

Audition, Amplification, and Social Engagement

By Douglas L. Beck AuD, F-AAA, CCC-A

Oberlin College (2023)¹ reports that humans are essentially group-oriented social beings. We typically live in families, we participate in social media, small and large groups, teams at school, work, hobbies, worship and fellowship services, music, politics, professions, economic alliances, politics, and more. They report, "Our norms are shaped by our culture, itself an emergent property of group-living." As such, social engagement is an important, dominant, and pivotal factor in our daily lives.

During the recent COVID-19 pandemic, people were urged to stay home, to not visit, to not participate in groups, and to avoid social contact. Although these cautions and realities helped slow and attenuate the spread of COVID-19, social isolation, anxiety, and loneliness increased, with anticipated concomitant results.

Osborne (2023)² reports that 34 years ago, in 1990, 27% of adults had three or fewer friends. That is not a lot! Unfortunately, in 2021, 49% reported having three or fewer friends. Likewise, in 2003, young people (ages 15-24 years) spent 2.5 hours per day with in-person friends. By 2020, it was less than 40 minutes per day.

Social engagement impacts our quality of life and communication disorders present substantial barriers to social engagement. When hearing and listening disorders are suspected, diagnosed, and treated early, they can most often be successfully managed by hearing care professionals working in tandem with the patient.

PREVALENCE OF AUDITORY ANOMALIES IN 2023

In their revealing publication, Haile, Orji, Reavis, et al. (2023)³ report approximately 73 million people in the United States experience auditory problems (hearing loss, sub-clinical hearing loss, listening disorders, etc.). As one might expect, they report most problems are "mild" and "disability" was mostly experienced and reported in those with "moderate" or worse hearing thresholds. Of note, the prevalence of hearing loss was



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28% higher in 2019 than in 1990. Further, they note 10% of individuals with hearing loss use hearing aids. Therefore, an estimated one in five people experience hearing and/or listening difficulty and of those, only one in 10 use hearing aid amplification.

HEARING AND LISTENING

Hearing and listening are not synonyms. Hearing is simply detecting or perceiving sound and is generally measured based on pure-tone thresholds, not actual speech sounds. Nonetheless, in many respects hearing is a basic, essential survival mechanism, which almost all beings share. Listening is generally founded upon hearing, and listening is the ability to comprehend, to understand, to make sense of sound.⁴ The ability to listen is a learned skill among most beings but is an extraordinarily important and dominant skill in humans. Although some animals can comprehend basic alerting, warning or mating sounds, their response is limited and is often a startle, fight or flight or other instinctual (or perhaps learned) response. Humans have thousands of languages that can describe the past, present, and future, things that have happened, things that will never happen, fiction and nonfiction, science, math, entertainment, religion, fashion, technology, and more. Our learned languages enable us to transmit and receive all manner of human thought through speaking and listening and other language protocols (e.g., American Sign Language).

Regarding the hierarchy of audition, hearing is simply step one. Hearing is the easy part. We can make anyone hear via hearing aids, assistive devices, cochlear implants, auditory brainstem implants, and more. Hearing is not enough. Dogs, cats, lions, tigers, and dolphins all hear better than humans. Humans



Dr. Douglas L. Beck is a senior editor at *The Hearing Journal*. He is among the most prolific authors in audiology with 221+ publications, interviews, and op-eds published by the American Academy of Audiology, *Hearing Review*, *Audiology Online*, and others. His work has addressed a wide variety of audiology and professional topics, including op-eds, audiology, language, pediatrics, cognition, hearing aids, amplification, psychology, neuroscience, anatomy and physiology, counseling, and more. Dr. Beck has delivered more than 1,000 lectures, keynote addresses, webinars, and other professional presentations. He continues to consult for multiple clinical, scientific, and other organizations.

are the top of the food chain partly due to our acquisition and creation of complex, meaningful, abstract words and languages, and the ability to listen and apply meaning to sound. The heavy lift that separates humans from all other beings is our ability to communicate complex information receptively and expressively via sophisticated languages; to apply meaning to produced and received sound.

LOUDER VERSUS CLEARER

Some people with hearing loss simply need sounds to be louder. However, people with the most typical auditory complaints need sound to be clearer. Some need both. For example, people with outer and middle ear anomalies, such as tympanic membrane issues, ossicular problems, or other middle ear issues, are most often successfully managed via medical or surgical intervention. The goals of these medical/surgical interventions are to avail a safe, and well-functioning outer and/or middle ear. Naturally, once these interventions have been successfully completed, the ear generally “hears” better and facilitates improved (i.e., more audible) detection/perception of sounds. However, only some 4-5% of hearing loss issues can be appropriately medically/surgically managed. Most (perhaps 95%) hearing and listening problems are not medically or surgically remediable.

