



## Auditory Training

Clinician-Led Therapy

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### Auditory Training: Clinician-Led or CBAT

- ▶ Can be done during regular clinician-led therapy sessions, with computer-based auditory training as a supplement (i.e. homework)
- ▶ Increasingly, CBAT (Computer-based Auditory Training) is being formulated to be done more independently by client on own computer at home.
- ▶ For school-based program, a certain number of sessions with SLP could be followed by more home-based follow-up.

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**Example of Clinician-Led Model:**  
Jeanane Ferre: *Processing Power (amenable to group therapy sessions):*



- ▶ 3Ms: Me, Message, Medium
- ▶ Sequence: Listen, Drill, Teach
- ▶ **FOCUS ON LISTENING FIRST:**
  - ▶ Importance of listening:
    - ▶ Explain "way to listen"
    - ▶ Listening stance
    - ▶ Listening rules

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**Jeanane Ferre: 3M Model of Auditory Training.**

- ▶ **DRILL** SENSORY SKILLS (Bottom-up; Afferent Training)
  - ▶ Stimuli are auditory
  - ▶ Use repetition (multiple stimuli with maximum # of tries)
  - ▶ Provide feedback re accuracy, encourage child to judge
  - ▶ Activities are adaptive, systemic, varied
- ▶ **TEACH** CONCEPTUAL SKILLS (Top-down; Efferent Training)
  - ▶ Concept driven
  - ▶ Teach compensatory strategies
  - ▶ Central resources training
  - ▶ Use visual cues
  - ▶ Counseling included: discuss what problem is and what can be done.

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**Example: Afferent/Bottom-Up:**  
**Early Auditory Skills** (Auditory Localization, Auditory Identification, Auditory Pattern Recognition)

- ▶ Close eyes. Have children listen for sounds in environment. Identify location of sound and identify it. Teacher makes sounds that children identify.
- ▶ Record environmental sounds. Identify them.
- ▶ Food sounds. Children identify what food and what is being done.
- ▶ Attending to sound patterns: close eyes. Clap hands, play drum, bounce ball in increasing rhythm patterns, child imitates. Do this with two objects.
- ▶ Judging far/near or loud/soft or high/low.
- ▶ Hide object that makes a sound. Child must find it.
- ▶ Blindman's Bluff: blindfolded child guess what sound was made.
- ▶ Auditory figure/ground: introduce background sound to these tasks.

▶ Terry (2008-2016) *Reading, Writing & Math Help*, [www.bonnieterry.com/blog](http://www.bonnieterry.com/blog)

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**Clinician-Led Therapy: Buffalo Model (Katz)**

- ▶ Buffalo Model sorts into four categories: decoding, tolerance/fading, memory/integration, (organization)
- ▶ This training is typically foundational for Decoding difficulties
- ▶ Instructions for Speech-in-Noise training also included in this book, as well as instructions in Localization training

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**“Decoding”:** Breakdown in Auditory Discrimination: inefficient analysis of acoustic cues.

- ▶ This impacts phonological awareness, listening stamina, direction-following, spelling, language comprehension, vocabulary, foreign language acquisition, social interaction, story retelling, pragmatic skills.
- ▶ Treatment: focus on sound discrimination and auditory closure.
- ▶ Auditory Discrimination requires:
  - ▶ Pattern recognition
  - ▶ Prosody recognition
  - ▶ Comprehension of visual cues
  - ▶ Adequate working memory and sequencing

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**Phonemic Training Program**

- ▶ To address Decoding issues.
- ▶ Can be used with very young children.
- ▶ Materials: deck of cards with letters of the alphabet printed on them; acoustically-transparent screen.
  - ▶ 1. Introduction Without Bias
  - ▶ 2. Acoustic contrast
  - ▶ 3. Random review with foils
- ▶ Sessions begin with review, introduction of new sounds, review.
- ▶ Manual is available through Educational Audiology Association: *Therapy for Auditory Processing Disorders*, Jack Katz, \$84.95

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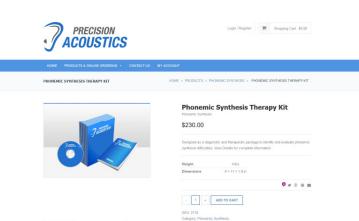


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**Phonemic Synthesis Program**



The screenshot shows the product page for the "Phonemic Synthesis Therapy Kit". The page includes the product name, price (\$270.00), and a brief description. There are also links for "Add to Cart" and "Buy Now".

