Make Sound Decisions: Hearing Aids and the Brain

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Board of Trustees Hearing Loss Association of America (HLAA)
Agenda

Neuroscience of Communication. Role of the brain.

Problem
Older adults are at a disadvantage when making use of sound. Cognitive Decline: Auditory learning.

Solution
Implications for treatment and advocacy.
1. Describe to their patient how the aging brain is affected by hearing loss so that realistic expectations for rehabilitation can be set.

2. Answer frequently asked questions about hearing loss and hearing aids in relation to cognition/training & brain plasticity.

3. Share new resources and tools, aimed at promoting healthy aging.
Hearing Loss Statistics

- Hearing loss is **the most prevalent sensory loss** in older adults. It’s one of the top 3 chronic health conditions.

- 18 percent of American adults 45-64 years (1/5).
- 30 percent of adults 65-74 years old (1/3).
- 47 percent of adults 75 years old or older (1/2) and prevalence increases with age.
The Graying Of America
(Source: US Census Data)

AGE WAVE

Age 65 and older
Age 85+
Consequences of Untreated Hearing Loss

• Social isolation
• Loss of independence
• Depression
• Increased risk of falls
• Increased risk of cognitive decline and dementia
• Early retirement
• Financial decline
• Difficulty navigating public and private systems (e.g., health care, transit)
• Difficulty advocating for oneself.
• Relationship Stress
Age related hearing loss
50% people need hearing help

25% who need help get hearing aids

12% use their hearing aids
No changes in Hearing Aid Use Over Time

% People with Hearing Loss

Davis et al. 2011
Your listening experience depends on.....
Neuroscience of Communication. Role of the brain.
Older adults are at a disadvantage when making use of sound.
Strength of sound conduction declines with AGE.

Tremblay et al. *Hear Research* (2009; 2013)
Strength of sound conduction declines with advancing AGE.

22 year old  43 year old  77 year old

Tremblay et al. *Hear Research* (2009; 2013)
Damage to the cochlea affects various structures in the brain.
Hearing Loss is Correlated with Gray Matter Volume in Auditory Cortex.

Peelle et al., 2011, J. Neurosci.
Possible contributions to hearing aid satisfaction
Working memory & speech understanding

Miller et al. (accepted)
Possible contributions to hearing aid satisfaction
No changes in Hearing Aid Use Over Time

Davis et al. 2011
Possible contributions to hearing aid satisfaction
We can look at what comes out of a hearing aid and how your brain is encoding it.
Possible contributions to hearing aid satisfaction
Brain Waves Generated While Wearing Hearing Aids
A
Without Hearing Aids

B

With Hearing Aids

C

Strength of sound conduction declines with advancing AGE.

22 year old       43 year old       77 year old

Tremblay et al. *Hear Research* (2009; 2013)
Abstract

Background

Auditory training involves active listening to auditory stimuli and aims to improve performance in auditory tasks. As such, auditory training is a potential intervention for the management of people with hearing loss.

Objective

This systematic review (PROSPERO 2011: CRD42011001406) evaluated the published
What about cognition?

NEWS & RESEARCH

Study Links Cognitive Deficits, Hearing Loss

By JUDITH GRAHAM  JANUARY 23, 2013 5:20 AM  34 Comments

There’s another reason to be concerned about hearing loss — one of the most common health conditions in older adults and one of the most widely undertreated. A new study by researchers at Johns Hopkins Medicine suggests that elderly people with compromised hearing are at risk of developing cognitive deficits —
Wearing hearing aids reduces the risk of cognitive decline associated with hearing loss.
New Research is coming out.

**Age-Related Sensory Impairments and Risk of Cognitive Impairment.**

Fischer ME¹, Cruickshanks KJ²,³, Schubert CR², Pinto AA², Carlsson CM⁴,⁵, Klein BE², Klein R², Tweed TS².

**Abstract**

**OBJECTIVES:** To evaluate the associations between sensory impairments and 10-year risk of cognitive impairment.

**DESIGN:** The Epidemiology of Hearing Loss Study (EHLS), a longitudinal, population-based study of aging in the Beaver Dam community. Baseline examinations were conducted in 1993 and follow-up examinations have been conducted every 5 years.