The most common hearing loss cause/origin/diagnosis is sensorineural hearing loss (SNHL), which includes presbycusis (age-related hearing loss, ARHL), noise-induced hearing loss (NIHL), sudden SNHL, ototoxic reactions, and more. Given these more common SNHL problems, the primary complaint patients report is the need for sounds to be clearer, not necessarily louder. In other words, they can hear, but they cannot understand and the challenge to understand is even worse in a background of noise (e.g., cocktail parties, restaurants, etc.).

To make sounds “clearer” the primary requirement is an improved signal-to-noise ratio (SNR)⁵, which can be optimally provided via hearing aids with custom earmolds, loop systems, assistive listening devices, FM systems, digital remote microphone systems, and more. Of note, many over-the-counter and many prescription hearing aids use “open dome” systems which allow sounds into the ear without processing them at all. Open domes allow sound to essentially by-pass (and thus compromise) the sophisticated directional, beam-forming, noise-reduction (and other sound management) systems that are present and available in most contemporary hearing aids.

It is my opinion that domes may be fine for a hearing aid demonstration or trial period, or if recommended for a mild hearing loss or for “sub-clinical” or “functional” or “suprathreshold listening disorders.” However, open domes most often provide sub-optimal hearing and listening performance. The analogy I often use when discussing domes is...Imagine you have an amazingly well-engineered automobile such as a Mercedes, Porsche, Ferrari, or a Lamborghini. What would happen if you used regular 87 octane gas? You would substantially degrade the performance of the very expensive car. The same is true with hearing aids. Using domes typically degrades the technical and auditory performance of hearing aids. Professionally made and fitted custom ear molds with appropriate vents, fitted, verified, and validated using real-ear systems as well as

speech-in-noise measures are the preferred protocol and are in-sync with nationally established (AAA, ASHA and IHS) Best Practice models.

HEARING AND LISTENING PROBLEMS FACILITATE SOCIAL DISENGAGEMENT, HEALTH, MEDICAL, COGNITIVE, AND QUALITY-OF-LIFE ISSUES

Hearing loss, sub-clinical hearing loss, and listening problems facilitate communication problems which attenuate and distort the quantity and quality of information transmitted from the ear to the brain. Resultantly, the brain must work harder to acquire, interpret, understand, and comprehend the auditory signal (i.e., primarily speech) and the brain must “re-assign” increasingly more cognitive resources to untangle the attenuated and distorted bio-electric auditory-neural signal, thereby increasing cognitive load. Important secondary problems often result from these same auditory anomalies such as isolation, fatigue, anxiety, stress, and loneliness. As such, hearing and listening problems have a far greater impact on quality of life than one might otherwise imagine.

People with hearing and/or listening problems need louder and/or clearer auditory information (respectively) to hear and listen. Indeed, for most people with auditory complaints, simply making sounds louder is not the goal and is not enough. The most common complaint which patients express is that speech sounds are not clear enough, particularly in noise. There are some 23-26 million people in the US *who do not have* hearing loss on an audiogram^{6,7}, but they struggle to understand speech-in-noise (SIN) and they report hearing difficulty. These people are often said to have sub-clinical hearing loss, central hearing disorders, auditory processing disorders, suprathreshold listening disorders, and/or functional hearing disorders.

Mick, Kawachi, and Lin (2014)⁸ reported cross-sectional data on adults 60 to 84 years old based on the 1999 to 2006 National Health and Nutrition Examination Surveys. They reported that as hearing loss increased, so too, did social isolation in women ages 60 to 69 years.

West (2017)⁹ reported hearing impairment is a growing physical disability affecting older adults and hearing loss is an important physical health stressor. People with worse self-rated hearing ability were associated with a significant increase in depressive symptoms. West reports hearing impairment is a chronic stressor in individuals' lives and that responses to this stressor vary by the availability of social resources.

Gao, Hu, and Yao (2020)¹⁰ reported the association between self-reported hearing loss and health-related quality of life (HRQoL). Their study evaluated 4,035 older adults (60+ years) and determined that self-reported hearing loss is negatively associated with HRQoL and reduced mental well-being. They reported that social engagement partially mediated the impact of hearing loss. The authors reported that hearing aids or social engagement may facilitate improvements in the quality of life among the elderly.

