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Clinician and Patient Perspectives on Unexplained Hearing Complaints, in partnership with the American Academy of Audiology

Aryn Kamerer, PhD

Disclosures

- **Presenter Disclosure**: Financial: Aryn Kamerer was funded by the NIH for portions of this research: NIDCD R01DC016348, NIDCD T32DC000013, NIGMS P20GM109023. Utah State University funded other portions. She received an honorarium for presenting this course. Non-financial: Aryn Kamerer has no relevant non-financial relationships to disclose.
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National Institutes of Health

HEARING HEALTH + PHYSIOLOGY LAB

Emma Eccles Jones College of Education and Human Services
Utah State University

Limitations/Risks

- The applicability and accuracy of the course content may vary by the clinical, geographical, and cultural context; you should evaluate the course accordingly.
- As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.
- The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.
- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learning Outcomes

After this course, participants will be able to:

- Describe the relationship between the Basic Audiologic Evaluation and self-reported measures of hearing ability.
- Identify themes in patient, clinician, and student perspectives on the evaluation appointment of people with unexplained hearing concerns.
- Discuss how to critique evaluation practices and wording choices when interacting with patients with hearing concerns that cannot be explained by the basic audiologic evaluation.

Thank you

AMERICAN ACADEMY OF AUDIOLOGY

Thank you

aural rehabilitation lab

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Cassidy Lewis
Kourtney Payne

Macall Walker

Hearing Health Lab


Kyler Vugteveen
Makenzie Meadows


Alex Jennings
Emily Fullington

Will Allen

Emma Eccles Jones College of Education and Human Services
Utah State University

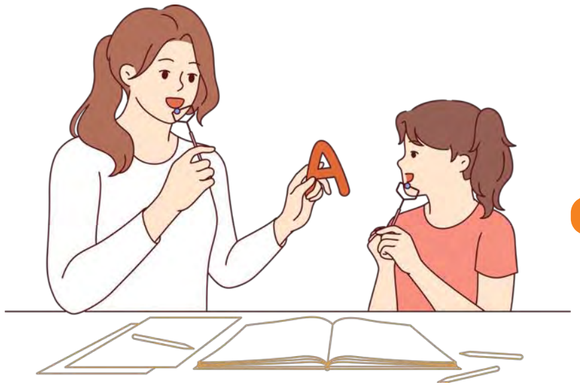
BOYS TOWN National Research Hospital®


Stephen Neely, DSc
Sara Harris, AuD

KU THE UNIVERSITY OF KANSAS

WorldTeach

KU MEDICAL CENTER The University of Kansas



BOYS TOWN National Research Hospital

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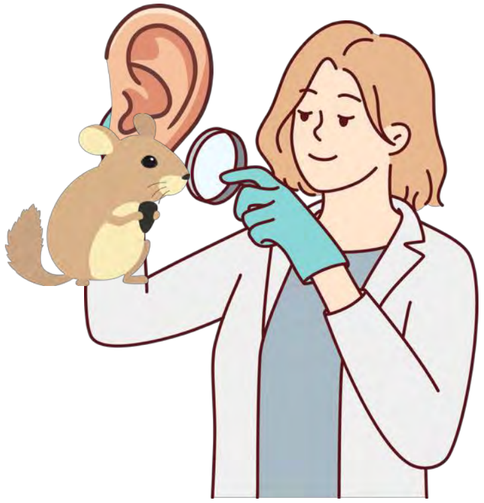

Agenda

- What is an unexplained hearing disability
- Historical perspective of the ‘Basic Audiologic Evaluation’
- The problem with the ‘Basic Audiologic Evaluation’
- Patients’ perspectives on seeking hearing healthcare
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What is a Disability and Handicap?

A physical or mental impairment that substantially limits one or more major life activity

Americans with Disabilities Act

What is a Disability and Handicap?

A physical or mental impairment that substantially limits one or more major life activity

Americans with Disabilities Act

impairment

disability

What is a Disability and Handicap?

A physical or mental impairment that substantially limits one or more major life activity

Americans with Disabilities Act

impairment

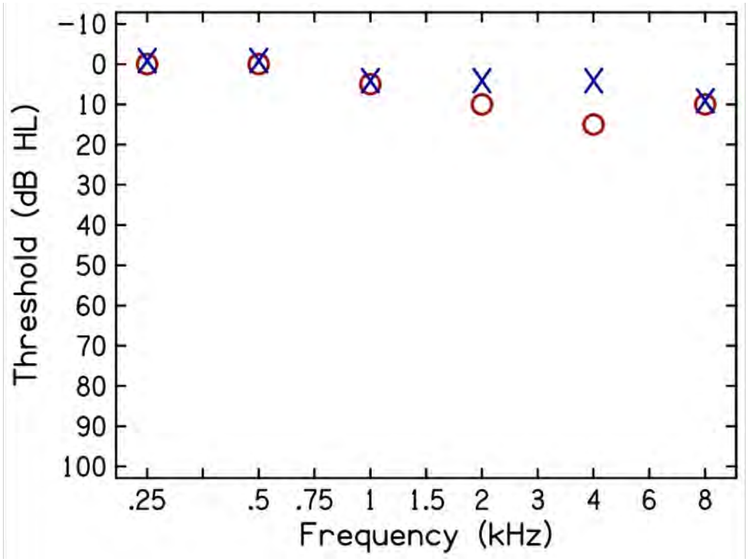
disability

I can’t hear when I go out to dinner with my friends

handicap

It’s embarrassing to ask them to repeat themselves, so now I just stay at home

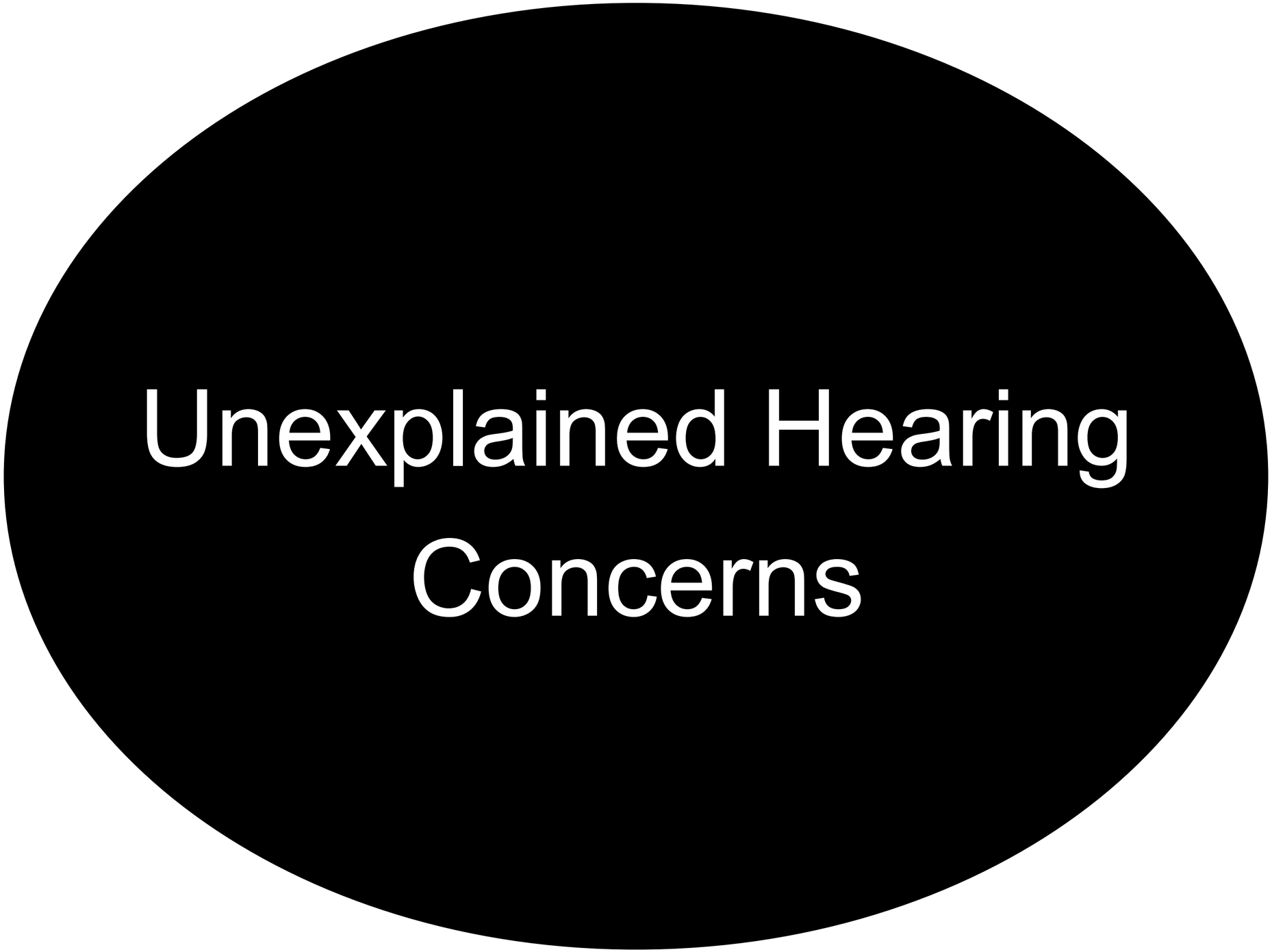
What is Unexplained Hearing Difficulty?



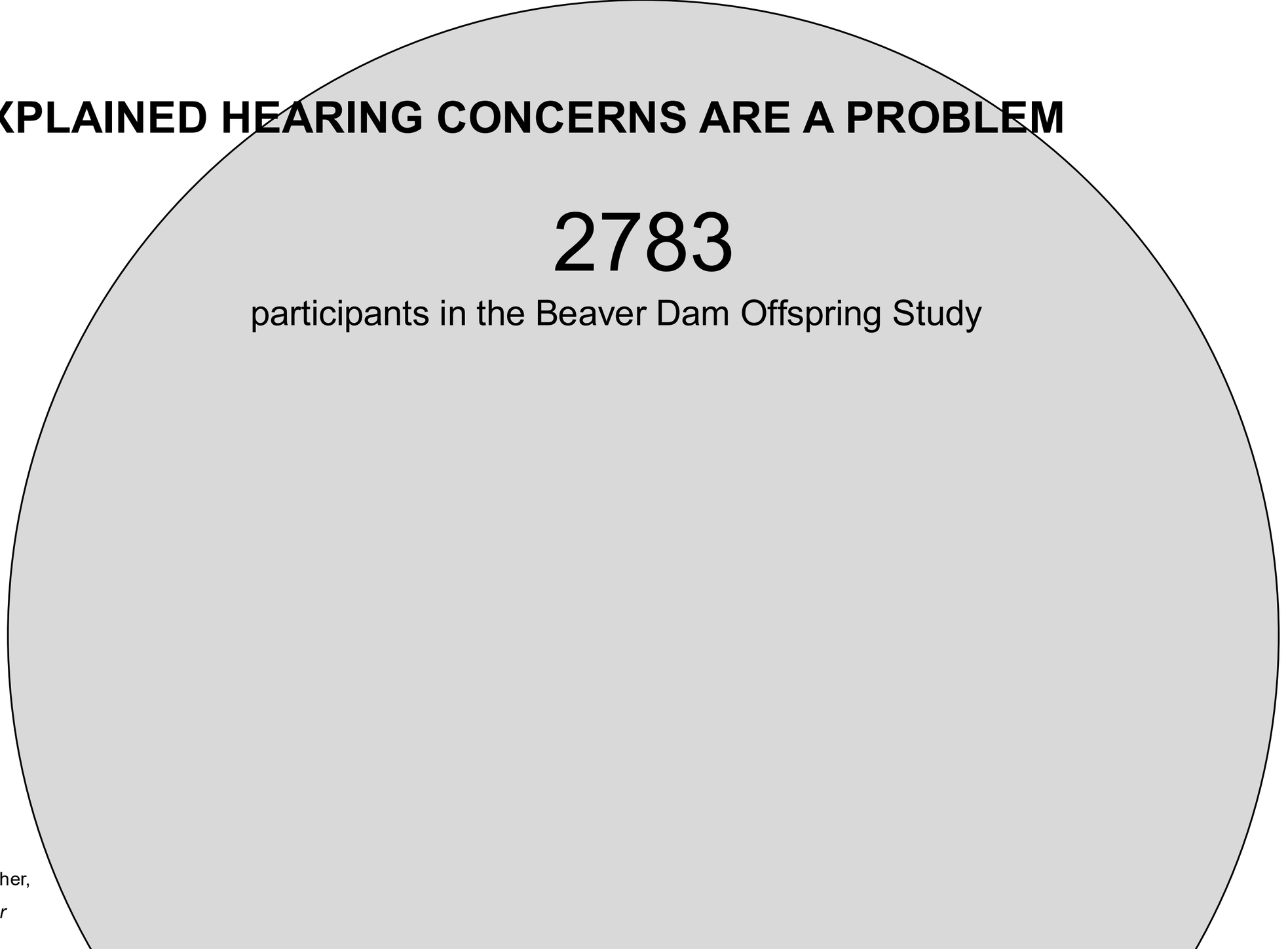
	Left	Right
SRT	5	10
Word Rec	100%	95%

I can’t hear when I go out to dinner with my friends


metabolic disorder
alzheimer's disease and dementia
receptive aphasia
auditory dysacusis
auditory neuropathy
obscure auditory dysfunction
auditory disability with normal hearing
idiopathic discriminatory dysfunction
dyslexia
king-kopetzky syndrome
cognitive decline
hidden hearing loss
auditory processing disorder
neurocognitive disorder
cochlear synaptopathy
central presbycusis

