

Objective and Subjective Assessment of Perceived Mild-to-Moderate Hearing Loss

Stephen Tyler Dougherty, John Peyton Deming, & Lisa Lucks Mendel
The University of Memphis School of Communication Sciences & Disorders

Introduction

The topic of subjective versus objective means of determining hearing sensitivity has been studied in the past, and wide variability has been seen among the broad population of individuals who have been tested. This topic is more relevant today than ever before because of the Over-the-Counter (OTC) Hearing Aid Act of 2017, also known as H.R. 1652, which was signed into law on August 18, 2017. Under the law, the Food and Drug Administration (FDA) has three years to develop a category for OTC hearing aids. According to the law, OTC hearing aids are for “adults over the age of 18 to compensate for perceived mild-to-moderate hearing impairment.” Any adult who thinks he or she has a mild-to-moderate hearing loss will be able to purchase an OTC hearing aid without receiving a proper audiological evaluation. Individuals may perceive their hearing difficulty as a mild-to-moderate impairment when in fact they may have a greater or lesser degree of hearing impairment.

The OTC Hearing Aid Act of 2017 was based on reports and recommendations from the President’s Council of Advisors on Science and Technology (PCAST) and the National Academies of Sciences, Engineering, and Medicine (NASEM). Both groups have indicated that hearing aids are considered to be high cost with a lack of innovation among manufacturers. Secondly, both groups acknowledge there is a lack of consumer choice when it comes to treatment options for hearing difficulty. Thirdly, both groups acknowledge the FDA rules are too strict regarding obtaining a hearing aid. The key recommendations made by PCAST were to increase innovation by making a category for OTC hearing aids and increasing consumer choice. The key recommendation made by the NASEM was the establishment of an OTC hearing aid category by the FDA for adults with perceived mild-to-moderate hearing difficulty. When a category for OTC hearing aids is officially established, people believe innovation will increase and costs will decrease. The focus of this study was to determine what is meant by the phrase “perceived mild-to-moderate hearing impairment.”

Numerous studies completed in the past have shown that there is a lack of relationship between hearing threshold data and self-perceived hearing difficulties (Brainerd & Frankel, 1985; Palmer & Solodar, 2009). Overall, these studies suggest people are poor at subjectively quantifying their own degree of hearing impairment. In addition, there is no widely accepted definition or criterion for what “mild-to-moderate hearing impairment” is within the law. The definition of “mild-to-moderate hearing impairment” will likely vary from person to person. The American Speech and Hearing Association (ASHA) states that degree of hearing loss refers to how loud sounds need to be for you to hear them. ASHA classifies a mild degree of hearing loss as thresholds within a range of 26-40 dB HL and a moderate loss within the range of 41-55 dB HL (Clark, 1981).

Purpose

The purpose of this study was to examine the relationship between subjective and objective hearing sensitivity in relation to “perceived mild-to-moderate hearing loss” as indicated in the Over-the-Counter Hearing Aid Act of 2017.

Specific Research Questions

1. Can individuals who perceive they may have a hearing loss accurately describe the degree of loss?
2. Can individuals who do not perceive they have a hearing loss accurately describe it?”
3. How do individuals define mild-to-moderate hearing loss?

Method

Participants

Young Adult	Older Adult
N = 11 (7 females, 4 males)	N = 10 (6 females, 4 males)
Age range: 22-35 Mean age: 26.4	Age range: 38-73 Mean age: 51.1
Inclusion Criteria	
(1) No hearing evaluation within the past 12 months	
(2) Non-hearing aid user	

