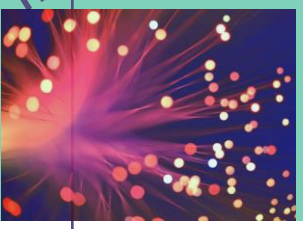
2022!! HAPPY NEW YEAR!

January 2022

NeuroAudiology Newsletter

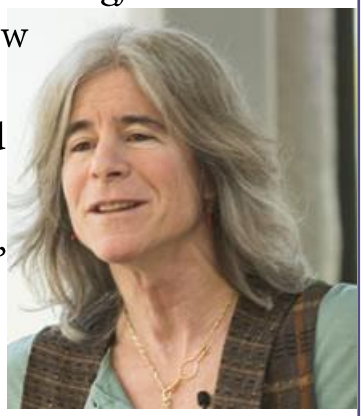


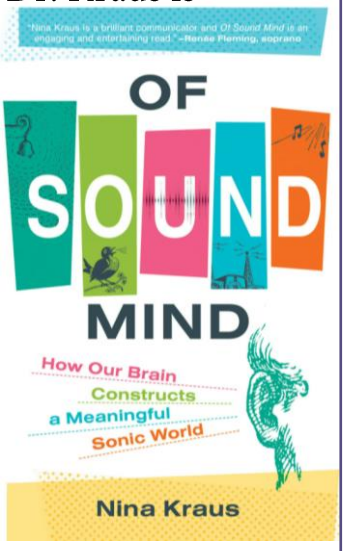
Editor: Alyssa Davidson, PhD, AuD, CCC-A
Supervisor: Frank Musiek, PhD, CCC-A

Of Sound Mind: An Interview with Dr. Nina Kraus

"The magic of hearing depends on the entire processing system working together"
-Dr. Kraus; Of Sound Mind

Nina Kraus, PhD (pictured below), is a Neuroscientist and Professor of Neurobiology at Northwestern University. As of Fall 2021, she is also the author of the book, *Of Sound Mind: How Our Brain Constructs a Meaningful Sonic World*. I had the opportunity to read this work and interview Dr. Kraus. Dr. Kraus had her own auditory world initially shaped by growing up learning three languages, English, Italian, and Music. After reading through and discussing her work with her, it became very clear that Dr. Kraus is motivated to engage readers of any background who may be curious about how the auditory brain works. She accomplished this with carefully crafted wording, engaging pictures and examples.





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AUDIOLOGY TRIVIA

ANSWERS ON THE LAST PAGE

1) The Frequency Following Response measures electrical signals at the scalp primarily from what structure in the auditory pathway?
a) Midbrain, b) Cortex, c) Cochlear Nucleus, d) Auditory Nerve

2) True or False. Athletes have lower levels of neural noise making it easier to process sounds in background noise.

3) What are some of the components that help us differentiate sounds?

Of Sound Mind: An Interview with Dr. Nina Kraus

During our interview, Dr. Kraus discussed that auditory processing is more than just understanding speech in noise; it is in fact, understanding the whole auditory world around us. The Frequency Following Response (FFR) is highlighted as a useful tool to address a number of different problems. For example, the syllable "*da*" when used with the FFR could predict reading ability from 3-8 years old. Dr. Kraus discussed how we can use this information to implement change early on by providing a richer auditory experience.

Additional content in this book was also discussed in the interview such as how the brain is an elegant timekeeper and how poor temporal processing could result in poor hearing [aid] outcomes. I think one of the most interesting aspects of this book is the chapter that covers the biological impact of "safe" noise and how it can still have negative impacts on the auditory brain. In the interview, Dr. Kraus explained how noise pollution from everyday life (e.g., your refrigerator running, beeps at the airport ticket line) can desensitize your auditory experience and although it may not cause threshold changes, it may be causing increased stress levels and possibly reorganization of the auditory processing centers in the brain.

