

Variability in Hearing Aid Outcomes and the Role of Mild Cognitive Impairment

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Variability in Hearing Aid Outcomes in Adults at Risk for Mild Cognitive Impairment

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The HEARO Project, LLC

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Learning Outcomes

After this course, participants will be able to:

- Discuss the impact of hearing treatment on cognitive function in adults with hearing loss, differentiating between those at risk and not at risk for mild cognitive impairment.
- Assess the influence of hearing treatment on depression levels and self-perceived satisfaction and benefit among adults with hearing loss, distinguishing between those at risk and not at risk for mild cognitive impairment.
- Explain the importance of considering an adult patient's baseline cognitive status in clinical decision-making and the hearing treatment process, elucidating how such understanding enhances the efficacy and appropriateness of interventions.

Inspiration for this Work

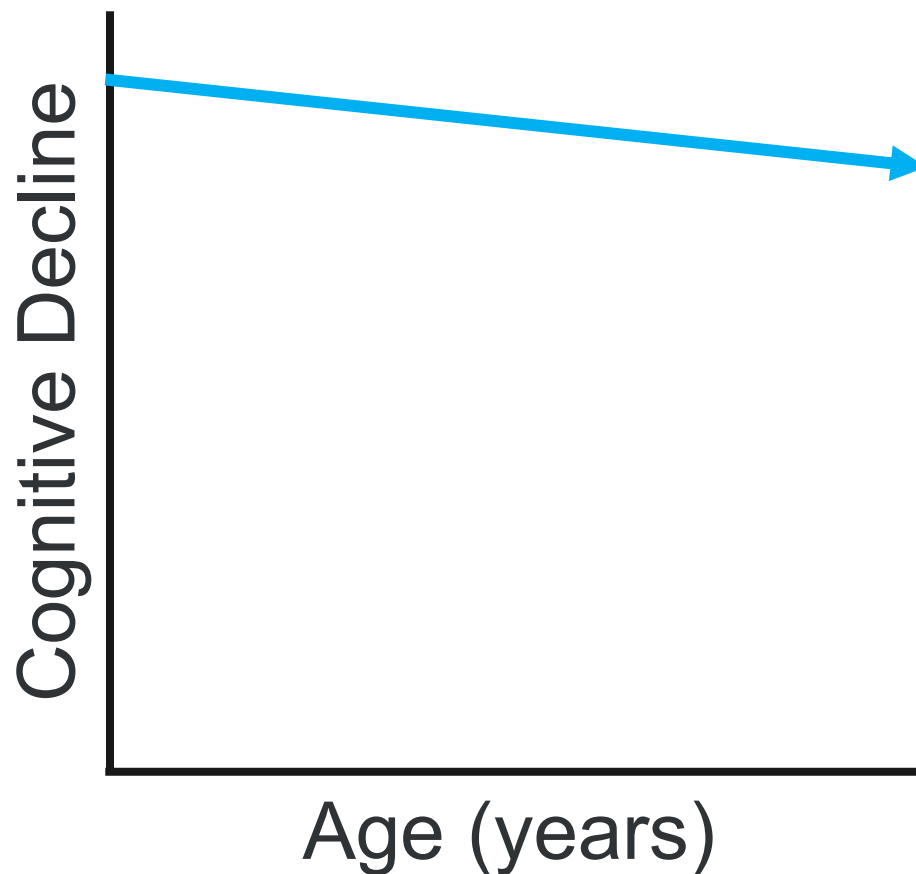


Presentation Overview

1. Overview of mild cognitive impairment (MCI) and dementia
2. Link between hearing loss and MCI/dementia and implications from a public health perspective
3. Research discoveries
4. Clinical implications

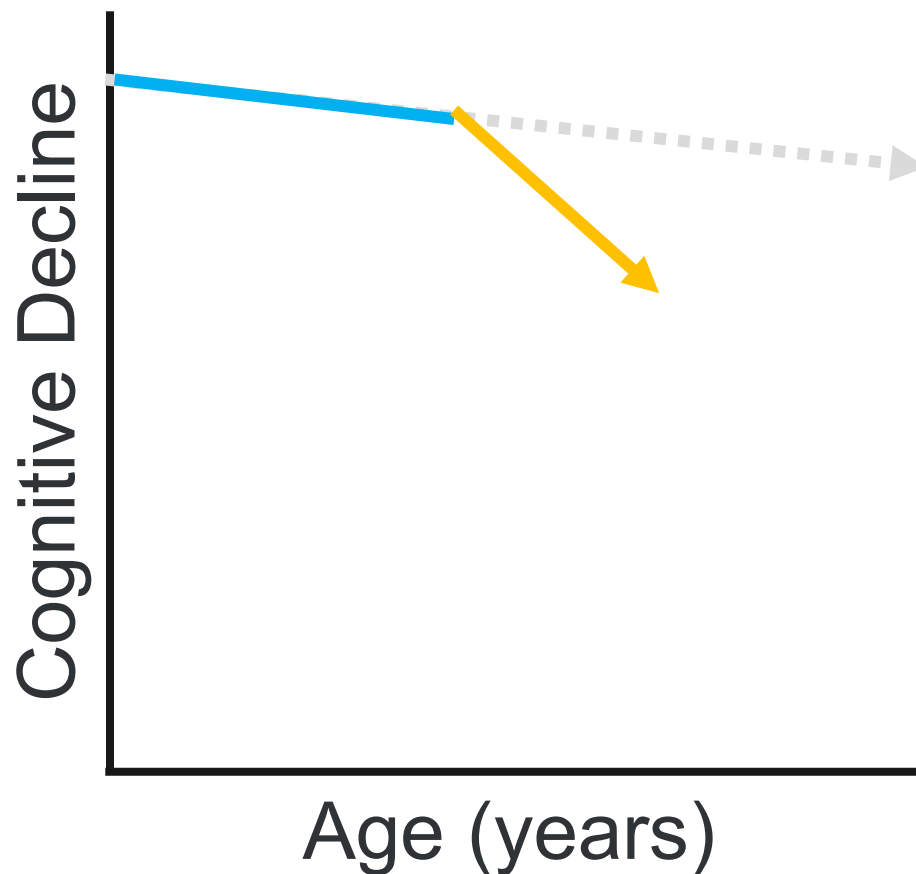
Contrary to popular belief, mild cognitive impairment and dementia are not inevitable and are distinct from the process of typical aging.