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**Alternatively, Phonemic Synthesis Program, Katz**

- ▶ Similar to previous program, but more elaborate: all phonemes are included. They must be remembered and *blended* to respond with correct word.
- ▶ Sounds presented at rate of 1 to 1.5 per sound. Must be blended.
- ▶ Increases from simple to difficult.
- ▶ There is a cost to purchase these materials.

▶ More information at: *Phonemic Training and Phonemic Synthesis Programs*, Jack Katz IN (2007) Geffner and Ross-Swain, *Auditory Processing Disorders*, Plural Publishing, Chapter 13.



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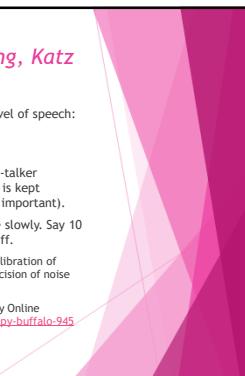
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**Speech-in-Noise Desensitization Training, Katz**

- ▶ Use for those with Tolerance/Fading Memory diagnosis
- ▶ Goal is to increase one's tolerance for noise using a constant level of speech to pull the speech out of the background noise.
- ▶ SIN uses recorded words (monosyllabic words recommended).
- ▶ Noise source can be recorded noise ("cafeteria noise" or "multi-talker babble") Important that the noise is consistent in level. Noise is kept constant, and speech level is varied (so recorded speech is also important).
- ▶ Start with speech at comfortable level, no noise. Increase noise slowly. Say 10 words at one level, then increase 2 dB until performance falls off.
  - ▶ This training can be done with audiometer, which allows precise calibration of noise, but also possible with audio recording devices, although precision of noise level is not as good.
- ▶ See Katz, APD Evaluation To Therapy: *The Buffalo Model*, Audiology Online <http://www.audiologyonline.com/articles/apd-evaluation-to-therapy-buffalo-945>



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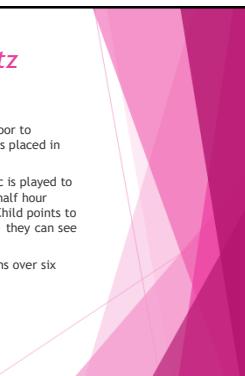
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**Localization Clock Training, Katz**

- ▶ Goal: improve ability to localize sounds in space.
- ▶ Materials: Numbers from 1 to 12 are placed in a circle on the floor to represent a clock with a diameter of roughly 7 to 8 feet. A dot is placed in middle of circle for child's chair (centered over the dot).
- ▶ Child seated in chair with eyes closed (facing 12 o'clock). Music is played to conceal movement of therapist. Therapist stand on hour or half hour point, stops music, gives brief verbal signal (i.e. says a word). Child points to where therapist is. Child can open eyes and verify. (If incorrect, they can see how far off they were).
- ▶ Good gains in brief therapy. Katz recommends 10 minute sessions over six sessions.



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**Dichotic Offset Training**

- ▶ Appropriate for those with Integration form of APD, which seems to stem from poor interhemispheric coordination.
- ▶ Clinician-Led because requires audiometer/stereo playback system
- ▶ Uses phonemes presented dichotically, but with varied offsets
- ▶ This program can be acquired from IGAPS (International Guild of Auditory Processing Specialists). Dr. Katz gives it away for free.

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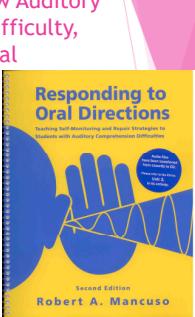
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Persons with TFM typically also show Auditory Memory and Auditory Sequencing Difficulty, so are poor at following complex oral directions:

- ▶ Clinician-led therapy to focus on these areas is helpful.
- ▶ Executive function training
- ▶ Heavy use of visual cues, mind-mapping, visual prompts is helpful
- ▶ Use re-auditorization, social schema, logical troubleshooting
- ▶ Many apps can be used as follow-up



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**Auditory Memory/Working Memory often problem area for APD kids**

