



Remediation via Categorization

Bridge from Diagnosis to Remediation

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Interpretation Models

- ▶ KATZ and BUFFALO MODEL: developed by Jack Katz when at U of New York, Buffalo. Decoding, Tolerance/Fading Memory, Integration, Organization.
- ▶ BELLIS/FERRE: Teri Bellis/Jeanane Ferre: Auditory Decoding, Prosodic, and Integration.
- ▶ MUSIEK/CHERMAK
- ▶ KRAUS, AUDITOR NEUROSCIENCE LAB AT NORTHWESTERN UNIVERSITY: Nina Kraus: APD due to poor precision in neural synchrony, leading to poorer "learning" at higher cortical levels, resulting in less ability to use "top down" mechanism to make sense of sound, especially in noise.

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BUFFALO MODEL

- ▶ Developed in 1970's when Jack Katz at University of New York, Buffalo.
- ▶ Dr. Katz self-identifies as having APD. Interest in topic came from his own experience.
- ▶ At one time, there was heavy emphasis on "site of lesion" but this is not emphasized as much now.
- ▶ Buffalo Model has a full Central Test Battery, but the tests can be used outside of the battery also:
 - ▶ Staggered Spondaic Word Test
 - ▶ Speech in Noise Test
 - ▶ Phonemic Synthesis Test (including a picture version)
 - ▶ Competing Environmental Sound Test (obsolete)

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DECODING FORM OF APD: difficulty accurately and quickly processing what heard

BEHAVIORS ASSOCIATED WITH DECODING APD:

- ▶ History of conductive hearing loss (chronic otitis media)
- ▶ Acts "as though has a hearing loss"
- ▶ Poor phonemic skills. Difficulty with phonics, oral reading, spelling
- ▶ Slow responder
- ▶ Word-finding errors
- ▶ Difficulty keeping up with the flow of communication
- ▶ Prosody errors
- ▶ Difficulty with discourse, oral and written. Low vocabulary.
- ▶ Difficulty following directions.
- ▶ Difficulty hearing in noise.
- ▶ Difficulty with group listening.
- ▶ Articulation errors.
- ▶ BUT HAS GOOD PRAGMATIC SKILLS. Has friends.

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DECODING: SUGGESTED REMEDIATION

- ▶ Improve auditory environment. Augment with visual and multimodal cues.
- ▶ Teach active listening.
- ▶ Use phonetic approach to reading. Teach metaphonemic skills (rhyming, syllable and phoneme segmentation)
- ▶ Encourage listening to audiobooks.
- ▶ Use Clear Speech: clear, concise and repeated directions.
- ▶ Test modification.
- ▶ Provide outlines. Teach how to outline. Pre-tutoring or pre-teaching.
- ▶ Rephrasing and restating.
- ▶ Written instructions.
- ▶ Communication strategies.
- ▶ Teach auditory closure.
- ▶ Provide speech and language services.

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TOLERANCE/FADING MEMORY: difficulty understanding speech under adverse conditions with short-term memory weakness.

BEHAVIORS ASSOCIATED WITH TFM:

- ▶ Poor comprehension of speech-in-noise.
- ▶ Poor reading comprehension skills and handwriting due to poor motor planning.
- ▶ Short attention span, easily distracted.
- ▶ Expressive language problems, including cluttering.
- ▶ Reduced ability to make inferences.
- ▶ Short-term memory weakness.
- ▶ Receptive language weakness in elaborated syntax.
- ▶ Difficulty following directions.
- ▶ Often report hyperacusis.

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TFM: SUGGESTED REMEDIATION

- ▶ Improve acoustic listening environment: preferential seating, remote microphone systems, improve classroom acoustics, etc.
- ▶ Auditory isolation to shut out distracting noise.
- ▶ Obtain attention: eye contact, call name, gentle touch.
- ▶ Teach to take notes and outline. Record class to listen to later.
- ▶ Quiet study areas.
- ▶ Noise sensitivity training
- ▶ Compensatory strategies for auditory memory: rehearsal strategies, improve a delay, use mnemonics and chunking.
- ▶ Identify scripts (classroom and other situations).

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INTEGRATION: difficulty integrating auditory information with other functions, such as visual or nonverbal aspects of speech.