Beck (2022A)¹¹ reports the relationship between hearing and listening disabilities and the potential exacerbation of cognitive decline is well-documented. He notes that as hearing

loss increases, so too, does the potential for cognitive decline in at-risk patients. Beck argues that managing hearing and listening problems in accordance with Best Practices (AAA, ASHA and IHS) as early as possible allows the greatest potential opportunity to alter the trajectory of cognitive decline and using cognitive screenings in appropriate (i.e., high risk) patients is warranted and is easily, accurately, and quickly accomplished and is in accordance with AAA and ASHA Scope of Practice documents.

Pronk, Deeg, and Kramer (2023)¹² evaluated the longitudinal relationships between hearing status (based on self-report and speech-in-noise scores) and depression and loneliness over four years for adults ages 63-93 (upon entry into the study). The authors report significant adverse effects of poor hearing on loneliness were found for specific subgroups of older persons.

The National Academies of Science, Engineering, and Medicine (NASEM, 2020)¹³ reports adults may experience isolation, fatigue, anxiety, stress, and loneliness from hearing and listening problems. The NASEM notes social isolation is a major risk for premature mortality, similar to high blood pressure, smoking, or obesity.

Jayakody, Wishart, Stegeman et al. (2022)¹⁴ note that untreated hearing loss significantly increases the likelihood of being emotionally lonely and hearing-impaired older adults are at a greater risk of developing loneliness and psychological discomfort. The authors state that hearing care professionals (HCPs) should be aware of the psychosocial burdens that often accompany hearing loss.

The Surgeon General of the United States (Murthy, V., 2023)¹⁵ issued a declaration in May 2023, which noted the public health crisis of loneliness, isolation, and lack of connection in our country. Dr. Murthy noted being “disconnected” affects mental, physical, and societal health and loneliness and isolation increase the risk of mental health challenges. Additionally, he noted, a lack of connection may increase the risk for premature death.

Lin (2023)¹⁶ reports important links between hearing and health including hearing loss may contribute to a faster rate of brain atrophy. He reports hearing loss contributes to social isolation and hearing loss may reduce the desire to be with or converse with other people and these factors may contribute to dementia.

HEARING AID AMPLIFICATION AND SOCIAL ENGAGEMENT

Kochkin and Rogin (2000)¹⁷ reported the outcomes from 2,069 people with hearing loss who wore hearing aids and some 1,700+ family members. Kochkin and Rogin reported people with hearing loss who wore hearing aids were more likely to report improvements in physical, emotional, mental, and social well-being. These same people were more socially active and hearing aid use was positively related to greater earning power, improved interpersonal relationships, decreased communication difficulty, reduced compensatory behaviors, reduced anger and frustration, reduced depression, enhanced emotional stability, reduced paranoia, reduced anxiety, reduced social phobias, more control over one’s life, reduced self-criticism,

improved cognitive function, improved health status, reduced pain, and enhanced group participation.

The American Academy of Audiology¹⁸ Task Force on the Health-Related Quality of Life Benefits of Amplification in Adults reported that hearing aids improve adults’ health-related quality of life by reducing psychological, social, and emotional effects of sensorineural hearing loss.

Nasrullah, Tahir, and Fida (2023)¹⁹ report the effectiveness and benefit of hearing aid fittings to manage psychological distress in adults with hearing loss. They report 114 patients with SNHL ages 20 to 70 years. The authors evaluated depression, restlessness, psychological distress, nervousness, and hopelessness pre- and post-hearing aid fittings. They reported “Hearing loss is associated with psychological distress and poor quality of life. Hearing aids are effective in the management of psychological distress in adults.”

Jiang, Mishra, Shrestha, et al. (2023)²⁰ reported in *The Lancet* that the UK Biobank population-based study of some 437,000 adults (ages 40–69 years) compared people *without* hearing loss to unaided people *with* hearing loss. They report the unaided people with hearing loss had an increased risk of all-cause dementia, yet people with hearing loss who wore hearing aids demonstrated no increased dementia risk. They report the benefit of hearing aid use was observed in all-cause dementia and cause-specific dementia subtypes (Alzheimer’s disease, vascular dementia, and non-Alzheimer’s disease non-vascular dementia). The authors reported that for people with hearing loss, hearing aid use was associated with a risk of dementia of a similar level to that of people without hearing loss. The authors stated their findings highlight the *urgent need* to take measures to address hearing loss to improve cognitive decline.

