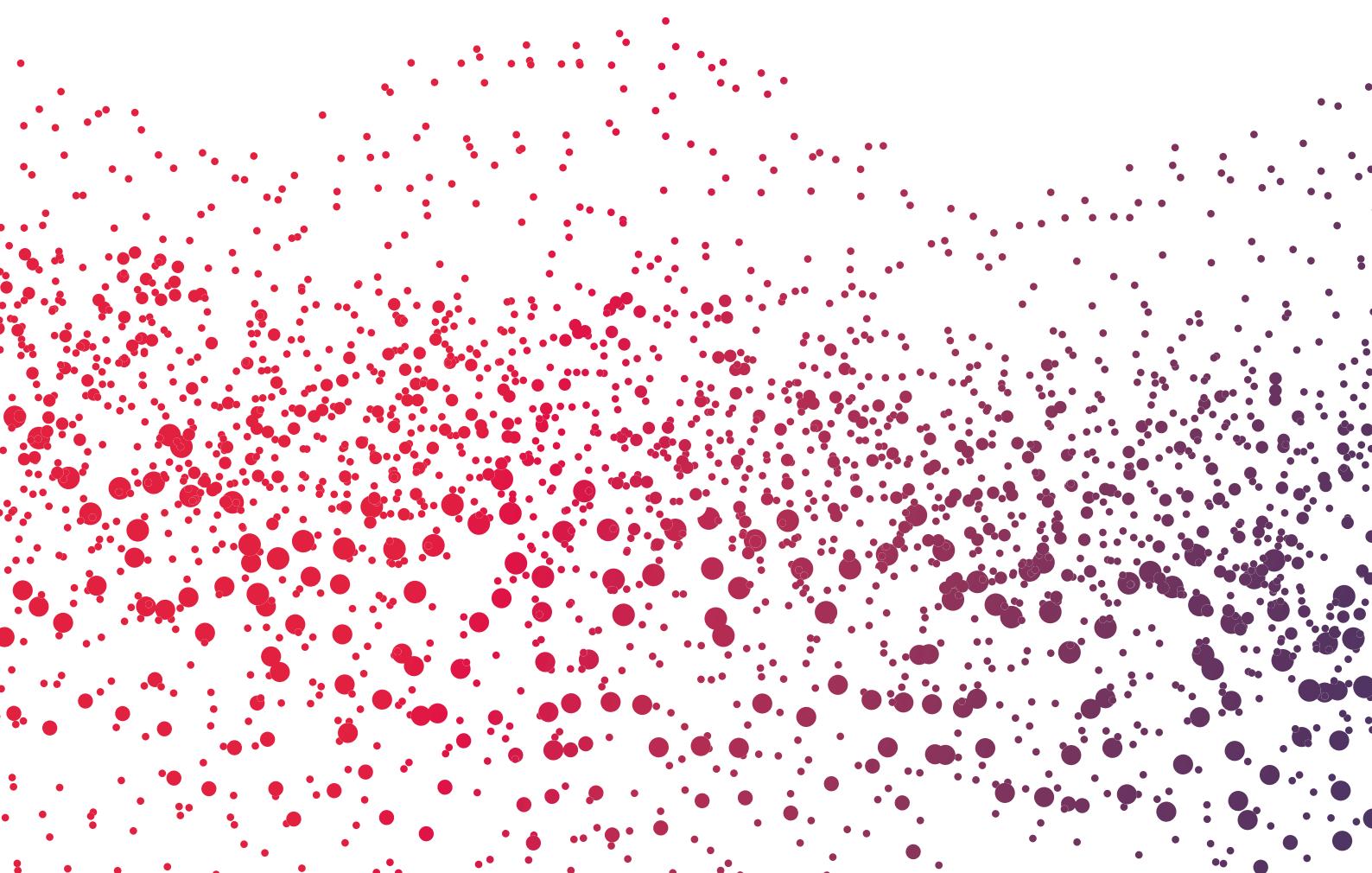




# **CRS SCIENTIFIC JOURNAL**

## **Otology & Audiology Article Review**

Volume 8  
November 2025



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Adults' recollections of discussions with their audiologist: A qualitative study of what was and was not successfully communicated about listening difficulties

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Hearing Intervention, Social Isolation, and Loneliness (ACHIEVE)

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Hearing Benefits of Cochlear Implantation in Older Adults with Asymmetric Hearing Loss

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# CONTENT

39

## SOCIAL PREDICTORS OF HEARING AID PURCHASE: DO STIGMA, SOCIAL NETWORK COMPOSITION, SOCIAL SUPPORT, AND LONELINESS MATTER?

Singh G., Goy H., Wright-Whyte K., et al.

*Ear Hear.* (2025): 46(5), 1149–1163. doi: 10.1097/AUD.0000000000001656.

41

## COCHLEAR IMPLANTATION IS ASSOCIATED WITH REDUCED INCIDENCE OF DEMENTIA IN SEVERE HEARING LOSS.

Seo HW., Ryu S., Han SY., et al.

*Ear Hear.* (2025): 46(5), 1189–1196

doi: 10.1097/AUD.0000000000001660.

43

## EXPLORING THE POTENTIAL OF USING THE INTEGRATED DIGIT-IN-NOISE TEST AS A MEASURE OF SPEECH RECOGNITION IN OLDER HEARING AID USERS.

Wang S., Wong LLN.

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45

## THE BENEFITS OF HEARING AIDS FOR ADULTS: A SYSTEMATIC UMBRELLA REVIEW.

Tang D., Tran Y., Bennett RJ., et al.

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47

## HEARING INTERVENTION, SOCIAL ISOLATION, AND LONELINESS: A SECONDARY ANALYSIS OF THE ACHIEVE RANDOMIZED CLINICAL TRIAL

Reed NS., Chen J., Huang AR., et al.

*JAMA Intern Med.* (2025): 185(7), 797–806.

doi: 10.1001/jamainternmed.2025.1140. PMID: 40354063; PMCID: PMC12070280.

49

## ADULTS' RECOLLECTIONS OF DISCUSSIONS WITH THEIR AUDIOLOGIST: A QUALITATIVE STUDY OF WHAT WAS AND WAS NOT SUCCESSFULLY COMMUNICATED ABOUT LISTENING DIFFICULTIES.

McNeice Z., Tomlin D., Timmer BHB., et al.

*Int J Audiol.* (2025): 64(4), 343–354.

doi: 10.1080/14992027.2024.2351033.

51

## PERSONAL LISTENING DEVICE, PERSONAL HEADPHONES, AND SONG CHOICE'S INFLUENCE ON PREFERRED LISTENING LEVELS.

Amarante MC. & Zalewski TR.

*Am J Audiol.* (2025): 34(2), 355–363.

doi: 10.1044/2025\_AJA-24-00247.

53

## HEARING BENEFITS OF COCHLEAR IMPLANTATION IN OLDER ADULTS WITH ASYMMETRIC HEARING LOSS.

Smith HJ., Takkoush S., Mendenhall TJ., et al.

*Otol Neurotol.* (2025): 46(5), 515–520.

doi: 10.1097/MAO.0000000000004487.

54

## USABILITY OF OVER-THE-COUNTER HEARING AIDS IN OLDER ADULTS.

Coco L., Weeks T., Mouzin C., et al.

*Am J Audiol.* (2025): 34(3), 695–706.

doi: 10.1044/2025\_AJA-25-00013.

# EDITORIAL



Dear Reader, the Amplifon Centre for Research and Studies, CRS, houses one of the finest private libraries in the field of audiology and otorhinolaryngology, offering the sector's most important international journals. Every quarter, a team of Amplifon Audiologists from around the globe select the most relevant publications in the field of Otolaryngology and Audiology and make a comprehensive review. The Amplifon Centre for Research and Studies coordinates the development of this quarterly review. We are happy to share these new reviews with you. For this issue, our team reviewed 9 interesting articles published in the second and third quarter of 2025. This issue offers a diverse range of article reviews related to hearing interventions, ranging from personal headphones and listening devices, to OTC and prescription hearing aids (HA), as well as cochlear implants (CI).

Recent findings highlight that the uptake of hearing aids is influenced by several factors, including age, self-reported hearing functionality (as measured by the HHIE-S), knowing someone with suspected hearing loss (HL) and HA-related stigma. Interestingly, social isolation and loneliness had no significant impact on HA uptake. One of our featured articles, A Systematic Umbrella Review on the Benefits of Hearing Aids for Adults, confirms consistent improvements in speech perception, communication, hearing handicap and self-assessed HA benefit across 83 studies. However, the evidence regarding cognitive function, depression, tinnitus, loneliness and social isolation remained inconclusive.

In contrast, the Secondary Analysis of the ACHIEVE Randomised Clinical Trial demonstrated that HA use significantly reduces social isolation and loneliness' compared to a control group.

The original ACHIEVE trial had already shown that cognition was significantly positively influenced by HA use in participants at risk for atherosclerosis compared to a control group. Building on these findings, the study titled Cochlear Implantation Is Associated With Reduced Incidence of Dementia in Severe Hearing Loss suggests a potential protective effect of cochlear implantation (CI) against dementia. Another publication focuses on CI in individuals with single-sided deafness reported notable improvements in word and sentence recognition in quiet conditions.