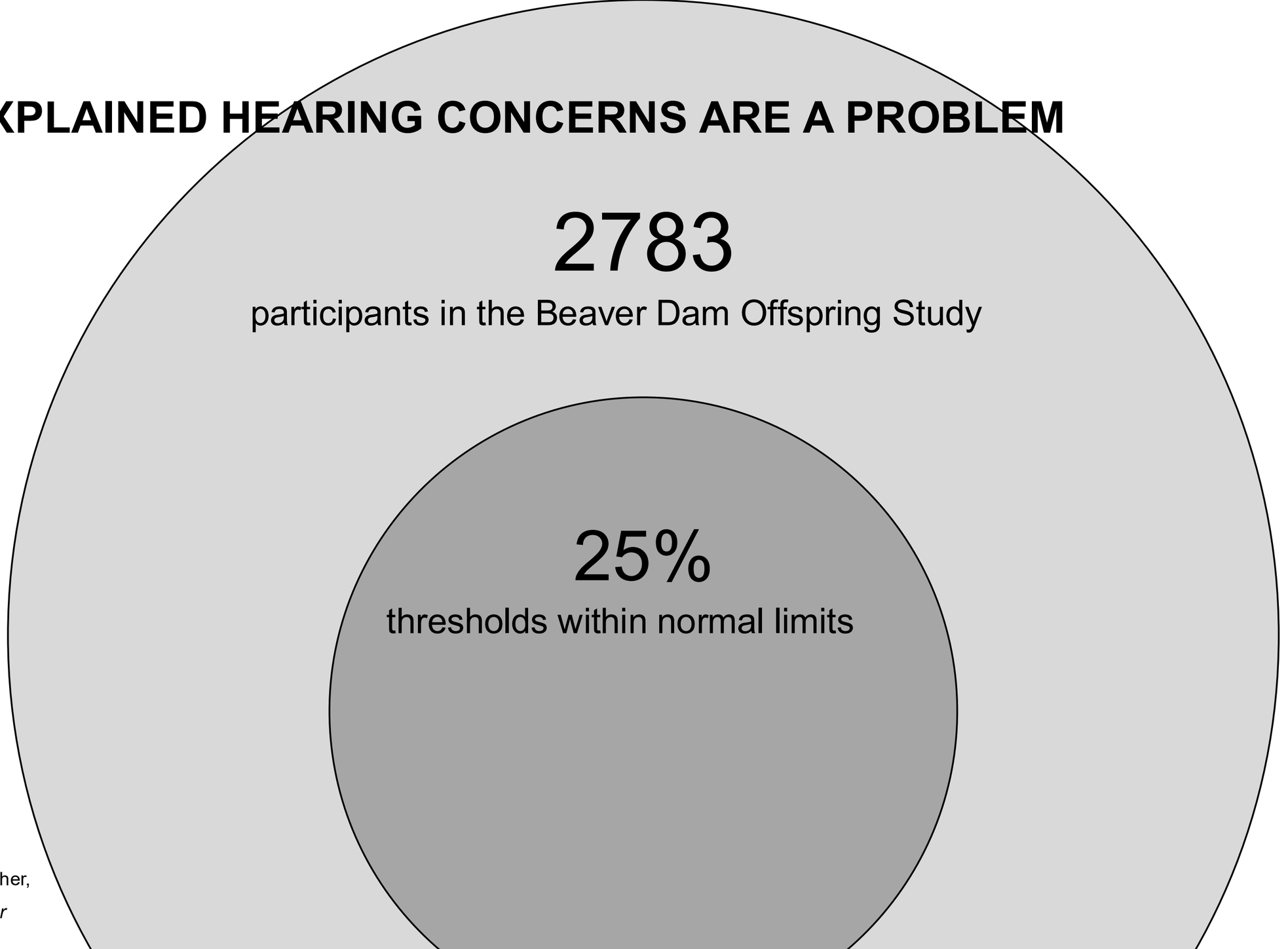

Unexplained Hearing
Concerns

UNEXPLAINED HEARING CONCERNS ARE A PROBLEM



Tremblay, Pinto, Fischer, et al. (2015) *Ear Hear*

UNEXPLAINED HEARING CONCERNS ARE A PROBLEM



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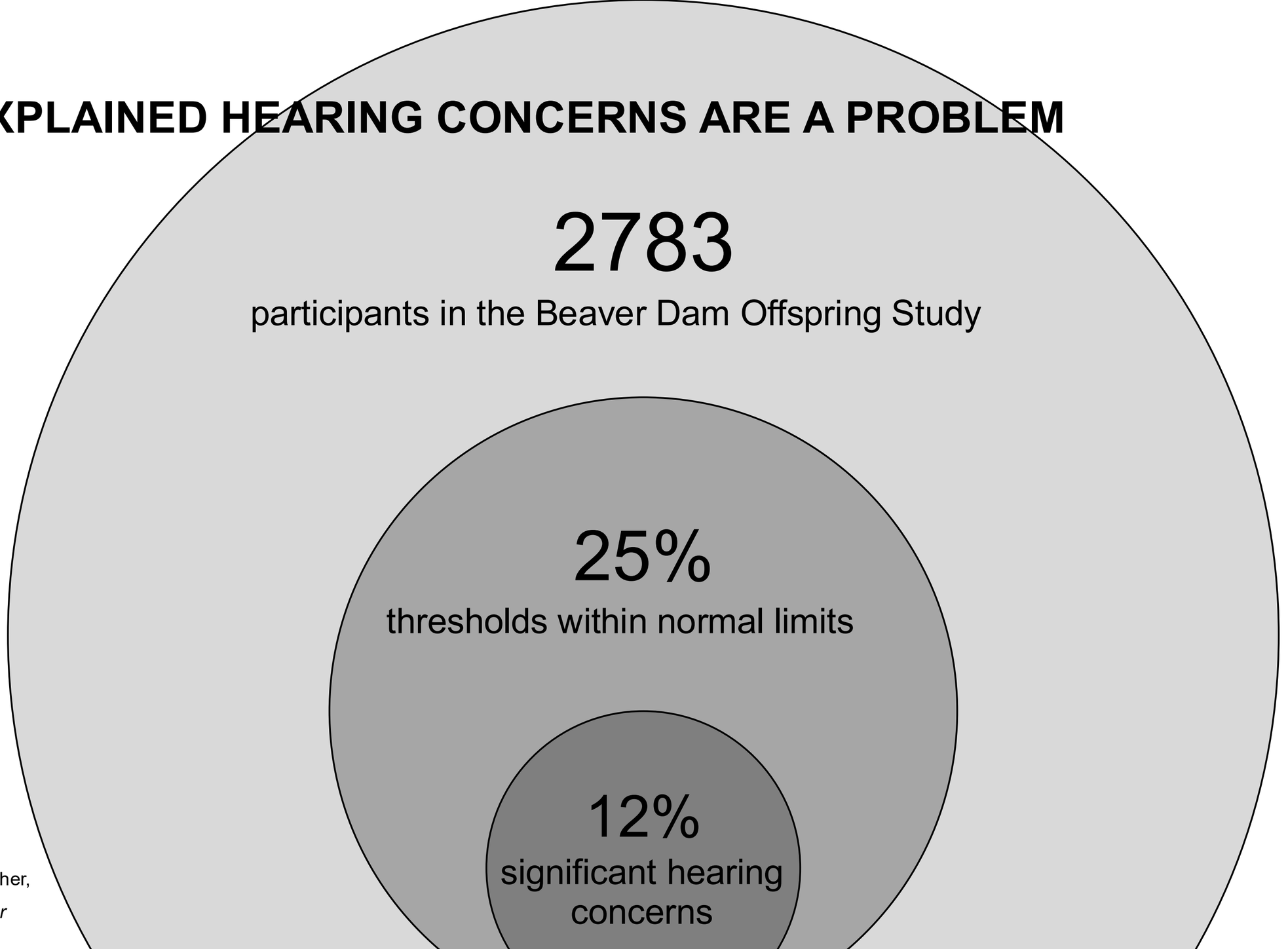


Tremblay, Pinto, Fischer, et al. (2015) *Ear Hear*

UNEXPLAINED HEARING CONCERNS ARE A PROBLEM

47-67% of audiologists see **at least 1 patient per month** with an unexplainable hearing disability

---

Koerner, Papesh, and Gallun (2020) *AJA*

Kamerer, Barker, Harris, et al. (*in Prep*)

UNEXPLAINED HEARING CONCERNS ARE A PROBLEM

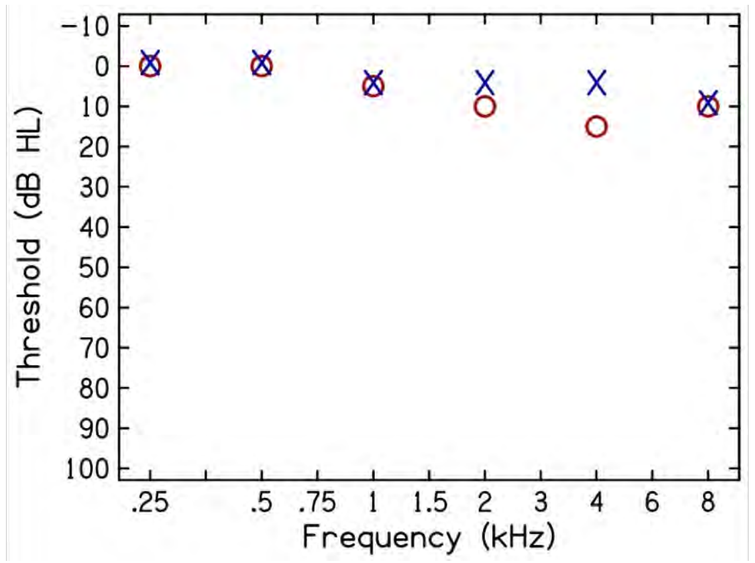
18-24% of audiologists see **at least 4 patients per month** with an unexplainable hearing disability

---

Koerner, Papesh, and Gallun (2020) *AJA*

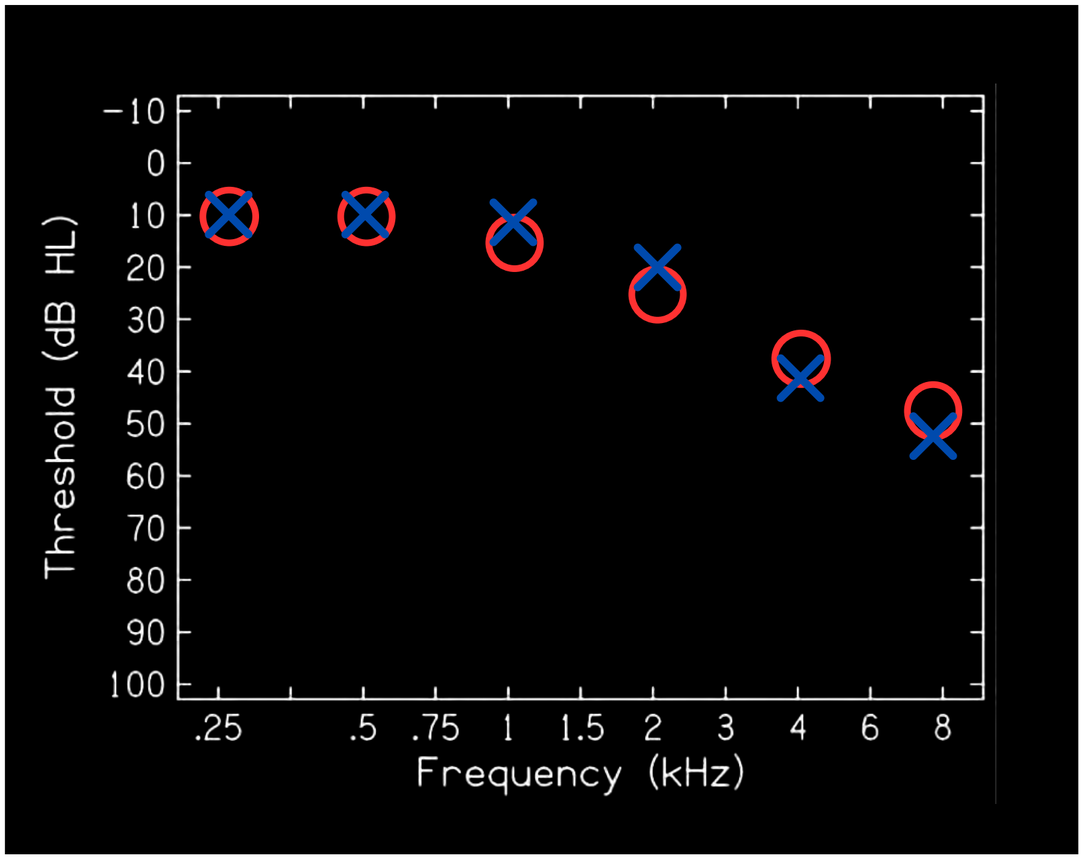
Kamerer, Barker, Harris, et al. (*in Prep*)

LACK OF PROFESSIONAL GUIDANCE FOR DIAGNOSIS AND TREATMENT



	Left	Right
SRT	5	10
Word Rec	100%	95%

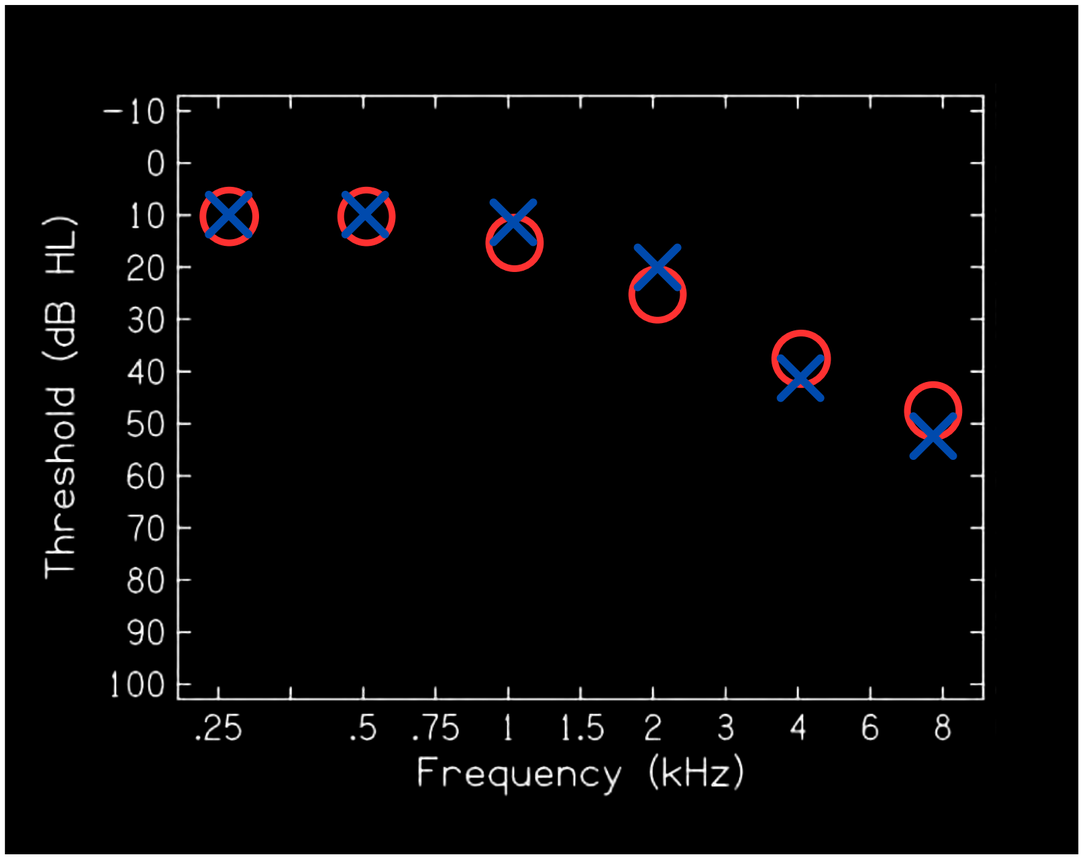
AUDIOMETRIC AMBIGUITY



Great for...

- Documenting loss of sensitivity
- Fitting hearing aids
- Differentiating conductive from sensorineural pathology

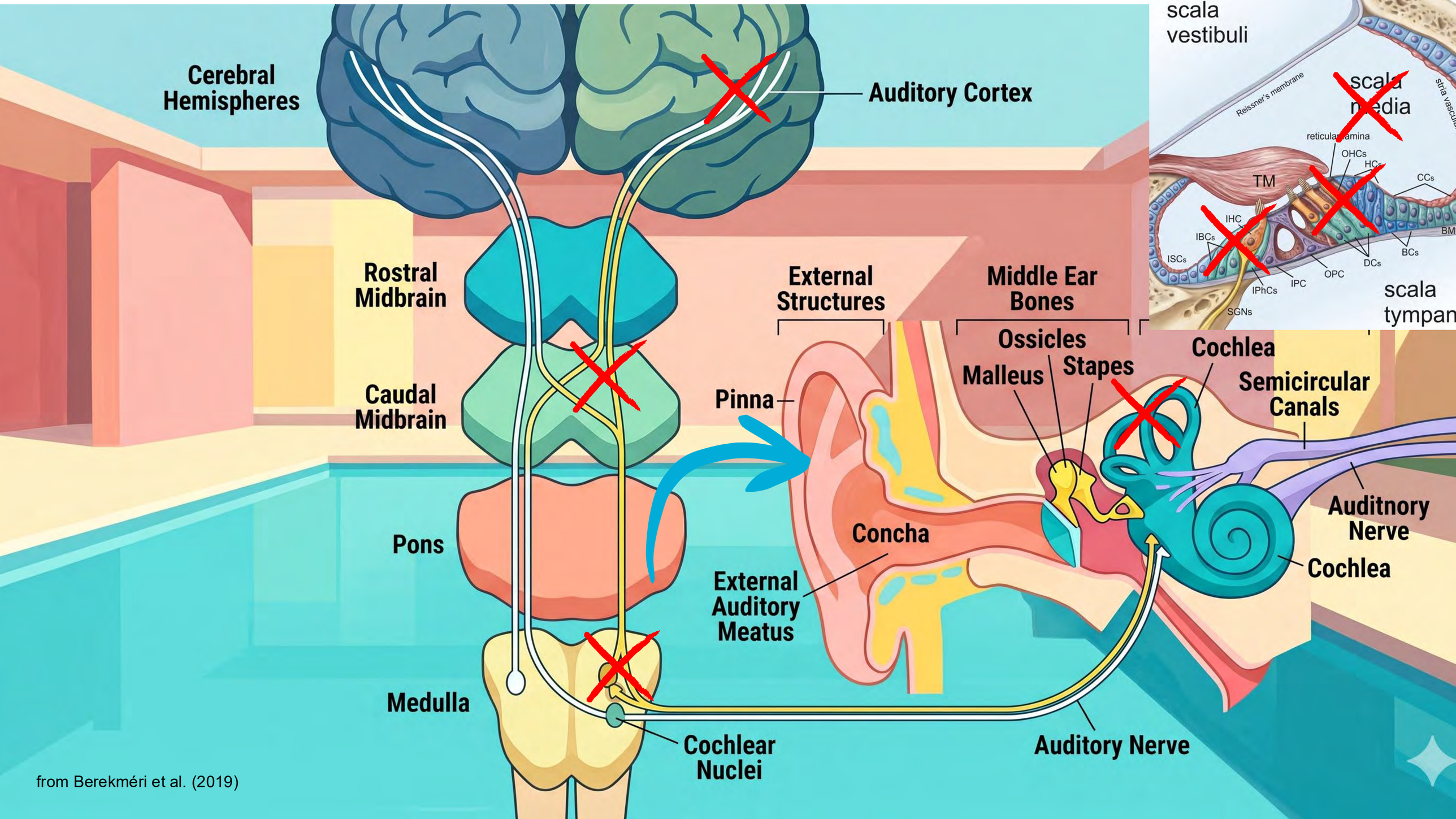
AUDIOMETRIC AMBIGUITY



Not so great for...