Procedure

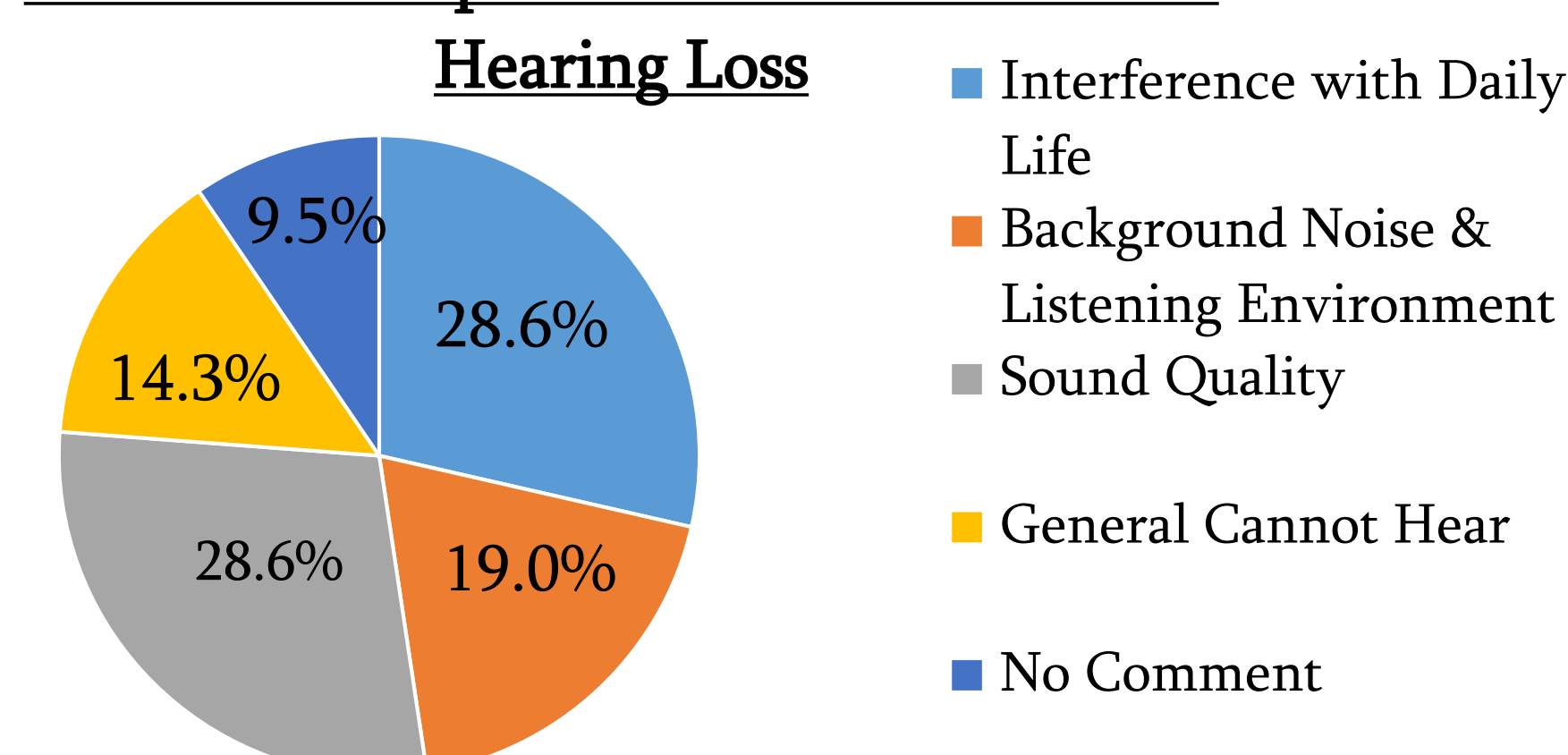
<i>Perceived Hearing Abilities Questionnaire</i> (Pre-Test)
Otoscopy
Tympanometry
Air Conduction Testing (250-8000 Hz)
Speech Recognition Threshold
Word Recognition Testing (NU-6 Lists 1A & 2A)
ETYMOTIC Research QuickSIN (Lists 1 & 2)
<i>Perceived Hearing Abilities Questionnaire</i> (Post-Test)
Counseling of Test Results & Participant Testing Comments
Awareness of OTC Hearing Aid Act (“Yes” or “No”)