Finally, a qualitative study exploring 'Adults' Recollections of Discussions with Their Audiologist' stresses the importance of improving two-way communication through structured prompts, patient-empowerment tools, and enhanced information sharing. Such approaches may strengthen the patient-audiologist therapeutic relationship, promote hearing instrument adoption, and optimise auditory rehabilitation outcomes.

We hope you enjoy this issue of our CRS Scientific Journal.

**Mark Laureyns**  
Global International CRS & Medical Scientific  
Research Manager





# SOCIAL PREDICTORS OF HEARING AID PURCHASE: DO STIGMA, SOCIAL NETWORK COMPOSITION, SOCIAL SUPPORT, AND LONELINESS MATTER?



*Singh G., Goy H., Wright-Whyte K., et al.*

*Ear Hear. (2025): 46(5), 1149–1163. doi: 10.1097/AUD.0000000000001656. Epub 2025 Mar 28. PMID: 40148265; PMCID: PMC12352571.*

*by Carrie Meyer – United States*

This study examined social factors that may act as barriers to hearing aid (HA) adoption. Researchers surveyed older adults with no prior experience in hearing health care regarding four key social factors—stigma, social network composition, social support, and loneliness—alongside demographic measures and the Hearing Handicap Inventory for the Elderly—Short Form (HHIE-S). The findings provide new quantitative evidence on the impact of social factors on HA uptake.

## INTRODUCTION

The role of social influences in predicting hearing aid uptake has been considered in only a few studies. This novel study examined four social factors that may influence hearing aid (HA) adoption among older adults:

### - Stigmas

- Related to age
- Related to hearing loss (HL)/HAs

### - Social network composition

- Social contagion, i.e. how individuals' attitudes and behaviours are shaped by those of others within their social environment.

### - Social support

### - Loneliness

The authors proposed four hypotheses:

1. Participants with negative perceptions of stigma toward HL and/or aging would demonstrate a lower likelihood of HA uptake.
2. Participants would be more likely to adopt HAs if one or more people within their social group had HL.
3. Participants reporting higher levels of social support would show higher rates of HA uptake.
4. Participants who reported higher levels of loneliness would be more motivated to seek hearing help.

## METHODOLOGY

Study data was collected over approximately a one-year period, from April 2018 to May 2019. Participants aged 50 years or older with no prior HA were recruited across 130 hearing care clinics in Canada. Each participant was evaluated by an audiologist or hearing instrument specialist. Inclusion criteria required hearing thresholds greater than 26 dB HL

## CRITICAL NOTE

*Hearing aids (HAs) are the primary treatment option for most adult hearing loss (HL), yet adoption rates for HAs remain persistently low. This study evaluates the impact of social factors on HA uptake. Beyond degree of HL and age, perceived stigma around HA use as well as familiarity with others experiencing HL emerged as critical determinants in HA use.*

in the better ear. Participants were tracked for a minimum of three months and up to 15 months. A total of 735 participants with complete datasets were included in the analysis.

Data collection was done via a custom 56-item survey encompassing two main domains: perceived hearing ability and aspects of the social world. The survey included items on participant demographics, as well as questions from the Age Stigma Consciousness Scale, the Hearing Aid Stigma Questionnaire, and from the Social Network and Contagion developed by the authors specifically for this survey. The survey also incorporated a loneliness item from the Canadian Longitudinal Study of Aging, questions from the Oslo 3 social Support scale, all ten items from the Hearing Handicap Inventory for the Elderly – Short Form (HHIE-S), and the Subjective Age Questionnaire.

## STATISTICAL METHOD

Penalised logistical regression and classification tree analysis were used to predict likelihood of HA purchase based on 28 variables.

## RESULTS

Study results revealed that HA outcomes were best predicted by four factors:

1. Participant age emerged as the most significant predictor, notably highlighting a 5% increase in the likelihood of purchase per year of age.
2. Perceived hearing handicap, measured using the HHIE-S, was found to be the second-highest predictor of HA use.
3. HA stigma score was a significant predictor of HA purchase, whereas age-related stigma was not.
4. Social exposure, i.e. the binary social variable of having social contact with a person with suspected HL was found to double the likelihood of HA purchase.
5. Notably, neither loneliness nor objective hearing ability were significant predictors of HA purchase.

### STUDY LIMITATIONS

This study is correlational in nature, therefore, the significant predictive variables identified in this study cannot be interpreted as causal factors for HA purchase. In addition, because this research relied on self-reported data, incomplete

survey responses resulted in some gaps in survey data. Finally, the group of participants with HL was older ( $> 50$  years) than the excluded group with normal hearing ( $< 50$  years).

### CONCLUSIONS

Findings from this study provide new, quantifiable evidence that HA stigma significantly influences HA adoption. Additionally, this study supports the effectiveness of self-assessment tools such as the HHIE-S in capturing fully the emotional and social effects of HL. While this study found that social support showed little impact on HA purchase, participants who reported knowing at least one individual with HL were more likely to purchase a HA than those who had no such social connections. Importantly, despite the well-established relationship between HL and social isolation, ultimately no significant correlation was found between loneliness and HA purchase. •



# COCHLEAR IMPLANTATION IS ASSOCIATED WITH REDUCED INCIDENCE OF DEMENTIA IN SEVERE HEARING LOSS



Seo HW., Ryu S., Han SY, et al.  
*Ear Hear.* (2025): 46(5), 1189–1196  
 doi: 10.1097/AUD.0000000000001660. Epub  
 2025 Apr 9. PMID: 40200399.  
 by Karen Lovelock –Australia

This paper investigated treatment options in Korea for severe-to-profound hearing loss, and evaluated their potential role as modifiable risk factors for dementia.

## BACKGROUND

Global demographic aging is driving a marked increase in many age-related health conditions, including hearing loss (HL) and dementia. Both conditions contribute to a substantial public health burden. As no effective treatment for dementia currently exists, efforts to identify and address modifiable risk factors are of critical importance.

The Lancet Commission (2024) highlighted 14 potentially modifiable risk factors associated with dementia, with HL recognised as one of the more readily treatable factors. Nevertheless, the extent to which interventions for HL may mitigate dementia risk remains unclear.

Existing studies examining such impacts for more severe HL—particularly through cochlear implantation (CI)—have shown that intervention can lead to improvement in cognitive function. However, it remains uncertain whether such treatments can prevent or delay the onset of dementia.

## MATERIALS AND METHODS

Data for this study was obtained from the Korean National Health Insurance Scheme (KHIS) database, a scheme which provides health care coverage for approximately 97% of the Korean population, from January 2002 to December 2020.

The study population was divided into two cohorts:

Cohort 1. Individuals aged 40 to 79 years at the time of intervention, with bilateral severe HL >70dBHL, who received hearing treatment between January 2005 and December 2010. Participants were further categorised according to their treatment pathway: CI; HAs; or no treatment

## CRITICAL NOTE:

*The authors acknowledge several study limitations and advise caution in interpreting the findings, particularly regarding the underlying causal relationship between hearing loss (HL) and dementia. Nevertheless, the large sample size and long-term follow-up of this study provide compelling evidence that auditory rehabilitation—particularly through cochlear implantation—may reduce the risk of developing dementia among individuals with severe HL.*

Cohort 2. A normal hearing (NH) group, comprising subjects with no recorded HL over the same period.

The incidence of dementia was monitored beginning two years after enrolment and continued up to the study's data cutoff date, i.e. from January 2007 through December 2022.

## RESULTS

The distribution of participants across the study cohorts was as follows:

- **Cohort 1 – HL group: n = 52,219**

HA subgroup: n = 35,076

- No rehabilitation subgroup: n = 16,494
- CI subgroup: n = 649

- **Cohort 2 – NH group: n = 1,280,788**

The incidence of dementia (per 100,000 person-years) was as follows:

- **Cohort 1 (HL group):**

- HA subgroup: 2.96
- No rehabilitation subgroup: 3.81
- CI subgroup: 1.13

- **Cohort 2 (NH group): 1.71**

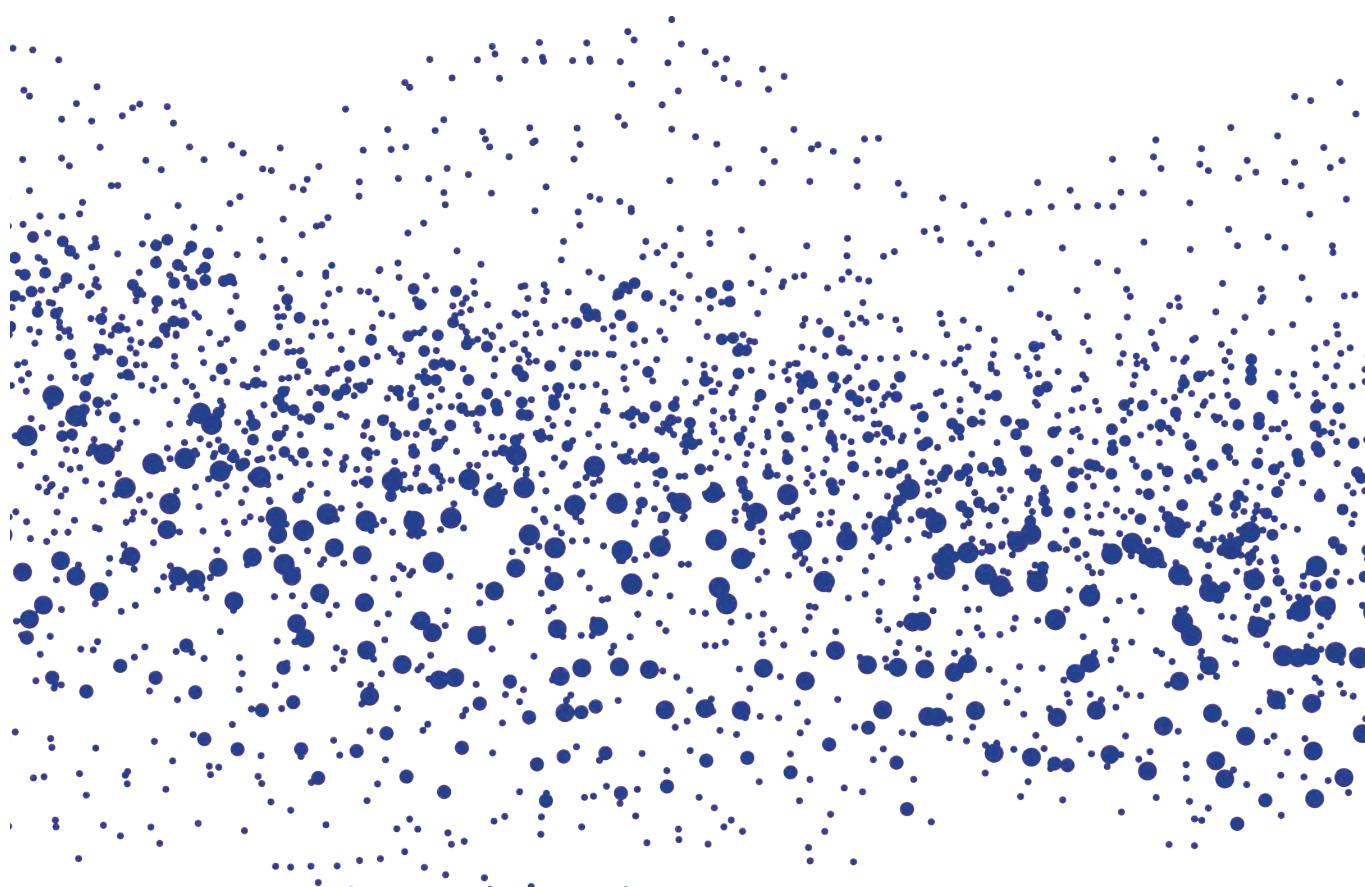
The results were statistically adjusted to account for differences in age, gender, income, degree of urbanisation, Charlson Comorbidity Index (CCI) score, and relevant comorbidities.

When analysed by rehabilitation type, individuals in the HA subgroup demonstrated a lower risk of developing dementia compared with those in the no rehabilitation subgroup, while participants in the CI subgroup exhibited the lowest risk among all subgroups. The dementia risk in the CI subgroup did not differ significantly from that of the NH cohort.

An age effect was observed, with no significant difference in dementia risk observed among younger participants across rehabilitation subgroups. The greatest reduction in risk was seen in the 60–69-year age group within the CI subgroup.

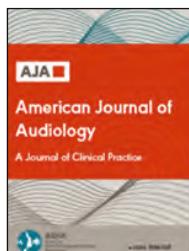
## DISCUSSION AND CONCLUSION

CI is widely recognised as the treatment of choice for most individuals with severe HL as well as poor speech recognition. Whilst the 2017 Lancet Commission report identified HL as a potentially modifiable risk factor for dementia, studies assessing the impact of auditory rehabilitation through HAs have yielded inconclusive results. Previous research examining the effects of CI on cognition has shown promise, but was often limited by the absence of appropriate control groups. This large, population-based study from Korea, conducted over a 10-year period, suggests that among individuals with severe HL, auditory rehabilitation through HAs and CI is associated with a reduced risk of developing dementia. Of the two, CI demonstrated the greatest effective treatment, with dementia risk in this subgroup comparable to that of individuals without HL. •





# EXPLORING THE POTENTIAL OF USING THE INTEGRATED DIGIT-IN-NOISE TEST AS A MEASURE OF SPEECH RECOGNITION IN OLDER HEARING AID USERS



*Wang S., Wong LLN.*  
*Am J Audiol. (2025): 34(3), 581–594.*  
*doi: 10.1044/2025\_AJA-24-00264.*  
*Epub 2025 Jul 7. PMID: 40623415.*  
*by Gian Carlo Gozzelino – Italy*

**The Integrated Digit-in-Noise Test is a valid and efficient tool for assessing speech perception in noise among older hearing aid (HA) users, bridging the gap between pure-tone audiometry (PTA) and more demanding sentence-based tests.**

## INTRODUCTION

The evaluation of speech recognition in noisy environments remains a longstanding challenge in audiological practice. Conventional sentence-based measures, such as the Hearing in Noise Test (HINT; Nilsson et al., 1994) and the Matrix Sentence Test (Kollmeier et al., 2015), are widely used to assess functional communication under adverse listening conditions. However, these tests can be too demanding for older adults with reduced cognitive capacity or severe hearing loss (HL), often resulting in incomplete or unreliable results (Billings et al., 2023; Parmar et al., 2022). In response, the digit-in-noise (DIN) paradigm has gained increasing recognition for its simplicity, cross-linguistic adaptability, and robust psychometric properties (Smits et al., 2013; Van den Borre et al., 2021). With this paper, the authors set out to expand this approach by investigating the integrated digit-in-noise test (iDIN) (Wang & Wong, 2024), which uses variable sequence lengths, to determine whether it could serve as a clinically meaningful proxy for sentence-in-noise measures in older hearing aid (HA) users.

### Summary of Key Findings

The study recruited 81 native Mandarin-speaking individuals with moderate-to-severe sensorineural HL who had been using HAs for at least two years. Participants completed iDIN sequences ranging from two to five digits, two sentence-in-noise tests (the Mandarin HINT and the Mandarin Chinese Matrix test), as well as two measures of working memory (digit span and reading span). Correlational analyses revealed strong associations between digit recognition thresholds and sentence-in-noise thresholds, with coefficients ranging from  $r = .66$  to  $.73$ . Notably, two-digit thresholds alone predicted participants' ability to complete sentence-based tests with

## CRITICAL NOTE

*Several limitations temper the interpretation of the findings. The sample was restricted to Mandarin-speaking older adults with moderate-to-severe hearing loss (HL) and long-term hearing aid (HA) use, limiting generalisability to younger populations, individuals with milder HL or speakers of other languages. Although the DIN has been adapted across multiple languages (Akeroyd et al., 2015), further validation is required before widespread clinical endorsement. Another concern relates to test administration: the extensive battery of procedures may have introduced order effects or fatigue, potentially influencing performance on later tasks. Moreover, the study relied on span tasks as the sole indicators of working memory. While useful, these measures may not fully capture the multidimensional cognitive processes that contribute to speech-in-noise perception (Dryden et al., 2017). Finally, although strong correlations were observed, digit thresholds do not fully substitute for sentence recognition; thus, clinicians should interpret results as complementary rather than interchangeable.*

high sensitivity (.818) and specificity (.895). Regression models confirmed that digit thresholds in combination with working memory measures accounted for a substantial proportion of variance in sentence recognition performance. Importantly, nearly all participants were able to complete the iDIN, including those who failed to finish the sentence-based tasks, underscoring the accessibility of this test across a broad range of auditory and cognitive abilities. These findings

suggest that the iDIN provides clinically relevant insights into both auditory processing and cognitive contributions to speech perception in noise.

### STRENGTH OF THE STUDY

The study presents several notable strengths. First, the relatively large and heterogeneous sample enhances ecological validity, as it included individuals with diverse auditory and cognitive profiles. Second, the use of multiple test paradigms—including digits, sentence recognition, and memory—enabled a comprehensive evaluation of both auditory and cognitive contributions to speech perception, consistent with cognitive hearing science frameworks (Rönnberg et al., 2016, 2022). Third, the application of hierarchical regression and receiver-operating-characteristic analyses provided robust evidence supporting the diagnostic accuracy of iDIN thresholds. Finally, the study addresses a pressing clinical issue: the underutilisation of speech-in-noise measures in HA fittings due to time constraints and patient limitations (American Speech-Language-Hearing Association, 2019). By demonstrating the feasibility and predictive value of a

simpler test, the authors provide a strong rationale for the clinical adoption of the iDIN.