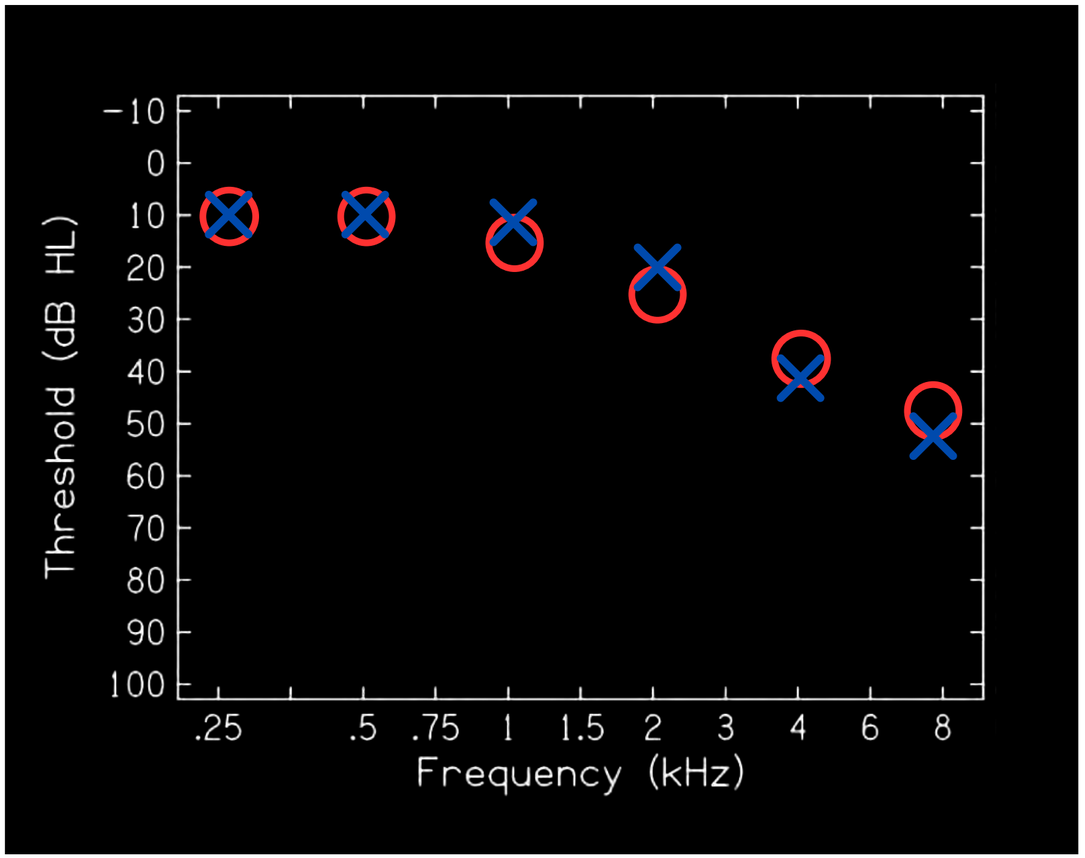
- Differentiating sensory and neural pathology
  - Puretone thresholds may not change until neural loss > 80-95%

    Schuknecht and Woellner, 1955; Lobarinas et al., 2013; Chambers et al. (2016)



from Berekméri et al. (2019)

AUDIOMETRIC AMBIGUITY



Not so great for...

- Differentiating sensory and neural pathology
  - Puretone thresholds may not change until neural loss > 80-95%

    Schuknecht and Woellner, 1955; Lobarinas et al., 2013; Chambers et al. (2016)

- Reflecting reported (or demonstrated) perceptual difficulties

  Bharadwaj et al., 2015; Gordon-Salant, 2005; Grose and Mamo, 2010; Ruggles et al., 2011

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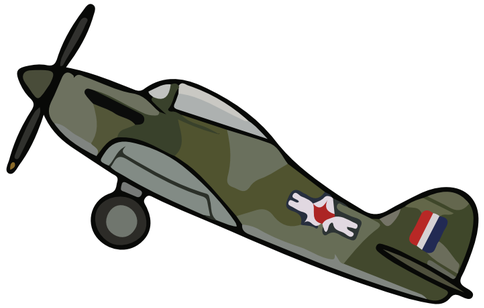
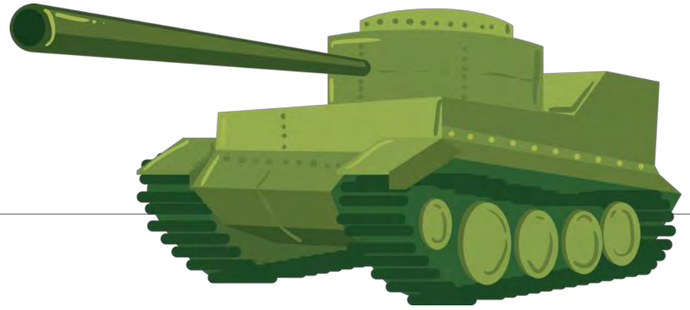
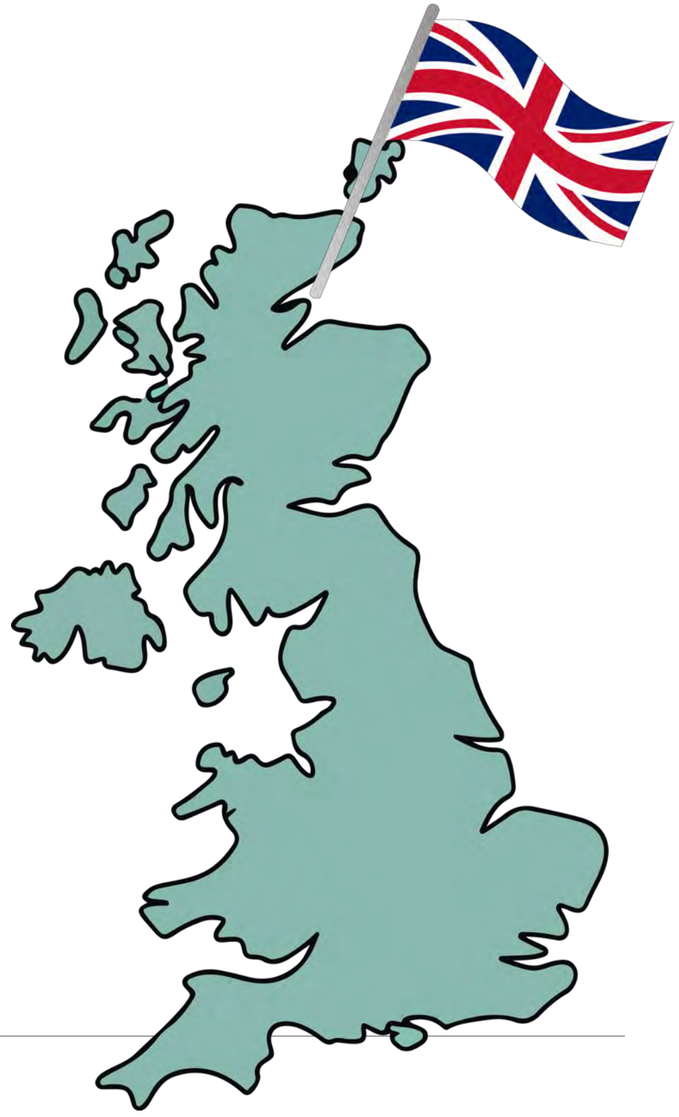
HISTORY OF THE BASIC AUDIOLOGIC EVALUATION

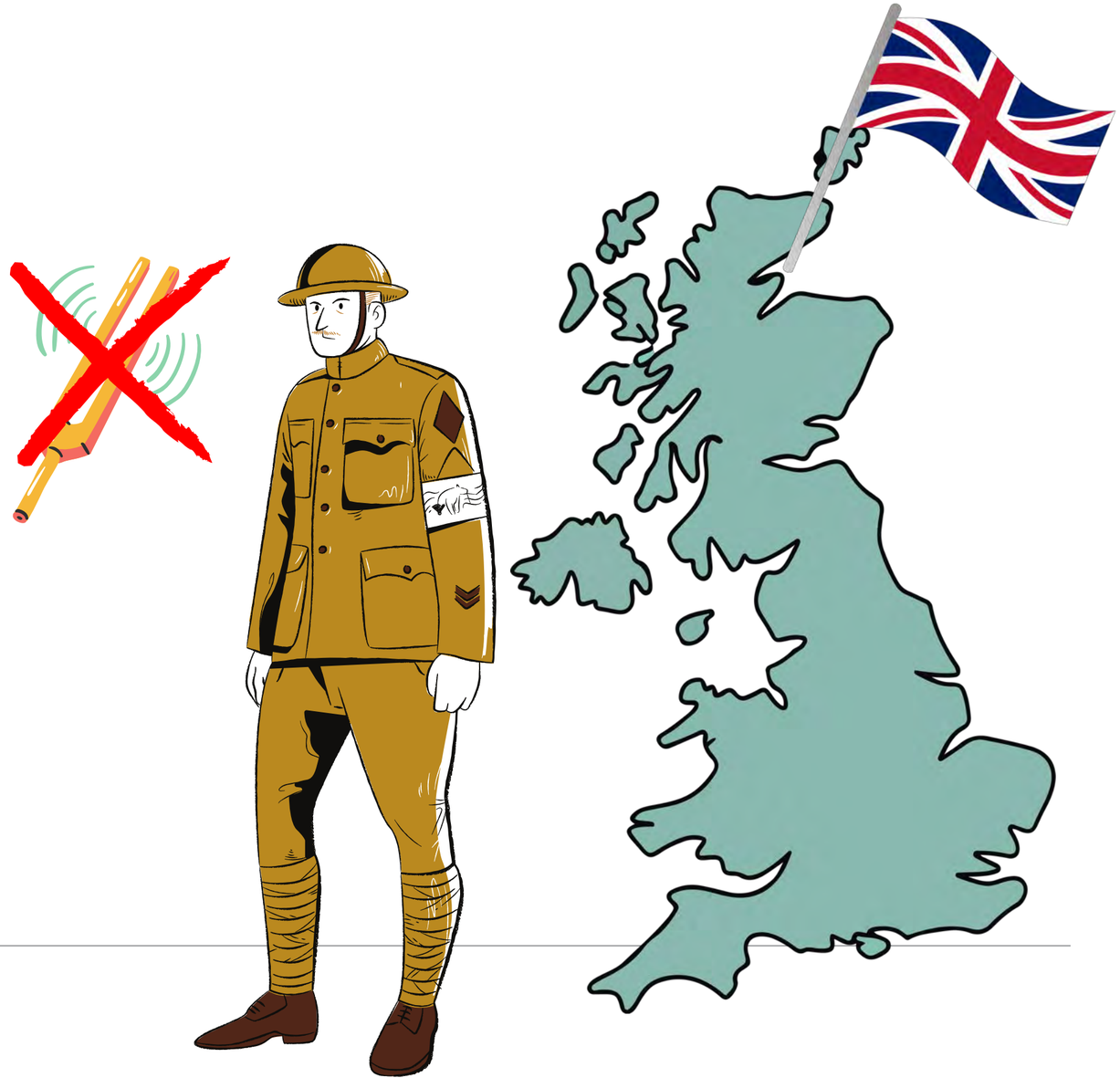






HISTORY OF THE BASIC AUDIOLOGIC EVALUATION

British Post Office “Artificial Ear”



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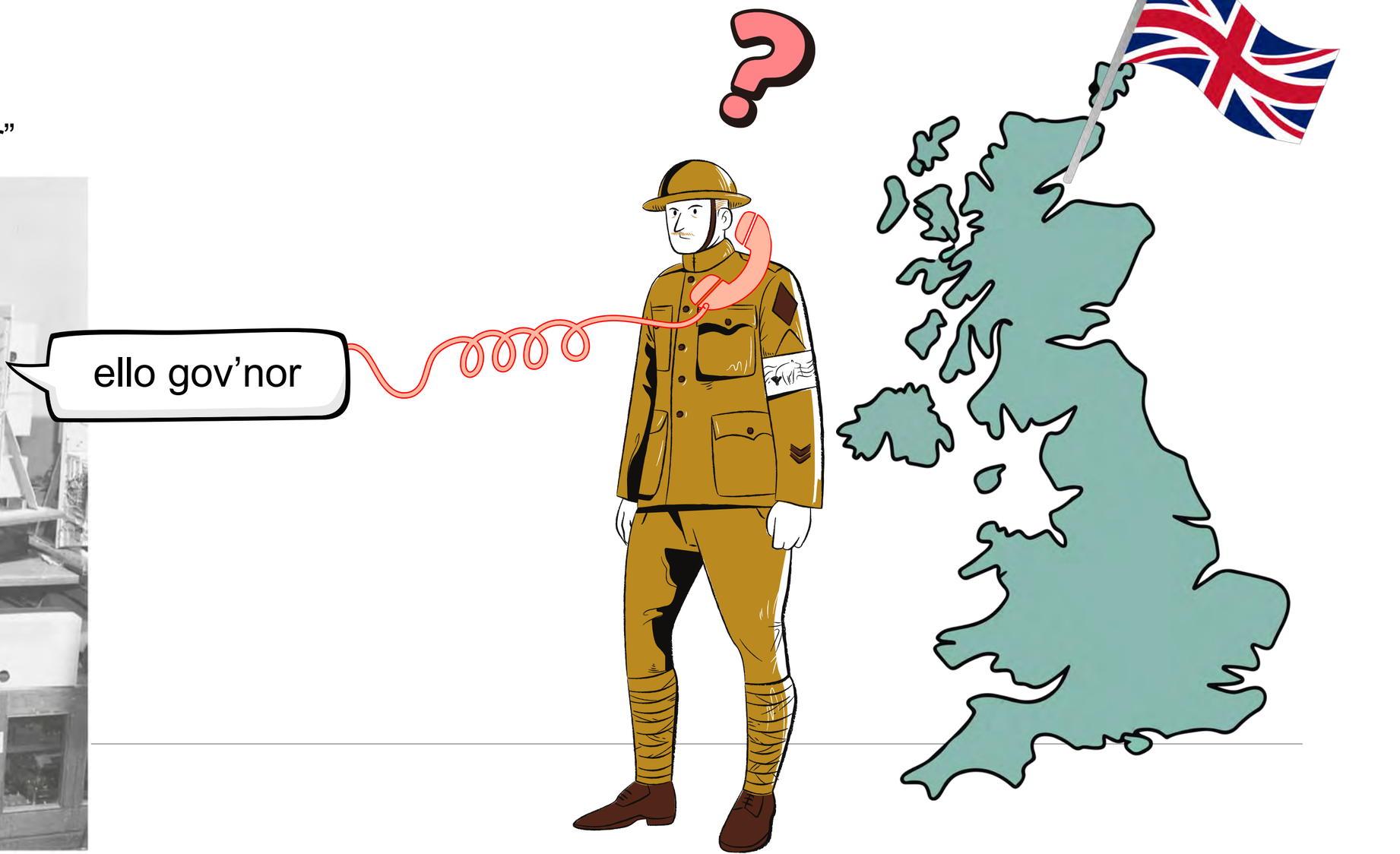
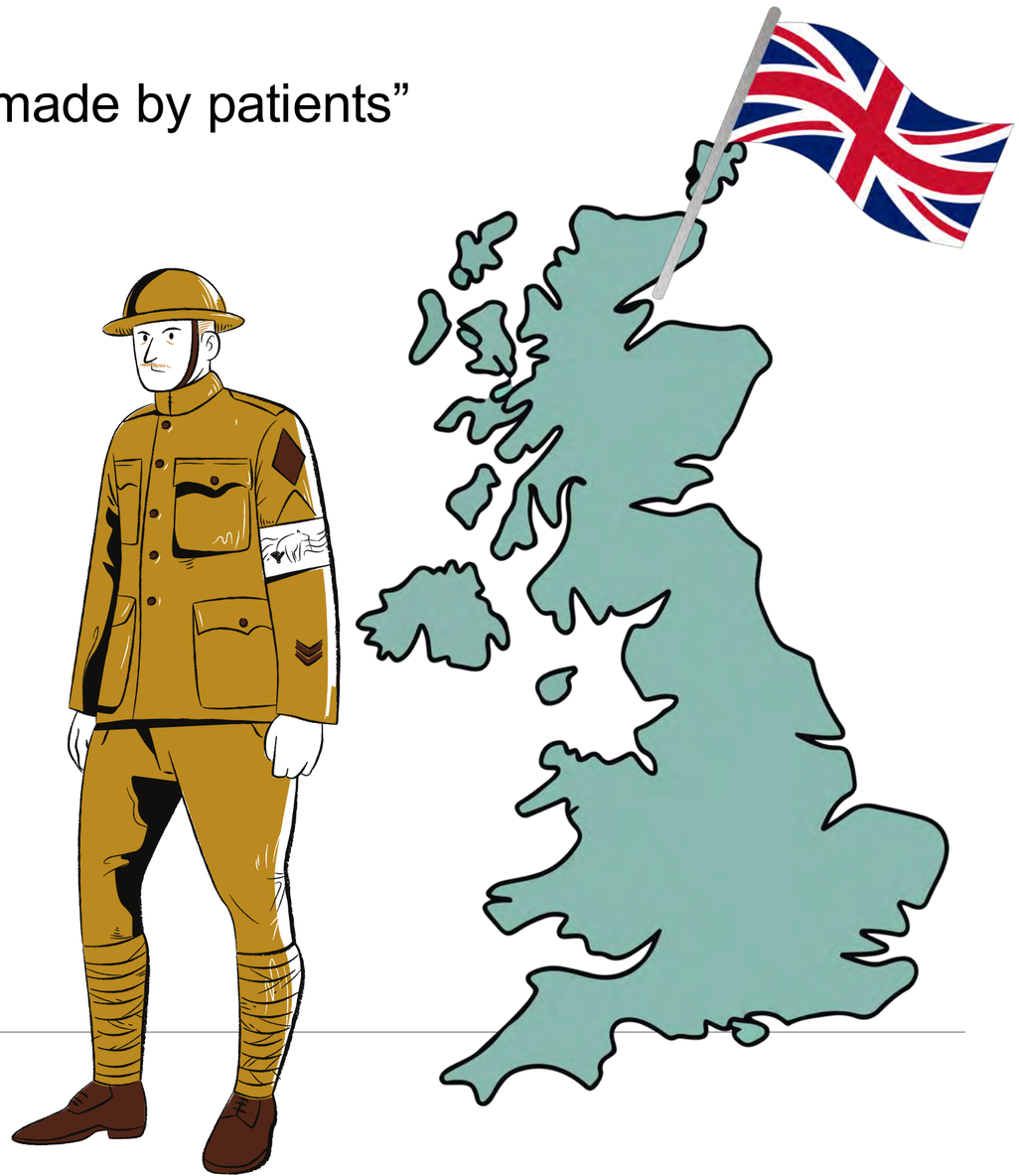