Dr. Kraus described this book as "a love letter to sound" and that is exactly what it is. Any person interested in music, sound, or the world around us will get enjoyment out of reading this book.
The full 45-minute interview can be viewed here: https://youtu.be/-qQ7LFO5qG4

Dr. Kraus discussed the BEAMS Hypothesis during the interview and interested parties can find out more information in her recently published article. Further, Dr. Kraus was featured in the Wall Street Journal and LA Times discussing Of Sound Mind:

- Kraus, N. (2021). Memory for sound: The BEAMS Hypothesis [Perspective]. *Hearing Research.*
- The Wall Street Journal: Hearing Too Much in a Noisy World
- LA Times: Keep it down: The dangers of human-created sound

For more information on Dr. Kraus and the studies her Auditory Neuroscience Laboratory is involved in, go to www.brainvolts.northwestern.edu

NeuroAudiology/CAPD Corner

Topic: Use for the Auditory Brainstem Response (ABR)

In the1990s, considerable controversy arose over the concern that ABR may be missing small acoustic tumors (appropriately termed vestibular schwannomas [VS]). ABR has always had high sensitivity (~ 95%) for the detection of VS. However, in the 1990s, otologically driven articles impugned the value of ABR due to hit rates for small VS that were not considered acceptable. Now, years later, data is beginning to show that this may not have been a well-conceived notion. A full discussion may be better suited for another time. What was unfortunate is that the movement away from ABR for VS identification also turned audiologists away from ABR as a diagnostic tool for other disorders. For example, auditory neuropathy (ANSD), can occur in both infants and adults, often without radiologic indicators. An ABR is essential to making this diagnosis. Various types of head injuries, with associated auditory problems, can yield normal MRI results. In these cases, ABR and other evoked potentials become invaluable. ABR can also be of value in evaluating oto- and neurotoxicity, for which MRI is often of little help. Finally, ABR can be of value in evaluating auditory involvement in degenerative disorders such as multiple sclerosis.

The point of this short script is to encourage audiologists to dust off their evoked potential equipment and use it. As mentioned, there are clinical populations for which ABR can and should be applied. Audiology needs to embrace and defend the use of its most powerful diagnostic tool. Both patients and our field will benefit.