### CONCLUSION

Wang and Wong (2025) provide compelling evidence that the iDIN is a valid and efficient tool for assessing speech perception in noise among older HA users. Short digit sequences primarily reflect auditory-driven, bottom-up processing, whereas differences between short and long sequences capture additional cognitive contributions, offering a more nuanced assessment of a patient's listening ability. The test's high completion rate, simplicity, and predictive accuracy make it particularly valuable for individuals unable to complete conventional sentence-in-noise measures. Future research should broaden the validation of this tool across languages, age groups, and degrees of HL, and investigate how iDIN performance relates to real-world communication success. Overall, the iDIN emerges as a promising complementary measure in audiological practice, bridging the gap between pure-tone audiometry and more demanding sentence-based tests. •



# THE BENEFITS OF HEARING AIDS FOR ADULTS: A SYSTEMATIC UMBRELLA REVIEW



Tang D., Tran Y., Bennett R.J., et al.  
*Ear Hear.* (2025): 46(3), 563–570.  
 doi: 10.1097/AUD.0000000000001620.  
*Epub 2025 Jan 24. PMID: 39849317.*  
 by Jan De Sutter—Belgium

**This study constitutes the first umbrella study on the positive outcomes of hearing aid (HA) use, offering a consensus on the benefits of hearing rehabilitation that are supported by current evidence.**

## INTRODUCTION

Hearing loss (HL) is a well-documented cause of disability, currently estimated to affect over 1.5 billion people worldwide (World Health Organization, 2021). Individuals with untreated HL often experience communication challenges which negatively impact social engagement and mental well-being. The WHO estimates the global economic burden of HL at over USD 980 billion per year, a figure projected to increase with global population aging.

Hearing aids (HAs) are the most widely documented and primary form of rehabilitation for HL. Despite increasing uptake, the current penetration rate remains low at approximately 11%. Previous systematic reviews have identified seven audiological and nine non-audiological factors which influence HA adoption.

While numerous studies have explored the benefits of HA use and several systematic reviews have summarised these findings, no single review has integrated this evidence comprehensively. This umbrella review addresses that gap, offering high-level insights to support clear messaging and effective counselling for HA users.

## DESIGN

Systematic reviews were considered eligible if they included an adult population using at least one conventional HA and assessed an intervention at any stage with a report on outcomes such as hearing function, hearing handicap, HA benefit, and psychosocial benefits.

## RESULTS

The systematic review included a total of 83 studies. Approximately half of the articles focused on populations aged over 40 years, while the remainder examined individuals older than 65 years. The authors concluded that HAs exert a positive impact on four outcomes: speech perception, communication, hearing handicap, and self-reported HA

## CRITICAL NOTE:

*Both hearing loss (HL) and the use of hearing aids (HAs) continue to be affected by stigma. This umbrella review represents an important step toward establishing a shared understanding of the benefits of HAs. While the benefits confirmed in this review are broadly accepted in the audiological community, they offer a strong basis for discussing and informing governmental approaches to hearing health care.*

*Addressing the stigma associated with the use of HAs may require a broader perspective on the psychological and sociological dimensions of HL, including the challenges associated with acknowledging the need for support and rehabilitation. Expanding upon this work, a similar umbrella review focused on factors influencing acceptance of HL and HA could serve as a valuable platform for enhancing counselling strategies employed by hearing care professionals, ultimately supporting individuals with hearing difficulties more effectively.*

benefit. Evidence for four additional outcomes was deemed inconclusive, and conclusions for another two outcomes were conflicting.

Among body-related outcomes (speech perception, balance, cognitive function, depression and tinnitus), only speech perception demonstrated a conclusive positive association with HAs across various assessment measures. Other outcomes, including balance, cognitive function, depression, and tinnitus, yielded inconclusive results.

For activities and participation-related outcomes, HA use was positively correlated with communication function, hearing handicap, and self-perceived HA benefit. Conversely,

evidence regarding loneliness and social isolation remained inconclusive.

### DISCUSSION AND CONCLUSION:

This umbrella review confirms a positive impact of HAs on four outcomes among participants aged 40 years and older, noting a gender imbalance with a predominance of male participants. When compared with the ICF Core Sets for HL, only nine out of 19 categories could be represented in the review. This likely stems from the subjective allocation of ICF codes and the lack of comparable data points across a sufficient number of systematic reviews.

Among body function outcomes, speech perception was the only measure consistently positively associated with HA use. According to the authors, these benefits are largely driven by advanced and validated HA technologies, including

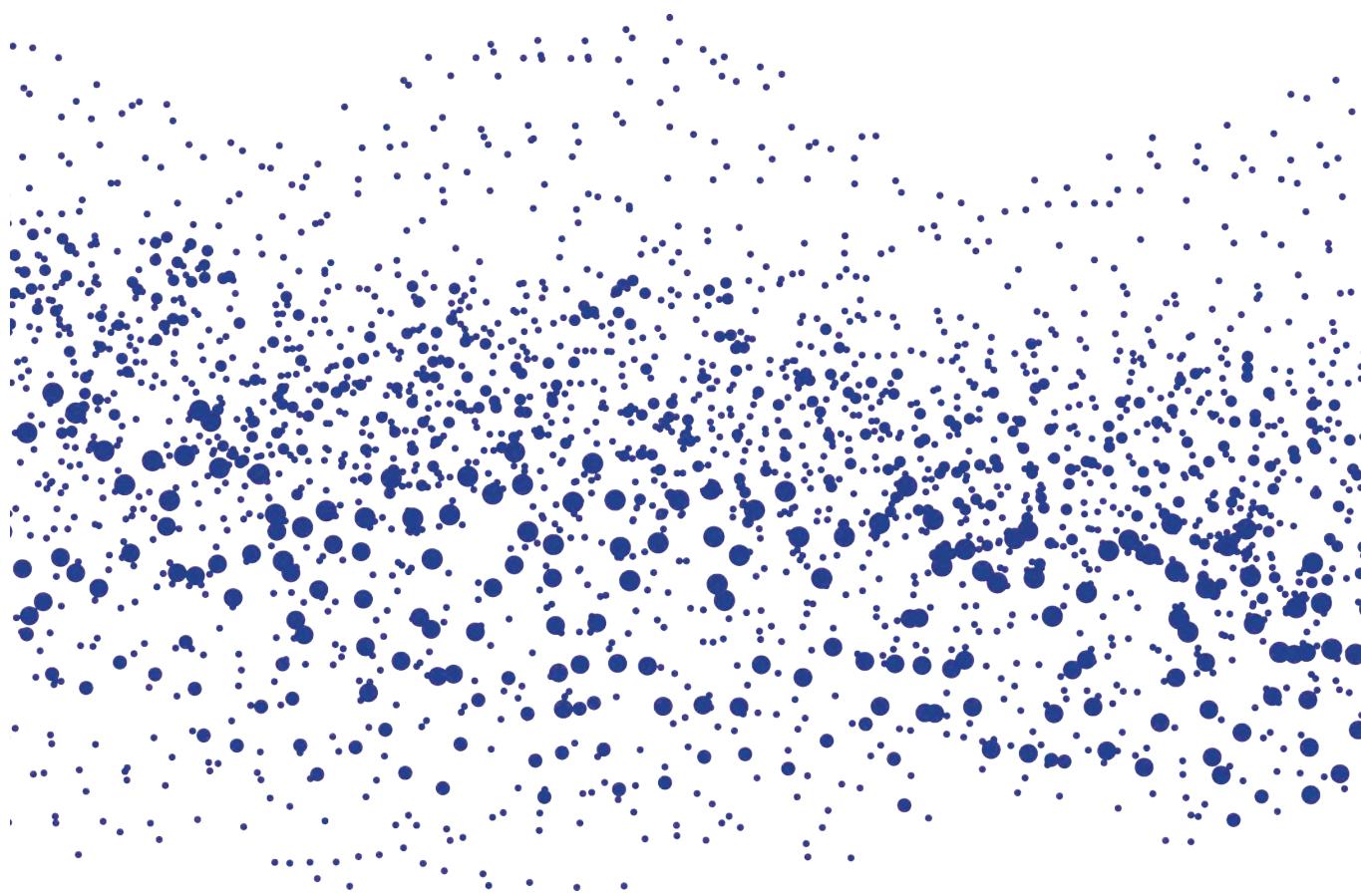
automation, directionality, artificial intelligence, and noise reduction.

According to the authors, the absence of positive associations for other body functions is largely attributable to limitations in research design and methodological robustness.

Within the activities and participation domain, communication, hearing handicap, quality of life, and self-reported HA benefit were positively associated with HA use.

Many of the included studies, the authors note, employed the Hearing Handicap Inventory for the Elderly (HHIE) to assess these outcomes, although this instrument was not always originally designed for that purpose.

Similar to the body function domain, outcomes related to loneliness and social isolation did not demonstrate conclusive associations with HA use, primarily due to insufficient evidence or suboptimal study design. •





# HEARING INTERVENTION, SOCIAL ISOLATION, AND LONELINESS: A SECONDARY ANALYSIS OF THE ACHIEVE RANDOMIZED CLINICAL TRIAL



Reed NS., Chen J., Huang AR., et al.  
*JAMA Intern Med.* (2025): 185(7), 797–806.  
 doi: 10.1001/jamainternmed.2025.1140.  
 PMID: 40354063; PMCID: PMC12070280.  
 by Mark Laureyns –Italy–Belgium

This analysis of the ACHIEVE randomised controlled trial, which originally focussed on the impact of amplification on cognition, found that hearing aid intervention was associated with a significant decrease in social isolation and loneliness over a three-year follow-up period.

The ACHIEVE trial was the first published randomised controlled trial to investigate whether hearing intervention can mitigate cognitive decline in older adults. In the analysis under review, outcomes related to social isolation and loneliness were examined.