**SETTING:** General community.

**PARTICIPANTS:** EHLS members without cognitive impairment at EHLS-2 (1998-2000). There were 1,884 participants (mean age 77.5 years) who completed EHLS-2 sensory data and follow-up information.

**MEASUREMENTS:** Cognitive impairment was defined as a Mini-Mental State Examination score of <24 or history of dementia. Hearing impairment was a pure-tone average of hearing thresholds (0.5, 1, 2, 4 kHz) of >25 dB hearing level in either ear. Impairment was a Pelli-Robson contrast sensitivity of <1.55 log units in the better eye, and olfactory impairment was a San Antonio Breath Identification Test score of <6.

**RESULTS:** Hearing, visual, and olfactory impairment were independently associated with cognitive impairment risk (hearing: HR = 1.90, 95% confidence interval (CI) = 1.11-3.26; vision: HR = 2.05, 95% CI = 1.24-3.38; olfaction: HR = 3.92, 95% CI = 1.67-9.28). Nevertheless, 85% of participants with hearing impairment, 81% with visual impairment, and 76% with olfactory impairment had no cognitive impairment during follow-up.

**CONCLUSION:** The relationship between sensory impairment and cognitive impairment was not unique to one sensory system or specific to advanced sensory impairment. Instead, sensory impairment may be a marker of brain aging. The development of a combined sensory-neurocognitive measure is needed to further investigate this relationship.
Implications for treatment and advocacy
50% people need hearing help

25% who need help get hearing aids

12% use their hearing aids

Why?
FDA takes steps to improve hearing aid accessibility

The U.S. Food and Drug Administration today announced important steps to better support consumer access to hearing aids. The agency issued a guidance document explaining that it does not intend to enforce the requirement that individuals 18 and up receive a medical evaluation or sign a waiver prior to purchasing most hearing aids. This guidance is effective immediately. Today, the FDA is also announcing its
A Big Problem and New Priority:

Pros and Cons of Inexpensive Hearing Aids Called PSAPs
New Devices Cost Much Less, but Often Come Without Professional Guidance

By NORM CRAMPTON

Just Don’t Call Them Hearing Aids

By ANNE EISENBERG  MARCH 22, 2014
Healthcare system?
Gatekeepers, management, sector, place, ethos, values,

Mindset?
Motivation, stigma, cognition, mental health, lifestyle, social, participation

Person Centered Care?
Needs assessment, Self management, shared decisions, holistic care, care plan, range of interventions

Accessibility?
Ease of access, convenience, welcome, quality, e-health, mobile technology, t

Funding?
Cost to system? person/family? incentives; wider costs and benefits, Medicaid? Insurance?
http://publicgoodventures.com/ehearingstudy/
Hearing Access Technology Needed in Senior and Residential Settings, Hospitals, Primary Care Physicians Offices

- Counter loops
- Loops for recreation rooms, large spaces
- Microphones, Pocket Talkers, headsets, and PA systems
New Tools
The Problem:
• **VISION**: to allow people to hear and be heard by creating a crowd sourcing communal resource for public good.

• **MISSION**: to engage and empower any one, any where, any time, so they can make **sound decisions**. With our tools and information, they can identify and locate places and spaces that meet their listening needs.

• iHEARu is a mobile app that uses GPS and crowdsourcing to help you find commercial or public places with sound levels that are right for you.
Sept 2016 – 4 months

What We Do

We live in a noisy world and so we created iHEARu to help you make sound decisions.

Do you want to find a quiet cafe to discuss business or chat with a friend? On a specific day and time? iHEARu can help. Our mobile app uses crowd-sourcing to help you find locations with noise levels that suit your needs. If you’re looking for a quiet eatery, bar or cafe then iHEARu GPS will help you find it. If you’re looking for public or commercial spaces that offer assistive listening options, our mobile app can locate those too.

Like it Loud? That’s okay too. iHEARu provides you with that information in advance so you can decide if you want to bring hearing protection.

Wherever you go in the world, iHEARu users can search for ear-friendly restaurants, theaters and more.

Join our team and map the world!
We help you make SOUND decisions

iHEARu.co

Download the app and write a review
iHEARu HELPS YOU MAKE SOUND DECISIONS.

Sign Up!

What We Do

http://www.ihearu.co/
Questions?

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