



MINNESOTA ACADEMY OF AUDIOLOGY Newsletter

Feature Story

Alzheimer Disease Diagnosis and Hearing Loss

*By Kara Balken, Graduate Student of Audiology
and Lindsey Jorgensen, AuD, PhD*



Alzheimer disease (AD) is the most common form of dementia; an estimated 5 million Americans over 65 years of age had Alzheimer disease in 2010 (Hebert, Weuve, & Scherr, 2013). [It should be noted that in the DSM-5 the term dementia was replaced by cognitive impairment, however, most practitioners continue to use this term. (American Psychiatric Association, 2013).] Typically, the symptoms of AD appear after the age of 60 and can have a significant emotional and societal impact on a person’s life including fear of the unknown. However, it is interesting to note that several of the symptoms of hearing loss overlap with dementia (Jorgensen, Palmer, & Fischer, 2014). Hearing loss is prevalent in 63.1% of adults aged 70 years and older in the United States (Lin et al., 2011). Therefore, it is reasonable to assume that many individuals diagnosed with AD also have a hearing loss.

Alzheimer disease is typically irreversible and progressive in nature, beginning with mild memory lapses that can lead to severe deficits in memory; more specifically, recent memories. AD can present itself in a multitude of ways, both cognitively and psychologically, and the progression of the disease varies between individuals. Common cognitive symptoms include memory loss, confusion, disorientation, or difficulty with communication, problem solving, complex tasks, and planning/organization. Common psychological symptoms include personality changes, depression, anxiety, inappropriate behavior, paranoia, agitation, and hallucinations. At the current time, there is no known cure for AD; however, early diagnosis and medical management can help to preserve some daily living activities, although the pathophysiology of the disease cannot be stopped (Mayo Clinic, 2017). There are several medications and many clinical trials for the treatment of persons with AD; however, there is limited evidence to suggest the effectiveness of these treatments to date.

AD is diagnosed through family interviews (regarding overall health, medical history, ability to carry out activities of daily living, and changes in behavior or personality), tests of memory, problem solving, attention, counting, and language. These tests can be significantly skewed by hearing loss. This is particularly concerning as most physicians are diagnosing AD with the combination of family report and verbally presented tests (Jorgensen, Palmer, & Fischer, 2014). There are other medical exams that can be used to diagnose AD including medical tests to rule out other medical

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pathologies; brain scans (e.g., CTs, MRIs, and PET), and after death via autopsy. Unfortunately, many of these are not used and the standardized tests used to diagnose dementia are presented orally and individuals who also have a hearing loss are at a significant disadvantage regardless of their cognition (Jorgensen et al., 2016).

it is possible that persons could be misdiagnosed or over-diagnosed with AD as the hearing loss could impact their family's perception of their cognitive ability.

At this point, research has suggested that individuals diagnosed with AD are not inherently more likely to have a hearing loss. It should be noted, however, that it is possible that persons could be misdiagnosed or over-diagnosed with AD as the hearing loss could impact their family's perception of their cognitive ability (Jorgensen et al. 2015). Further, given the prevalence of AD and hearing loss separately, it is likely that audiologists working with adults and older adults will encounter individuals with AD or those who are showing signs of AD. Having AD should not impact an individual's ability to receive audiologic treatment (e.g., hearing aids or cochlear implants). Rather audiologic care of these individuals may more heavily rely on family or caregivers to help with daily device use, equipment maintenance, and consistent follow-up care. Further, it should be noted that the caregivers for those with AD who are fitted with hearing aids are likely to report fewer problems and less caregiver stress (Palmer, et al. 1999).

In the clinical setting, certain accommodations may be necessary to help patients with AD. Possible techniques that may be useful for individuals with AD include providing written instructions to orally presented information or providing the information to the patient and their caregiver(s) or family members. As many individuals with AD may live in care facilities, providing in-service trainings regarding device use and maintenance at care facilities can also be helpful. Audiologists also have interaction with patients who may be showing signs of AD, and therefore can make referrals to appropriate professionals for further evaluation. Results from Jorgensen et al. (2016) indicated that individuals with untreated hearing loss may be susceptible to wrongful diagnosis of dementia; so audiologists should be aware and in communication with physicians who are diagnosing and treating age related cognitive declines. It is recommended that hearing evaluations be a part of the treatment plan prior to the diagnosis of hearing loss. It is further recommended that audiologists take into account the current and future possible cognitive abilities of their patients when making recommendations.

At this point, cognitive ability does not significantly impact the use of hearing assistive technology, but devices should be matched with people's physical and cognitive ability. Although, the specific type of audiologic treatment should not be impacted by a diagnosis of AD, audiologist can provide multiple accommodations with hearing loss and AD. Hearing aids are not for everyone and this includes those with cognitive decline. There are many resources available for people who have specific questions about fitting devices on patients with cognitive impairment

(e.g., Audiology Online). Audiologists can have a unique role in helping to appropriately diagnose form of dementia, specifically when standardized tests are presented orally.

