



Sound to Meaning

Nina Kraus presented by Marlene Lewis and Janet Gibson



Learning Objectives

- 1)** Participants understand the neurobiological importance of providing a rich auditory environment;
- 2)** Participants can describe the elements of an auditorily rich environment;
- 3)** Participants will be able to employ practical activities that will enhance the auditory experiences of children to expand their language/listening and pre-literacy skills, and prevent possible difficulties down the line.

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Nina Kraus's presentation was first viewed by both presenters at the Visionary Conference (2016) hosted by Scientific Learning.

Permission was granted by Nina Kraus and Scientific Learning to share her presentation.

Dr. Nina Kraus said to share this widely. Thank you to Dr. Kraus and Scientific Learning for making this video available for this presentation.



What is Auditory Processing?

It's what we do with what we hear.

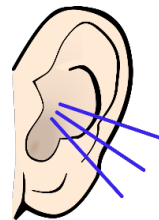
(Tomlin 2017)

It's the Efficient and Effective use of sound by the central nervous system

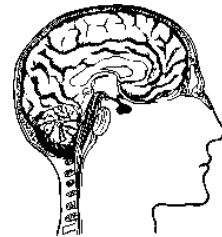
(AAA 2010)

It's “solving the puzzle of complex listening” (Tomlin 2017), using acoustic and cognitive level processing.

The link between **detecting sound**



And **extracting meaning**



(Bamiou et al. 2006)

Possible Challenges with Auditory Processing

Poor discrimination: what? 'Bat' or 'Pat'?

Difficulty localizing: 'Where's that coming from'?

Timing issues: "an apple" is heard as "a napple"
Huh? What is a "napple"?

Difficulty learning how parts of words fit together:
'hopstipal' instead of hospital

Doesn't hear clearly in background noise

Memory for auditory information is fleeting.

Remember: sound is transient. It's gone, unless our auditory memory can hold onto it for long enough to make sense of it

Difficulty following multi-step instructions

Can be associated with attention challenges

Weak auditory processing has a high co-morbidity with literacy delays (Tomlin 2017)



Hearing Loss in the Preschool Population

If You Observe Poor Listening

First Rule out Hearing Loss

Acute Otitis Media - symptomatic with pain and fever

Otitis Media with Effusion: asymptomatic and easily missed

Can last for months before resolving

Can result in fluctuating hearing loss

Other causes of hearing loss

First steps: recommend visit to family doctor and hearing test at local health unit



Train the Brain to Recognize & Keep Rhythm

What can parents and others do to train children's brains to recognize and KEEP rhythm?

- Integrate motor movements with sound and rhythm
 - Playing action with rhythm games: e.g. Pat-a-Cake
 - Dancing
 - Playing percussion instruments (e.g. xylophone, maracas, drums, etc)



Example: Play a short rhythm at a very slowed rate; ask the children to do the same. Then play it a little faster; ask them to do the same. Then a little faster again and ask them to do the same.

Watch to see that all of the children are following and playing the rhythm accurately. If some aren't, slow down again or have an adult **provide some physical support/guidance to the children who aren't replicating the rhythm.** If after providing physical guidance, some of the children still can't replicate the faster rhythm, play a slower rhythm that all can do. Repeat this a few times until all of the children can replicate the rhythm at different speeds.

Rhythm and the Aboriginal Child

Shared with us by Dr. Sharla Peltier, from the Chippewas of Rama First Nation, Ontario, a member of the Loon Clan

“We speak of the fetus and how Mother's heart beat associated with joy, sadness, excitement, fear are experienced rhythms and when expectant Mother is continually in a stressed state, the midwives and Grandmothers will remove her from the situation such as family violence, lack of rest etc. The child's first teacher is their Mother and the rhythm of her movements are maintained when the child is placed in the cradleboard and carried on her back...the same movement and rhythm as she walks about and this helps the infant transition to their earthly walk. The sound of the drum represents the heartbeat of Mother Earth and mimics Mother's heartbeat...calming and familiar to all”.

Localization: Where is that sound?



Training children to listen to where sound is coming from can be fun and meaningful.

Have you ever played “Marco Polo” in a swimming pool? That’s sound localization! One person closes their eyes and has to tag the other people in the pool through listening. The person with their eyes closed shouts “Marco”, and the others shout back “Polo”. The listener moves toward the speaker and tries to tag them.

In the classroom, with musical instruments: have a child in the middle of a circle close their eyes. Have other children in different positions in the circle play a few notes from an instrument. The child in the middle must identify the sound source. Children take turns to be in the middle.

Make this into a sound discrimination activity too: Not only must the child in the middle of the circle identify the sound source, let them identify the instrument too! Cymbal, Triangle, Drum, Recorder, Maraca

Train the Brain to Follow Speech Patterns

- Singing songs with a repetitive rhythm (e.g. Old MacDonald Had a Farm)

When you have the children sing “ee-i-ee-i-o”, sing it slowly at first so that all of the children can follow along and sing it accurately. Then gradually speed up the chorus and **watch and listen for ALL of the children being able to follow along accurately**. If not, slow it down again until you see and hear that all can sing along accurately. If some still can't, have an adult work one-on-one with the child until they can sing the sequence accurately.

ee-i-ee-i-o

Syllable Sequencing

A practice called '**backward chaining**' often helps children learn to include all sounds and syllables in multisyllabic words. In backward chaining, you would model syllables from the back of the word to the front. Let's look at some examples of multisyllabic words that are often hard for a child to say such as 'animal' or 'spaghetti'. Say "mal", then "ni-mal", then "a-ni-mal"; say "ti" then "get-ti", then "spa-ge-ti".

mal

ni-mal

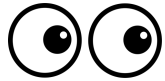
a-ni-mal

The ABC song

Ay



ay



see

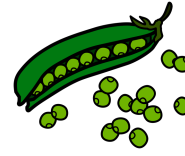
chi



lemon

deeyee

effgee



na

pea



jaykay

a

kewar

ress

tea

doubleyou

you

wex

vee



why

anzee.