Typical Age-Related Declines in Cognitive Function



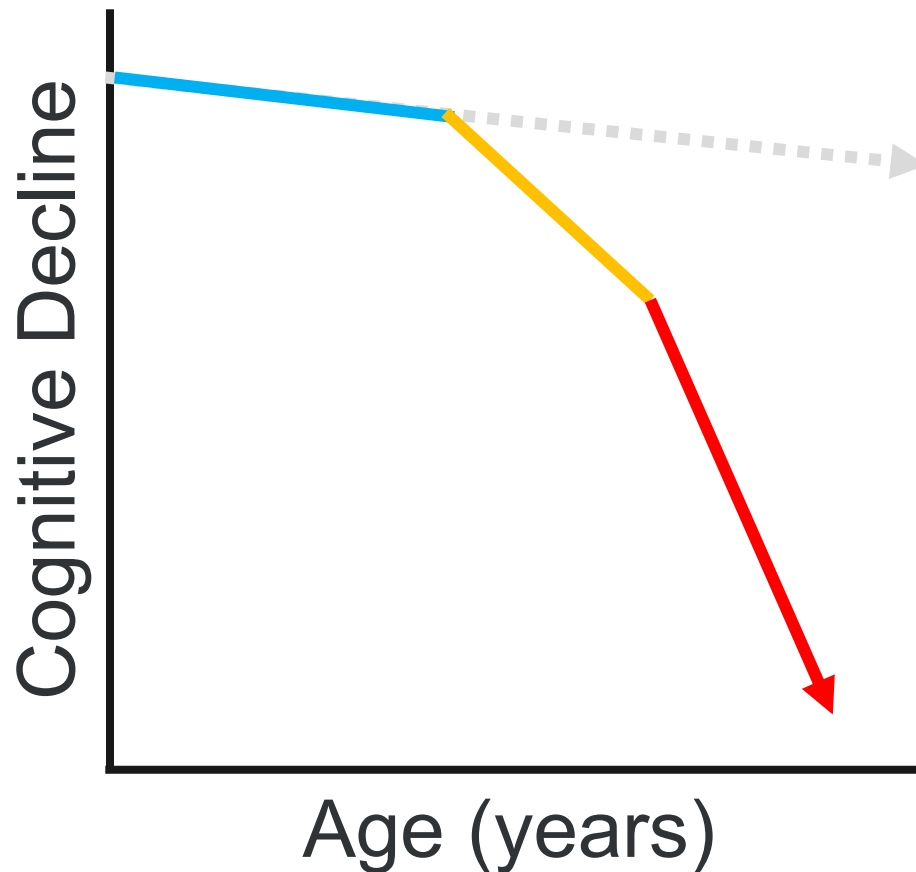
Typical Aging:
Expected decline in cognitive functioning associated with typical aging

Mild Cognitive Impairment (MCI)



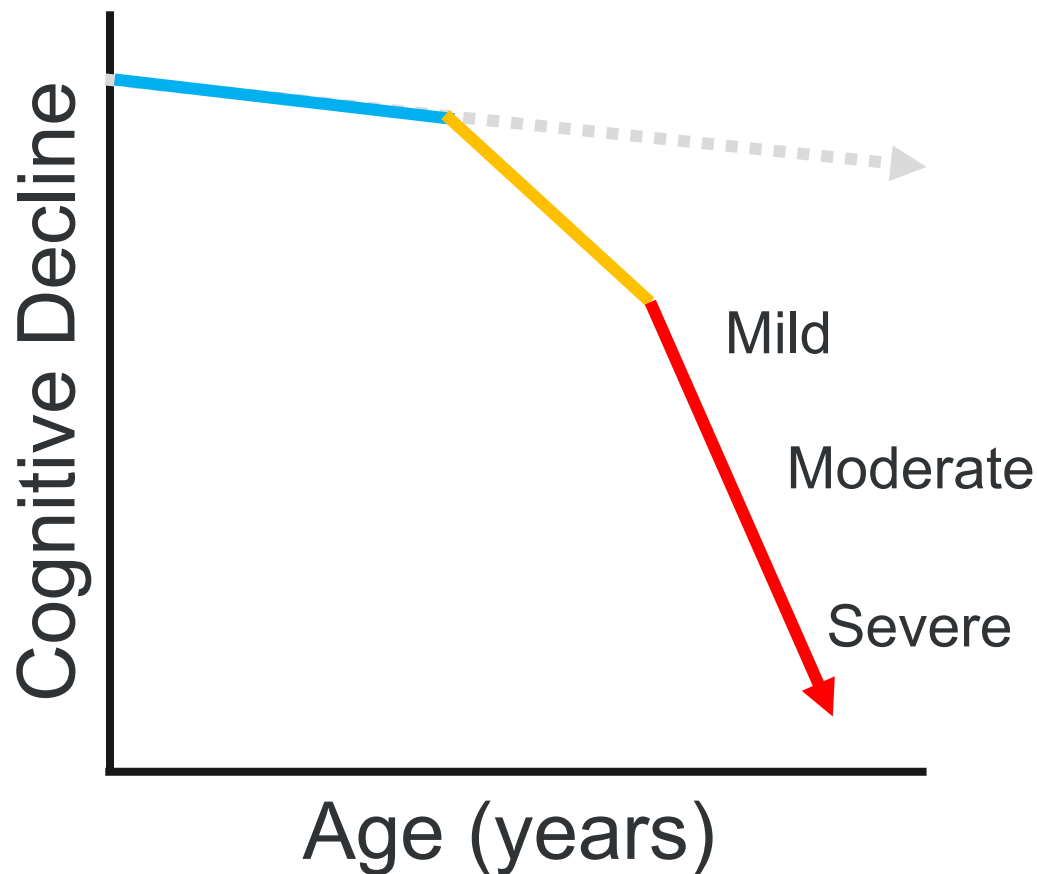
Mild Cognitive Impairment (MCI):
 Impairment in
 cognitive function but
 no significant
 impairment in daily
 functioning

Dementia



Dementia:
Impairment in
cognitive function
and significant
impairment in
daily functioning

Dementia

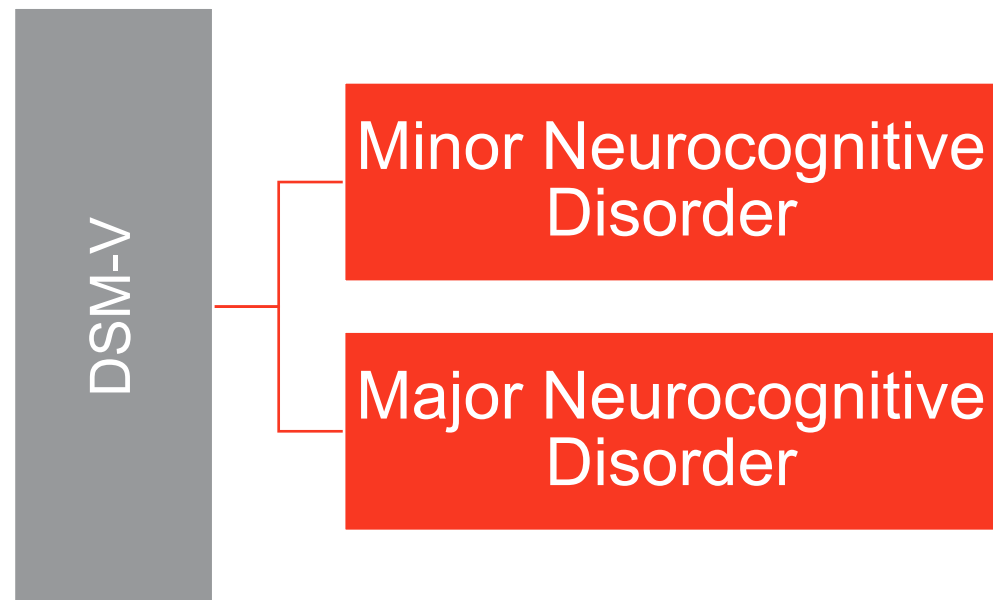


Dementia:
Impairment in
cognitive function
and significant
impairment in
daily functioning

Current Diagnostic Criteria (DSM-5)

- The term “mild cognitive impairment” is not delineated as a separate diagnostic category
- The term “dementia” has been replaced with separate diagnostic categories

Current Diagnostic Criteria (DSM-5)



- New diagnostic categories reflect a broader understanding of cognitive decline and aims to improve accuracy in diagnosis and treatment