- ▶ Auditory attention is pre-requisite [see Ferre 3M model]
- ▶ Comprehension: use familiar words and language
- ▶ Phonological loop
- ▶ Sub-vocal rehearsal\*\*
  - ▶ Spectrum of stimuli: begin with single syllable and work to more critical elements.
  - ▶ Model Vocal Rehearsal, then model Sub-vocal Rehearsal (whispering, then lips only)
  - ▶ Work within categories or contextual groups before unrelated words.
  - ▶ Add music
- ▶ Examples: Telephone Game; Going to Grandma's; Simon; Concentration (modify it to be auditory, rather than visual)
- ▶ See Garber (2013) *Auditory Comprehension: Focus on Memory for Professionals*, AudiologyOnline (on web).

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**Other strategies for tasks involving memory:**

- ▶ Put it to music
- ▶ Echo
- ▶ Recite in Different Voices
- ▶ Erase It
- ▶ Create an Acronym
- ▶ Review Often
- ▶ Break It Up
- ▶ Use More Senses
- ▶ Give directions in multiple formats
- ▶ Over-learn Material
- ▶ Use Visual Images
- ▶ Study Handouts Prior to Class
- ▶ Be Active Reader
- ▶ Write Down Steps in Math Problems
- ▶ Prime the Memory
- ▶ Review Material Before Going to Sleep

Thorne (no date) 10 Strategies to Enhance Student's Memory, [www.readingrockets.org](http://www.readingrockets.org)

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**Differential Processing Training Program: resources for multiple age and topics**




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**Top-Down, Clinician-Led Metacognitive Approaches**




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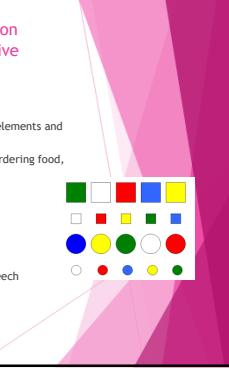


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**Clinician-Led Top-Down Training:** Training on auditory tasks that incorporates linguistic and cognitive knowledge.

- ▶ FOLLOWING DIRECTIONS
  - ▶ Short to long. Start with "Token-Test-like materials". Begin with few elements and increase number of elements.
  - ▶ Transfer to more likely real-life scenarios: taking orders as a waiter, ordering food, grocery shopping lists, etc.
  - ▶ Increase difficulty by adding time-delay
  - ▶ *Finish this module before proceeding to story retelling.*
- ▶ COMPREHENSION OF DISTORTED SPEECH
  - ▶ Start with few elements, and increase.
  - ▶ Speaking on telephone, electronic speech, accented speech, rapid speech



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**Other Top-down Activities**

- ▶ SEQUENCING
- ▶ TOPIC MAINTENANCE
- ▶ SELECTIVE ATTENTION
  - ▶ Sequence: auditory attention, auditory vigilance, selective auditory attention.
- ▶ INTONATION/PROSODY TRAINING: identifying key words. Drills for stress and sequencing.
- ▶ LIPREADING ("prior knowledge affects perception")



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**Lipreading Training:** maximizing fusion of visual and auditory cues to facilitate communication.

- ▶ Lipreading can be approached by *both* bottom-up and by top-down methods.
  - ▶ Synthetic training: studying phonemes and visemes to build up understanding.
  - ▶ Analytic training: Breaking down the bigger picture into component parts.
- ▶ If only have access to auditory cues of speech, or only have access to visual cues, it is very hard to make sense through lipreading, but phonemes and visemes are complimentary. With both, the ability to disambiguate a message is greatly increased.



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### Visemes

#	phonemes	example	#	phonemes	example
1	p, b, m	put, bed, mat	8	u, i	bit, got
2	t, v	fut, voice	9	r	red
3	D, ʌ	think, that	10	A	car
4	t, d	tip, doll	11	e	bed
5	k, g	gall, gas	12	I	tip
6	ɛ, ɔ, ʌ, ʊ	char, pon, ʌf	13	Q	top
7	s, z	gs, zeal	14	U	book



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### Lipreading: “listening” to a speaker by watching the speaker’s face to figure out speech patterns movements, gestures and expression.