Results

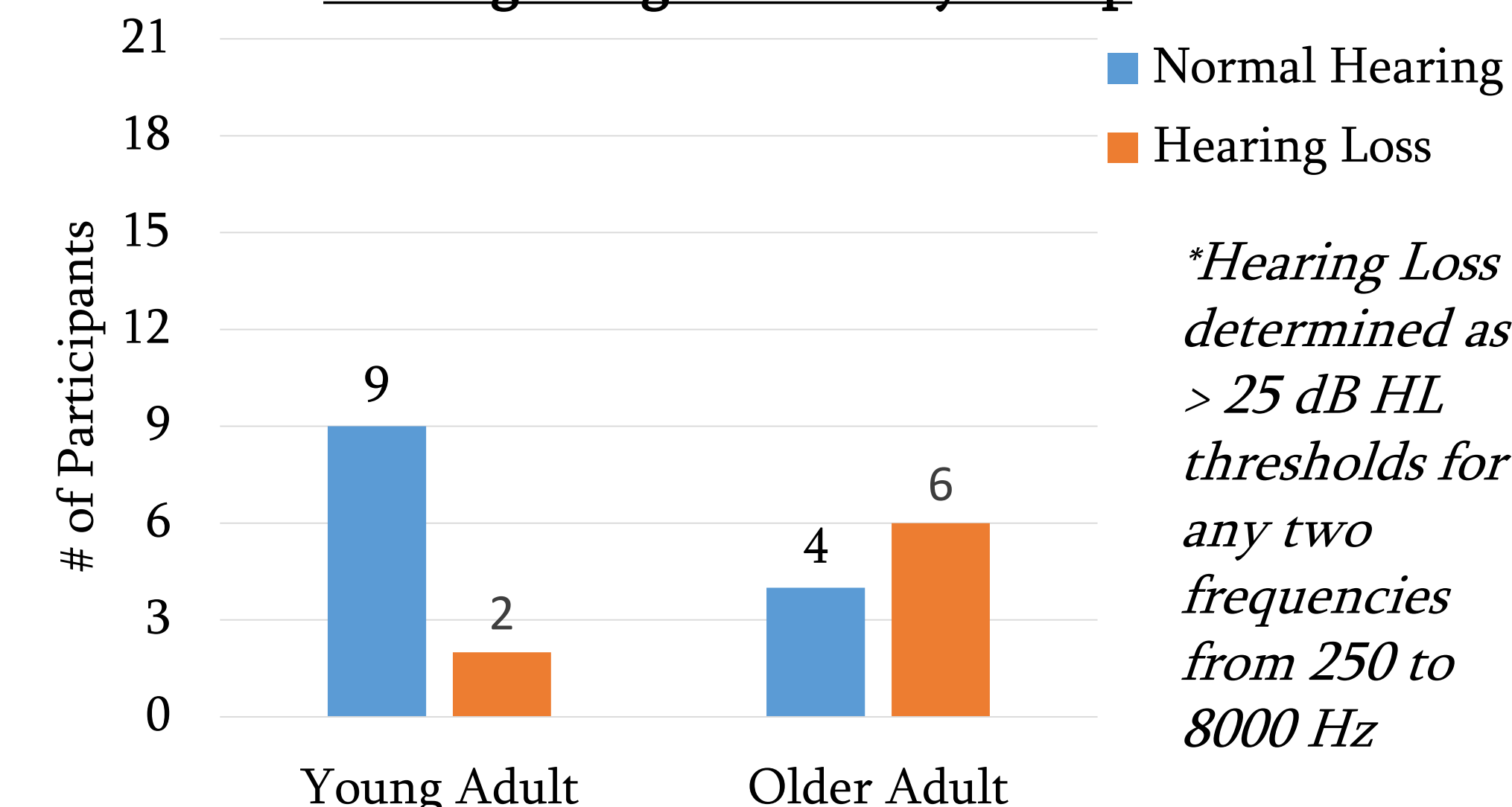
Sample Descriptions of Mild-to-Moderate Hearing Loss:

- “Can’t distinguish a few words at normal speaking volumes”
- “Not hearing certain volume or frequency of sounds”
- “Have to have someone repeat themselves”
- “If I cannot hear someone speaking in a crowd. I would say I have mild to moderate hearing loss”
- “Just a little loss in your hearing”
- “Being unable to hear sounds in a certain range; this interferes with daily life”
- “Not being able to hear moderate noises”
- “The perceived loudness to my ears lessening over time”
- “Difficulty hearing conversations when in crowded places”
- “The inability to hear faint or soft noises”
- “Muffled, dimmed, distant sounds”
- “Difficulty hearing in certain settings”

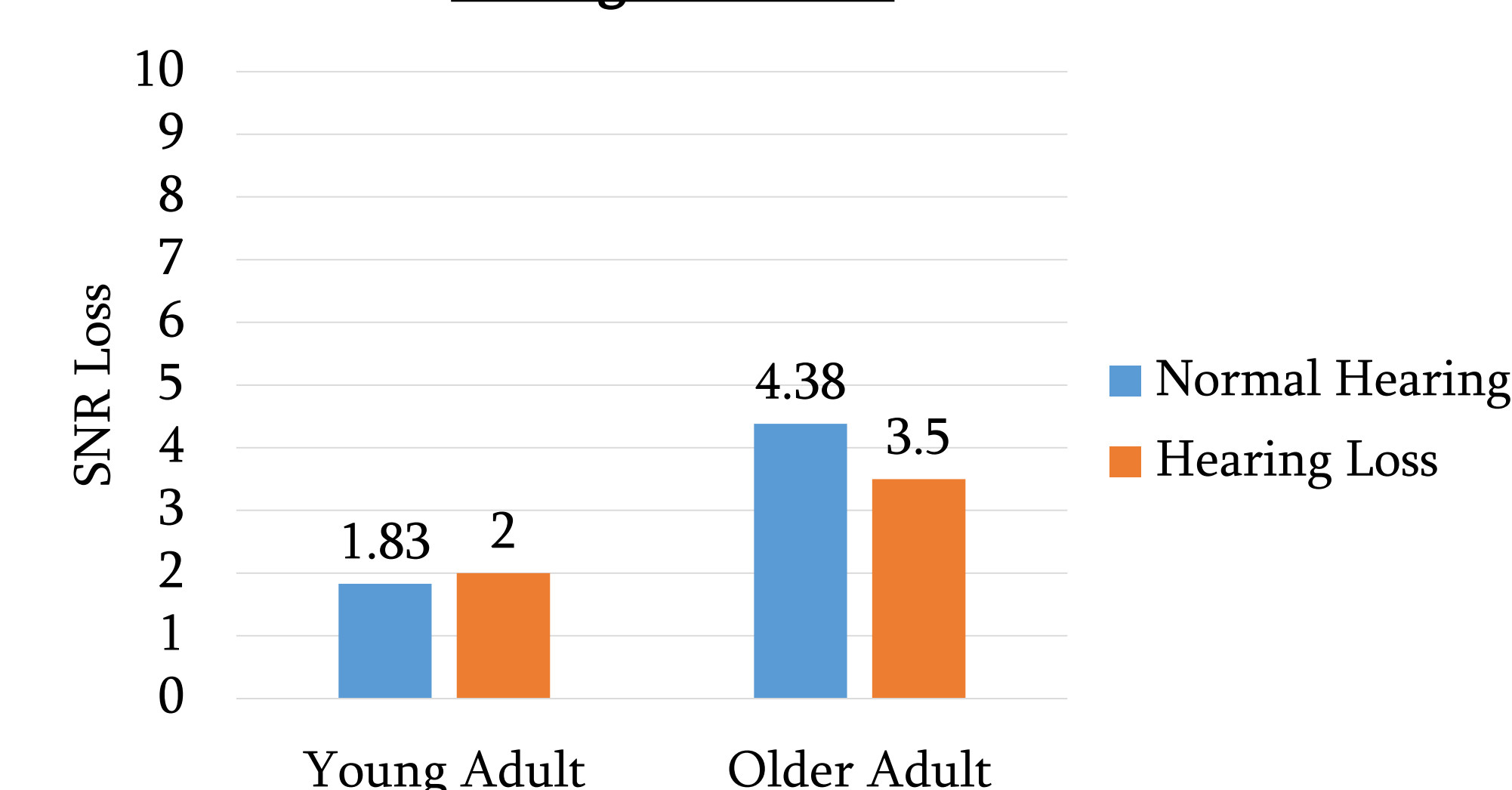
General Descriptors of Mild-to-Moderate Hearing Loss