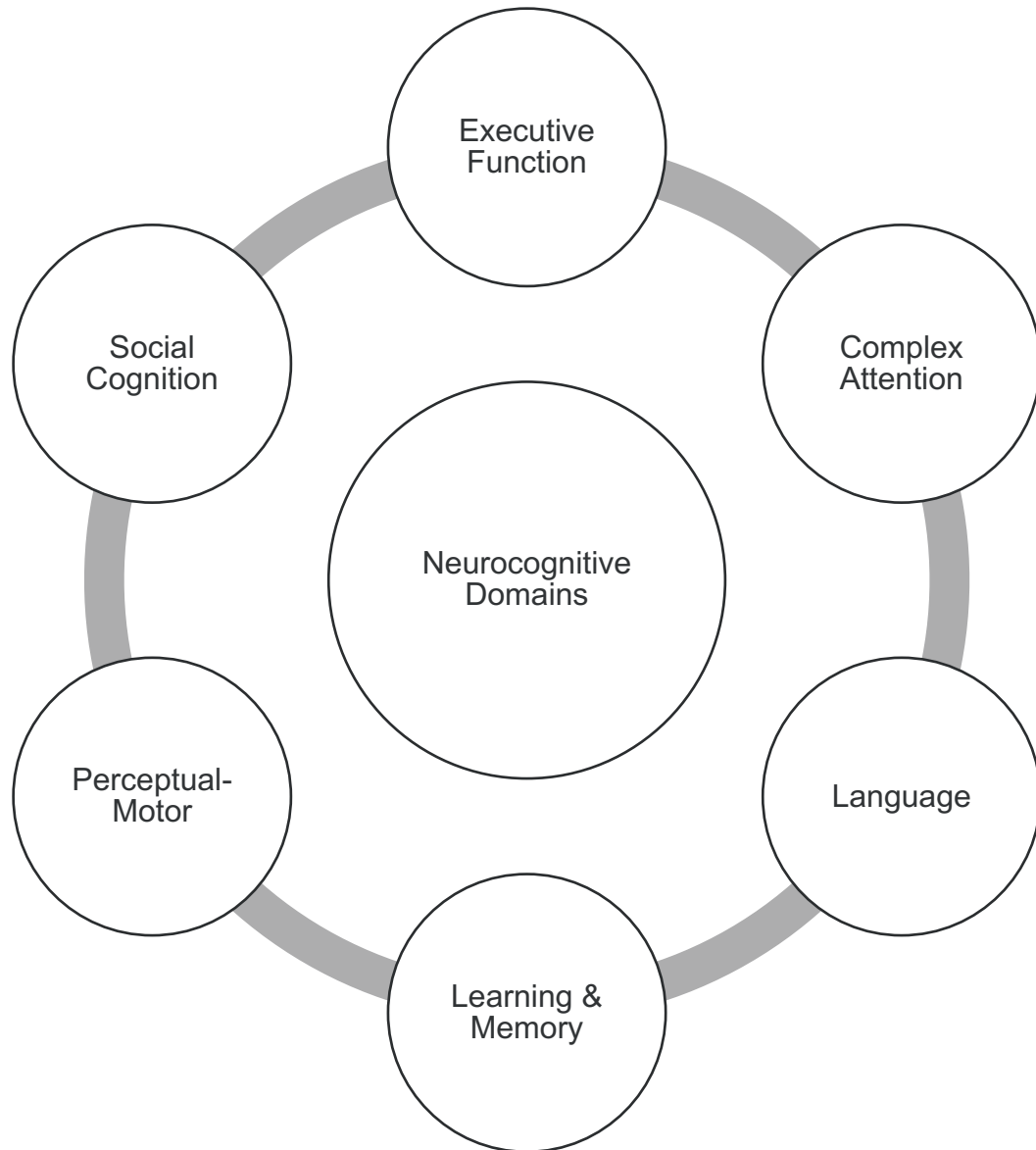
Minor Neurocognitive Disorder (Minor NCD)

- Modest decline in cognitive function from previous levels of performance in one or more cognitive domains that do not interfere significantly with independence in everyday activities
 - Not exclusively attributable to delirium
 - Not attributable to another mental disorder
 - Not attributable to the physiological effects of a substance or medical condition

Major Neurocognitive Disorder (Major NCD)

- Significant decline in cognitive function from previous levels of performance in one or more cognitive domains that does interfere with independence in everyday activities
 - Not exclusively attributable to delirium
 - Not attributable to another mental disorder
 - Not attributable to the physiological effects of a substance or medical condition