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How Two Scientific Perspectives on How Audiologists Learn and Develop Can Help Us Navigate the Tides of Change

By Stella Ng, PhD, FAAA
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Change is happening to audiology, and thus to audiologists.

I have been an audiologist for over 10 years now, and I've watched change wash over our profession. For example, I was just deciding to become an audiologist in the early 2000s when, in my home province of Ontario, our public health insurance plan stopped (for the most part) funding audiology services. For the last decade, I've also been studying how health professionals practice, learn, and enact change in the face of uncertainty, and societal and systems constraints.

At a time when considerable social change is (again) approaching our profession, it also behooves us to be aware of the social sciences ... and how these disciplines can support the profession and its professionals.

Audiology has paid too little attention to rigorous research on this topic. Given the ramifications of the changes (e.g. direct-to-consumer devices) facing us now, it's time to pay attention. Audiology

embraces evidence-based practice as a guiding light: conferences feature renowned researchers; protocols for best practices cite the latest research; hearing device manufacturers support research in-house and collaboratively. For these purposes, we wisely turn to domains like biomedicine, psychophysics, or acoustics to inform these aspects of our professional knowledge.

At a time when considerable *social* change is (again) approaching our profession, it also behooves us to be aware of the *social sciences* like sociology, education, and cognitive psychology and how these disciplines can support the profession and its professionals. In this article I'll introduce two broad schools of thought on how clinicians learn and develop.

Note that these two schools of thought are presented as simplifications, given the brevity of this article. Check out the linked readings if you're interested in more.

1) The cognitivist school of thought. Here, researchers focus on questions about how clinicians store and retrieve information in/from memory, the ability to integrate knowledge (e.g. the basic sciences and clinical signs and symptoms), the transfer of learning in one context to application in another, and many other questions about how we acquire and use information.

Laboratory-based, experimental designs are common in this realm. Landmark papers here include those that have investigated the causes of error in

clinical reasoning and how they relate to different thinking processes. [Example](#).

The cognitivist school of studying health professions' learning and development focuses on what's going on in the minds of clinicians – and using this understanding, how to best facilitate learning and performance.

2) The sociocultural school of thought. Here, researchers focus on questions about how professions and professionals come to be the way they are. For example, why do doctors often wear white coats? What does this signify? If a clinician chooses not to wear a white coat for particular reasons, what are the implications of this act? Where did stigma about hearing loss and hearing aids come from? What role does the profession of audiology play in resisting and reproducing this stigma further? [Example](#).

Naturalistic (non-interventional, real-world), qualitative studies are common in this realm. Some of the landmark papers here have investigated the hidden curriculum; that is, the unsanctioned, unofficial, sometimes negative lessons health professionals learn about how to behave as they observe and become socialized into their field of work. [Example](#).

The sociocultural school of studying health professionals' learning and development focuses on the social and systemic drivers of what is learned – and with the recognition this research affords, how to resist and recreate the

cont.



Message From Your President

Working Together to Promote Hearing Health

By Jennifer Reside, Au.D.

At what point do we, as audiologists, work together to promote hearing

health? At what point do the multiple organizations that represent us decide they can serve us best by banding together and representing all audiologists to improve this noble profession of ours? I certainly do not have all the answers, but I have to imagine that it starts with each and every one of us.

As colleagues, we have few options: We either get out in front of the changes coming ahead of us or we risk losing the uphill battle. I suggest we make concerted efforts, within our communities, to educate the public and demonstrate the value of our unique skillset. When it comes down to it, our patients love *us*. They form a bond with *us* and love *us*, not only as the audiologist, but the person. Our work brings people closer together, and our patients recognize and appreciate that.

How do we share what our patients already know? Starting locally, we could find the health fairs, senior centers, and community centers in your community and find ways to educate

your community. As medical experts, we can contribute newspaper articles, write blog posts, leverage social media, and distribute brochures. We could be providing informative classes either within our offices or for community groups. Let's make better hearing more readily available and visible to the public by reaching out to our local theatres and churches about the importance of looping systems.

What we do, today, will have a lasting impact on the future of the profession that we love. What will you do today to breathe life into audiology? What will you do to promote access to quality hearing healthcare for our patients? Now, I must get to work.

Audiologists, cont.

conditions under which we learn and work.