The trial was conducted across multiple field sites and included participants from two main populations: healthy volunteers recruited via advertisement (the 'de novo group'); and individuals already under monitoring for increased dementia risk due to cardiovascular conditions, recruited from the Atherosclerosis Risk in Communities (ARIC) study (the 'ARIC group').

A total of 977 participants without dementia (mean age 76.3 years; range 70–84) were recruited based on the following inclusion criteria: mild-to-moderate hearing impairment (30–70 dB HL) as assessed by a four-frequency pure-tone average (PTA) of 0.5–4 kHz; word recognition  $\geq 60\%$  in the better ear; fluency in English; and residing in the community. Exclusion criteria included: hearing aid (HA) use within the past year; poor vision; self-reported disability in more than two daily tasks; permanent conductive hearing loss (HL); and refusal to wear HAs on a regular basis. Participants were randomly assigned on a 1:1 ratio to one of two groups: best-practice hearing intervention (HAs and audiological care); or a health education control group. Given the nature of the intervention, participants could not be blinded to wearing hearing devices; however, a number of measures were implemented to minimise bias, including withholding access to results from previous study visits.

Participants in the hearing intervention group received bilateral HAs fitted to NAL-NL2 prescriptive targets, verified

## CRITICAL NOTE:

*This article presents a secondary analysis of the ACHIEVE study. The original study and its primary outcomes are reviewed on page 63 of CRS Scientific Journal, Vol. 6, Nov 2023 (Q3 2023). The robust design of the ACHIEVE randomised controlled trial lends credibility to the observed positive effects of hearing aid (HA) use on social isolation, loneliness, and cognitive decline, as reported in the original ACHIEVE publication.*

*The authors acknowledge the limitations of this study, noting that the clinical significance of reductions in social isolation and loneliness found in this study remains unclear due to the limited number of studies focusing on these topics. However, because HA intervention is cost-effective and low-risk, with the potential to support social engagement and reduce loneliness, policymakers, health insurers, and other stakeholders should be informed of its broader benefits.*

with real ear measurement. Additional hearing assistive technology was supplied as required. Participants from this group attended four one-hour sessions with a study audiologist, during which they received instructions on how to use the devices as well as on communication strategies. Booster sessions were conducted every six months to review and reinforce these instructions. Patients from the control group underwent an individual '10 Keys to Healthy Ageing' programme with a certified health educator, consisting of four sessions over a one to three-week period. This group also received booster sessions every six months.

Between March 2020 and June 2021 due to the COVID-19 pandemic, all sessions were conducted remotely via phone, with protocols adapted as necessary to maintain intervention fidelity.

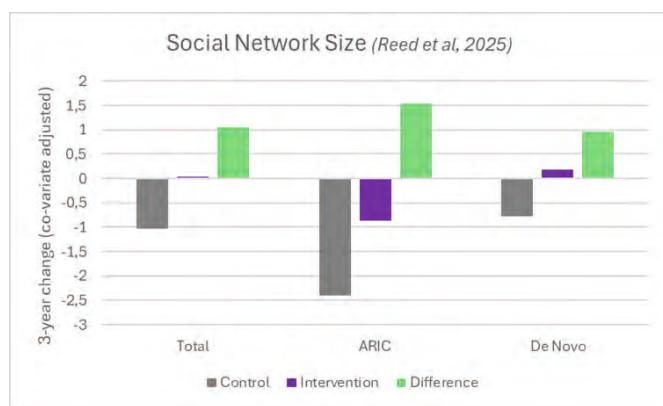
## OUTCOME MEASURES FOR THIS ANALYSIS

	Test	Frequency of follow up
Social isolation	Cohen Social Network Index	At baseline, six months, one year, two years, and three years in the study, aspects of their social networks, including size, diversity, and embeddedness was evaluated based on their social experiences over the two-week time frame before each assessment <ul style="list-style-type: none"> <li>• Social Network size: The total number of people in each of the 12 social domains with whom subjects had regular contact</li> <li>• Social Network Diversity: The number of different regular contacts</li> <li>• Social Network Embeddedness: The depth of engagement within each social domain.</li> </ul>
Loneliness	20-item UCLA Loneliness Scale	A 20-item questionnaire on loneliness, with responses recorded on a four-point Likert scale: Never, Rarely, Sometimes, or Often.
Measurements for both dimensions were collected at the start of the study (at baseline) and during follow-up assessments at six months, one, two, and three years.		

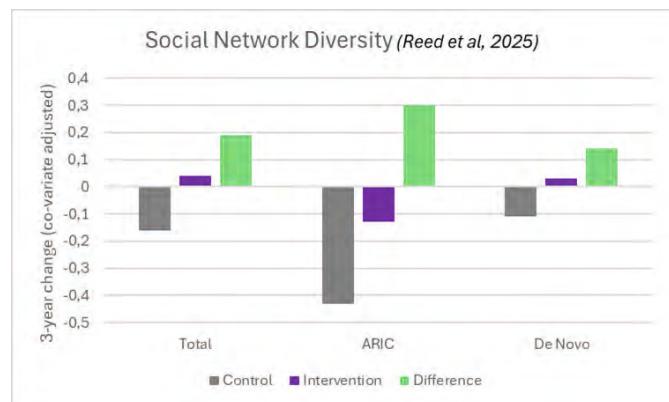
## RESULTS

**Participants:** Of the total 977 participants, 54% were female, 62% were married and 30% lived alone. The 238 participants from the ARIC group were slightly older and more likely to live alone compared to the 739 subjects from the De Novo group.

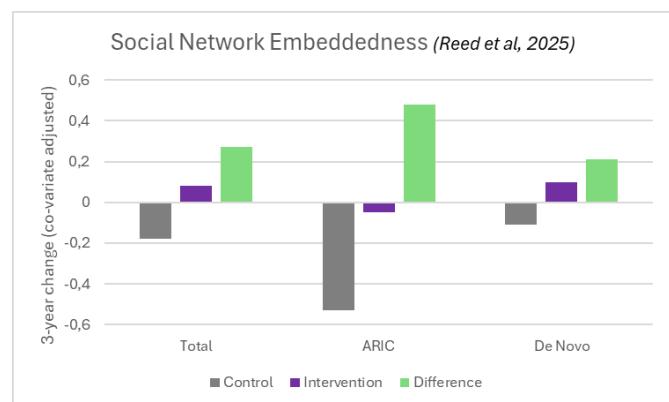
**Social isolation (Cohen Social Network Index):** Across the full sample, social network size, diversity and embeddedness declined significantly more over a three-year period for the control group, compared to the intervention group. The magnitude of these effects were stronger for the ARIC group compared to the De Novo group, as illustrated in Figures 1–3.



**Figure 1:** The three-year change of social network size for the total group, the ARIC group and the de Novo group (Reed *et al.*, 2025)

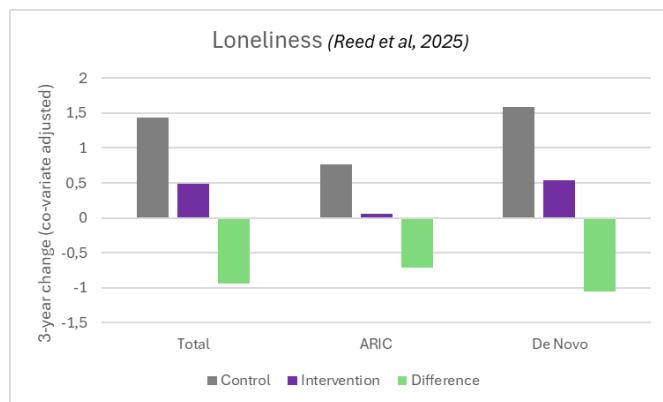


**Figure 2:** The three-year change of social network diversity for the total group, the ARIC group and the de Novo group (Reed *et al.*, 2025)



**Figure 3:** The three-year change of social network embeddedness for the total group, the ARIC group and the de novo group (Reed *et al.*, 2025)

**Loneliness (UCLA):** Across the full sample, loneliness scores increased over the three-year follow-up period. This increase was significantly higher for the control group, compared to the intervention group. This effect was somewhat stronger for the de novo group compared to the ARIC group, as depicted in Figure 4.



## LIMITATIONS

Participants and researchers were aware of the intervention, which may have influenced both evaluation and outcomes. This study was specifically designed for assessing the impact of hearing intervention on cognition, rather than social isolation and loneliness. Given the scarcity of comparable studies, the clinical significance of the observed reductions in social isolation and loneliness remains unclear.

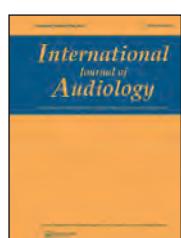
## CONCLUSIONS

Intervention with HAs resulted in a significant reduction in social isolation and loneliness over a three-year period in this randomised controlled trial. •

**Figure 4:** The three-year change of Loneliness (UCLA score) for the total group, the ARIC group and the de novo group (Reed *et al.*, 2025)



# ADULTS' RECOLLECTIONS OF DISCUSSIONS WITH THEIR AUDIOLOGIST: A QUALITATIVE STUDY OF WHAT WAS AND WAS NOT SUCCESSFULLY COMMUNICATED ABOUT LISTENING DIFFICULTIES



McNeice Z., Tomlin D., Timmer BHB., et al.  
*Int J Audiol.* (2025): 64(4), 343–354.  
 doi: 10.1080/14992027.2024.2351033.  
 Epub 2024 May 13. PMID: 38739207.  
 by Tali Bar-Moshe – Israel

The study underscores the heterogeneity and uniqueness of listening difficulties while providing new insights into patients' self-awareness of communication challenges and potential future concerns.

