hat under the bed.*

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## Memory Strategies for Details

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 - Try saying the words over and over, like: *blonde hair, hat, phone; blonde hair, hat, phone; blonde hair, hat, phone.*
- 
 - Try to picture the details in your head as you hear them, like: *brown hair, blue shirt, long pants, walking a dog.*
- 
 - Try putting the words to a rhythm or song, like: *black hair-long pants-walking dog, black hair-long pants-walking dog.*

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## Memory Strategies for Auditory Closure

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 - Listen for key words in the sentence and try to think of a word that goes with it. If you hear shoes, think of what would go with shoes—socks.
- 
 - Try to repeat the sentence in your head and think of each answer option in the place of the jumbled word. Then pick which one makes the most sense.

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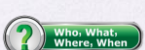
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## Memory Strategies for WH Info

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 - Try to picture the details in your head as you hear them, like: *Go to the library on 4th Street, bring 3 chocolate donuts and a watch.*
- 
 - Try repeating the details over and over to yourself, like: *4th Street, 3 chocolate donuts, watch; 4th Street, 3 chocolate donuts, watch.*
- 
 - Try to remember who the story is about, what they are doing, where they are, and when they are doing it.

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# HearBuilder® Auditory Memory

- Memory for Numbers
- Memory for Words
- Memory for Details
- Auditory Closure
- Memory for WH Info



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# Software Demonstration



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# HearBuilder® Auditory Memory

- Measurable learning objectives for every level
- Customizable
- Set, change, monitor levels of difficulty
- Add background noise
- Data-tracking for unlimited number of students
- Customizable and printable reports

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