Speed, Rhythm and the ABC Song

Slow it down! Dr. Kraus and others have talked about speed.

Make conscious distinctions between where one letter name ends and the next one begins.

Keep the rhythm constant. Don't speed up for L, M, N, O, P. **They are just as important!**

L M N O P

Have children use percussion instruments to keep time: triangles and possibly a metronome.

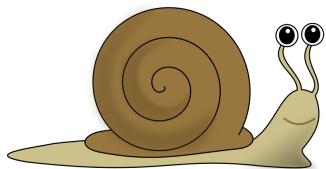
Divide the children into groups. One group is marching to each grapheme. One group is playing the instruments in unison, and all are singing the letter names.

They're integrating listening, movement, visual skills and making music!

Your Speaking Rate Matters: Slower is Better

- Monitor your own speaking rate.

A good way to do this is to record yourself, listen for and ask yourself, 'is my speaking rate fast at times'. If you notice it is, slow it down. Keep recording yourself talking with children and listen for the speaking rate you are using and modify it according to what you notice.



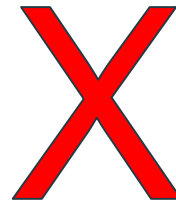
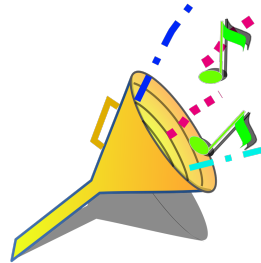
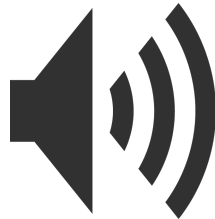
Background Noise: Keep it Down

Background noise makes it more difficult to perceive speech.

Overwhelming evidence points to the benefit to all students of acoustically optimal classrooms or learning environments.

Barriers to effective listening can be in the form of background noise, reverberation and distance from the speaker.

How can we remove barriers to listening?



Making Optimal Listening Environments

- ❑ Use sound-absorbing materials on walls, floors and ceilings (carpeting, tennis balls on chair-legs, curtaining, cushions, stuffed toys, acoustic ceiling tiles for example).
- ❑ Ensure efficient and low-sound heaters, fans and other electronic equipment.
- ❑ Keep doors and windows closed when outside noise levels are high.
- ❑ Ensure all students access to the sound source (teacher, audio-visual teaching equipment).
- ❑ Optimize lighting in the classroom to help a student to use visual cues to supplement auditory/verbal information.

What Is Phonological Awareness

The ability to recognize and manipulate sounds in language.

Rhyming Words
Syllables
Sounds

Why is phonological awareness important?

“Decades of scientific research show that reading success relies on a solid **foundation of rapid and consistent auditory processing (listening) and oral language (particularly phonological) skills**, and that weakness in these predispose a child to subsequent reading failure.”

- Dr. Paula Tallal

Testimony to the US House of Representatives 2015

Phonological Awareness Components & Corresponding Activities

Rhyming: **Discrimination:** Cat / Pig - do they rhyme?

Production: Cat, Pat, Sat _?

Example: Rhyming with motor integration: 1 Potato, 2 potato, 3 Potato 4, 5 Potato, 6 Potato, 7 Potato,
More!! _____ Play a circle game: "I see a cat on a ____." The children could say "mat", "rat", "bat".

Segmentation - sentences, syllables, phonemes

Example: "I see a cat" **4** (four words); cat4Har (four syllables); **3** cat
(three sounds)

Phonological Awareness continued

Isolation: Initial, Final, Medial

Example: What's the first sound in CAT? Last sound? Middle sound?

CAT

Deletion: compound word. Syllables, phonemes

Example: Say "rainbow" without "bow"
without "C"



"Popsicle" without "pop" "Cat"

Phonological Awareness Continued

Substitution: manipulation, without manipulation.

Example: Change the 'P' in "Pat" to 's' = "Sat"

P > S = Sat

Blending: **Example:** "p" "a" "t" makes "pat"

Graphemes: Names and their sounds. **Example:** "G" says "g"

Decoding: **Example:** "Jack sat on the mat."



What is the Take Away?

Slow down your speaking rate

Keep background noise down

Have kids play instruments

Have kids learn to keep rhythm

Have kids learn to hear sounds in words

Pay attention to the kids who aren't keeping up; don't let them fall behind

Meaningful sound matters for developing language and reading

References

Nina Kraus, presentation at the Visionary Conference hosted by Scientific Learning, 2016

Paula Tallal, Oral and Written Testimony presented to the US House of Representatives, Science and Technology Committee, 2015

Dani Tomlin, AudiologyOnline, 2017