HISTORY OF THE BASIC AUDIOLOGIC EVALUATION

"...instead of having to rely on the statements made by patients"

Amplivox audiometer



HISTORY OF THE BASIC AUDIOLOGIC EVALUATION

original audiometer (sonometer) invented in 1879

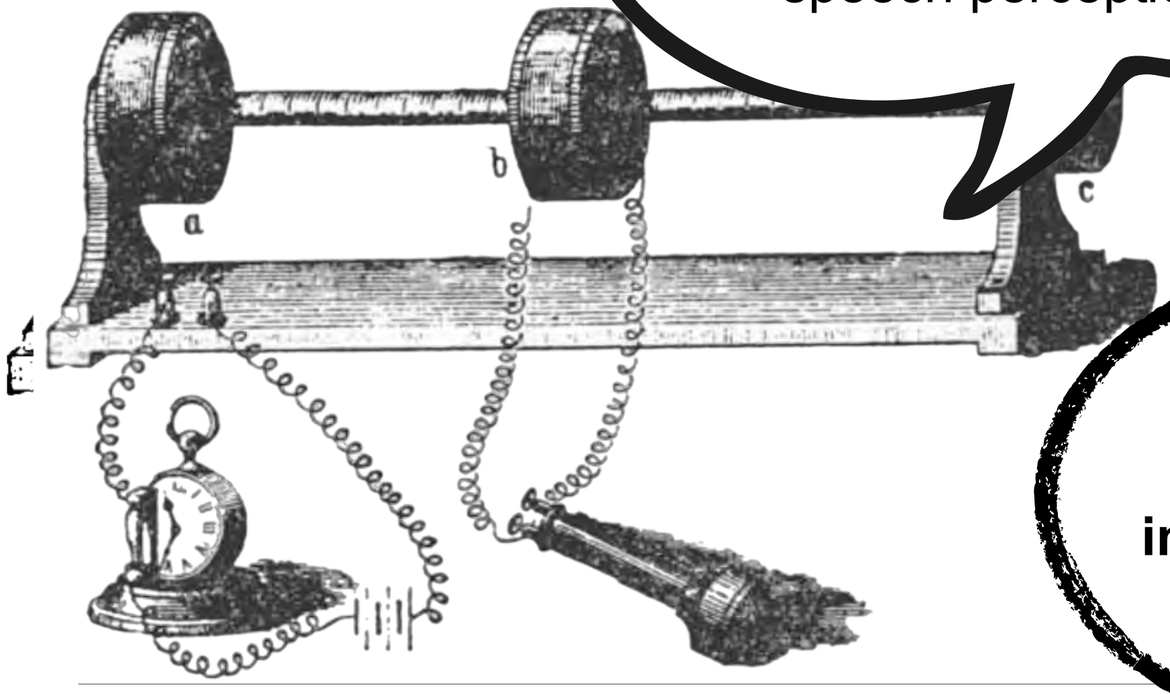


FIG. 1
Hughes' original audiometer from Urbantschitsch (1890).

While it is good for detecting changes in hearing power, this is not necessarily related to speech perception

The measure of hearing obtained with this device relates only to the particular stimulus which it produced and not to the discrimination of speech in general

certain aspects of hearing can be impaired while others remain normal

Stephens (1979)
Putnam (1880)
Hovell (1894)

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CAN THE BASIC AUDIOLOGIC EVALUATION EXPLAIN REPORTED ABILITY?

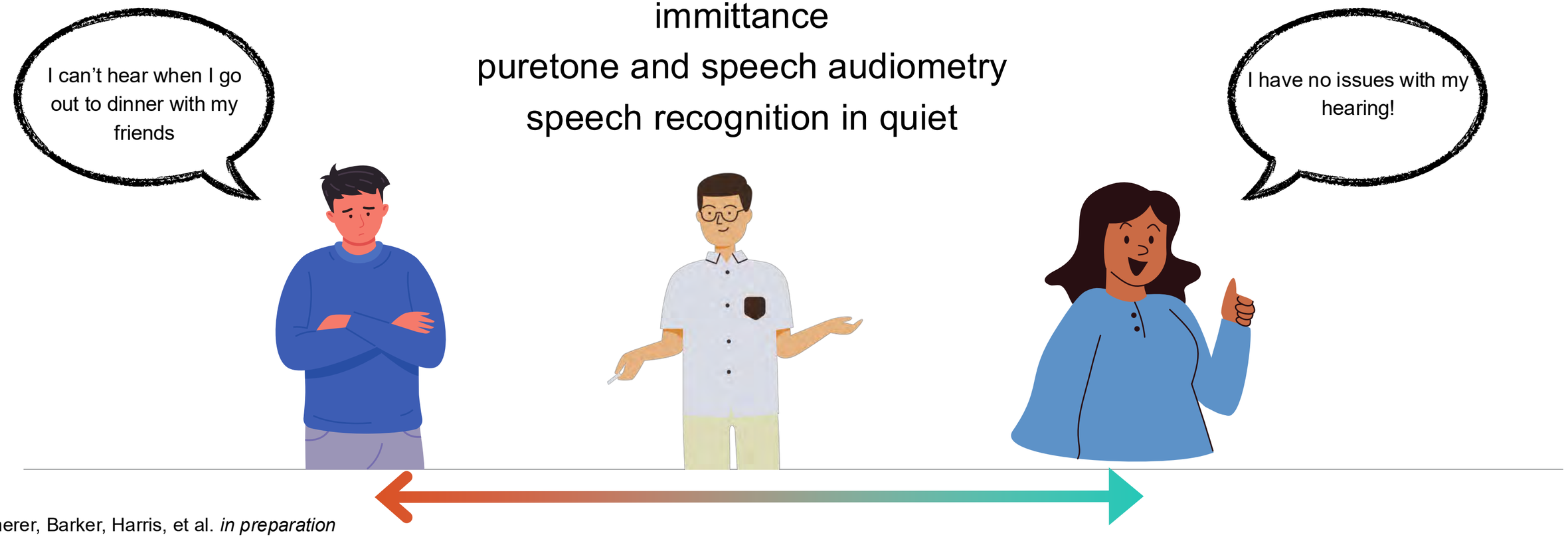
Basic Audiologic Evaluation per ASHA (2006)

otoscopy

immittance

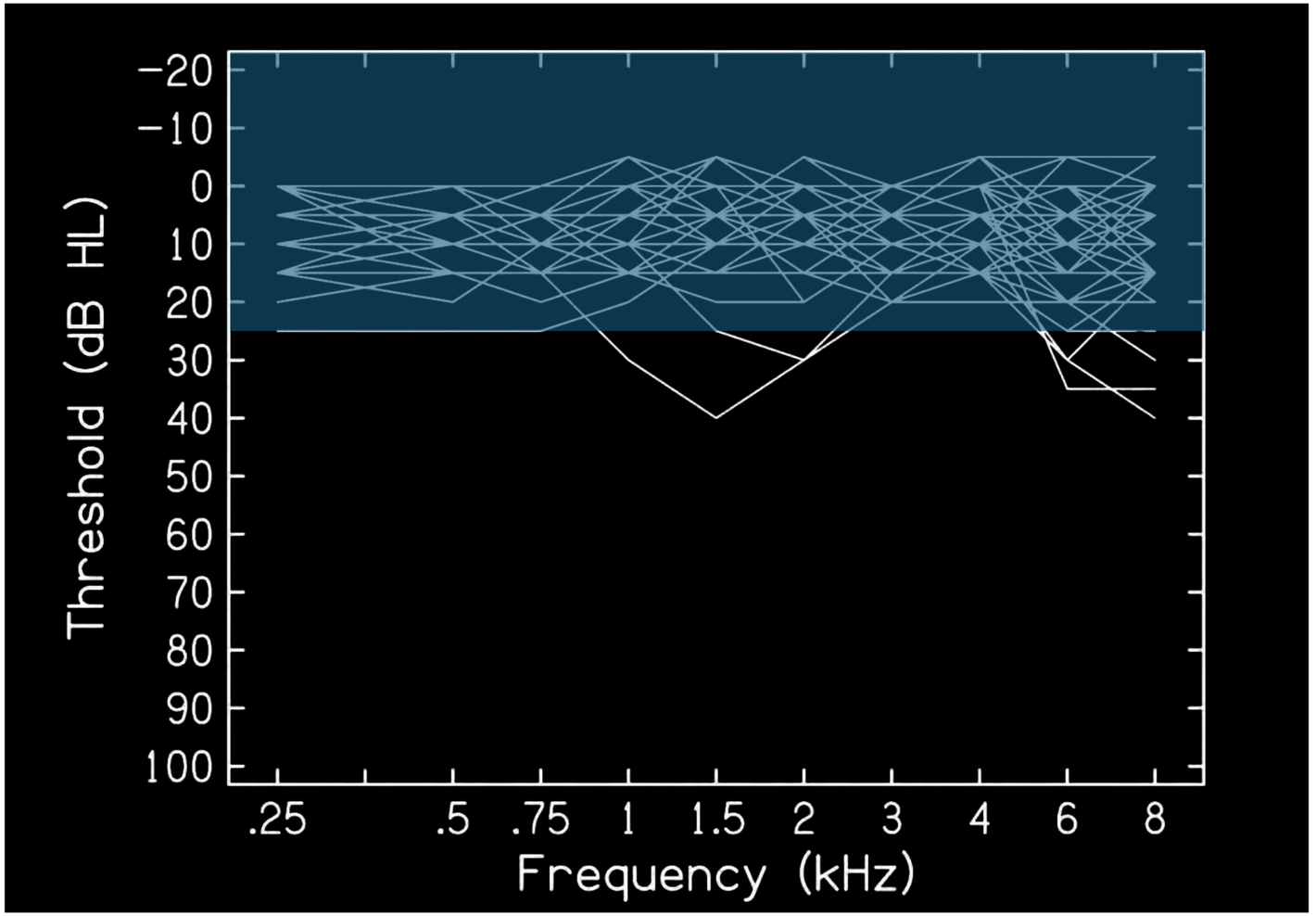
puretone and speech audiometry

speech recognition in quiet



Kamerer, Barker, Harris, et al. *in preparation*

CAN THE BASIC AUDIOLOGIC EVALUATION EXPLAIN REPORTED ABILITY?



normal or near normal thresholds

Kamerer, Barker, Harris, et al. *in preparation*

CAN THE BASIC AUDIOLOGIC EVALUATION EXPLAIN REPORTED ABILITY?

SSQ12 = 12 item version of the **S**peech, **S**patial, and **Q**ualities of Hearing Scale

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Kamerer, Barker, Harris, et al. *in preparation*

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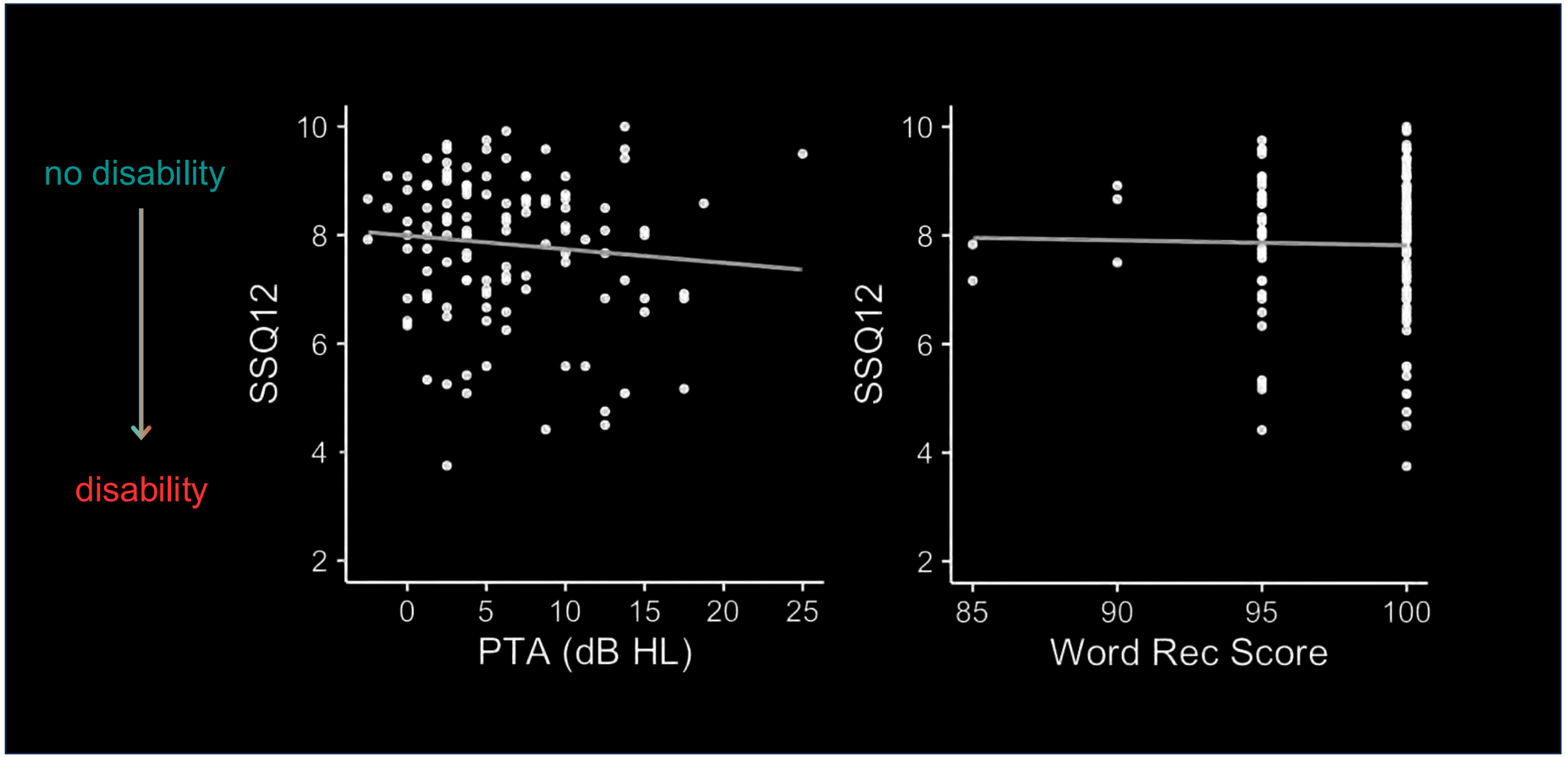

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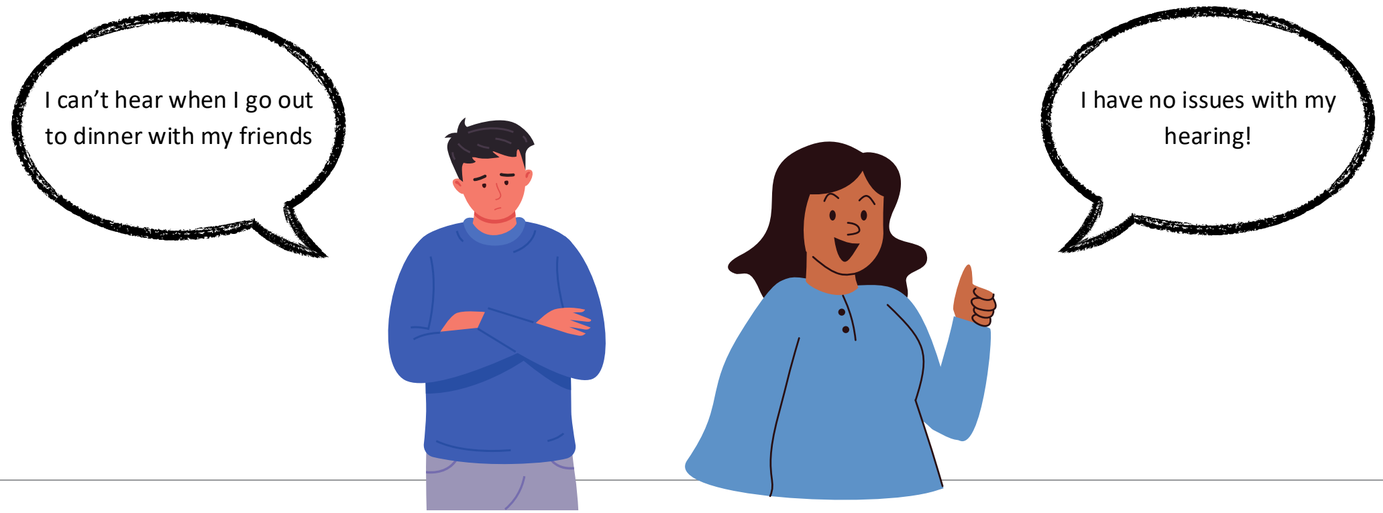
Kamerer, Barker, Harris, et al. *in preparation*

CAN THE BASIC AUDIOLOGIC EVALUATION EXPLAIN REPORTED ABILITY?