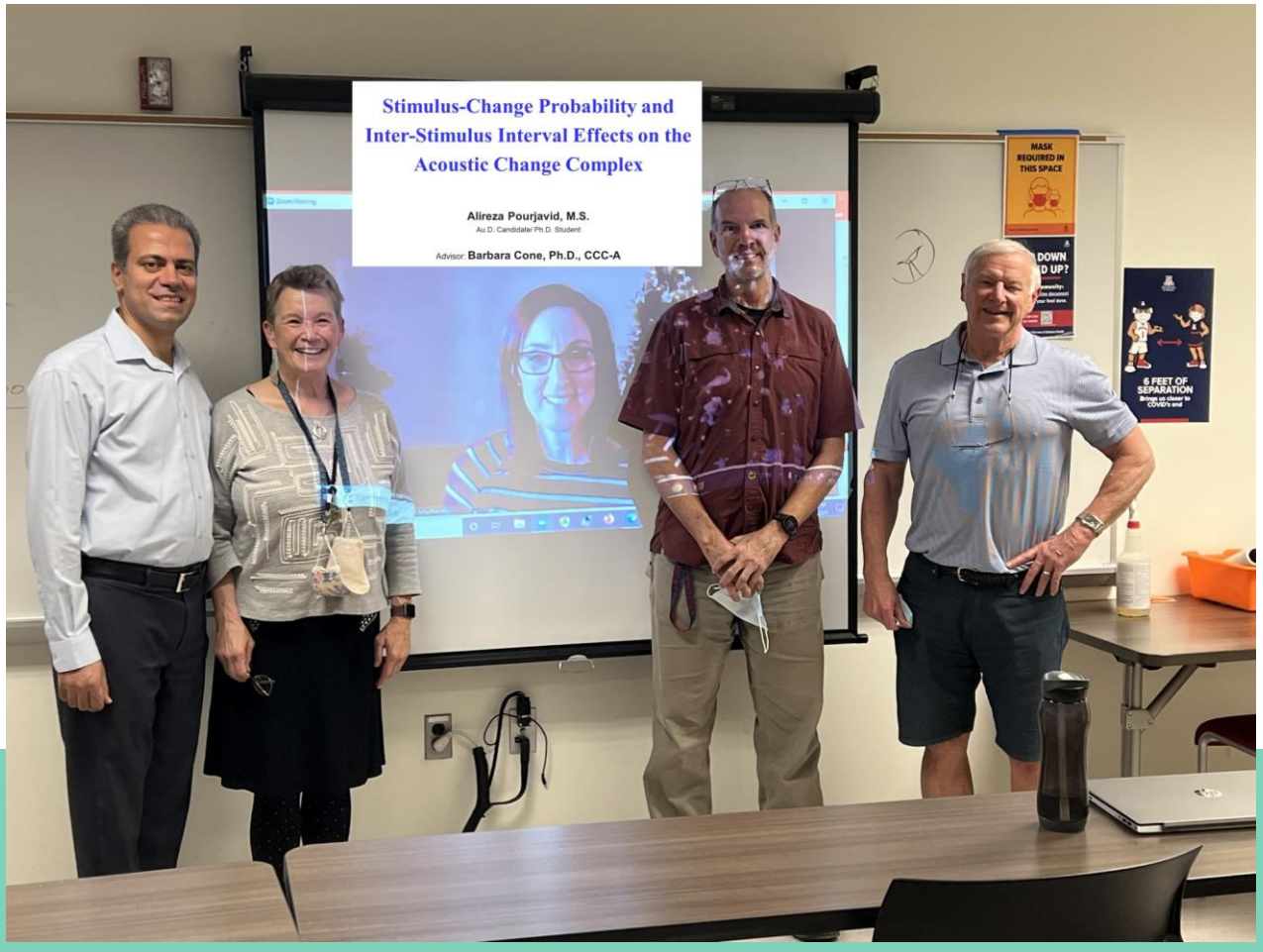
CAPD Corner Suggested Readings

- DiStadio, A., et al. (2018). Sudden hearing loss as an early indicator of multiple sclerosis: A systematic review. European Review of Medical and Pharmacological Sciences, 22, 4611-4624.
- Koors, P., et al. (2013). ABR in the diagnosis of vestibular schwannomas: A meta-analysis. American Journal of Otolaryngology, 34, 195-204
- Vandervelde, C. & Connor, S. (2009). Diagnostic yield of MRI for audiovestibular dysfunction using contemporary referral criteria: Correlation with presenting symptoms and impact on clinical management. Clinical Radiology, 64, 156-163.

Congratulations Dr. Pourjavid!

Alireza Pourjavid, member of the Neuroaudiology Lab, successfully defended his Doctor of Audiology project titled Stimulus-Change Probability and Inter-Stimulus Interval Effects on the Acoustic Change Complex on December 6, 2021. Pictured below from left: Alireza Pourjavid, AuD, Barbara Cone, PhD (chair), Leah Fabiano-Smith, PhD (committee member), David Velenovsky, PhD (committee member), and Frank Musiek, PhD (committee member). Dr. Pourjavid will continue at the University of Arizona with Dr. Cone to complete his PhD.

A well-deserved congratulations, Ali ! We look forward to your future contributions to the field.



Collaboration: USA and the Land Down Under

Alyssa Davidson, PhD, AuD, CCC-A (editor of the newsletter) teamed up with Angela Loucks Alexander, AuD, CCC-A, MZAZ (Director of the Auditory Processing Institute in Australia) and her group to publish an interesting case study on auditory processing and auditory training. Currently published in the New Zealand Audiological Society Bulletin, this case study is in preparation to be considered in a peer reviewed journal. This case study describes a 28-year-old female with an auditory processing disorder underlying her hearing loss. Prior to auditory training, her subjective hearing functional scores were suggestive of a severe handicap. Following a 14-week auditory training program with Dr. Alexander, her scores indicated no psychosocial impact from the auditory processing disorder ! This article is very timely and highlights the importance of diagnosing and treating auditory processing disorders.

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New Zealand Audiological Society Bulletin

FEATURE ARTICLES

Auditory Processing Difficulties and Hearing Loss: A Case Study Involving Auditory Training and an Adult Bimodal Client

Angela Loucks Alexander, AuD, CCC-A, MZAS
Kaila Howard Au.D. CCC-A, F-AAA
Tricia Nechodom, AuD, PASC
Alyssa Davidson, Ph.D., AuD, CCC-A
Fatima Abbas, BS

AUDIOLOGY TRIVIA ANSWERS

1) The Frequency Following Response is primarily measuring signals that originate in the (A) midbrain.
2) True !
3) Some sound ingredients (components) are: Pitch, Timing, Timbre, Intensity, Harmonics, FM, and AM