## INTRODUCTION

Aural rehabilitation, encompassing counselling, hearing instrument fitting, education, and training, can substantially improve quality of life. However, it remains underutilised, often due to communication barriers between patients and audiologists. Effective, patient-centred communication is associated with greater hearing aid (HA) uptake, yet many adults report that their listening experiences are not

fully understood during consultations. Communication breakdowns commonly arise when patients are unable to express their concerns—particularly psychosocial issues—or when they withhold information they perceive as irrelevant. The authors note a paucity of research on the topics adults choose not to disclose to audiologists and aim to explore adults' experiences of both successful and unsuccessful communication in this context.

## METHODS

A qualitative study was conducted with a purposeful sample of 15 Australian adults, aged 18 to 76 years. All participants had prior audiology consultations, varied in HA use, and held differing perceptions of their past interactions with audiologists. After two weeks of deliberate reflection on their listening difficulties, participants took part in semi-structured interviews lasting 23 to 105 minutes, conducted either in person or via Zoom. The interview guide focused on how participants described their listening challenges and which aspects they felt were inadequately communicated during consultations. Data were analysed using template analysis.

## FINDINGS

Four major themes emerged from participants' recollections and descriptions of their listening difficulties:

1. Situational or contextual listening difficulties: Specific environments in which difficulties arise (e.g. noisy restaurants, poor acoustics, group conversations, or potential future situations).
2. Contributing factors to listening difficulties include: speaker behaviour (accent, speech speed, direction, etc.); physical barriers (e.g. masks), patient engagement habits, and technology limitations.
3. Emotional concerns and impacts: Physical (fatigue, tinnitus), emotional (frustration, stress, fear), social (avoidance, disengagement), and functional (safety risks, missed alerts) domains
4. Behavioural responses to listening difficulties: Coping/repair strategies (asking for repeats, optimising seating); use of visual cues; hearing aid adjustments; and in some cases concealing the problem.

Three primary areas were identified in which information was either not communicated or poorly conveyed to audiologists:

1. Emotional concerns and impacts: Participants frequently avoided discussing their emotional distress, stigma, or fear of hearing loss (HL) progression, typically to avoid upsetting conversations or because they believed such feelings were irrelevant to the audiologist.
2. Descriptions of sound quality: Many participants struggled to articulate the nuances in sound quality, using descriptors such as 'crinkly' or 'buzzy'. Additionally, some were hesitant to report auditory problems, either fearing they would be misinterpreted or assuming that acclimatisation would resolve the issues.
3. Changed Listening Experiences: Participants experienced difficulty to explain the effects of device adjustments or changes over time, especially when their audiometric results did not align with their perceived decline in hearing.

Two additional themes emerged regarding information that participants felt audiologists did not communicate effectively:

## CRITICAL NOTE:

*Effective communication between patients and audiologists is vital for building a meaningful therapeutic relationship throughout the patient's care journey. Audiologists should approach patients as complete individuals rather than focusing solely on hearing issues. By embracing a holistic approach, clinicians can address multiple dimensions of a patient's life, recognising that audiological concerns are just one piece of the puzzle. Empowering patients by providing them with opportunities and tools to share their experiences and challenges will not only foster trust and engagement, it will ultimately enhance the overall effectiveness of their audiological care.*

1. Device options and features: Participants highlighted the need for more comprehensive discussions about the various types of HAs, associated costs, and available technologies
2. Hearing aid management – Participants stressed the need for ongoing reviews, reinforcement of strategies, and practical training in the use and maintenance of HAs.

## CONCLUSIONS

This study supports existing literature on the diversity and uniqueness of listening difficulties while also offering new insights into patients' self-awareness and future concerns regarding communication challenges.

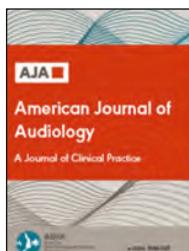
The findings indicate that many adults struggle to discuss emotional experiences and subjective aspects of sound quality with audiologists. Patients frequently describe their difficulties in a 'shopping list' format, which can hinder audiologists' understanding of their needs.

To more effectively identify both current and anticipated listening difficulties, audiologists should use open-ended questions, encourage patients to share their narratives, and implement agenda mapping. Integrating discussions about emotional well-being, when appropriate, could enhance holistic care. Additionally, providing patients with descriptive vocabulary and opportunities to trial devices in real-world settings may improve the accuracy of feedback. It is also important to regularly revisit education on device options and features, so as to ensure patients remain well-informed and engaged.

Improving two-way communication through structured prompts, patient empowerment tools, and enhanced information-sharing may strengthen the patient–audiologist relationship, increase hearing instrument uptake, and optimise rehabilitation outcomes. •



# PERSONAL LISTENING DEVICE, PERSONAL HEADPHONES, AND SONG CHOICE'S INFLUENCE ON PREFERRED LISTENING LEVELS



*Amarante MC. & Zalewski TR.  
Am J Audiol. (2025): 34(2), 355–363.  
doi: 10.1044/2025\_AJA-24-00247.  
Epub 2025 Apr 14. PMID: 40228025.  
by Marco Marcato –Italy*

**Personal Listening Device, Personal Headphones, and Song Choice's Influence on Preferred Listening Levels.**

## INTRODUCTION

People listen to music throughout the day, and their listening preferences are often influenced by more than just the music itself. Factors like convenience can dictate the choice of personal listening device (PLD) and headphone type (transducers). For example, in-the-ear headphones are commonly used during active tasks, whereas over-the-ear headphones are usually preferred during more stationary activities (Gilliver et al., 2017).

The type of transducer significantly impacts the sound intensity within the external auditory meatus (EAM). Variations in the transducer's diaphragm position relative to the eardrum can cause differences in sound pressure levels (SPLs). Previous studies found that in-the-ear transducers can increase output by approximately 6 dB compared to over-the-ear styles (Dobrucki et al., 2013), while in-the-canal transducers may produce even higher levels (Breinbauer et al., 2012).

The concept of a Preferred Listening Level (PLL) suggests that a listener should adjust the volume to compensate for variations in transducers or devices, thereby maintaining a consistent EAM SPL. This implies that, ideally PLLs, measured by EAM dB SPL, should remain stable regardless of changes in equipment. However, previous research—largely relying on self-reported data and lacking control for all variables at once—has not definitively proven this. Furthermore, the lack of a clear distinction between a 'preferred volume setting' and the actual PLL introduces a significant weakness in existing literature. The present study addresses this gap by objectively measuring EAM SPL while controlling key variables.

Accurate PLL data is vital because PLD use poses a potential risk to hearing. These devices can reach intensities up to 136 dB (WHO, 2015), and prolonged exposure—even at lower levels—can cause hearing damage. Young adults are

## CRITICAL NOTE:

*The authors aimed to control for confounding variables not addressed in previous research by conducting a repeated-measures study with 21 college students, measuring external auditory meatus sound pressure levels (EAM SPLs). Pure-tone audiometry and distortion-product otoacoustic emissions (DPOAEs) were assessed before and after the listening sessions to monitor for temporary threshold shifts (TTS); no evidence of TTS was observed. Results did, however, indicate that the computer used in the study produced significantly lower EAM SPLs than participants' personal devices. Additionally, over-the-ear transducers resulted in significantly lower EAM SPLs compared to in-the-ear, in-the-canal, and participant-owned transducers. This suggests that PLLs are not consistent across devices. Over-the-ear transducers and computers were associated with the lowest risk of hearing damage. The authors conclude with a recommendation that individuals exercise caution regarding listening duration and volume settings when using personal listening devices (PLDs).*

at a particularly high risk due to their cumulative exposure. Therefore, understanding the variables that influence PLLs is crucial for promoting safe listening habits.

## METHODS

The study included 21 participants, all of whom were college students, aged 18 to 22 (81% female, 19% male). Prior to participation, all subjects provided informed consent and completed a demographic questionnaire. An otoscopic examination, pure-tone audiometry, and DPOAEs were

performed, to ensure normal hearing (NH) and establish baseline measurements. These tests were repeated following the listening sessions to monitor for any temporary threshold shifts (TTS).

During the listening <sup>2</sup>sessions, an Audioscan Verifit2 system with a probe microphone was used to measure EAM SPL. Participants used hand signals to indicate their PLLs. The study used three types of Sennheiser wired transducers: over-the-ear; in-the-ear; and in-the-canal. Participants also used their own personal transducers and PLDs. To control for order effects, the sequence of ear, song, device, and transducer was counterbalanced across participants.

Data was collected over two 40-minute sessions. Participants listened to two songs: one selected by the researchers and one of their own choosing. Playback was conducted using a Hewlett-Packard EliteDesk 800 G4 computer as well as the participants' PLDs. The starting volume for both devices was set to the lowest level that produced sound.

