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Look, Listen...and Sequence!

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Sequencing refers to students' abilities to put events in order. Sequencing may be difficult for a student who has deficits with visual processing (information that is seen) or auditory processing (information that is heard). In school, visual and auditory processing are important for different sequencing tasks such as telling a story, completing an experiment, or taking a test. Therefore, the skills of looking and listening are important for students' success in the classroom.

Visual Processing and Sequencing

Visual processing refers to how the brain processes visual information. *Visual information* refers to things we see, like letters, numbers, pictures, etc. We process (make sense of) what we see to help us learn more and better understand the world around us. Visual processing is important for sequencing events. There are different visual processing skills. These skills include:

- **Visual discrimination** – the ability to compare and distinguish the differences between items;
- **Visual figure-ground discrimination** – discriminating an object from its background;
- **Visual sequencing** – identifying the correct order of words and images;
- **Visual memory** – the ability to remember things that are seen;

- **Visual closure** – the ability to identify an item when only shown parts of it;
- **Spatial relationships** – the ability to know where items are in space. This includes verbal and written descriptions ("Visual Processing," 2009).

Any of the visual processing problems listed above may affect students' abilities to place pictures in the correct order. Sometimes, pictures have very small differences between them that reveal which one comes first, next, and then last. Students with visual processing deficits do not always see these differences and have difficulty putting items in the correct order. For younger students, this can limit their comprehension of stories.

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(cont.)

Auditory Processing and Sequencing

Auditory processing refers to how the brain perceives and interprets sound information. Sound information refers to things we hear, like others' voices, traffic, alarms, etc. We listen to and process different sounds to help us complete different tasks and interact with others. Auditory processing is important for sequencing events. There are different auditory processing skills. These skills include:

- **Auditory Awareness** – the ability to detect sound;
- **Auditory Discrimination** – the ability to hear differences between sounds;
- **Auditory Identification** – the ability to attach meaning to sounds and speech;
- **Auditory Comprehension** – the ability to understand longer auditory messages.

Typically these skills are developed in a general four-step hierarchy (from easiest to most difficult), but all work together and are essential for daily listening (Cochlear Americas, 2009; Johnson, Benson & Seaton, 1997; Nevins & Garber, 2006; Roeser & Downs, 2004; Stredler-Brown & Johnson, 2004). Difficulties with sequencing may occur at any of these levels, especially auditory comprehension.

Understanding oral, or spoken, narratives (stories) can be particularly difficult for students with auditory processing disorders because they require students to process information accurately, then to *understand* the information, *retain* it, and finally *organize* it (Anthony, Kleinow & Bobiak, 2009). This becomes more difficult in noisy environments, like a classroom. Anthony, Kleinow, and Bobiak (2009) found that students with auditory processing disorders and students that score at the lower end of normal on an auditory processing screener had more difficulty with comprehension of oral narratives in noisy environments.

Resources:

Anthony, S., Kleinow, J., & Bobiak, J. (2009). Narrative ability under noisy conditions in children with low-normal auditory processing skills. *Contemporary Issues in Communication Science and Disorders*, 36, 5–13.

Cochlear Americas. (2009, February). Listening at school. *In Educator's guide to cochlear implants.* Retrieved from http://www.cochlearamericas.com/Support/2156.asp

Johnson, C. D., Benson, P. V., & Seaton, J. B. (1997). *Educational audiology handbook.* San Diego, CA: Singular Publishing Group.

Nevins, M. E., & Garber, A. (2006, May). Auditory skill development. *Cochlear Americas Habilitation Outreach for Professionals in Education*. Retrieved from http://professionals.cochlearamericas.com/sites/default/files/resources/HOPEFUN666.pdf

Roeser, R. J., & Downs, M. P. (2004). Auditory disorders in school children: The law, identification, remediation (4th ed.). New York Thieme Medical Publishers, Inc.

Stredler-Brown, A., & Johnson, C. D. (2004). *Functional auditory performance indicators: An integrated approach to auditory skill development* (3). Retrieved from http://www.cde.state.co.us/cdesped/download/pdf/FAPI_3-1-04g.pdf

"Visual Processing." National Center for Learning Disabilities (2009, March). *Visual processing disorders*. Retrieved from http://www.ncld.org/ld-basics/related-issues/information-processing/visual-processing-disorders

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