Basic Audiologic Evaluation per ASHA
(2006)

Explained 0% of the variance in reported speech-in-noise ability



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CAN THE BASIC AUDIOLOGIC EVALUATION EXPLAIN REPORTED ABILITY?

what if you add speech-in-noise testing?

SSQ12 = 12 item version of the **S**peech, **S**patial, and **Q**ualities of Hearing Scale

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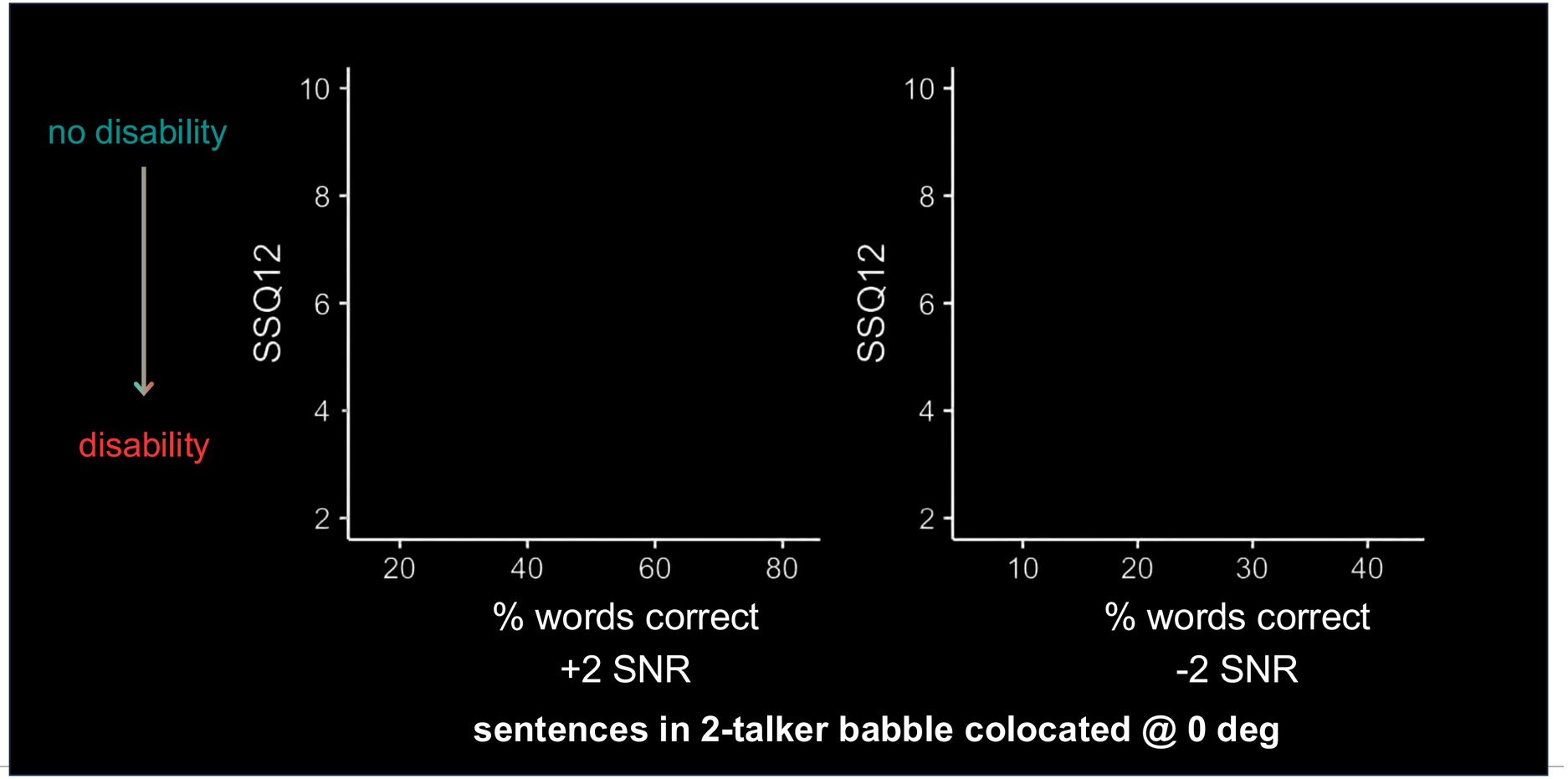

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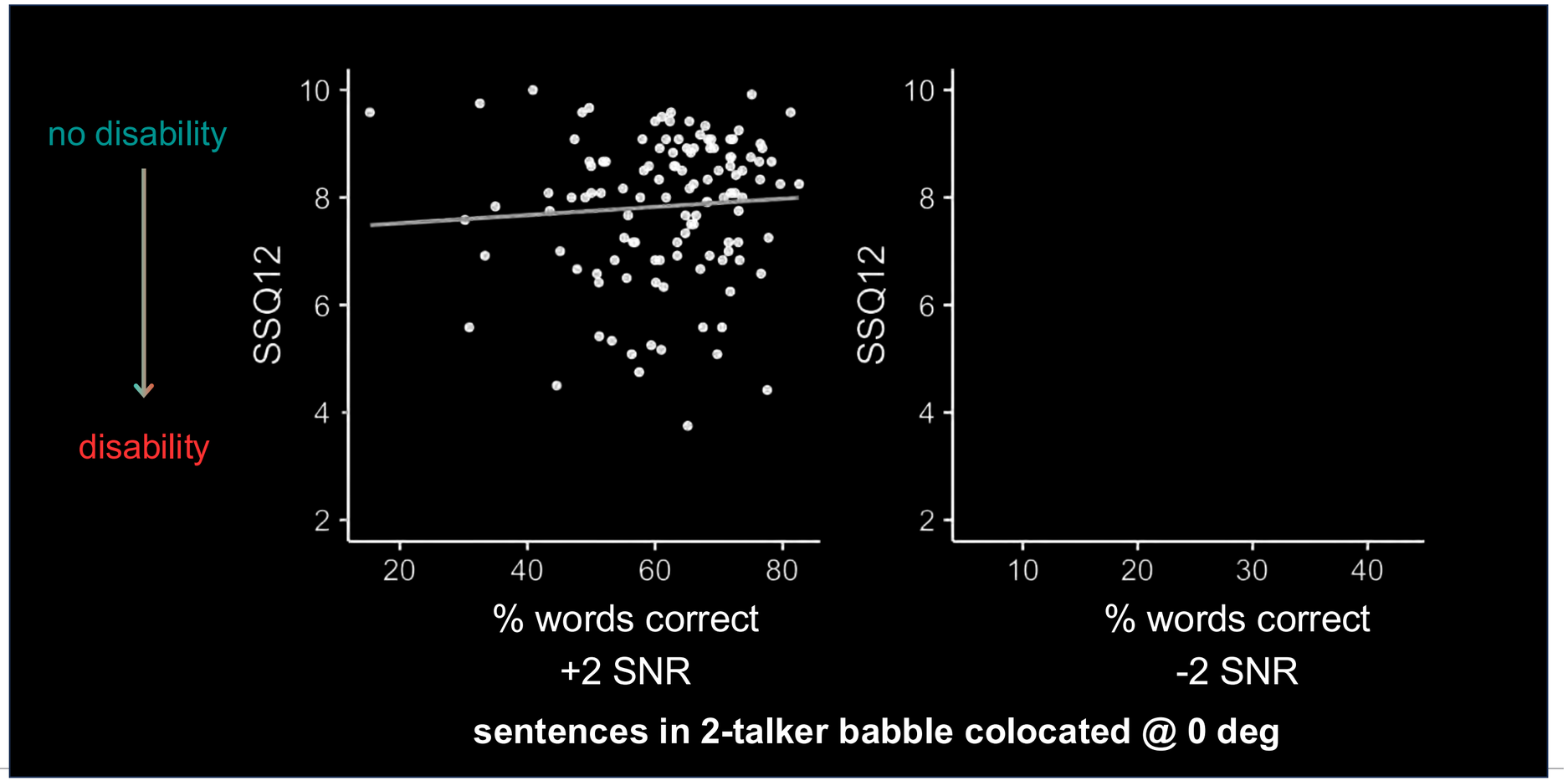

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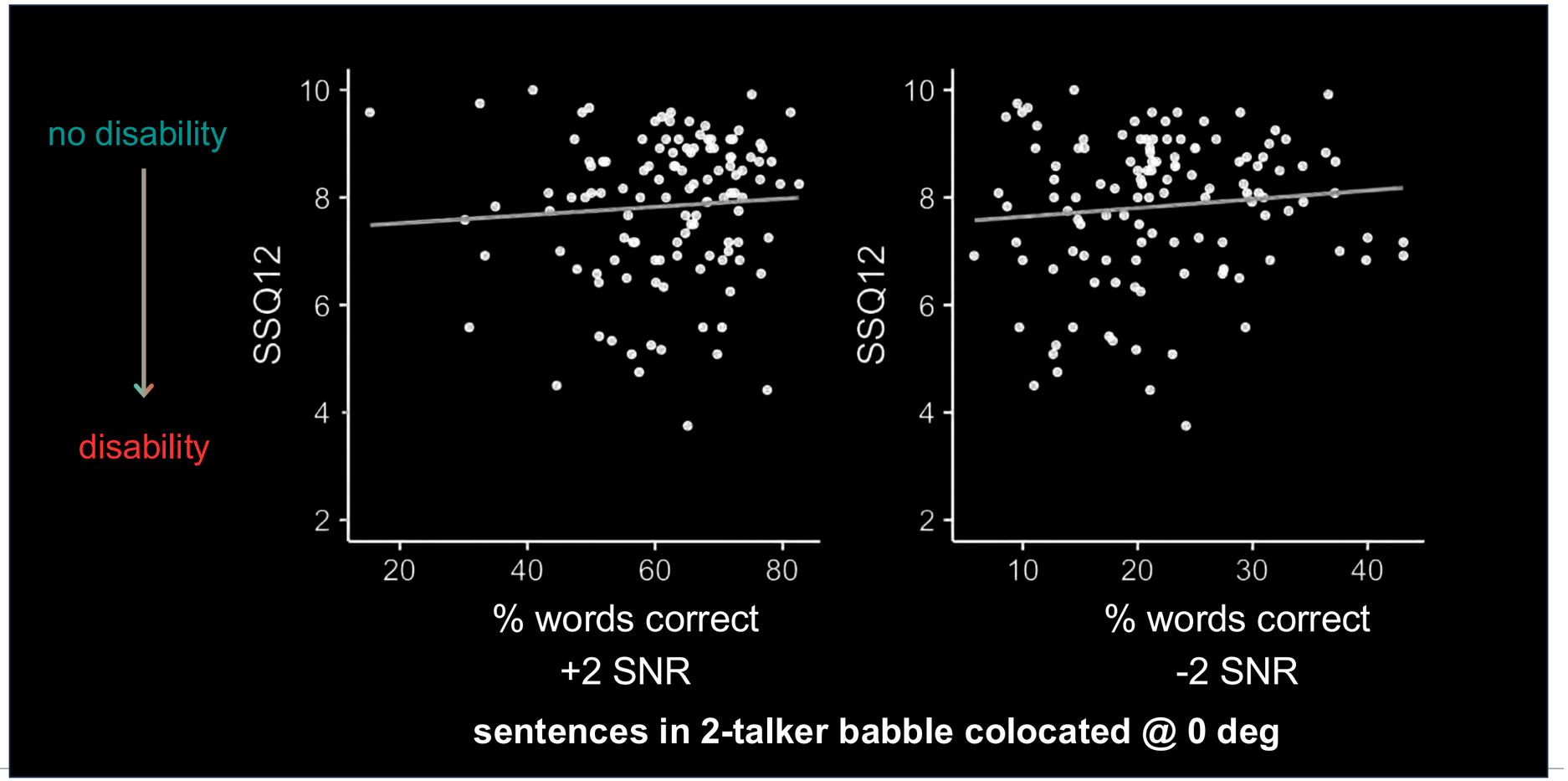


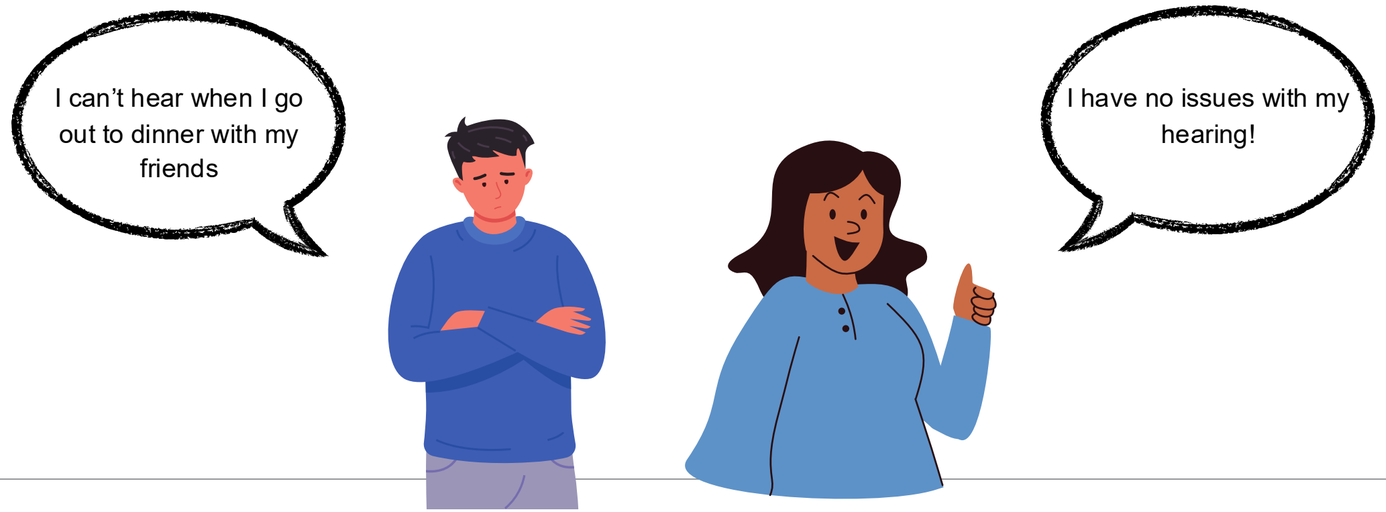
Kamerer, Barker, Harris, et al. *in preparation*

CAN THE BASIC AUDIOLOGIC EVALUATION EXPLAIN REPORTED ABILITY?