Hearing Categorization By Group



Average SNR Loss



Sample Post-Test Comments Related to QuickSIN Testing:

- “Pick out her voice but not understand what she is saying. Testing made me feel like I have worse hearing than I thought”
- “Last test very hard to concentrate. That’s where I have some problems.”
- “Though left ear had a problem but now think right ear has a problem. Trouble remembering sentences.”
- “Last test difficult”
- “I think I failed the last test the hardest”
- “Is the last test a test of perception?”
- “Interesting. Last part restaurant setting.”

Summary and Conclusions

- **Description of Hearing Loss by Those Who Had Hearing Loss:**
 - 10 participants stated they had a hearing loss on the pre-test questionnaire.
 - 3 participants accurately described their degree of hearing loss.
 - 7 participants either could not accurately define their hearing loss or they had normal hearing sensitivity.
- **Description of Hearing by Those Who Had Normal Hearing:**
 - 11 participants said they did not have a hearing loss.
 - Based on their 3-frequency PTA (0.5, 1.0, & 2.0 kHz), all 11 accurately described themselves as not having a hearing loss.
- **Description of Mild-to-Moderate Hearing Loss:**
 - There was no single definition of mild-to-moderate hearing loss among these participants.
 - Definitions were influenced by participants’ knowledge of hearing and their own personal experiences.
 - Despite no uniform definition of mild-to-moderate hearing loss, there were some common themes that were identified.
- **95% of the participants were unfamiliar with the OTC Act.**

Future Directions

- Include older adults (> 60 years) in order to analyze the objective versus subjective perception of this population.
- Recruit a greater number of participants to better generalize the results to the greater population.
- Utilize more speech-in-noise tests in audiological evaluations to better reflect hearing difficulties.
- When OTC hearing aids become more readily available, how will it impact a person’s decision when it comes to selection of hearing assistive technology?

References

- Brainerd, S. H., & Frankel, B. G. (1985). The Relationship between Audiometric and Self-Report Measures of Hearing Handicap. *Ear and Hearing*, 6(2), 89-92. Retrieved March 16, 2018.
- Clark, J. G. (1981). Uses and abuses of hearing loss classification. *ASHA*, 23, 493-500. Retrieved March 16, 2018, from <https://www.asha.org/public/hearing/Degree-of-Hearing-Loss/>
- National Academies of Sciences, Engineering, and Medicine. 2016. *Hearing Health Care for Adults: Priorities for Improving Access and Affordability*. Washington, DC: The National Academies Press.
- Palmer, C. V., Solodar, H. S., Hurley, W. R., Byrne, D. C., & Williams, K. O. (2009). Self-Perception of Hearing Ability as a Strong Predictor of Hearing Aid Purchase. *Journal of the American Academy of Audiology*, 20, 341-347. doi:10.5766/jaa.20.6.2
- PCAST Approves Report to Encourage Use of Over-the-Counter Hearing Aids and PSAPS. (2015, October 26). Retrieved March 16, 2018, from <https://www.audiology.org/advocacy/pcast-approves-report-encourage-use-over-counter-hearing-aids-and-psaps>
- U.S.Cong., Senate-Health, Education, Labor, and Pensions. (n.d.). *S.670 - Over-the-Counter Hearing Aid Act of 2017* (E. Warren, C. Grassley, M. Hassan, & J. Isakson, Authors) [Cong. S.670 from 115 Cong., 1st sess.].