Cognitive Domains



Other Behavioral Symptoms of Dementia

Depression

Agitation /
Aggression

Delusions

Anxiety

Irritability

Hallucinations

Elation

Motor
Behaviors

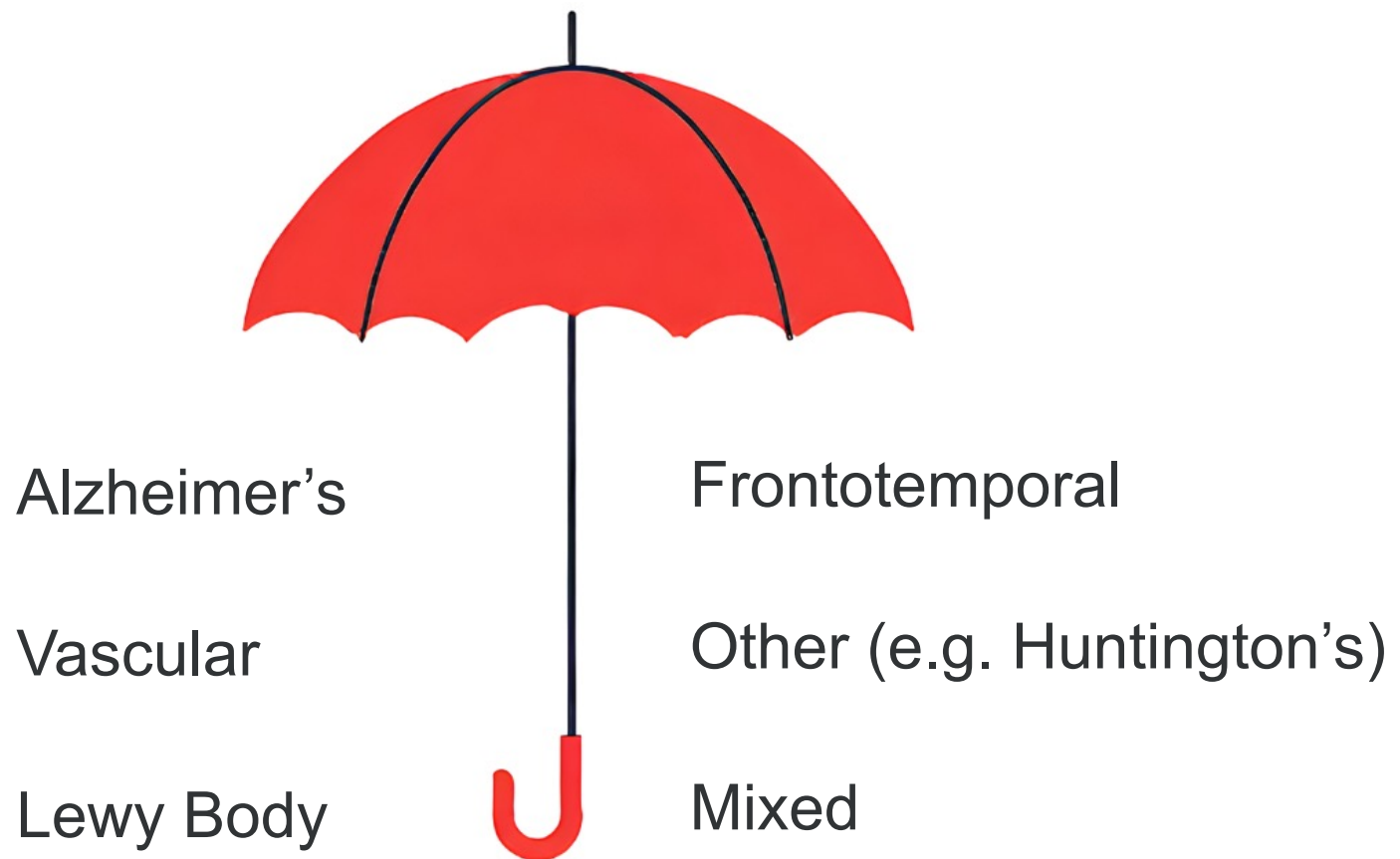
Nighttime
Behaviors

Apathy

Disinhibition

Change in
Appetite /
Eating

Types of Dementia



Audiologists are Uniquely Positioned for Cognitive Screening



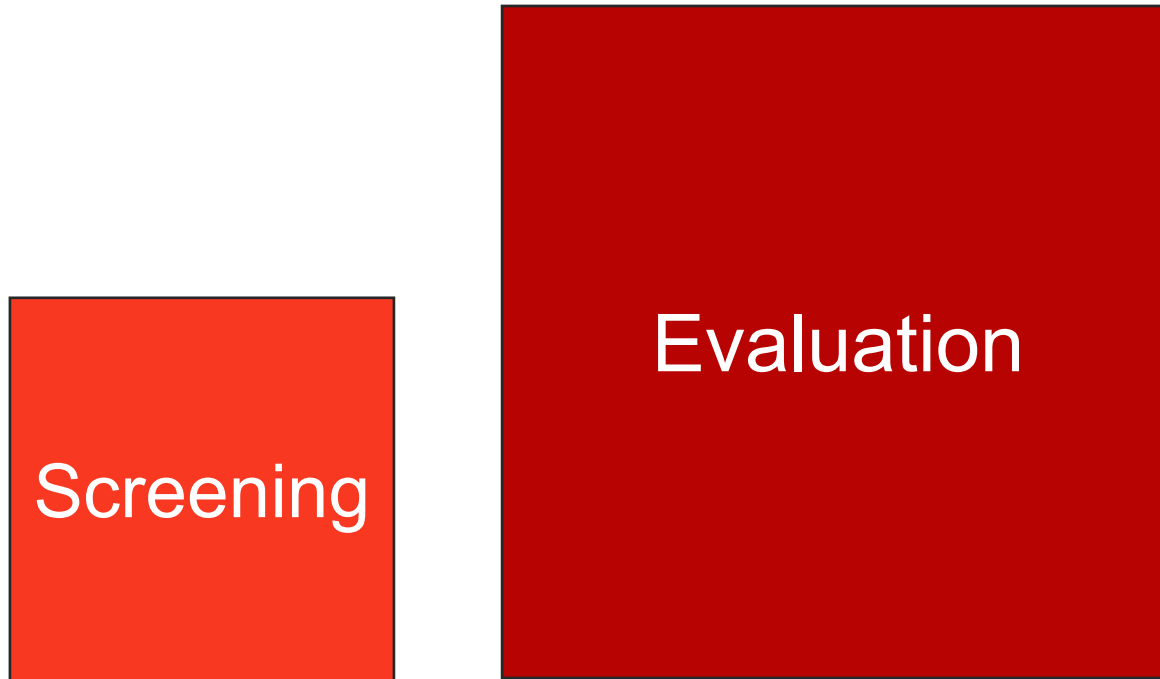
Average Duration of
Physician Visit



Average Time for Counseling in
the Adult Audiological
Treatment Process

Shen et al (2016)

Cognitive Screening vs. Cognitive Evaluation



Examples of Common Cognitive Screening Tools

- Mini Mental State Examination (MMSE)
- Montreal Cognitive Assessment (MoCA)
- Saint Louis University Mental Status Examination (SLUMS)
- Mini-Cog
- Cognivue Thrive

Examples of Common Cognitive Screening Tools

- Mini Mental State Examination (MMSE)*
- Montreal Cognitive Assessment (MoCA)*
- Saint Louis University Mental Status Examination (SLUMS)*
- Mini-Cog*
- Cognivue Thrive

**Free*

Examples of Common Cognitive Screening Tools

- Mini Mental State Examination (MMSE)
- Montreal Cognitive Assessment (MoCA)*
- Saint Louis University Mental Status Examination (SLUMS)
- Mini-Cog
- Cognivue Thrive*

**Less susceptible to effects of audibility on test performance*

Example Script

Before Cognitive Screening:

“The next screening we are going to do today tells us about how your brain processes information. Your brain’s ability to process information plays an important role in communication. Understanding how your brain processes information can also help shape your hearing healthcare plan. Do you have any questions before we begin?”

Example Script

After the Cognitive Screening:

“How did the test go for you?”

“I am going to score the screening after our visit today. I’d also like to share the results with your primary care physician if that is alright with you.”

“Based on all the information we’ve gathered today, let’s talk about next steps related to your hearing health. Does this sound good to you? Do you have any questions before we dive in?”

Communicating Cognitive Screening Results

- Share results with patient's PCP
- Encourage discussion about screening test results and cognitive concerns with PCP
- Follow up at next visit to ask if patient talked with PCP about cognitive screening results

Up to 60% of cases of dementia
go undetected.

Lang et al (2021)

Connecting Patients with a Dementia Diagnostic Center

- PCPs
- Local area Agency Council on Aging
- Local Alzheimer's Association
- Alzheimer's Association online [Community Resource Finder](#)

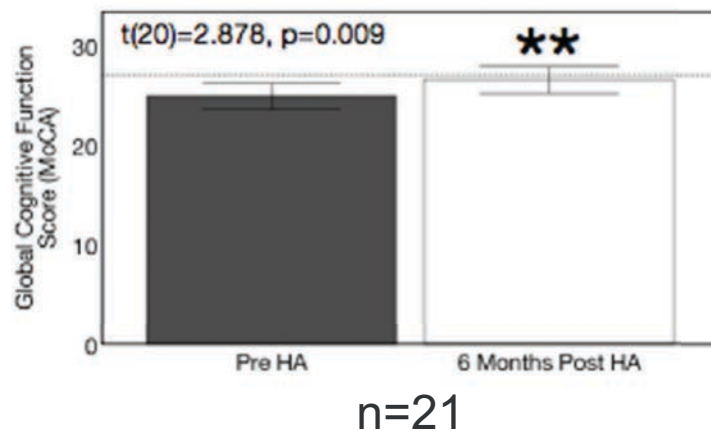
Undetected dementia can lead
to delays in treatment and
management.