The cognitivist and sociocultural schools of thought on how professionals learn and develop go hand in hand. As our profession marches forward, it does so in the face of constant societal and systemic change. Becoming and remaining the best professionals we can requires us to do more than advance our bioscientific knowledge and technological toolkits. Change is constant; in order for audiologists to be agents of change, rather than passive recipients of reform, we must also finely attune our social gaze: we must draw deeply from the social sciences, and engage *real evidence-based practice* in our health professions training, professional development, and systems change efforts.

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Clinical Verification of Consumer Electronics Products

By David Smriga, M.A.
Senior Audiology Consultant, Audioscan

On August 18 of 2017, the “Over-The-Counter Hearing Aid Act” was signed into law. This legislation directs the FDA to establish within the next three years, regulations that would clear the path for consumer electronics products – available over-the-counter – to be marketed as hearing aids for adults over 18 years of age who perceive themselves to have a mild to moderate hearing impairment.

function of personal sound amplification products (PSAP’s). (The Consumer Technology Association is recognized by ANSI as a de facto standards developer.) Of the three categories of tests included in this standard, the tests itemized in Category 1 describe performance measurements that include a specific threshold or acceptable range parameter. Thus, the tests described in Category 1 are Pass/Fail tests. For devices that do not claim to be wideband, these tests can be executed by any clinician equipped with a 2cc coupler testing device.

smoothness result. A table for estimating the insertion response for each 1/3 octave value from this 2cc coupler measurement is provided in the standard for both ITE and BTE styled products (see below). Using these 1/3 octave estimated insertion gain values, the average of these values from 500-3000Hz is calculated, and then 10dB is subtracted from this result.

The low and high frequency points that cross below this 10dB down value on the frequency response curve become

10dB DOWN CALCULATION											
1/3 Octave Frequency	500	630	800	1000	1250	1600	2000	2500	3150	Avg.	Avg. -10dB
2cc values (80dB Sweep)	81	80	80	79	78	78	79	81	81		
ITE CORFIG from CTA Table	-3.3	-3.1	-2.8	-2.9	-2.4	-1.1	1.3	3.4	0.9		
Estimated IR	77.7	76.9	77.2	76.1	75.6	76.9	80.3	84.4	81.9	78.56	68.56

Although the potential health risks associated with self-diagnosis and treatment have been well vetted by professional associations in hearings sponsored by both the FDA and the FTC, the general consensus behind this law is that such risks are minimal in comparison to the potential benefit in getting amplification assistance to a larger population of those in need through easier access and lower cost. With that said, what still remains is the potential for consumers to select devices that may not be appropriate in providing meaningful benefit for their existing hearing loss condition, or devices that would not be set or utilized in a fashion that would maximize their benefit potential.

In January of 2017, the Consumer Technology Association (CTA) released ANSI-CTA-2051 entitled, “Personal Sound Amplification Performance Criteria”, a standard which outlines a series of electro-acoustic performance metrics – some that include associated target values – specifically to quantify the

Dr. Mead Killion of Etymotic Research and others on his team sat on the committee that developed this standard. In presentations regarding this standard that Dr. Killion gave at the FDA hearings in the spring of 2016, and then again at the ADA convention in the fall of that same year, he zeroed in on three Category 1 tests in his presentation of comparative test data across different PSAP products:

- Frequency response bandwidth
- Frequency response smoothness
- Maximum acoustic output

To complete these three measures, and thus to determine if the tested device passes or fails any of them, two 2cc coupler electro-acoustic measurements must be obtained. First, a frequency response measurement in the presence of an 80dB pure tone sweep. And, second, an ANSI test battery.

The 80dB frequency response test forms the basis for calculating both the frequency response bandwidth result and the frequency response

the F1 and F2 values that define the instrument’s bandwidth. Instruments fail this Category 1 test if the bandwidth is less than 5,000Hz.

To determine frequency response smoothness, the same 1/3 octave values are examined to identify the 1/3 octave frequency with the highest output. Using the average of the 1/3 octave values two 1/3 octaves below and two 1/3 octaves above this frequency as a reference, the amplitude of this peak can be calculated. If the peak’s amplitude is greater than 12dB, it fails this test. Otherwise, it passes for frequency response smoothness.

Finally, to determine maximum acoustic output, the clinician simply identifies the peak OSPL90 value on the ANSI test result. If that value is greater than 120dB, the device fails this test.

With these three calculations that can be completed based on two simple electro-acoustic tests, any clinician with

cont.