For the statistical analysis, the paired t-tests were used to compare pre- and post-listening hearing thresholds and DPOAE amplitudes. A four-factor multivariate analysis of variance (MANOVA) with Bonferroni post-hoc analysis was used to identify differences in EAM SPL based on song, transducer type, and device.

## RESULTS

The pre- and post-listening hearing tests showed no significant differences, confirming that no TTS occurred.

Statistical analysis, however, revealed significant differences in EAM SPL depending on device and transducer type. The researcher's computer produced a significantly lower average EAM SPL (71.18 dB SPL) than the participants' PLDs (76.39 dB SPL). This finding suggests that PLLs are not consistent across different devices, thereby challenging the assumption of a stable PLL irrespective of equipment. Analysis of transducer type revealed that over-the-ear transducers produced significantly lower EAM SPLs than the in-the-ear, in-the-canal, and participant-owned transducers. The Bonferroni post-hoc analysis confirmed the statistical significance of these differences. In contrast, no significant difference was found between the in-the-ear and in-the-canal styles.

Regarding song selection, no significant difference in EAM SPL was found between the researcher-selected and participant-selected songs, contradicting prior findings that individuals tend to listen to their preferred songs

at higher volumes. Furthermore, a comparison between participant-owned transducers and the researcher-provided devices of corresponding style revealed no significant differences.

## DISCUSSION

This study successfully isolated key variables to provide a clearer picture of their influence on PLLs. Although no temporary threshold shifts (TTS) were observed—likely due to the relatively short exposure time—the measured EAM SPLs highlight a potential risk for hearing damage. Notably, all average EAM SPLs, with the exception of the over-the-ear transducers, were above the recommended safe listening level of 70 dBA (Fink, 2019).

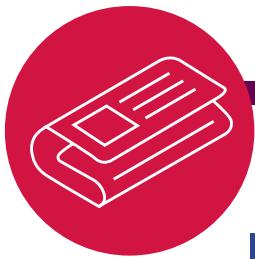
The significant difference in EAM SPL between the researcher's computer and participants' PLDs suggests that listeners do not consistently compensate for device differences. This may stem from variations in volume control precision; for example, the computer's 100-step volume scale may have allowed for more precise adjustments than the participants' devices, which often feature fewer steps.

Our finding that song choice did not influence PLLs challenges previous survey-based studies. This discrepancy may be due to the unreliability of self-reported data. By objectively measuring EAM SPL, the authors provided no evidence to support the claim that listeners increase volume for their favourite songs.

In contrast, the results regarding transducer types were consistent with existing literature, demonstrating that over-the-ear transducers yield the lowest EAM SPLs. This effect is likely due to the greater distance of the diaphragm from the eardrum, making this type of device a safer choice for listeners concerned about hearing health.

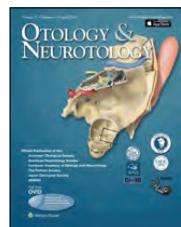
A potential limitation of this study is the Hawthorne effect. Participants, aware that their listening habits were being observed, may have consciously chosen lower volume settings, a phenomenon potentially amplified by the presence of an audiology professor during data collection.

In conclusion, the findings of this study indicate PLLs are not consistent across different devices, and transducer type is a key determinant of the final EAM SPL. Specifically, over-the-ear transducers and computers pose a lower risk of hearing damage due to their lower output levels. These results underscore the importance of listener awareness regarding device choice, listening duration and volume settings to mitigate potential hearing risks. •



# HEARING BENEFITS OF COCHLEAR IMPLANTATION IN OLDER ADULTS

## WITH ASYMMETRIC HEARING LOSS



Smith HJ., Takkoush S., Mendenhall TJ., et al.

*Otol Neurotol.* (2025): 46(5), 515–520.

doi: 10.1097/MAO.0000000000004487. Epub

2025 Mar 11. PMID: 40075242.

by Karen Lovelock –Australia

**This paper examined the benefits of cochlear implantation in older adults with asymmetric hearing loss or single-sided deafness.**

### BACKGROUND

Clients with single-sided deafness (SSD) and asymmetric hearing loss (HL) commonly report problems with localising sound, hearing in background noise, and tinnitus.

The options for treatment include a contralateral routing of signal (CROS) devices, bone conduction implants, or cochlear implants (CI). While CROS devices and bone conduction implants can provide some benefit for these issues, they primarily route the signal to the better hearing ear, thereby limiting binaural processing cues. In contrast, a CI treats hearing in the affected ear, potentially improving localisation, and hearing in noise, as well as reducing tinnitus.

This study explored the benefits of CIs specifically for older adults with SSD or asymmetric HL.

### MATERIALS AND METHODS

This study provides a retrospective analysis of data obtained from patients aged over 60 years of age with SSD or asymmetric HL, who received a unilateral CI between 2019 and 2023.

Patient records were reviewed to compare pre- and post-operative measures: Pure tone average (PTA); CNC word and phoneme scores; AZBio sentence speech audiometry test (created for Cochlear Implant users) in quiet, in noise (SNR +10dB), and binaurally; BKB sentences in noise. Data logs were examined to determine duration of device use. Additionally, patient-reported dizziness and balance were documented pre- and post-operatively.

### RESULTS

A total of 12 subjects, with a mean age of 72.6 years, were included in the analysis. Two subjects were classified as having SSD, while the remaining subjects presented with asymmetric HL. Post-operative testing occurred, on average, at 9.9 months following implantation.

### CRITICAL NOTE:

*The findings of this study are encouraging, albeit based on a small sample of older adults who underwent cochlear implantation (CI). A larger study which separately examines the benefit of CI in asymmetric hearing loss (HL) versus single-sided deafness (SSD) could inform clinical practices and enable professionals to provide better pre-operative counselling for these heterogeneous groups. Incorporating subjective benefit/satisfaction scales, as well as placing greater emphasis on results for speech testing in noise, would provide additional insight into functional benefit, particularly since adults with SSD often perform well in quiet environments and, and improvements are most desired for hearing in noise.*

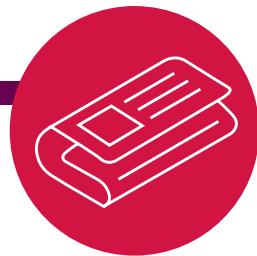
Significant improvements were found for average pure tone hearing, as well as word and sentence testing in quiet. Participants also reported improvements in dizziness, tinnitus, and sentence recognition in noise, although these changes were not statistically significant, likely due to the small sample size.

The average daily device use was 9.3 hours.

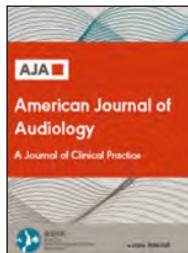
### DISCUSSION AND CONCLUSION

The authors note that despite the small sample size, all subjects demonstrated objective improvement as measured by PTA. A subset of subjects also showed gains in speech recognition in quiet, and in the binaural condition. The average daily use of 9.3 hours suggests the subjects derived meaningful benefit from the implant.

These findings align with recent research and support the notion of early cochlear implantation for patients with SSD and asymmetric HL, rather than delaying intervention until deterioration occurs in the better ear. •



# USABILITY OF OVER-THE-COUNTER HEARING AIDS IN OLDER ADULTS



Coco L., Weeks T., Mouzin C., et al.  
*Am J Audiol.* (2025): 34(3), 695–706.  
 doi: 10.1044/2025\_AJA-25-00013.  
*Epub 2025 Aug 28. PMID: 40875386;*  
*PMCID: PMC12418374.*

by Connie Loi –New Zealand

This study investigated the individual determinants associated with older adults' ability to effectively manage commercially available over the counter (OTC) hearing aids (HAs) in the United States.

## INTRODUCTION

Age-related hearing loss (HL) is a critical public health concern, which, if left untreated, can lead to communication barriers, social isolation, depression, and cognitive decline. While hearing aids (HAs) remain the primary intervention, uptake rates are low due to barriers such as cost, lack of awareness, stigma, and restricted access to health care professionals.

To address these limitations, over-the-counter (OTC) HAs have been introduced, allowing consumers to purchase and set up devices independently, without professional assistance. OTCs are intended to be more affordable and convenient, but they also pose challenges. Older adults may have difficulty managing the HAs including difficulty with insertion, technological challenges, or changing batteries, particularly among individuals with limited technological experience or low health literacy.

Previous studies in various countries have explored the ability of older adults to manage OTC HAs within local populations. The current study sets out to investigate these abilities in older adults in the United States.

## PARTICIPANTS:

### - Recruitment:

- study flyers distributed at libraries and senior centres across San Diego County
- college-wide and staff electronic mailing lists
- through a database that contains contact information of university audiology clinic patients who consented to being contacted for research studies.