Comorbidity Between Hearing Loss and MCI/Dementia

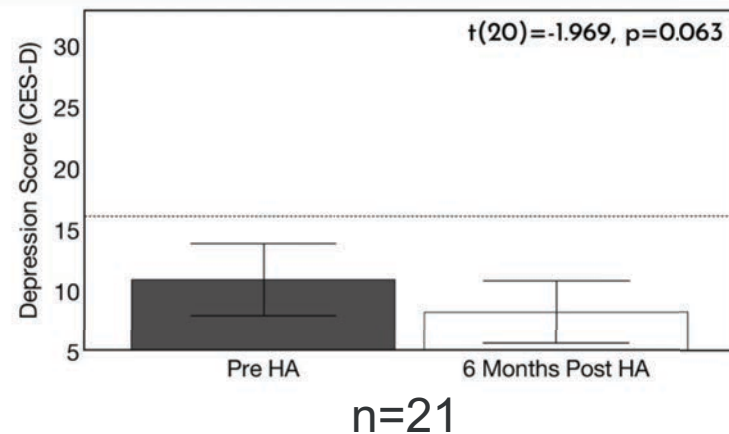
- Age-related hearing loss and MCI/dementia are highly co-morbid and commonly co-occur
- Prevalence of hearing loss is higher among adults with cognitive impairment (MCI = 71.3%, Dementia: 83.3%) compared to typically aging adults (64.7%) (Nieman et al., 2020)

Previous Studies

Global Cognitive Function
(MoCA)



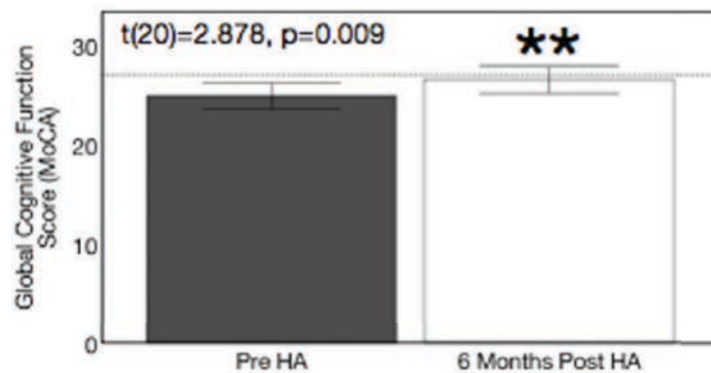
Depressive Status
(CES-D)



Glick & Sharma (2020)
Glick & Sharma (in preparation)

Previous Studies

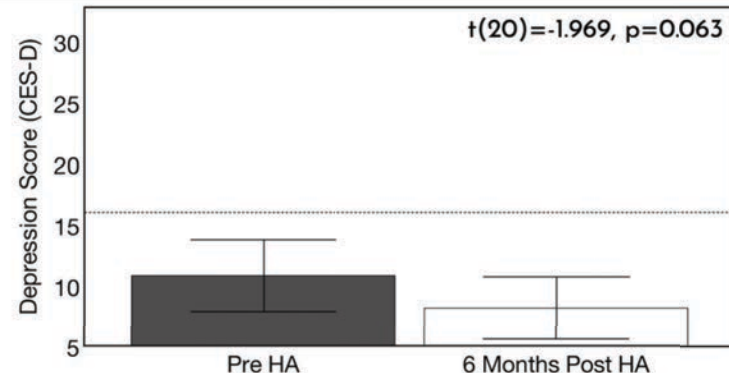
Global Cognitive Function
(MoCA)



n=21

Significant improvement in global cognitive function with hearing aid use

Depressive Status
(CES-D)



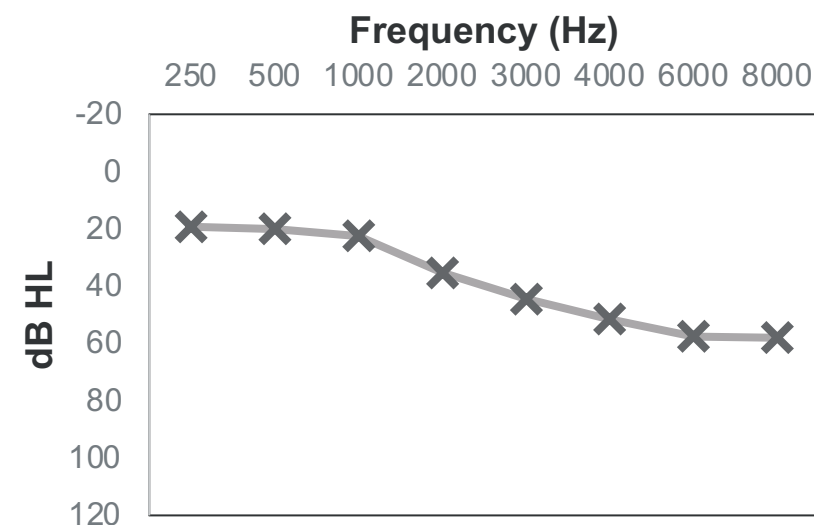
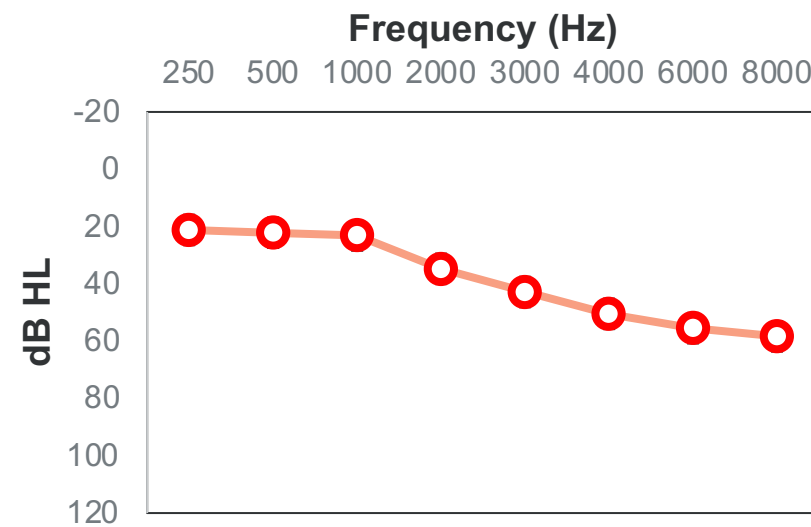
n=21

Reduced depressive symptoms with hearing aid use (nonsignificant)

Glick & Sharma (2020)
Glick & Sharma (in preparation)

Participants

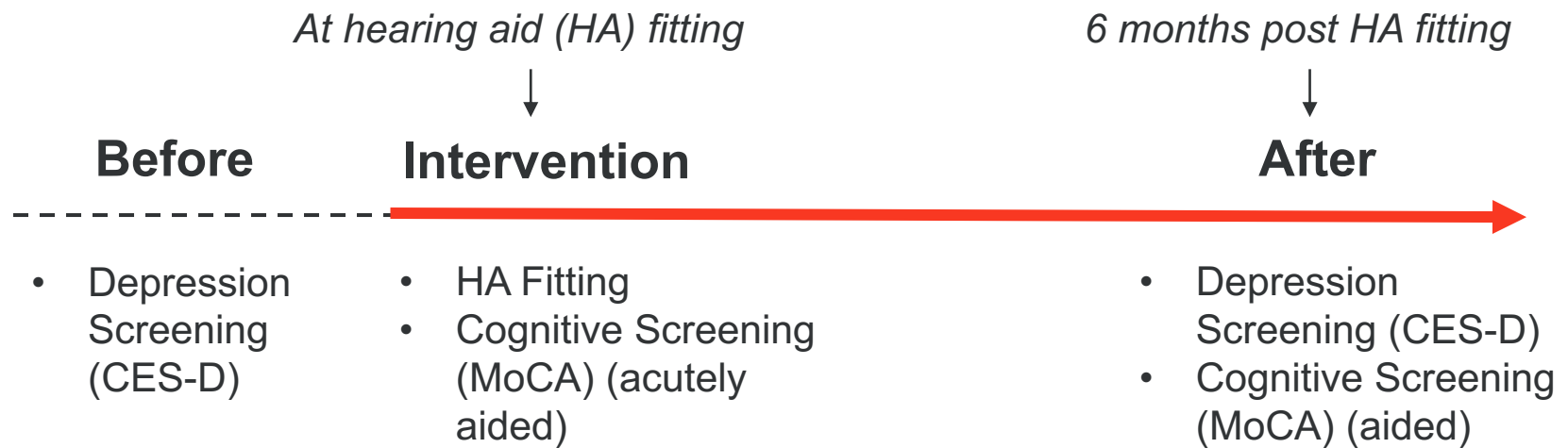
- n=21 (10 female, 11 male)
- Average age = 64.38 years
- Age range = 57-71 years
- Age standard deviation = 4.03
- Bilateral mild-moderate symmetrical SNHL
- No reported neurological impairment



