

March 2024

NeuroAudiology Newsletter

Editor: Alyssa
Davidson, PhD, AuD
Co-Editors: Frank
Musiek, PhD; Amy
Bradbury, AuD

Mini Symposium on NeuroAudiology

AUDIOLOGY TRIVIA

ANSWERS ON LAST PAGE

- 1) Who is the famous Canadian neuropsychologist who contributed notably to our understanding of dichotic listening?
a) Ptito, b) Hebb, c) Kimura, d) Penfield
- 2) In 1959, Ira Hirsh published a critical paper which was one of the first on what topic?
a) Masking, b) Temporal Processing, c) Speech Recognition, d) Dichotic Listening
- 3) Dr. Frank Lin's recent research covers which topic?
a) Dizziness, b) Meniere's, c) Hearing and Dementia, d) Unilateral Hearing Loss

A virtual "Mini" Symposium titled, *Pathways: The Quest for the Best in CAPD/NeuroAudiology*, will be held on April 27, 2024.

Program Directors: Frank Musiek and Jennifer Shinn

Start Time: 12pm EST (9PST)

Length: 4.5 hours

Cost: Professionals \$25; Students \$10

ASHA CEUs are available.

The following pages include the schedule of events along with the abstracts of each presentation. To register, please see the flyer at the end of this newsletter or contact beckysmith@uky.edu.



Schedule of Events-Mini Symposium

Time ordered agenda in EST with PST in parentheses.

12:00-12:45 (9:00-9:45) **Frank Musiek**, Snapshots over time: The lineage of CAPD/NeuroAudiology-A personal perspective

12:45-1:30 (9:45-10:30) **Doris Bamiou**, A diagnostic approach to the neurological patient with a suspected auditory processing disorder (APD)

1:30-2:15 (10:30-11:15) **Jeanane Ferre**, Using what we KNOW in the clinical assessment of CAPD

2:15-2:30 (11:15-11:30) **Break**

2:30-3:15 (11:30-12:15) **Nina Kraus**, Concussion: Under-recognized biological consequences for the hearing brain

3:15-4:00 (12:15-1:00) **Alyssa Davidson**, Low/mild gain hearing aids use and benefit: A viable management option for those with auditory processing deficits

4:00-4:15 (1:00-1:15) **Jennifer Shinn**, Evaluation and management of integration deficits: A case study

4:15-4:30 (1:15-1:30) **Frank Musiek**, A case study of compromised inter-hemispheric transmission

4:30-4:45 (1:30-1:45) **Maria Abramson**, The Pitch Discrimination Test: A simple test amongst the complexity of pediatric auditory processing

Abstracts for Mini Symposium

Frank Musiek: This presentation will highlight some of the key clinical and basic research that has led to foundational concepts in auditory processing and NeuroAudiology. Starting with the Italian pioneers, this overview will discuss key principles and studies related to dichotic listening, temporal processing, auditory evoked potentials, and interhemispheric processing as they have evolved over our history. Also included will be a review of significant etiological information on both pediatric and adult populations based on “break-through” studies over our recent history.

Abstracts Continued

Doris Bamiou: APD may arise due to several neurological disorders in subjects across the age span. Audiology Clinicians need to maintain a high clinical index for suspicion in cases of sudden or progressive onset of listening difficulties in both children and adults, as APD may be the first or only feature of neurological disease. Brain tumours, stroke, head trauma, prematurity or low birthweight, epilepsy, infectious causes including HIV, demyelinating conditions and other degenerative brain disorders that include the dementia syndromes may all lead to the clinical presentation of APD. While a reliable APD diagnosis requires the presence of normal audiometric thresholds, several neurological subjects will have abnormal hearing. Additionally, cognitive and language factors will need to be considered to inform appropriate choice of auditory processing tests and interpretation of test results.