HEARING SCREENINGS ARE NOT THE ANSWER

Many wise people will disagree with my opinion, but I respectfully offer my opinion to get the conversation started. I believe I should state clearly and unequivocally that newborn infant screenings are brilliant, very useful and valuable and I totally and absolutely endorse newborn infant screenings. I am not talking about newborn infant hearing screenings when I state the following: I do not believe licensed hearing health care professionals should offer “hearing screenings.” For children and adults with auditory concerns, suspicions, complaints, or problems, best practice-based comprehensive audiometric evaluations are (my opinion) the best option to evaluate, diagnose, treat and guide patients (children and adults) toward an accurate, reliable and professionally guided treatment plan to avail the best evaluation and outcome.

The most common “hearing screening” consists of something along the lines of “press the button when you hear the beep” and may involve 4-6 pure-tones at a fixed/prescribed loudness level. These “hearing screenings” (whether free or fee-based) may be fine when done by trained para-professionals, volunteers, school staff and other non-professional HCPs to grossly check an individual’s ability to hear. Fine. Another form of “hearing screening” may sometimes include “whisper tests” or “watch tick” tests²¹ and based on these

PERSPECTIVES WITH DR. BECK

(almost meaningless) tests, incorrect and damaging information is delivered to patients such as “your hearing is normal for your age” or “we all develop hearing loss (and/or tinnitus) as we age and you have to learn to live with it.” These incorrect and cavalier statements are unfortunate, frankly wrong, and they cause untold damage as patients may simply give up or stop seeking help for difficult, yet very treatable conditions.

However, when a hearing care professional (HCP) offers/performs a hearing screening, the HCP knows that the information obtained is not comprehensive. Further, telling anyone they “passed” a screening may offer a false sense of security as “screenings” (by definition) cannot detect sub-clinical, functional, or supra-threshold listening disorders, speech-in-noise problems or a host of other common and typical auditory complaints and communication problems all of which are invisible via a hearing screening, and most of which are treatable.

Free screenings are not taken seriously by many people as things that are free are usually worth the price paid, and when people are not willing to pay for a service, they are not invested in the same.

Most medical professionals do not offer free screenings, although some “screenings” are offered and very useful and arguably life-saving. For example, breast cancer ‘screenings’ are ordered by physicians, require imaging equipment and the results are interpreted by a radiologist and sent to a physician, all of whom charge a substantial fee. Colonoscopy ‘screenings’ are invasive, require a dreaded preparation, are thousands of dollars and are done by a medical team including physicians. These “screenings” are very different in all respects from ‘free, or fee-based hearing screenings.’ Consider psychiatrists, psychologists, neurologists, dentists, obstetricians, gynecologists, optometrists, neurosurgeons, orthopedic surgeons, and otolaryngologists; they generally, do not offer free screenings. Perhaps a professional will attend a specific “senior health fair” or similar, but they generally do not have patients make appointments in their office for free or fee-based screening.

I am not arguing that we should not test or evaluate, I am arguing we should be professional, comprehensive, and thorough. Again, for children and adults with auditory concerns, suspicions, complaints, or problems, best practice-based comprehensive audiometric evaluations are the best option (my opinion) to evaluate and guide adult and pediatric patients toward an accurate, reliable diagnosis, and a professionally guided treatment plan to avail the best outcome.


DISCUSSION

Despite overwhelming evidence of the need to quickly, accurately, effectively, and efficiently manage (i.e., diagnose and treat) hearing and listening disorders to maintain and enhance social engagement, these issues are not taken seriously (enough) by the clear majority of the public and/or many health care professionals.

Damage caused by undiagnosed and untreated hearing and listening disorders includes social isolation, loneliness, depression, anxiety, cognitive dissonance, psychological, emotional distress, physical ailments, and more. Comprehensive, appropriate, and timely diagnosis, management, and amplification

(in appropriate candidates) helps overcome and resolve these negative and damaging outcomes.

It is well-established over decades of peer-reviewed literature and through Best Practice (BP) publications from national professional organizations (i.e., AAA, ASHA, IHS) that early and thorough comprehensive audiometric evaluations are in the best interest of the patient. Each of their comprehensive BP statements advocate diagnostic tests, communication and listening assessments, speech in noise tests and appropriate and timely intervention.

As social beings, social engagement contributes substantially to our enjoyment of, and quality of, life. Hearing and listening disorders present significant barriers to successful social engagement. Importantly, most hearing and listening disorders can be successfully managed via hearing care professionals when these disorders are thoroughly, comprehensively, and professionally evaluated and managed in a timely manner and in accordance with nationally recognized best practice models. 

References for this article can be found at <http://bit.ly/HJcurrent>.