Glick (in preparation)

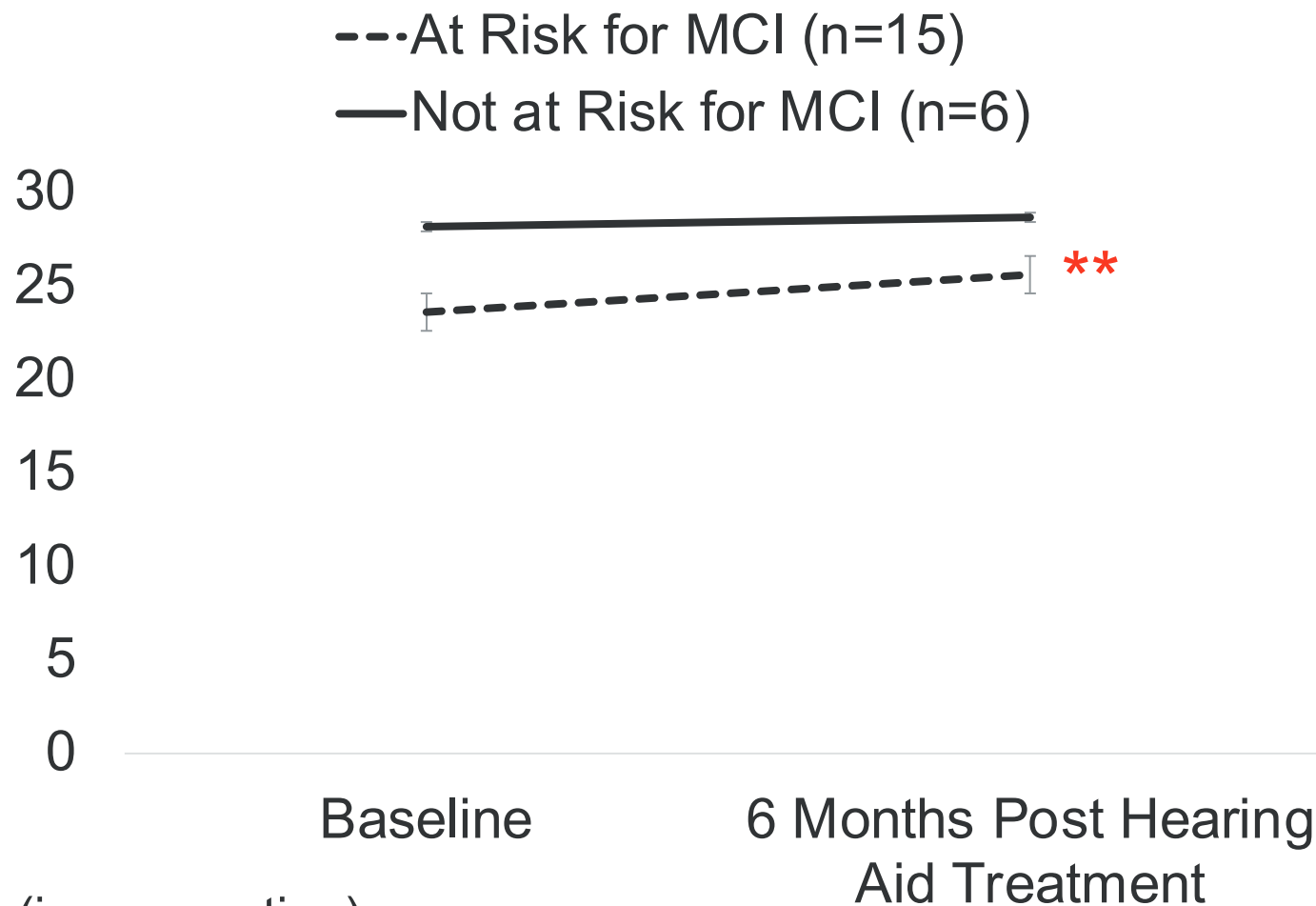
Study Design

- Retrospective hearing loss cohort study

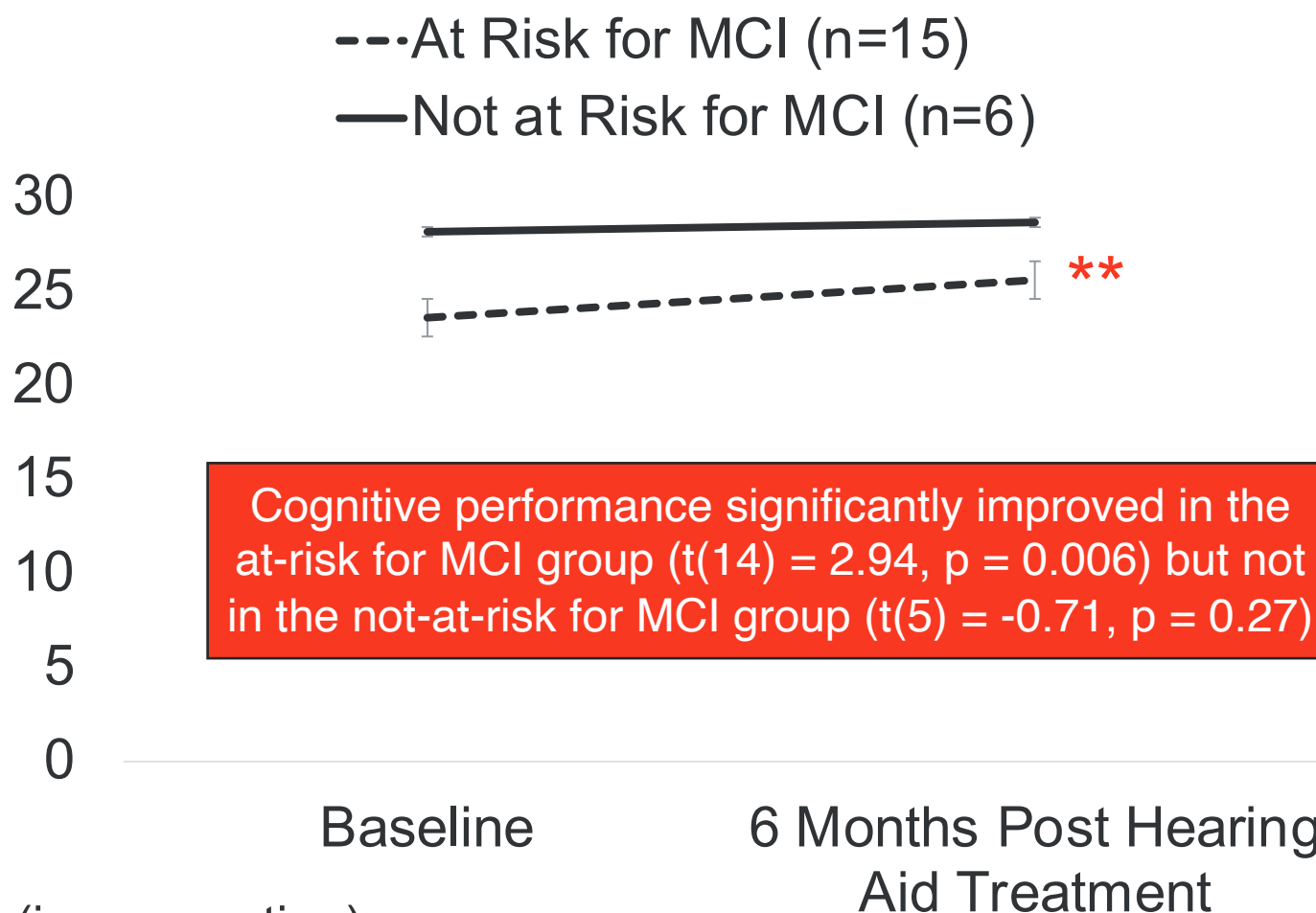


Glick (in preparation)