- ▶ Learn to use the cues provided by the movements of the speaker’s mouth, teeth and tongue.
- ▶ Read and evaluate the information provided by facial expressions, body language and gestures in conjunction with the words being said.
- ▶ Use vision to assist with listening.
- ▶ Use prior knowledge to fill in the gaps that can occur in understanding since it is impossible to read every word said.
- ▶ Needed: lipreaders need clear light since it is impossible to lipread in the dark.
- ▶ Everyone lipreads, but the skill can be improved.
  - ▶ There are resources on the internet: <http://www.lipreadingpractice.co.uk/> or <https://www.lipreading.org/>

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### Prosodic Deficit: Poor ability to track fundamental frequency of pitch can also lead to social difficulties:

- ▶ Misunderstanding of others’ intentions based on their tone of voice:
  - ▶ Feelings get hurt easily
  - ▶ Misses verbal humor
  - ▶ Misses hints or insinuations
- ▶ Misunderstanding by others of intentions based on tone of voice
  - ▶ Monotone voice, lack of inflection or inappropriate inflection
- ▶ There is a need for therapy to focus on social language and pragmatic language use, with emphasis on meaning and use of prosody, voice modulation and figurative language
  - ▶ Review of common schema and what is expected
  - ▶ Body language
  - ▶ How body and facial language interact with prosody
- ▶ Need for this therapy more recognized for autism, but also found with APD