- ▶ BEHAVIORS ASSOCIATED WITH INTEGRATION APD
- ▶ Poor reading comprehension skills, and poor handwriting (poor motor planning)
- ▶ Short attention spans, easily distracted.
- ▶ Expressive language problems, including cluttering. Discourse errors for both oral and written language. Word finding difficulties.
- ▶ Receptive language weakness in elaborated syntax.
- ▶ Reduced ability to make inferences.
- ▶ Short-term memory weakness. Difficulty following directions.
- ▶ Report hyperacusis.
- ▶ Often co-occurring learning disability. Often labeled dyslexic.
- ▶ Poor at sound/symbol relationships. Poor spelling
- ▶ Excessively slow response rate.
- ▶ Difficulty with multi-modal tasks, including appropriate affect and prosody with speech.

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INTEGRATION: SUGGESTED REMEDIATION

- ▶ Note-takers, record classes, scribe for tests.
- ▶ Audio-recordings for texts. Word processing with automatic spell check.
- ▶ Improve phonemic and metaphonologic skills.
- ▶ Structured, phonetic reading method (like Orton-Gillingham)
- ▶ Improve signal-to-noise ratio.
- ▶ Use of visual, tactile, and somatosensory aids.
- ▶ Music training, dancing, singing training.

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ORGANIZATION: Difficulty with sequencing and disorganized in work.

▶ BEHAVIORS ASSOCIATION WITH ORGANIZATION APD

- ▶ Disorganized.
- ▶ Messy writing.
- ▶ Difficulty with sequencing.
- ▶ Difficulty following directions.

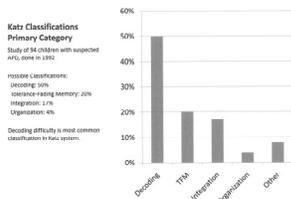
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ORGANIZATION: SUGGESTED REMEDIATION

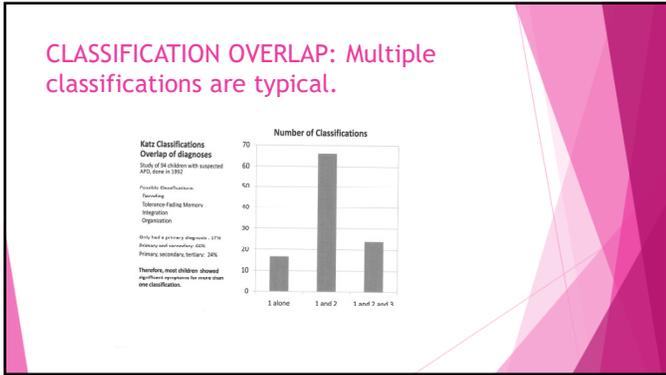
- ▶ Focus on sequencing.
- ▶ Improve executive function skills.
- ▶ Focus on discourse therapy for sequencing of information.
- ▶ Consistent routines at home and school.
- ▶ Use checklists and calendars.
- ▶ Teach to take listener's perspective.
- ▶ Teach Active Listening
- ▶ See "Smart But Scattered" book by Dawson and Guare.

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PRIMARY CLASSIFICATIONS ACCORDING TO BUFFALO MODEL



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- ### Bellis/Ferre Model: based upon suspected site of lesion
- ▶ Auditory Decoding Deficit (Left cerebral hemisphere)
 - ▶ Similar to Buffalo Model, but difficulty with fine auditory discrimination is grouped with difficulty hearing in noise. (BM's Decoding+TFM = Bellis/Ferre DecodingDeficit)
 - ▶ Prosodic Deficit (Right cerebral hemisphere)
 - ▶ Difficulty with fundamental frequency tracking results in poor understanding of prosody. (This category is not really analyzed separately in BM.)
 - ▶ Integration Deficit (Corpus callosum): poor on testing requiring equal contribution from right and left ears. (Similar to BM's Integration).

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- ### Bellis/Ferre: Auditory Decoding Deficit (left hemisphere)
- ▶ BEHAVIORS
 - ▶ Difficulty hearing in noise, or with speakers who do not enunciate clearly, resulting in frequent request for repetition.
 - ▶ Frequent mishearing, and subsequent misunderstanding (similar to what seen in peripheral hearing loss)
 - ▶ Feeling that hearing loss is present, even when acuity is WNL
 - ▶ Auditory fatigue or overload due to extra energy required for listening.
 - ▶ Does better in quiet environments, or when visual or multimodality cues are added.
 - ▶ Co-occurs with poor phonological awareness, so difficulty learning to read.
 - ▶ Co-occurs with phonological production errors (also seen in speech).