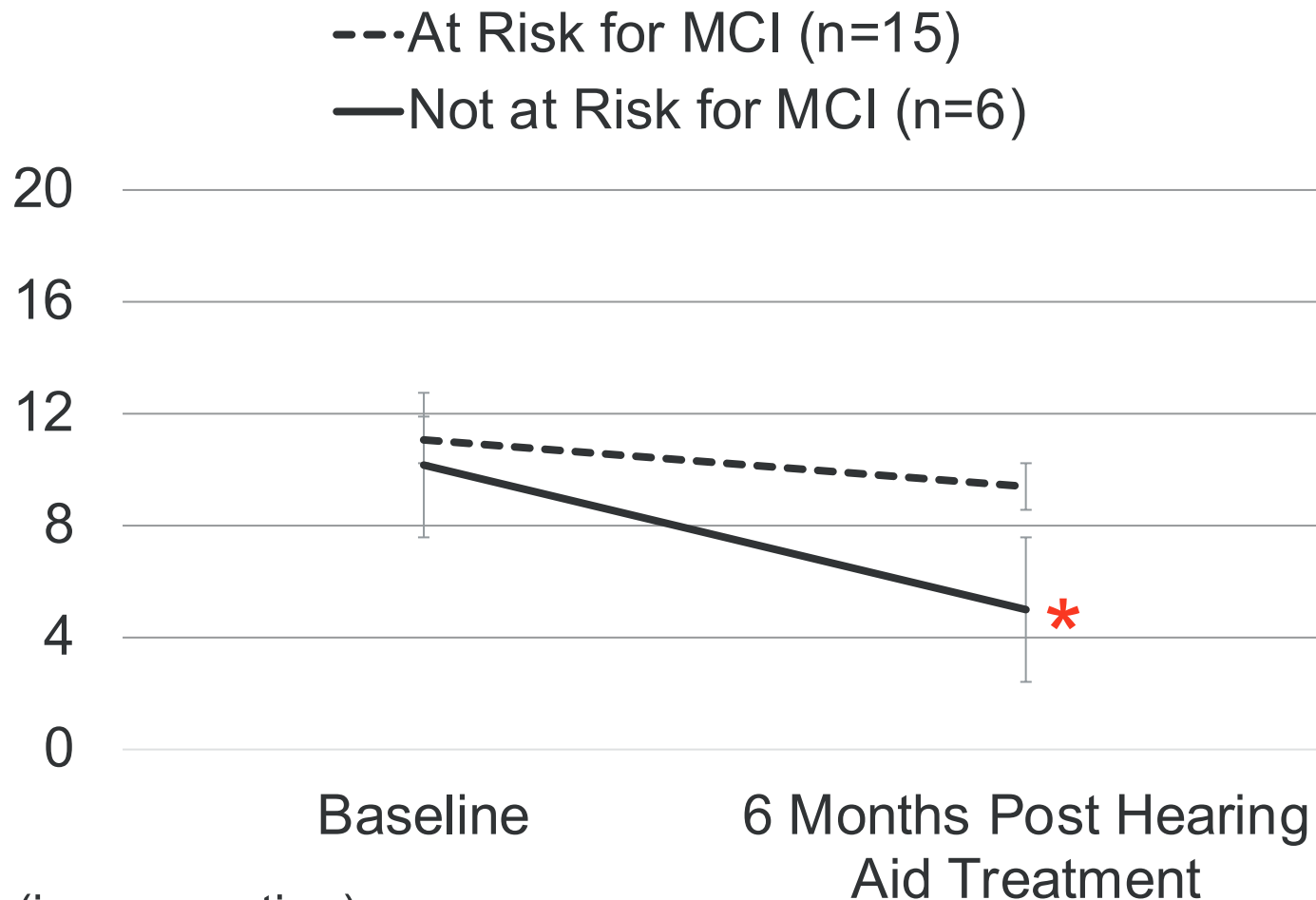
Cognitive Function Before & After Hearing Treatment



Cognitive Function Before & After Hearing Treatment



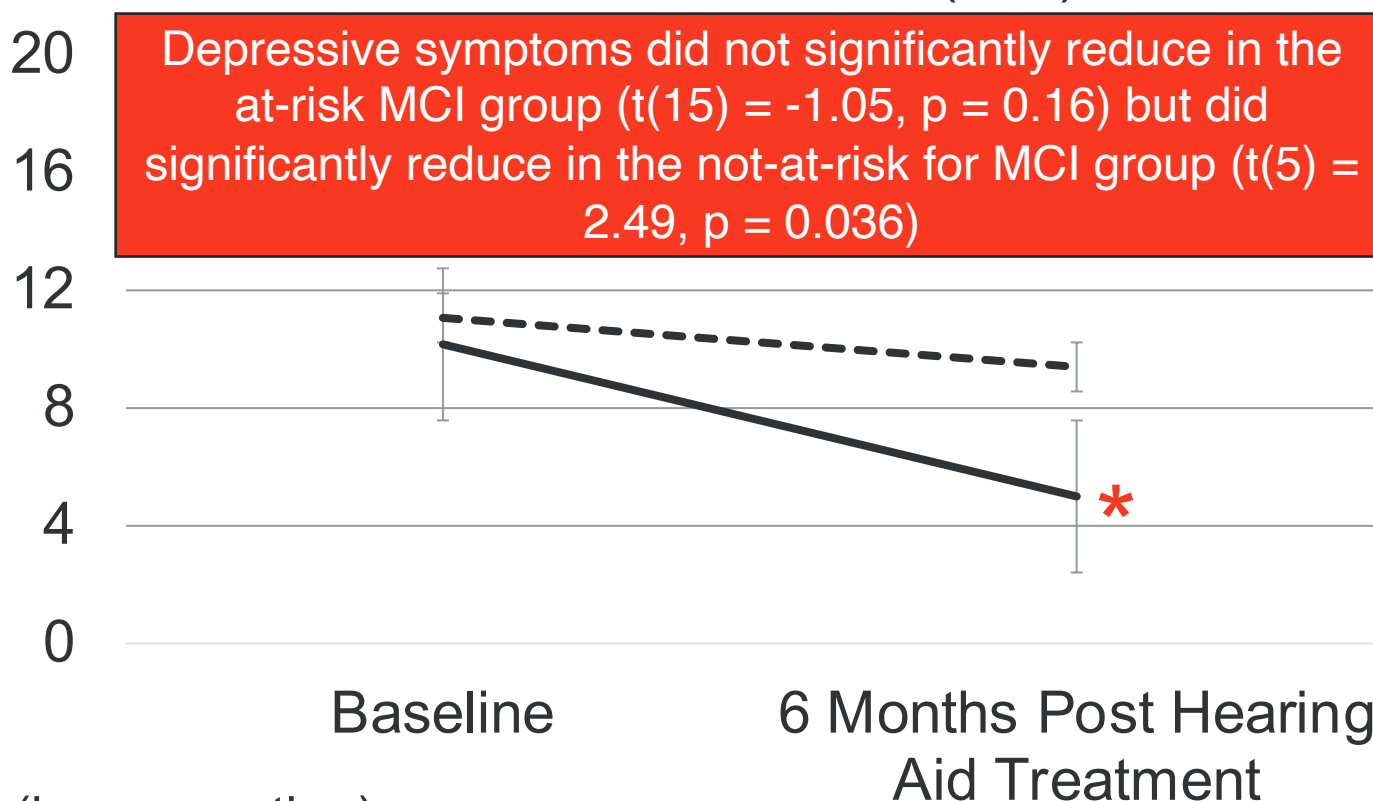
Depression Symptoms Before & After Hearing Treatment