This presentation will discuss the diagnostic approach for adults with suspected neurological type APD. The “red flags” from the patient’s clinical presentation and test results that indicate the need for imaging or electrophysiology tests will be presented. A systematic approach to diagnosis in terms of test choice and interpretation in light of additional assessments will be outlined. The clinical presentations of APD in stroke patients and in subjects with dementia will also be discussed.



Abstracts Continued

Jeanane Ferre:

While we may broadly refer to auditory processing as “what we do with what we hear,” we know that this concept encompasses an array of skills that begin at the outer ear and end when a response is provided – not all of which are truly auditory in nature. If we are to treat CAPDs effectively we must diagnose them specifically. As ethical practitioners, we must ensure that the assessment of, and by extension treatment for, a central auditory processing disorder is guided by the “state of the science” that underlies this complex set of skills. Understanding (and acknowledging) all the skills taxed by various behavioral CAP assessment tools ensures a valid specific diagnosis that “makes sense” based on the science of CAPD and minimizes misdiagnoses. We are then able to provide effective evidence-based treatment when a CAPD is indicated and recommend resources for follow-up with other professionals when it is not. This brief session will discuss current assessment tools that may be used in a test battery to evaluate central auditory function.



Abstracts Continued

Nina Kraus:

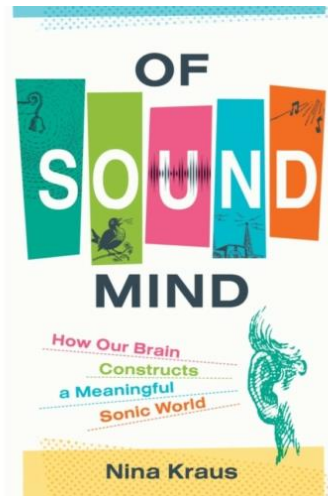
Making sense of sound is one of the hardest jobs we ask our brain to do. With millisecond precision, the auditory system must encode sound ingredients and assign meaning to them. In her award-winning book, *OF SOUND MIND: How Our Brain Constructs a Meaningful Sonic World*

(<https://mitpress.mit.edu/books/sound-mind>), Dr. Nina Kraus examines the partnership between sound and the brain, showing that auditory processing drives many of the brain's core functions and leaves a fundamental imprint on who we are as human beings.

A concussion can disrupt the intricate and delicate neural synchrony that underlies hearing. Through NIH-funded studies examining the effects of sports-related concussion in Big 10 collegiate athletes and in children, Kraus and colleagues in the Brainvolts laboratory have shown that a concussion can disrupt the hearing brain. Even mild traumatic brain injury can impede sound processing, especially in challenging listening environments.

Measuring sound processing in the brain using the frequency following response (FFR), has the potential to improve concussion diagnosis, monitor recovery and inform return-to-play and return-to-learn decisions.

-Supported by the National Institute of Neurological Disorders and Stroke [NINDS]; NIH NINDS R01-NS102500 and the Knowles Hearing Center



Abstracts Continued

Alyssa Davidson:

Low (or mild) gain hearing aids (LGHAs) are increasingly considered for individuals with normal peripheral hearing but self-reported auditory complaints, often referred to as individuals with auditory processing deficits. The Tinnitus and Hearing Survey-Hearing Subscale (THS-H) offers a normative cutoff, aiding identification of significant self-reported hearing difficulties (SHD). This research assesses the benefits of LGHAs as a management option for individuals with normal hearing sensitivity and significant SHD, comparing LGHA use and benefit to individuals without SHD and those with peripheral hearing loss. Participants across four groups, including those with or without SHD and peripheral hearing loss were recruited. Participants completed questionnaires that addressed hearing aid usage, benefit, SHD and tinnitus. Individuals with significant SHD and hearing sensitivity within the normal range (NHT) reported higher LGHA usage and benefit than individuals with normal hearing difficulties (NHD) and NHT. Comparable use and benefit were noted between groups with significant SHD regardless of peripheral hearing loss status. The findings support LGHAs as a suitable management option for individuals with AD, NHT and SHD, as indicated by hearing aid use and benefit. Quantifying the level of perceived auditory processing deficits (i.e., SHD), notably with the THS-H, enhances sensitivity in identifying those who may benefit from this management option.