Basic Audiologic Evaluation per ASHA (2006)

Explained 0% of the variance in reported speech-in-noise ability

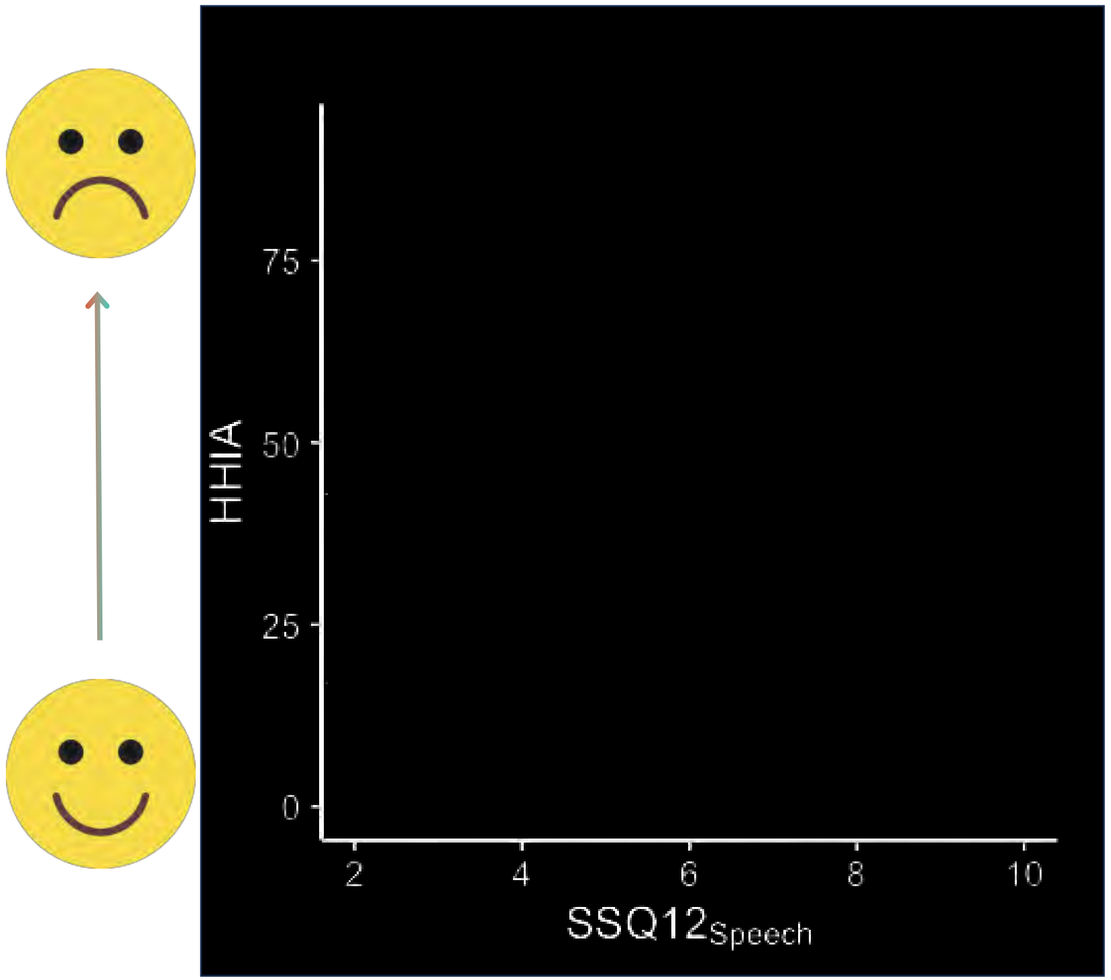
Adding a difficult speech-in-noise task did not help



Kamerer, Barker, Harris, et al. *in preparation*

IMPACT OF UNEXPLAINED HEARING DISABILITY

Hearing
Handicap
Inventory for
Adults



normal or near normal thresholds

disability ← no disability

Kamerer, Barker, Harris, et al. *in preparation*

IMPACT OF UNEXPLAINED HEARING DISABILITY

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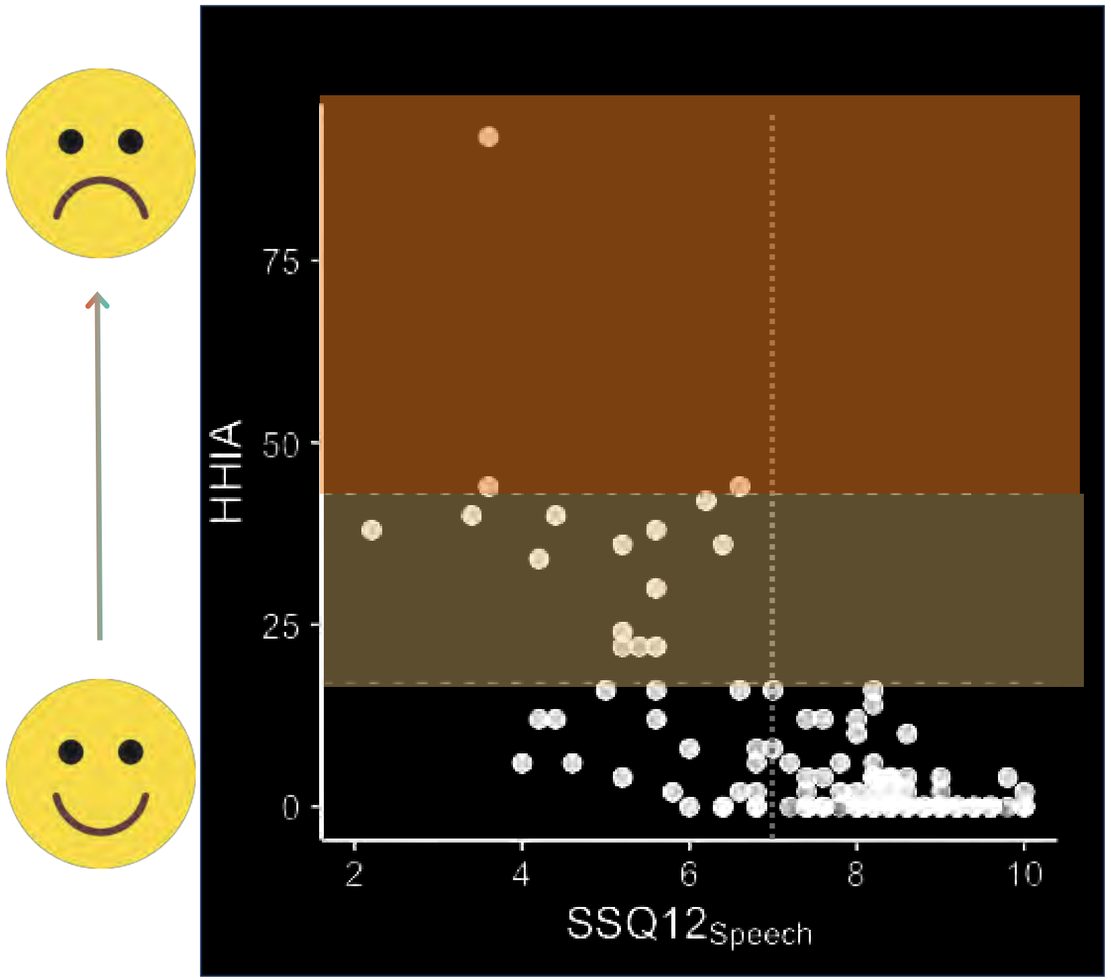

significant handicap

mild-to-moderate handicap

normal or near normal thresholds

disability ← no disability

Kamerer, Barker, Harris, et al. *in preparation*

THE MEANING OF LIFE

Wellbeing explained **20%** of reported ability in people with normal and near-normal sensitivity

Tyler, Perreau, Mohr, et al. (2020) *J Am Acad Audiol*

THE MEANING OF LIFE

Friendship and positive outlook

Tyler, Perreau, Mohr, et al. (2020) *J Am Acad Audiol*

THE MEANING OF LIFE

Friendship and positive outlook

Physical health

Tyler, Perreau, Mohr, et al. (2020) *J Am Acad Audiol*

THE MEANING OF LIFE

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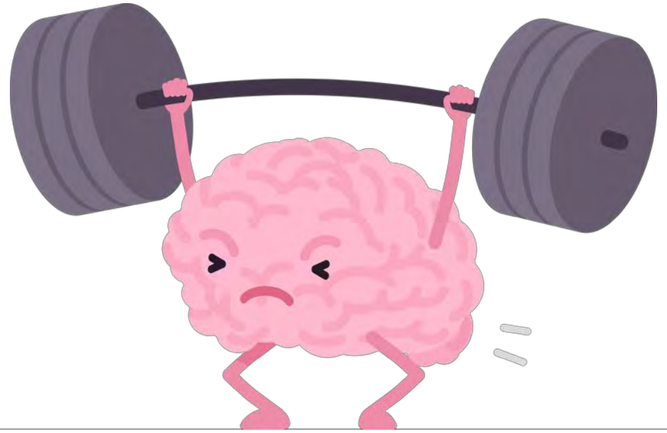
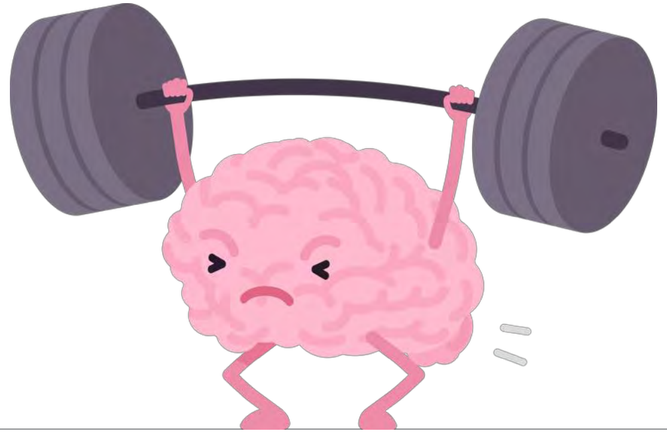


Mental health

Tyler, Perreau, Mohr, et al. (2020) *J Am Acad Audiol*

THE MEANING OF LIFE

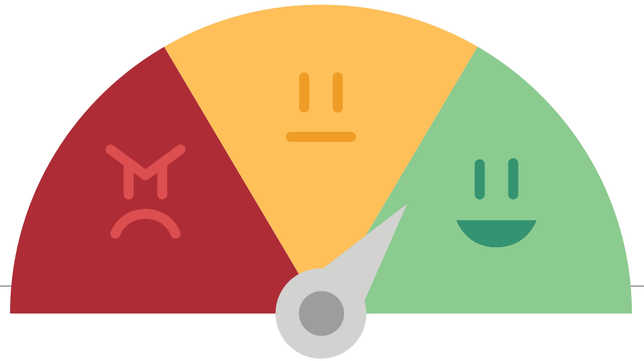
Friendship and positive outlook



Physical health

Mental health

Satisfaction

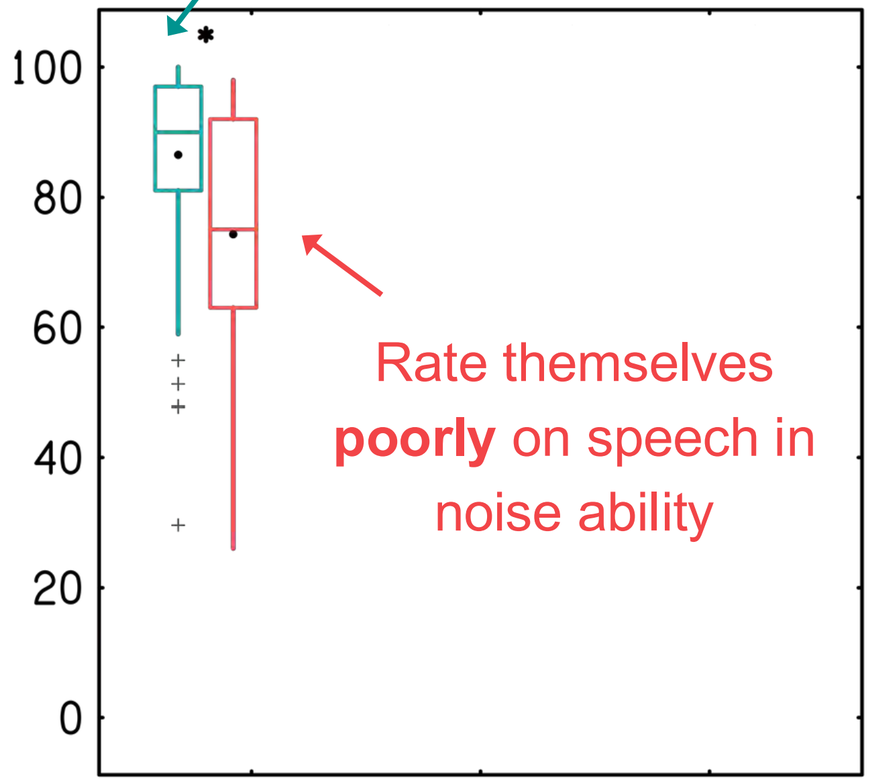


Tyler, Perreau, Mohr, et al. (2020) *J Am Acad Audiol*

THE MEANING OF LIFE

Rate themselves **highly** on speech in noise ability

Meaning of Life Score



Rate themselves **poorly** on speech in noise ability

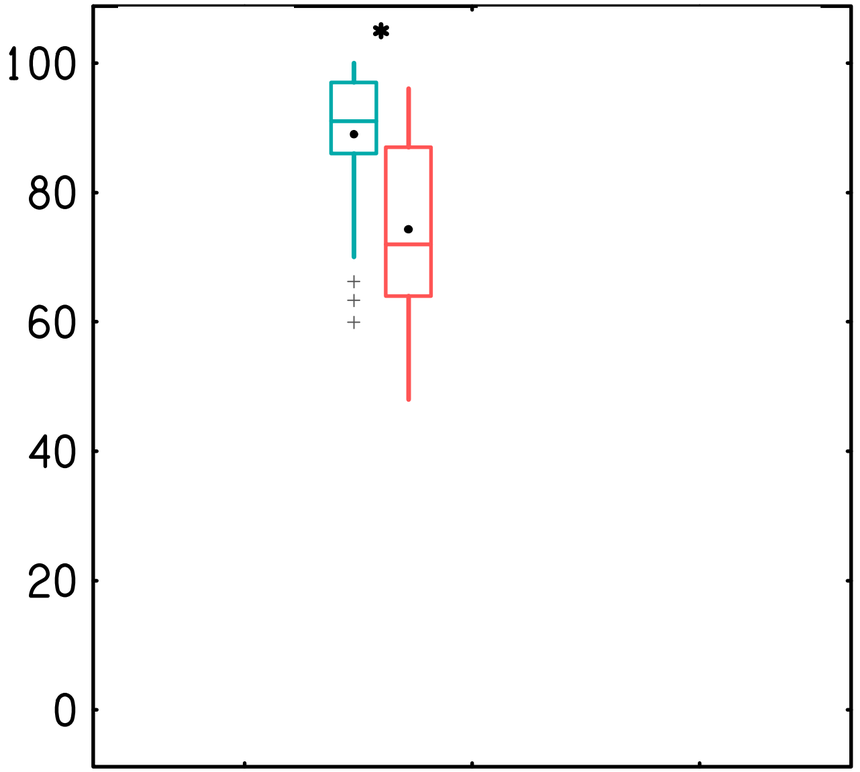
normal or near normal thresholds

Friendship and positive outlook

Kamerer, Barker, Harris, et al. *in preparation*

THE MEANING OF LIFE

Meaning of Life Score



Rate themselves **highly** on speech in noise ability

Rate themselves **poorly** on speech in noise ability

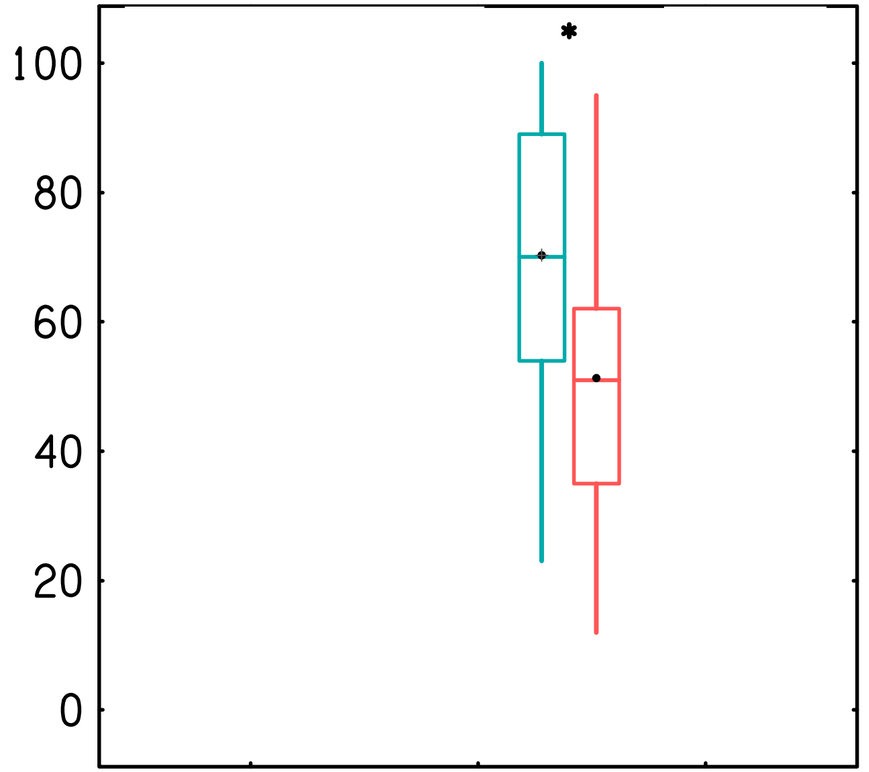
normal or near normal thresholds

Physical health

Kamerer, Barker, Harris, et al. *in preparation*

THE MEANING OF LIFE

Meaning of Life Score



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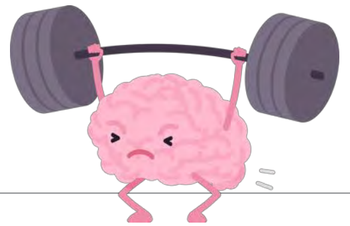
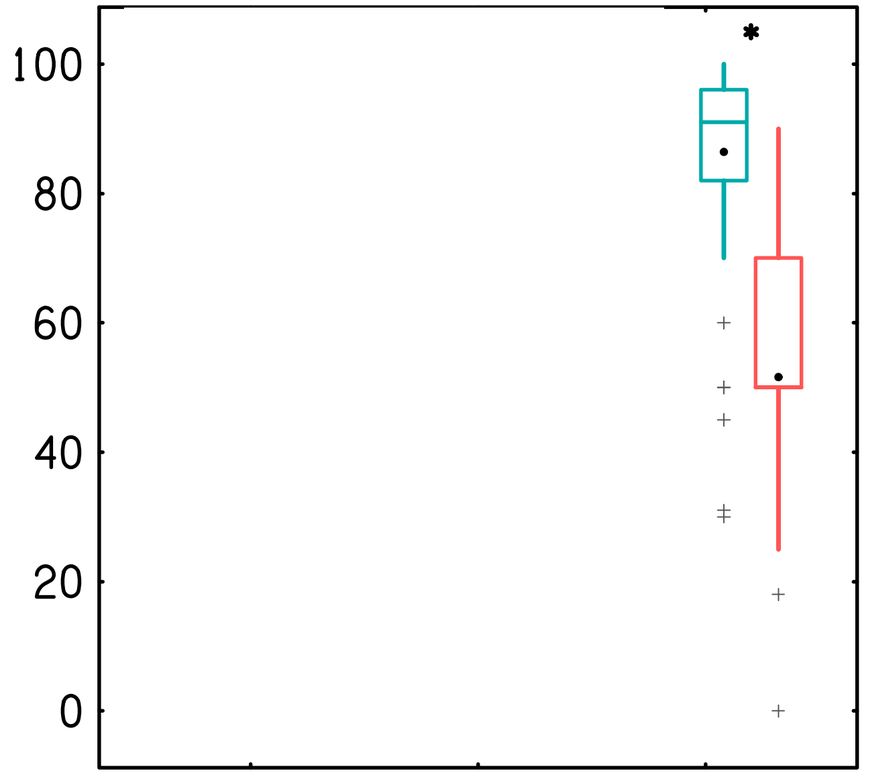