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Bellis/Ferre Auditory Decoding: Remediation

- ▶ Improve acoustic access to information
- ▶ Preteach new vocabulary and concepts
- ▶ Augment with visual and/or multimodality cues.
- ▶ Repeat, rather than rephrase, message
- ▶ Phonemic training to focus on discrimination of minimal contrast pairs and speech-to-print skills.
- ▶ Compensatory strategies to include Active Listening, auditory closure skills, and vocabulary enhancement activities.
- ▶ Speech and language therapy to address phonological and language deficits.
- ▶ Substitute verbal foreign language requirement with sign language.
- ▶ Testing in quiet.
- ▶ Notetaking assistance.

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Bellis/Ferre: Prosodic APD (right cerebral hemisphere)

- ▶ BEHAVIORS
- ▶ Difficulty comprehending intent (rather than content) of message.
- ▶ Frequent misunderstandings, complaints of hurt feelings, perceptions of others are abrupt, rude, sarcastic or negative in some way.
- ▶ Difficulty understanding verbal humor (jokes), sarcasm, but enjoys slapstick humor.
- ▶ Blunted affect (fewer facial expressions, flat/monotonic voice).
- ▶ Difficulty understanding messages with subtle changes in prosody that affect meaning.
- ▶ Difficulty comprehending overly abstract communication.
- ▶ Auditory complaints are typically not depending on acoustic environment.
- ▶ Poor pragmatic and social communication abilities.
- ▶ Difficulty with mathematics calculation, art, music

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Bellis/Ferre: REMEDIATION

- ▶ Placement with "animated" teachers who make generous use of prosodic cues and multimodality augmentation.
- ▶ Avoid hints: spell out expectations precisely.
- ▶ Temporal pattern and prosody training.
- ▶ Compensatory strategies training to include social communication and judgment, role-playing, comprehension of underlying intent, topic maintenance, and communication repair strategies.
- ▶ Music lessons, or theater lessons.
- ▶ Visual augmentations in classroom.
- ▶ Use of demonstrations and examples. Multisensory input
- ▶ Training in idioms, puns, rebus puzzles.

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Bellis/Ferre INTEGRATION DEFICIT: corpus callosum

- ▶ BEHAVIORS;
- ▶ Significant difficulty hearing in noise.
- ▶ Difficulty linking the linguistic content with the prosodic intent, leading to possible misunderstandings of the overall message (esp. with sarcasm).
- ▶ Difficulty localizing and tracking a moving sound source, especially if it crosses midline.
- ▶ Sensation that one ear (usually right) is better than other.
- ▶ Difficulty with any task in which interaction between the two hemispheres of the brain is require.
- ▶ Poor bimanual or bipedal coordination abilities.
- ▶ Greater difficulty when task is multi-modal.
- ▶ Difficulty taking dictation.

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Bellis/Ferre INTEGRATION: REMEDIATION

- ▶ Experiential, structured, hands-on environment.
- ▶ Provide lots of examples.
- ▶ Reduce or discontinue use of multimodality cues.
- ▶ Enhance "parts-to-whole" skills.
- ▶ Clear expectations stated clearly and up front.
- ▶ Give notetaking assistance and preferential seating.

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Musiek/Chermak

- ▶ Testing: focuses more on non-verbal, psychoacoustic tests or tests with limited language: such as Gaps in Noise, Frequency Patterns, Dichotic Digits
- ▶ Remediation: high focus on teaching Metacognitive and Metalinguistic skills

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Kraus Theoretical model: abnormal central function is one cause of APD

- ▶ The ABR relies upon **neural synchrony** (precision over time).
 - ▶ Abnormal timing patterns would result in APD behaviors.
 - ▶ Delayed onset/offset responses.
 - ▶ Delayed or abnormal fundamental frequency measurements.
 - ▶ Abnormal precision would result in APD.
 - ▶ Excessive baseline noise.
 - ▶ Poor replicability.
 - ▶ Poor correlation between stimulus and its response.
- ▶ *Abnormal neural synchrony at brainstem level would result in poor quality input at cortical level.*