New Technology: Preventing Hearing Loss In NICU Infants

NICUs are noisy places. According to Almadhoob and Ohlsson (2020), sound levels in NICUs range from 7 dB to 120 dB and often exceed the maximum acceptable level of 45 dB recommended by the American Academy of Pediatrics. Electrical engineer Dr. Lichauan Liu of Northern Illinois University has designed technology to prevent hearing loss in newborns who are in the neonatal intensive care unit (NICU). The technology was approved by the FDA in July 2023. Dr. Liu began a partnership with Invictus Medical to commercialize the active noise control device which can reduce harmful noises via wave cancelling technology, while still maintaining communication between newborns and their parents or caregivers.



Recent Articles of Interest

- Masri, S., Deng, D., Wang, W., Luo, H., Zhang, J., & Bao, S. (2023). Contributions of Hearing Loss and Traumatic Brain Injury to Blast-Induced Cortical Parvalbumin Neuron Loss and Auditory Processing Deficits. *Journal of Neurotrauma*, 40(3-4), 395-407.
<https://www.liebertpub.com/doi/abs/10.1089/neu.2022.0179>
- Aryal, S., & Prabhu, P. (2023). Understanding misophonia from an audiological perspective: A systematic review. *European Archives of Oto-Rhino-Laryngology*, 280(4), 1529-1545.
<https://link.springer.com/article/10.1007/s00405-022-07774-0>

AUDIOLOGY TRIVIA ANSWERS

- 1) The famous neuropsychologist is (c) Dr. Kimura.
- 2) Ira Hirsh published a critical paper on (b) temporal processing.
- 3) Frank Lin's recent research is focused on (c) hearing and dementia.

PAST NEWSLETTERS: Past newsletters can be found at:

hearinghealthmatters.org/category/pathways-society/

SAVE THE DATE

PATHWAYS: QUEST FOR THE BEST IN CAPD/NEUROAUDIOLOGY

A virtual mini-symposium sponsored by Pathways & the UK Department of Otolaryngology - Head & Neck Surgery

OVERVIEW

This conference assembles a unique mixture of noted practicing clinicians and researchers that will address contemporary topics in CAPD and NeuroAudiology. The combination of science and practice approaches represented by the outstanding faculty promises a highly informative learning experience. ASHA CEU's will be provided. Program Directors: Frank Musiek & Jennifer Shinn.

PRESENTATIONS

Alyssa Davidson, - AuD, PhD, *Walter Reed National Military Medical Center*, Low/mild gain hearing aids use and benefit: A viable management option for those with auditory processing deficits.

Doris Bamiou – MD, PhD, *University of London*, A diagnostic approach to the neurological patient with a suspected auditory processing disorder (APD).

Frank Musiek – Ph.D., *University of Arizona*, Snapshots over time: The Lineage of CAPD/NeuroAudiology – A personal perspective & a case study of compromised inter-hemispheric transmission.

Jeanane Ferre – Ph.D., *Private Practice*, Using what we KNOW in the clinical assessment of CAPDs (or. "does that make sense?")

Jennifer Shinn - Ph.D., *University of Kentucky*, Evaluation and Management of Integration Deficits: A Case Study

Maria Abramson – AuD, *Private Practice*, The Pitch Discrimination Test: A Simple Test Amongst the Complexities of Pediatric Auditory Processing

Nina Kraus - Ph.D., *Northwestern University*, Concussion: Under-recognized Biological Consequences for the Hearing Brain.

Cost: \$25 for professionals, \$10 for students (contact beckysmith@uky.edu if issues with registration arise)

SATURDAY

APRIL 27, 2024

[REGISTER HERE](#)