Consumer Electronics, cont.

a 2cc coupler test box can determine if any standard bandwidth PSAP-styled consumer electronics product passes or fails any of these tests. This information could form the basis of a potentially useful service that could be offered to OTC consumers who have purchased or are interested in purchasing an OTC product, thus creating a link between the OTC consumer and the professional. This interface could lead to additional

testing, and possible better treatment with PSAP or other products. In addition, this information could be used by the clinician to determine which OTC products work well (and are thus candidates for potential inventory in a clinical practice) and which do not. The reality that “hearing aid” products will soon be available over-the-counter needs to be recognized by the hearing health care community as a path toward

reaching a greater number of hearing impaired people than is possible through the traditional delivery model alone. As such, it behooves any hearing healthcare professional to play a meaningful role in this new path. The above electro-acoustic test package can become a tangible way for clinicians to establish that role.



Tele-audiology Makes Long-Distance Hearing Tests Possible for Infants

*By Betsy Schutte,
AuD*

For parents of newborns, learning that their babies could

have a hearing problem can be both scary and stressful. For those who live in rural communities, getting to a hearing specialist for diagnostic testing can mean many hours of driving, but tele-audiology technology is making long-distance diagnostics possible.

Some new tele-audiology is beginning to be offered for babies who didn't pass the hearing screening in the hospital before being discharged. The testing could also be used for follow-up screening after the family has left the hospital. In these situations, it is important that a diagnostic test with an audiologist be performed, preferably before the infant is 3 months old, but access to services can be an issue. Not all communities have local these services available, and families often find themselves driving many hours and incurring significant expense to have their infants diagnosed and referred for care. These barriers can also impact follow-up rates.

Families living between St. Cloud and the Canadian border are forced to travel to either St. Cloud, Duluth, Fargo, or the Twin Cities. The new tele-audiology service is expected to draw patients from throughout Minnesota, including from nearby Native American communities, says Maureen Ideker, director of Telehealth Services at Essentia Health.

In addition to cutting down the amount of time families will need to spend on the road, tele-audiology increases the likelihood of effective testing. The best time to test an infant's hearing is when they are asleep, and they're more likely to sleep during the exam if they haven't been traveling for many hours.

For example, tele-audiology has allowed me to test a baby's hearing in Deer River from my office in Duluth. The system utilizes a secure video-conferencing program to communicate remotely with the family. On the other end, a nurse is present and acts as my “hands and feet.” The on-site nurse is able to prepare the child for the screening and by setting up the testing equipment. From my computer, I am able to control the test equipment.

After the test are complete, I am able to review the test results and the diagnosis, with the family, and make referrals to the necessary healthcare professionals. The Minnesota Department of Health sees value in providing tele-audiology services for rural patients, and I expect to test about 30 babies through tele-audiology each year. That may not seem like very many, but all know the profound impact that early intervention can have on a child's speech, language development and learning: It can impact their entire life.

Currently, the state of Minnesota reimburses for the tele-audiology services through Minnesota Medical Assistance. Soon, we expect buy-in from private insurance companies.

Schutte also worked with Ideker to raise \$50,000 for the tele-audiology equipment in Deer River. MDH provided a grant, and the Deer River and Essentia Health foundations provided matching financial support. The Essentia Health-Deer River Auxiliary and the Deer River Lions Club also helped with funding.



Welcome New Members

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State Fair 2017 Wrap Up

Audiology Awareness Committee would like to send a huge THANK YOU to all audiologist and student volunteers who assisted in State Fair hearing screenings this year! We had a total of 48 volunteers that covered a total of 206 hours of volunteering time to complete screenings. During the 12 days of the Fair, a total of 1587 screenings were completed! This year through generous donations from our sponsors we were able to give out 800 packs of batteries to current hearing aid users and 18,000 sets of earplugs! That is AMAZING!

The State Fair hearing screenings are made successful by the audiologists and students who volunteer their time and expertise to share with the fair community. Many of the people who come through our booth do end up following up in clinics across the state for diagnostic testing. We have even seen some of these patients stop back at the booth with their new hearing aids to thank MAA for referring them to get help!

This year we did incentive drawings to encourage State Fair volunteering and thank those who do commit the time to volunteer. Four \$25 Target gift cards were awarded to randomly selected volunteers. Congratulations to Sarah Privette, Darcia Dierking, Angie Mucci, and Carissa Kucala! Despite the incentives, there were still 14 time slots that went unfilled. These unfilled times leave some volunteers working alone or cause us to have to turn away people who wish to be screened if no one is there to do so. This year it is estimated close to 200 people were turned away in the 7 hours we did not have any coverage. If you are not a regular Fair volunteer, please consider signing up for next year! Sign-ups for 2018 will open up during the winter conference. The Fair is a fun way to reconnect with colleagues and a great networking opportunity! If you sign up early, you get first pick at time slot as well better chance at winning incentive drawings!

The Audiology Awareness Committee is always looking for ways to improve the Fair screenings as well as volunteers to help in planning. If you have ideas or would like to join committee, please contact Mary Richter at richt340@umn.edu.

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Celebrating 10 Years of Minnesota EHD1!

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