### - Inclusion:

- Age 55 years and above
- No current ear infection
- Perceived mild-moderate HL

### CRITICAL NOTE:

*A key strength of this study was the relative ecological validity, as participants' HA management skills were assessed with OTC HA manufacturers' instruction manuals. While the current study only included two models of OTC HAs, future research could explore across a broader range of OTC HAs to improve generalisability. Additional studies are needed to evaluate OTC usability in real-world contexts, and long-term follow-up would provide valuable understanding of the potential ongoing support required for maintaining effective use of OTC HAs.*

### - Enrolled participants:

- 28 experienced HA users (mean age 74 years / 36% Female / Avg PTA 37dBHL)
- 54 new users (mean age 70 years / 50% Female / Avg PTA 24dBHL)

### PROCEDURES:

Participants were seated at a table with all the HA packaging, tools, and instructions. A mirror was provided to assist with device insertion, and a lab phone (iPhone or Android to simulate their own device experience) was available for downloading the relevant manufacturer app. Participants followed a flipchart of HA management tasks independently, requesting assistance only if needed. The researcher observed discreetly, scored each task for independence and accuracy using a four-point Likert scale. Individual task scores were summed and averaged to produce an overall skills score, and performance was also classified as 'successful' (score 2 or 3) or 'unsuccessful' (score 0 or 1). If participants were unable to complete app download or pairing steps, the researcher intervened. All tasks were audio- and video-recorded and scored independently by a second rater blinded to participant

group. Any discrepancies were resolved by the first author to ensure rigour.

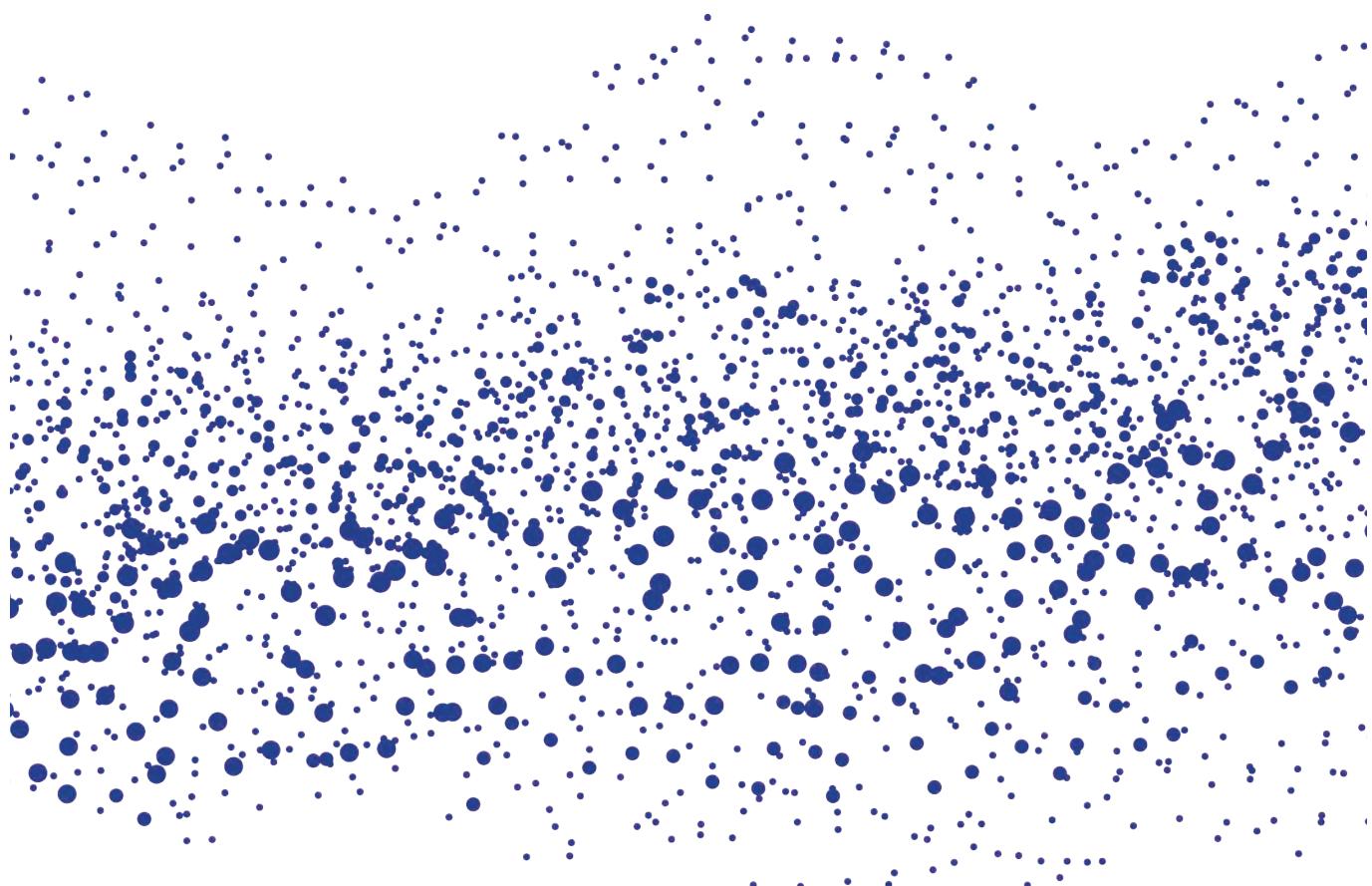
### RESULTS:

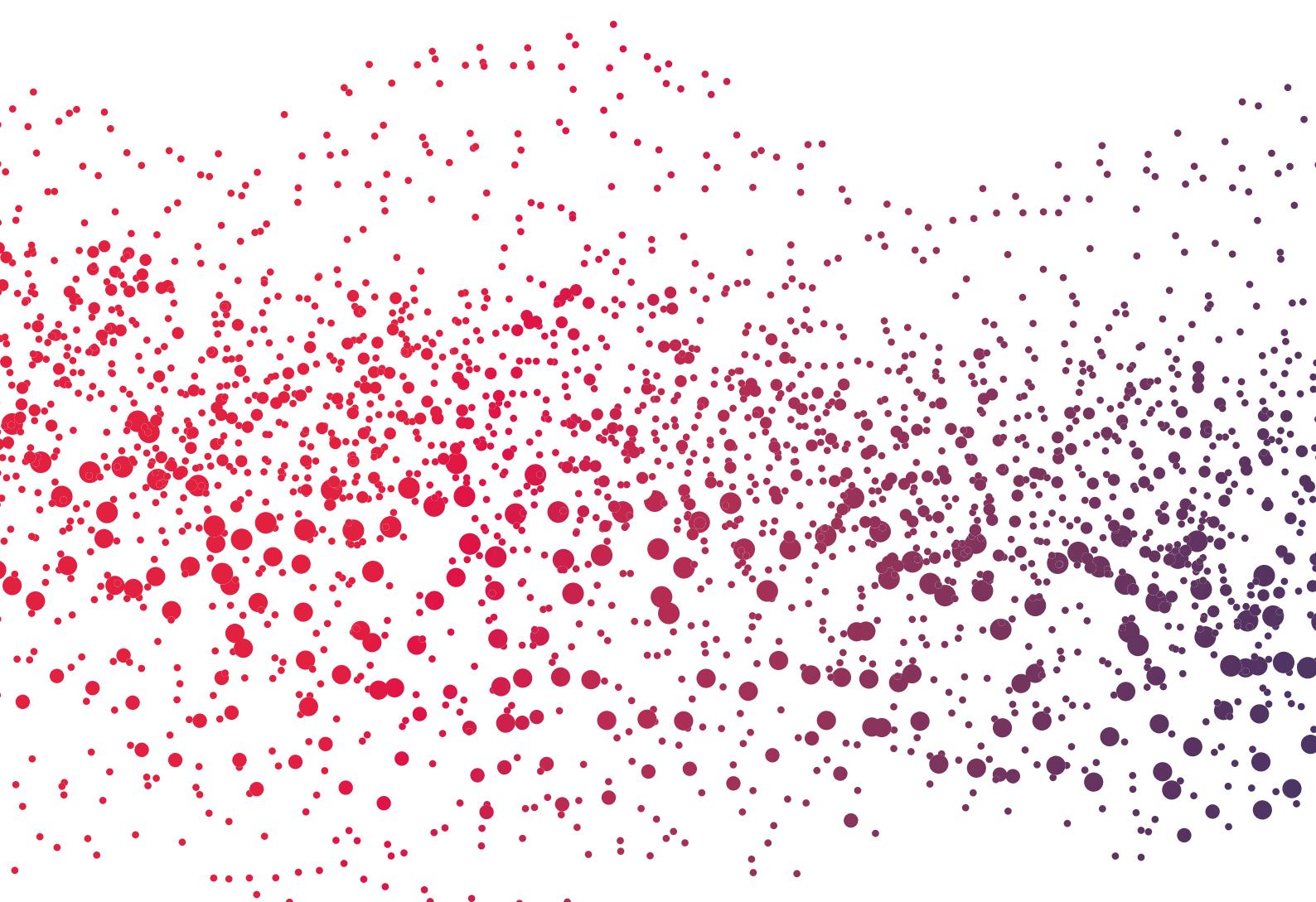
In total, 68% of experienced HA users and 72% of the new users were unable to complete the OTC HA assessment successfully.

On the OTC HA skills evaluation, the overall success rate was 86% for experienced and 83% for new users.

The most challenging tasks for participants were manual volume control, changing wax filters, and Bluetooth pairing to smartphones.

Education remained as a strong predictor of OTC HA skills: participants with less than a college degree showed 45% lower performance compared to those with a master's degree or higher. •





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