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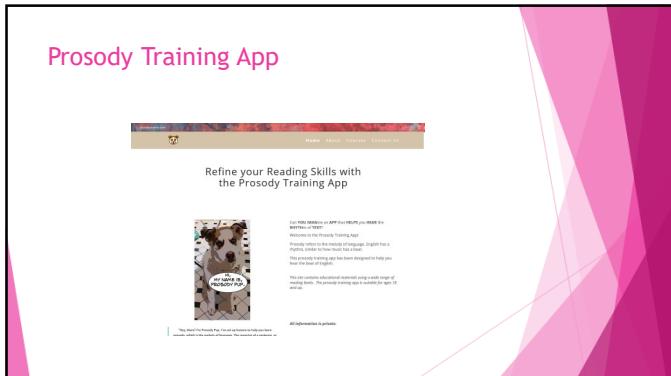
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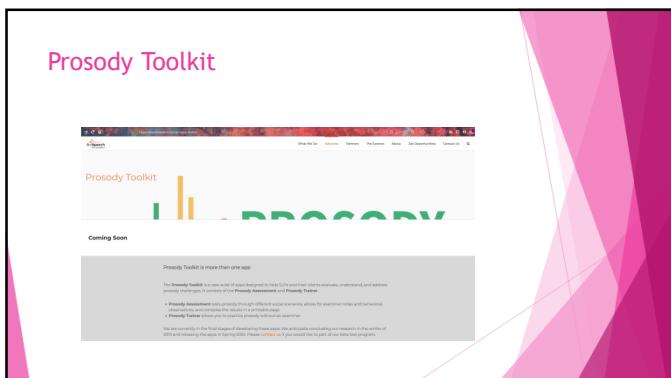
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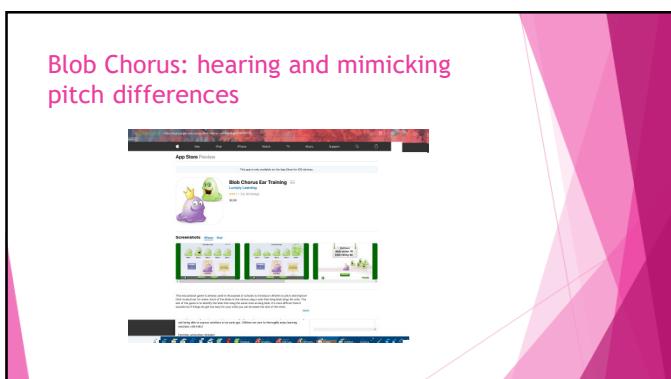
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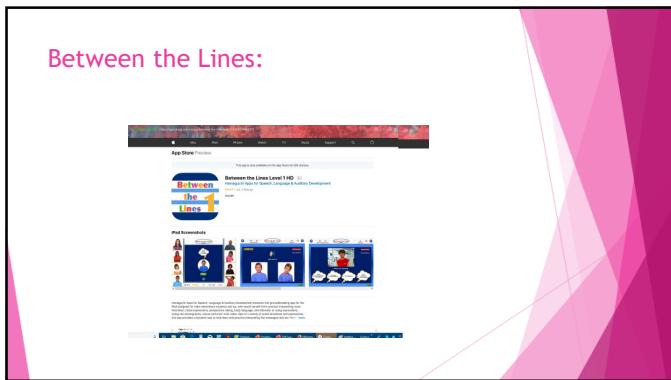
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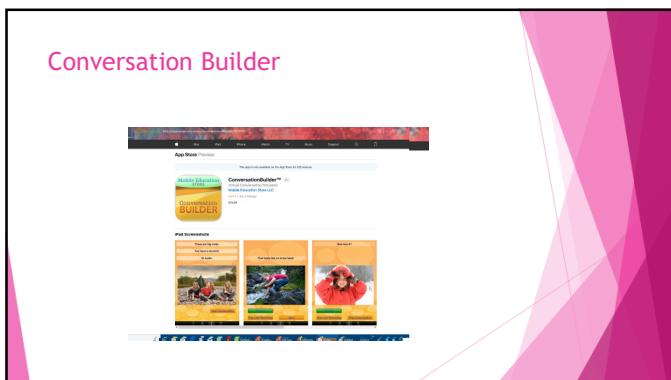
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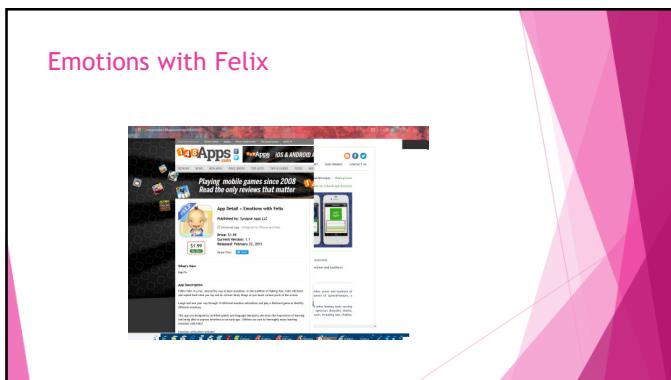
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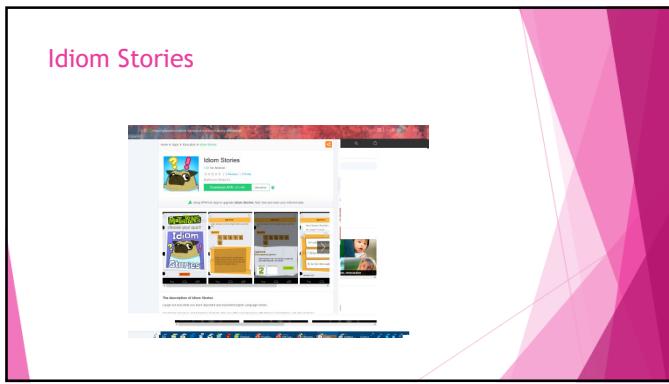
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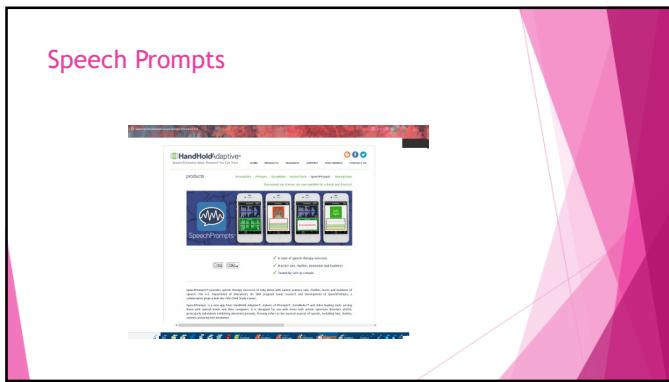
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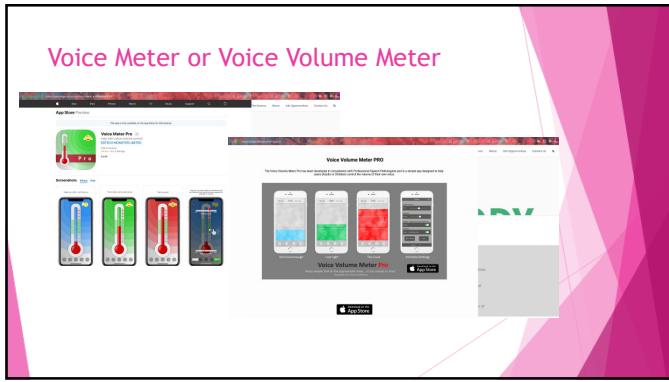
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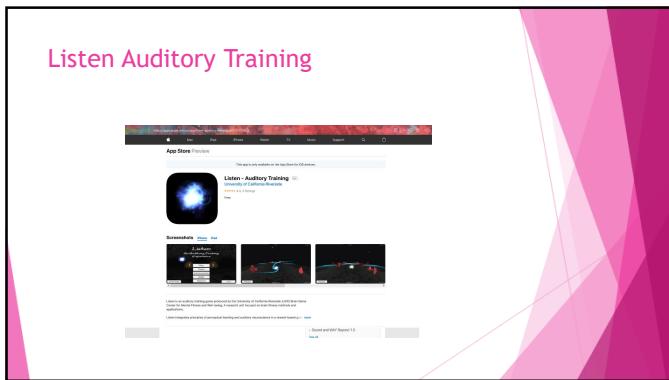
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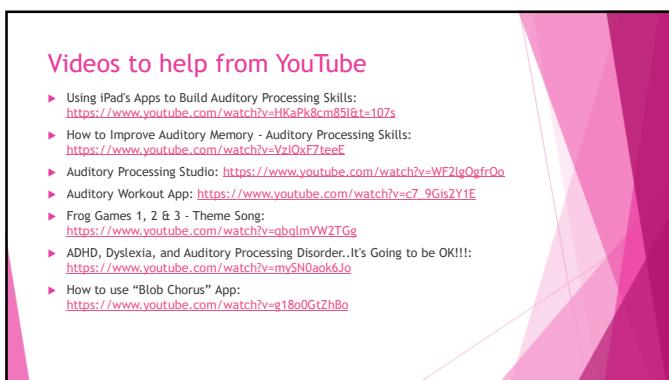
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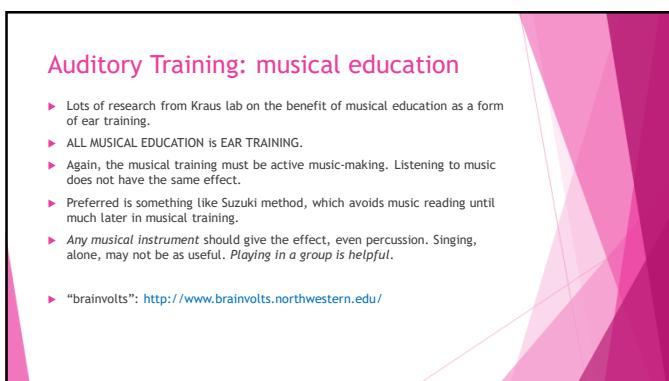
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**Articles on the Effect of musical education**  
 (find articles by searching for "brainvolts" in Internet browser, go to publications)