Depression Symptoms Before & After Hearing Treatment

--- At Risk for MCI (n=15)

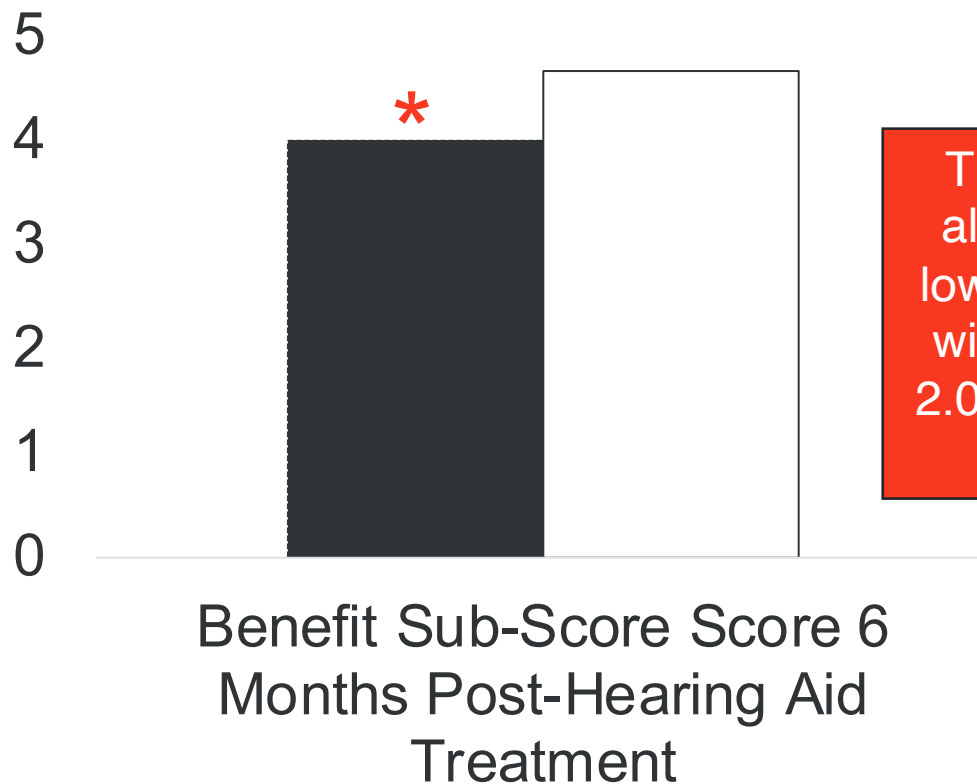
— Not at Risk for MCI (n=6)



Self-Perceived Benefit with Hearing Aids

■ At Risk for MCI (n=15)

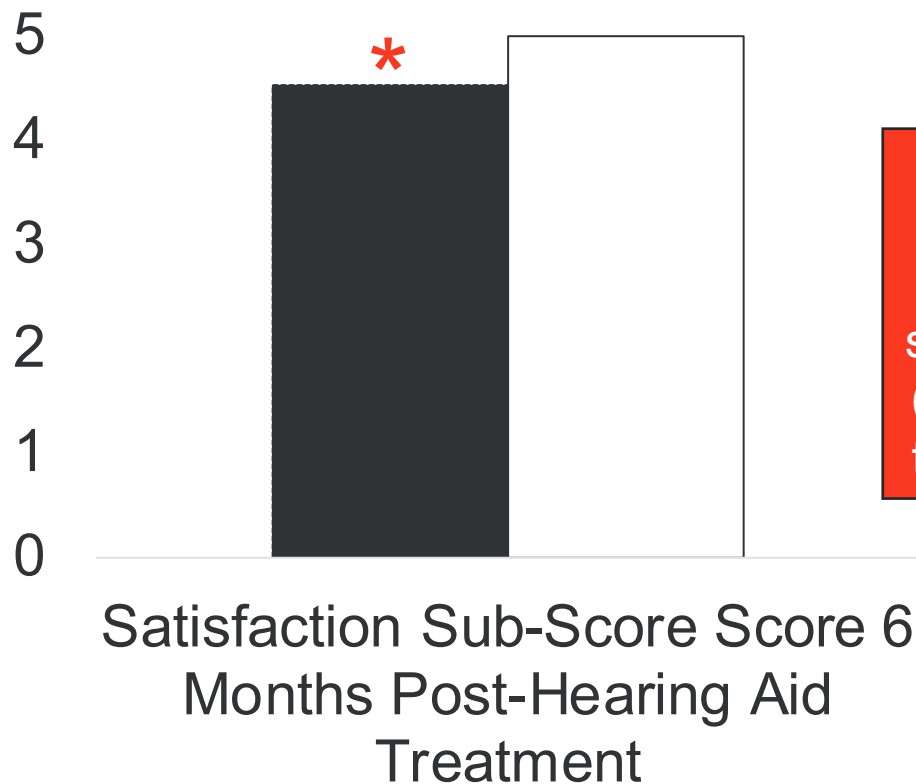
□ Not at Risk for MCI (n=6)



The at-risk for MCI group also reported significantly lower self-perceived benefit with hearing aids ($t(18) = -2.03$, $p = 0.04$) than the not-at-risk for MCI group

Self-Perceived Satisfaction with Hearing Aids

- At Risk for MCI (n=15)
- Not at Risk for MCI (n=6)



The at-risk for MCI group also reported significantly lower self-perceived satisfaction with hearing aids ($t(18) = -2.51, p = 0.01$) than the not-at-risk for MCI group

Persistent Hearing Aid Use in Adults with MCI/Dementia

- Adults age 60+ years with a dementia diagnosis have 54% lower odds of persistence in hearing aid use than typically aging adults (Naylor et al., 2022)

Clinical Implications

- Recommendation for hearing treatment technology
- Selection of specific signal processing characteristics
- Involvement of frequency communication partners in the treatment and rehabilitation process (e.g. family members, caregivers)
- Involvement of the multidisciplinary team in the treatment and rehabilitation process
- Identification for the need of additional forms of rehabilitation or support to optimize treatment success

Recommendation for Hearing Treatment Technology

- Cognitive ability
- Dexterity
- Self-efficacy
- Motivation
- Family/caregiver support
- Maximizing signal-to-noise ratio (SNR) and reducing cognitive load and listening effort

Selection of Specific Signal Processing Characteristics

- Slow acting compression
- Caution with compression ratios (<3.0)
- Caution with noise reduction

Windle et al (2023)

Involvement of Frequent Communication Partners

- Encourage attendance of family/caregivers at audiological appointments
- Elicit perspectives from family/caregivers at audiological appointments

Involvement Within the Multidisciplinary Team

- Frequent communication with the multidisciplinary team may help to identify barriers and facilitators to hearing aid/cochlear implant use and support the patient and family/caregiver toward successful use

Future Ideas for Optimized Treatment Success

- Group aural rehabilitation
- Pharmacological interventions
- Non-pharmacological interventions (e.g. cognitive training)

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Thank you!

Hannah Glick, AuD, PhD, CCC-A

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