Mental health

Kamerer, Barker, Harris, et al. *in preparation*

THE MEANING OF LIFE

Meaning of Life Score



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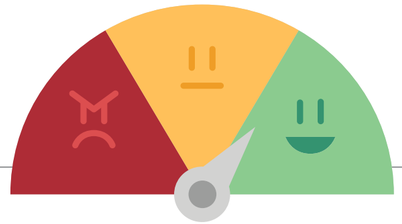
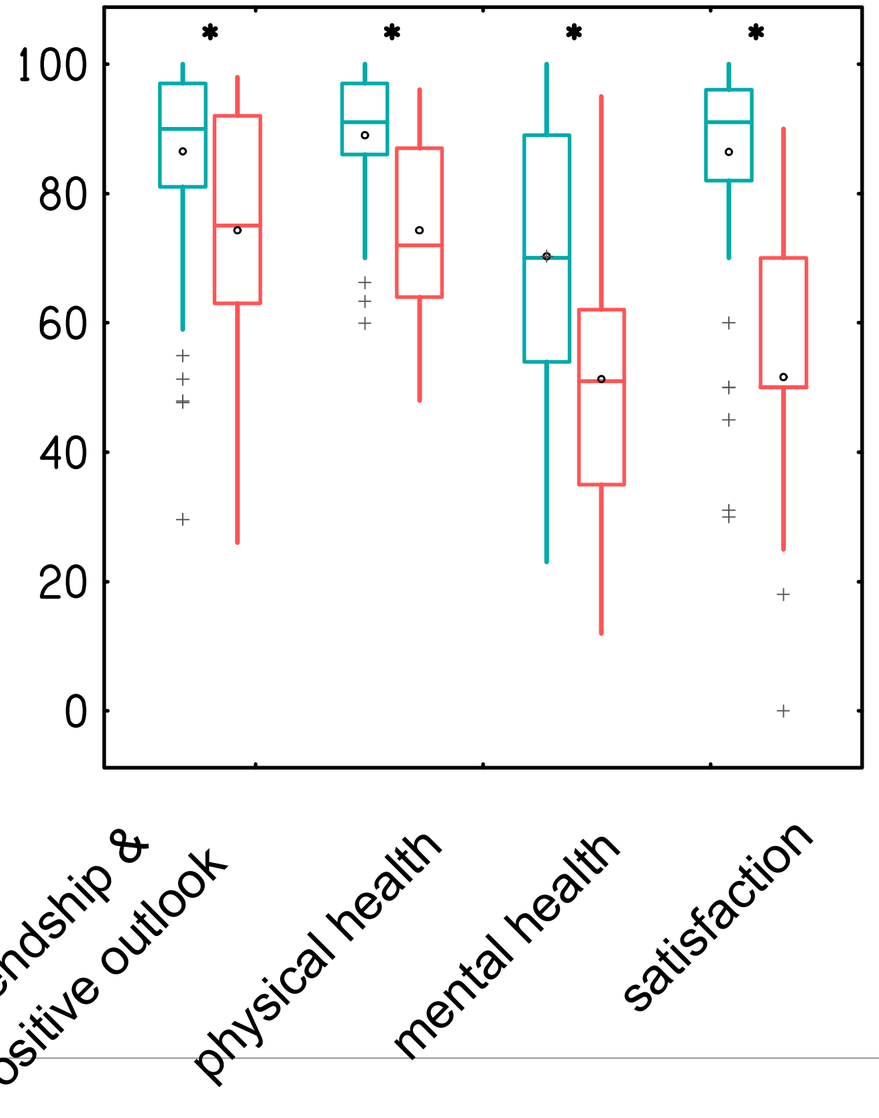


Satisfaction

Kamerer, Barker, Harris, et al. *in preparation*

THE MEANING OF LIFE

Meaning of Life Score



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Rate themselves **poorly** on speech in noise ability

normal or near normal thresholds

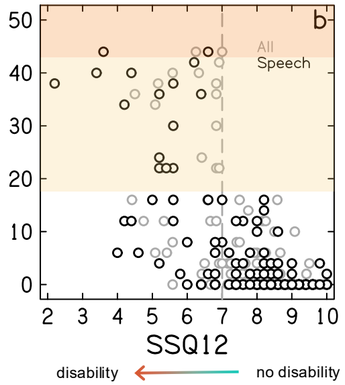
Kamerer, Barker, Harris, et al. *in preparation*

THE PROBLEM WITH THE ‘BASIC AUDIOLOGIC EVALUATION’

Disability and Handicap

People with normal audiometric thresholds can report significant hearing disability and mild-significant hearing handicap

Hearing Handicap Inventory for Adults

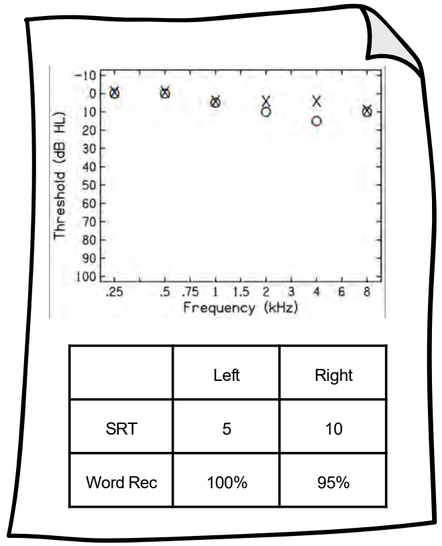


significant handicap

mild-to-moderate handicap

Basic audiologic evaluation provides little guidance

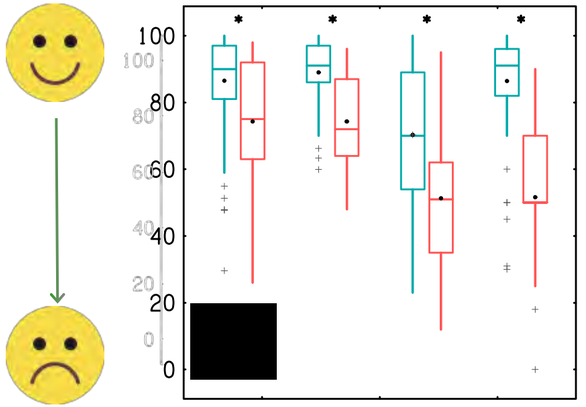
on people’s perceived hearing ability when audiometric thresholds are within normal limits.



	Left	Right
SRT	5	10
Word Rec	100%	95%

Wellbeing may be poorer

People with unexplained hearing disability have poorer social, physical, and mental wellbeing and poorer financial satisfaction than people with no hearing disability



Agenda

- What is an unexplained hearing disability
- Historical perspective of the ‘Basic Audiologic Evaluation’
- **The problem with the ‘Basic Audiologic Evaluation’**
- Patients’ perspectives on seeking hearing healthcare
- Clinicians’ and students’ perspectives on providing care

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IMPORTANCE OF PATIENT PERSPECTIVES

Narratives

helps us make sense of the world around us

Method of thinking

that allows us to organize information and experience
White (1981)

Perspective

of patients offers clinicians a first-hand view into the effects of living with an undiagnosed disease
Spillmann et al. (2017)

Improved care

can be achieved by listening to patients experiences, despite an unknown cause and lack of professional guidance for treatment
Halverson et al. (2021)

INTERVIEWS

Makenzie Meadows

Participants:
15 people across the U.S. who sought a professional hearing evaluation due to hearing concerns but received a diagnosis of normal hearing

Semi-structured narrative interview:
Started with narrative prompt “tell me the story about when you went to get your hearing tested...”

Interviews transcribed and deidentified: names replaced with pseudonyms

Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

ANALYSIS

Thematic Analysis
Inductive process of identifying common themes across patient narratives related to hearing healthcare

Follows established guidelines by *Braun & Clark (2006, 2021)* and verification processes by *Lincoln & Guba (1985)*

Saturation of themes reached by Interview #2

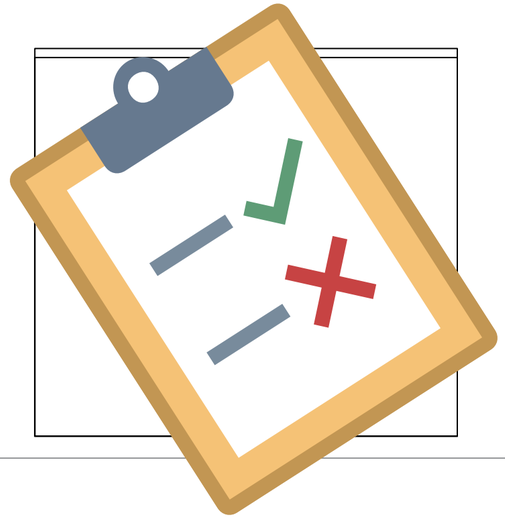
THEMES

1

Dismissive hearing healthcare providers

2

Misalignment of patient concerns and assessment protocols



3

Doctor shopping

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DISMISSIVE PROVIDERS

The first two [providers] I went to, I was quite upset, you know, especially the first lady. She just kind of went, "I don't believe you". You know, flat out said it—rolled her eyes at me. Thought I was "just seeking attention", she told me.

-Stacy *Interview #15*

Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

DISMISSIVE PROVIDERS

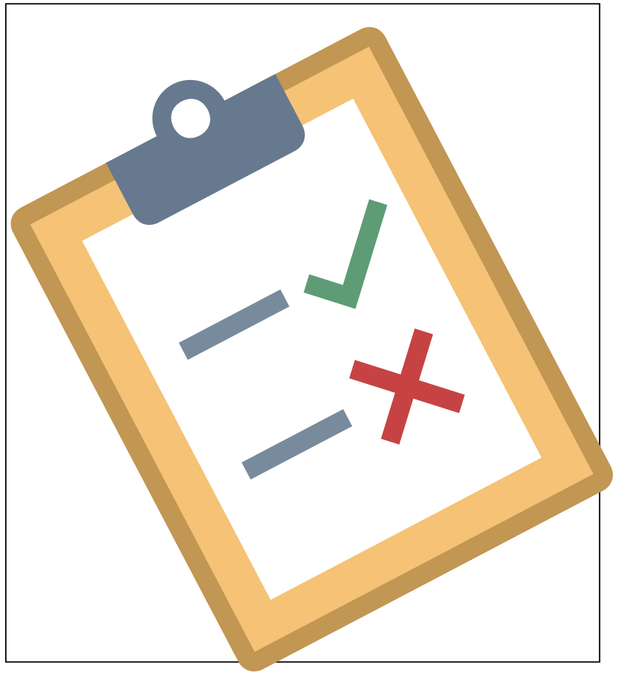
“And then after it was all done, [the provider] just ripped off the paper and gave me the yellow sheet [audiogram] and said, “Oh, you have a clean bill of health”. And I mean, it was really weird to me because I really felt like I had some concerns...I felt like it was kind of dismissed”

-Jane *Interview #5*

Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

MISALIGNMENT OF CONCERNS AND ASSESSMENT

> *Maybe the setting of being in a—umm—noise-controlled room or booth with headsets, with only one noise coming in, is an ideal place for me to listen and hear things, but that's not where I am every day. I'm not in a silent—uh—padded room, where nothing comes through except the noises I make. Umm, I'm not ever going to be in that spot.*
>
> -Ava *Interview #9*



Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

DOCTOR SHOPPING

I went back to my doctor because I was going between my doctor and the audiologist and that sort of thing. I did get an ENT referral. The ENT in [city] said that she couldn't–like there was nothing for her to like, do, because my audiograms were coming back normally. Um, and then I came to [another city] uh and again same–same thing.

-Carl *Interview #4*

Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

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CLINICIANS' AND STUDENTS' PERSPECTIVES

Alex Jennings
Emily Fullington

Clinicians

Recruited by directly contacting via work email found through ASHA or internet search of practices by state.

AuD students

Recruited through department heads of programs

Case Vignette

Brief case history narrative

Test Results

of a Basic Audiologic Evaluation

Open-response Questions

Open-response Questions

CLINICIANS’ AND STUDENTS’ PERSPECTIVES

Case Vignette

Jim Smith is a 45-year-old middle school teacher who has been struggling to hear in noisy places like restaurants and public spaces for the past five years. He can hear fine in quiet settings, but background noise makes conversations hard to follow. His wife, Betty, came with him to the appointment and confirmed his struggles, admitting she sometimes gets frustrated when he asks her to repeat herself.

Jim's hearing issues have taken a toll on his work and personal life. He's finding it harder to teach his classes and interact with his students, which leaves him feeling frustrated and discouraged. Socially, he's been avoiding the break room at work because he struggles to understand his colleagues, leaving him feeling isolated and lonely. Jim and Betty have even stopped going out for their monthly dinner dates because it's too hard for him to keep up with conversations in noisy restaurants. He says he misses his old social life and worries that his coworkers think he doesn't want to connect with them anymore.

He reports no tinnitus, pain, dizziness, or drainage, and no history of hearing loss in his family. He thinks he takes good care of his hearing, always using protection during loud activities like mowing the lawn. Other than his hearing challenges, Jim is in good health, with heartburn being his only minor issue, which he manages with a vitamin B supplement.

WHAT TESTS WOULD YOU INCLUDE?

82% of clinicians included speech-in-noise testing (overwhelmingly QuickSIN)

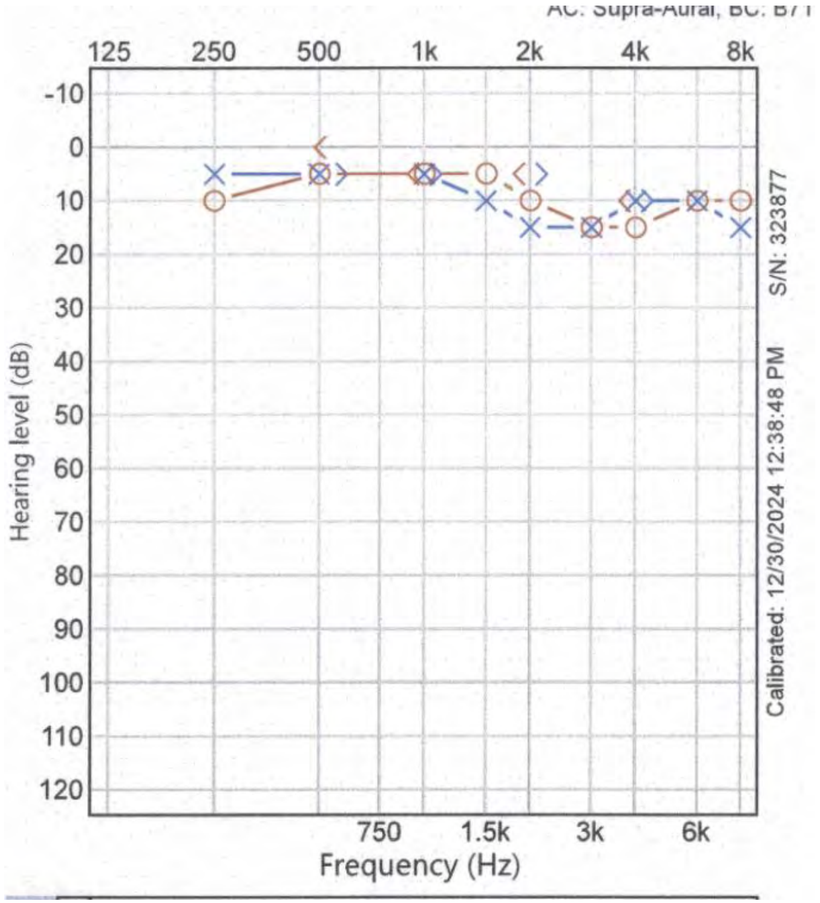
40% also included otoacoustic emissions either as standard practice or based on suspected hidden hearing loss

74% of students included speech-in-noise testing

CLINICIANS' AND STUDENTS' PERSPECTIVES

Case Vignette

- Otoscopy unremarkable
- Type A Tymps
- Reflexes ≤ 85 dB HL
- SRT 15 dB HL in both ears
- NU-6 presented at 40 dB HL
  - 96% in right
  - 100% in the left



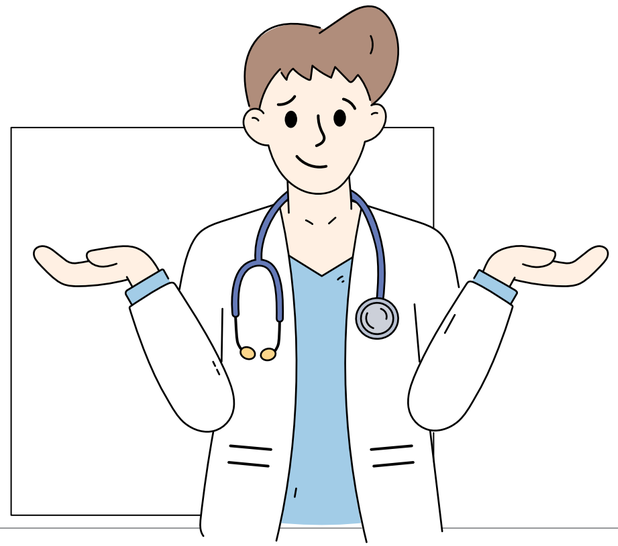
THEMES:
HOW WOULD YOU INFORM THE PATIENT OF THE RESULTS?