See: Slater, et al. (2015) *"The role of rhythm in perceiving speech in noise."*  
 See: Slater, et al. (2015) *"Music training improves speech-in-noise perception."*  
 See: Kraus and Strait (2015) *"Emergence of biological markers of musicianship with school-based music instruction."*  
 See: Kraus, et al. (2014) *"Auditory learning through active engagement with sound."*  
 See: Strait and Kraus (2011) *"Musical training shapes functional brain networks for selective auditory attention and hearing speech in noise."*

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**Other resources**

- ▶ Another resource for ideas: Pinterest:  
<https://www.pinterest.com/annus529/aural-rehabilitation/>
- ▶ Anderson (2013) *Strategies to Assess and Improve Communication Repair Skills*, <https://successforkidswithhearingloss.com>
- ▶ Binzer (no date) *Improving Understanding with Communication Strategies*, [www.CochlearAmericas.com](http://www.CochlearAmericas.com)
- ▶ Linguisystems: <https://www.linguisystems.com>
  - ▶ Central Auditory Processing Kit, Books 1-3.
  - ▶ Help for Memory
  - ▶ The Source for Learning & Memory Strategies
  - ▶ No-glamour Memory
  - ▶ Walk10: Memory
  - ▶ The Source for Processing Disorders: Auditory & Language

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