1

Provided results in a clinician-centered manner

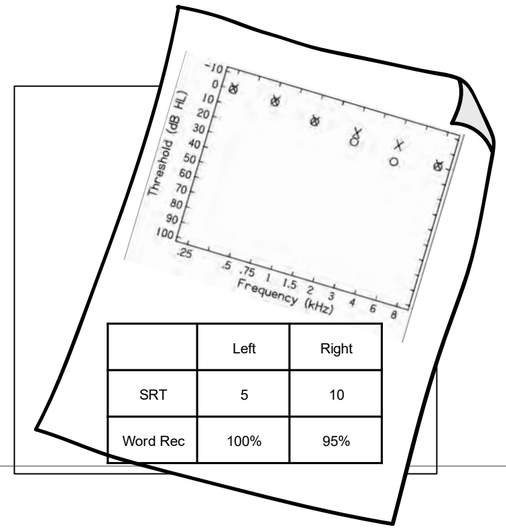
2

Provided results in a person-centered manner



3

Frustration with the Basic Audiologic Evaluation



PROVIDED RESULTS IN A CLINICIAN-CENTERED MANNER

> *As you can see, all of your thresholds, the softest sound you hear, are within the normal range of hearing. Y ou also responded to words in the normal level. When presented at a soft conversational level, your speech perception was excellent - 96% in the right ear and 100% in the left ear.. All results point to normal hearing in both ears.*

-Audiologist

I would let him know "good news is that the hearing test indicates normal hearing. The audiogram is set up from top being the quietest to the bottom being the loudest sounds. Going across is set up like a piano from low to high pitch. We classify any Xs or Os above the 20 line to be normal. Your eardrums were also moving well as well. And with those word tests you got an 'A' in quiet at 96 and 100%.

-First year AuD student

Kamerer, Barker, Fullington, et al. *In preparation*

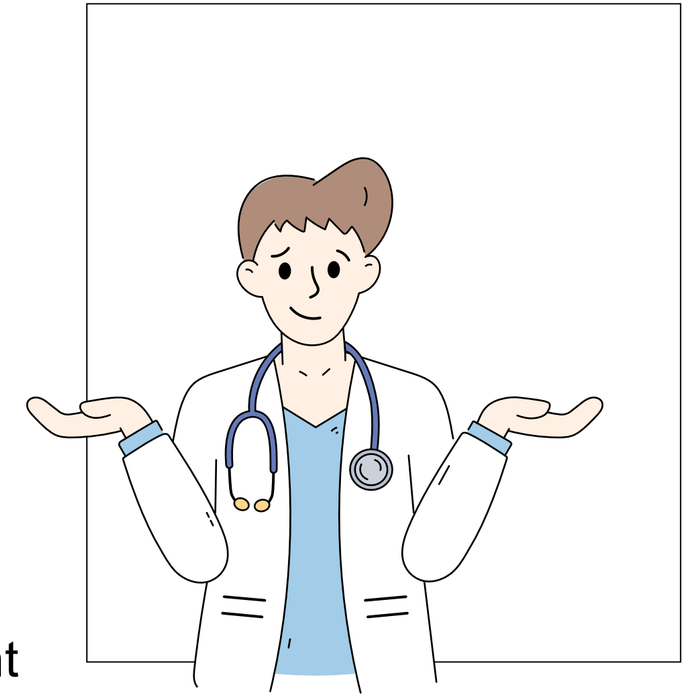
PROVIDED RESULTS IN A PERSON-CENTERED MANNER

> *I would let the patient know that while his hearing thresholds are considered in the normal range, it does not mean that the whole auditory system is functioning normally.*

-Audiologist

Based on our testing, you don't have any results that are immediately concerning about your hearing. However, these tests primarily look at the anatomy and not how you're actually processing the sound. There are a couple other tests that can help us zero in on the potential of a central/cortical hearing issue.

-Second year AuD student



Kamerer, Barker, Fullington, et al. *In preparation*

THEMES: NEXT STEPS

1

Recommended Follow Up

- PCP
- ENT
- Neurologists

- APD testing

- regular hearing tests

2

Recommended Treatment

3

Provided Patient Education

Kamerer, Barker, Fullington, et al. *In preparation*

RECOMMEND FOLLOW UP

Many of the patients we interviewed seemed to be referred to medical specialists (ENT, neurology) for unknown reasons

Kamerer, Barker, Meadows, Lewis (2024) Int J Audiol

Kamerer, Barker, Fullington, et al. *In preparation*

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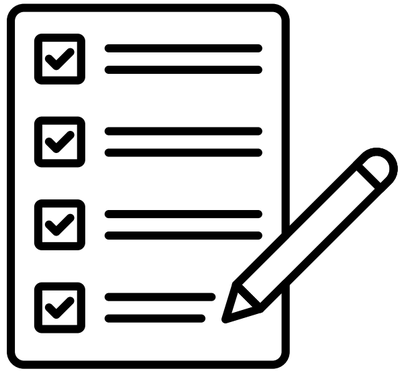
Kamerer, Barker, Meadows, Lewis (2024) Int J Audiol

ASHA Preferred Practice Patterns includes APD testing as a possible path for patients with unexplainable hearing disabilities



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Kamerer, Barker, Meadows, Lewis (2024) Int J Audiol

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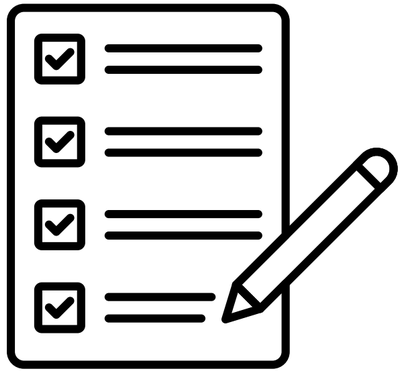


Social, physical, and mental wellbeing, and satisfaction with life may be poor in people with unexplained hearing disability

Kamerer, Barker, et al. (in prep)

Tremblay, Pinto, Fischer, et al. (2015) Ear Hear

THEMES: NEXT STEPS

1

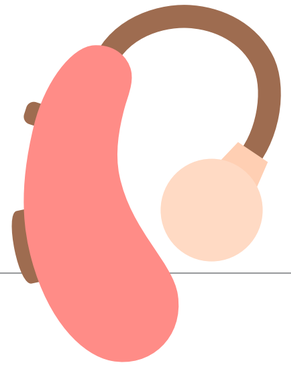
Recommended Follow Up

2

Recommended Treatment

training apps

OTCs low-gain HAs

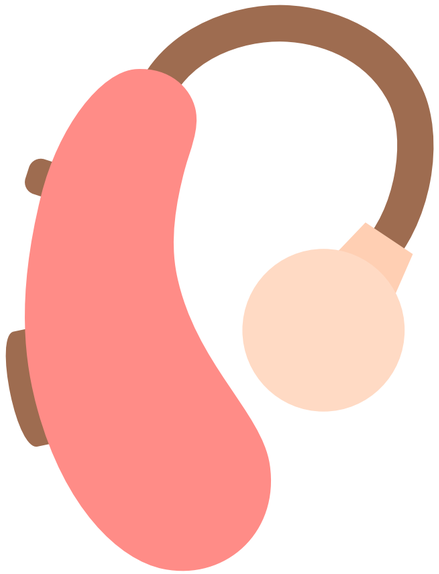


3

Provided Patient Education

Kamerer, Barker, et al. (In Prep)

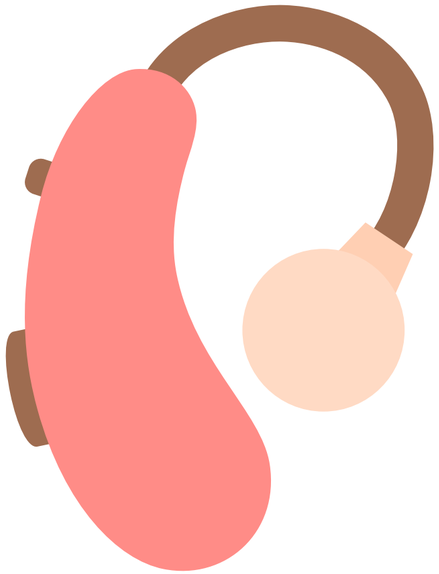
HEARING AIDS



85% of audiologists surveyed believe that when they fit hearing aids patients received moderate or major benefit

Koerner, Papesh, and Gallun (2020) Am J Audiol

HEARING AIDS



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Koerner, Papesh, and Gallun (2020) Am J Audiol

HHIA and speech-in-noise scores improved with low gain HAs

Roup, Post, & Lewis (2018) JAAA; Singh & Doherty (2020) AJA

71% of the trial participants said their HAs helped them listen in noise

Roup, Post, & Lewis (2018) JAAA

THEMES: NEXT STEPS

1

Recommended Follow Up

2

Recommended Treatment

3

Provided Patient Education

communication strategies

Kamerer, Barker, et al. (In Prep)

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Incorporating a person-centered approach to hearing healthcare

CLINICIAN V. PERSON-CENTERED APPROACH

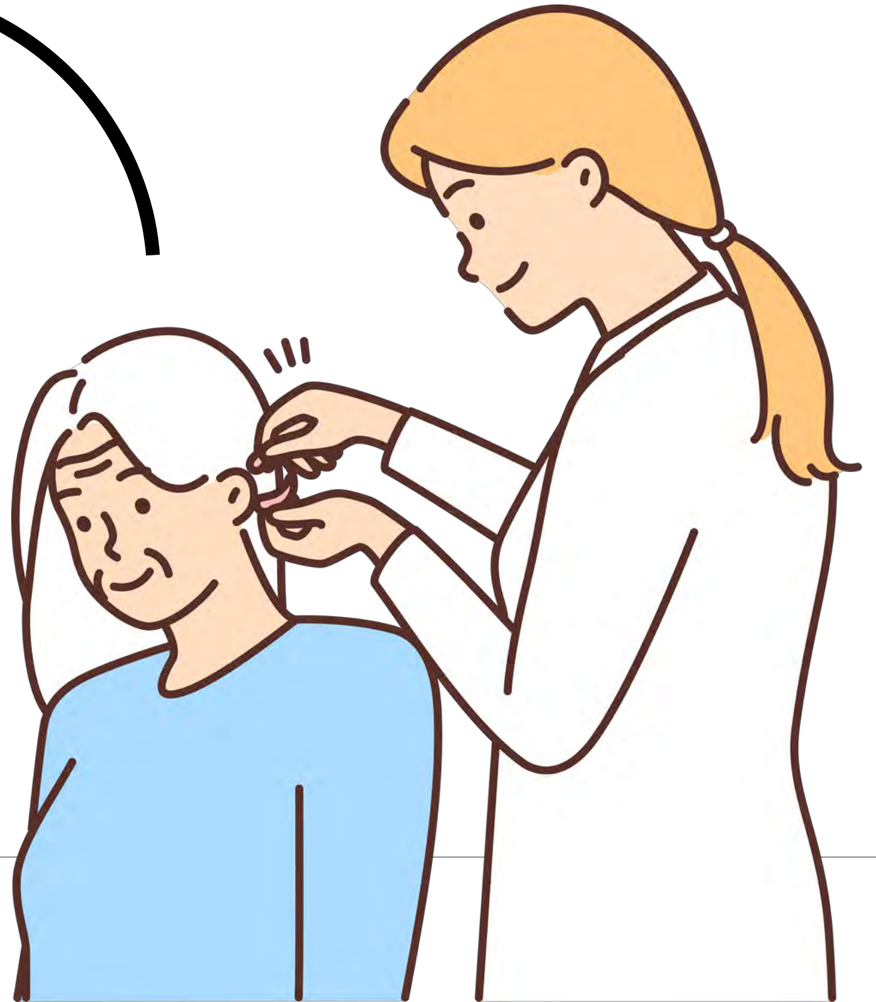
I want to fix the patient's hearing loss

I want to help the patient achieve their goals

Mead and Bower (2002) *Patient Ed and Counsel*

THE PATIENT IS ALWAYS THE EXPERT

Expert on life experience



Expert on hearing loss

Mead and Bower (2002) *Patient Ed and Counsel*

THE PATIENT IS ALWAYS THE EXPERT

I guess if things can't exactly be defined or pinpointed, um people are still experiencing things, and kind of just being aware of that, being aware that we don't all fit the same thing.

And if something's not visible or obvious or labeled—uh—we're still going through experiences. Um, just kind of try to be mindful of that and respond from that point of view.

-Joey *(Interview #14)*

Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

PATIENT-PROVIDER RELATIONSHIP

The patient’s relationship with their provider is often the most therapeutic aspect of the health care encounter

Tresolini (1994)

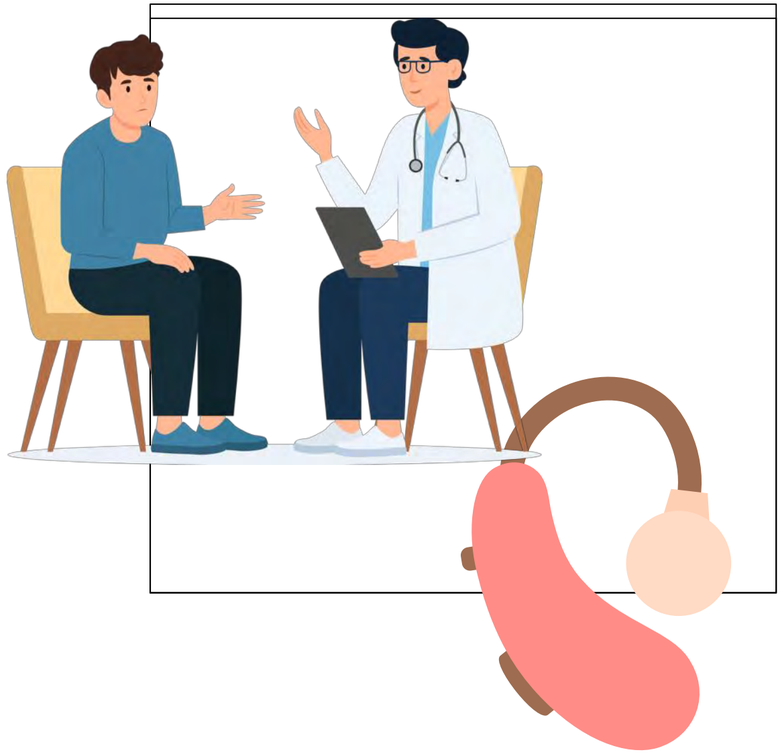
WHAT HAPPENS WHEN THE PATIENT IS AT THE CENTER OF CARE?

“

So [the third provider] he's the first one who did more than a 2-minute hearing test for me. And he can -he said -he answered all my questions and even said “I bet you have trouble with this and this and this and this”

...

[Provider 3 said] “How about you try these hearing aids? If they help, great, we'll move forward. If not, we'll look into other avenues.“ And so he gave me some hearing aids just to try for a week or two and they helped immensely.



-Stacy *Interview #15*

Kamerer, Barker, Meadows, Lewis (2024) *Int J Audiol*

CLINICAL RESPONSES TO UNEXPLAINED HEARING DIFFICULTIES

be careful when using the word **“hearing”** to describe the audiogram

CLINICAL RESPONSES TO UNEXPLAINED HEARING DIFFICULTIES

“The tests we have available to us are not perfect and cannot detect many disorders of the ear, and just because we didn't find anything today doesn't mean that nothing is wrong or that I don't believe you”

CLINICAL RESPONSES TO UNEXPLAINED HEARING DIFFICULTIES

“There are many others like you—this is an unfortunately common problem. But know that there are people who are working to figure it out and that we will hopefully have answers in the future. ”

Thank You!

Aryn Kamerer, PhD

Congratulations!

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