2015

Hearing and communication self-efficacy in adult hearing aid users and non-users with acquired sensorineural hearing loss

Ali Christina Mercedes Hunt
Washington University School of Medicine in St. Louis

HEARING AND COMMUNICATION SELF-EFFICACY IN ADULT HEARING AID USERS AND NON-USERS WITH ACQUIRED SENSORINEURAL HEARING LOSS

by

Ali Christina Mercedes Hunt

A Capstone Project
submitted in partial fulfillment of the
requirements for the degree of:

Doctor of Audiology

Washington University School of Medicine
Program in Audiology and Communication Sciences

May 20, 2016

Approved by:
Mitchell Sommers, Ph.D., Capstone Project Advisor
Nancy Tye-Murray, Ph.D., Second Reader

Abstract: The purpose of this research study is to determine if differences in hearing and communication self-efficacy exist between adult hearing aid users and non-hearing aid users with acquired sensorineural hearing loss. No statistical differences were found between groups.

Acknowledgements

I would like to extend my gratitude to Dr. Mitchell Sommers for his insight and advice throughout the development and competition of this capstone. I would also like to thank Dr. Nancy Tye-Murray for her assistance as the second reader on this project. Thank you to Dr. Kenny Marciniak for his help with participant recruitment. I would also like to extend sincere appreciation to the individuals who participated in this research study. Thank you to Jake Gonterman for his support and encouragement throughout the last two years and for helping to edit this paper. Finally, I would like to thank the Hunt-Gluszak family for always believing in my dreams and encouraging me to pursue them.

Research reported in this study was approved by Washington University's Institutional Review Board # 201410081 on November 4, 2014.

Table of Contents

LIST OF TABLES AND FIGURES

ABBREVIATIONS

BFI	Big Five Inventory
LSEQ	Listening Self-Efficacy Questionnaire
MARS-HA	Measure of Audiologic Rehabilitation Self-Efficacy for Hearing Aids
PSE	Perceived self-efficacy
PTA	Pure-tone average
SESMQ	Self-Efficacy for Situational Communication Management Questionnaire
SESMQC	Self-Efficacy for Situational Communication Management Questionnaire Confidence Scale
SESMQH	Self-Efficacy for Situational Communication Management Questionnaire Hearing Ability Scale
SETMQ	Self-Efficacy for Tinnitus Management Questionnaire
WRS	Word Recognition Score

INTRODUCTION

Age-related hearing loss, known as presbycusis, is a permanent hearing loss one may acquire over the course of the lifespan. Pure- tone audiometry will classically reveal a symmetrical sensorineural hearing loss with the higher frequencies being worse than the lower frequencies. Adults with acquired hearing loss typically observe communication difficulties in noisy and/or reverberant environments and a reduced ability to localize sound sources (Arlinger, 2003). Moreover, once the hearing loss progresses to the 2000 – 4000 Hz range, speech understanding becomes more effected, as this frequency range is significant in understanding voiceless consonants and vowel identification (Huang & Tang, 2010). Thus, a common complaint adults with age-related hearing loss report is the ability to hear, but not understand.

Presbycusis can occur in different pathophysiologic manners. One of the most common mechanisms of age-related hearing loss is sensory presbycusis. As described by Schuknecht, (1964) this type of presbycusis is characterized by atrophy of the supporting cells in the organ of Corti as well as degeneration of auditory hair cells. Neural presbycusis is another form of age-related hearing loss. This type occurs when the density of auditory neurons diminishes, affecting the transmission of auditory information from the cochlea to the brain (Schuknecht, 1964). Presbycusis may also be metabolic in nature. Schuknecht (1964) explains that metabolic presbycusis is progressive due to atrophy of the stria vascularis, affecting the properties of the cochlear endolymph, which then disrupts the functional capacity of the cochlea. Furthermore, Schuknecht (1964) describes mechanical presbycusis as a hearing loss due to a disorder in the motion mechanics of the cochlear duct or stiffening of the basilar membrane. Even though there

are differing etiologies of presbycusis, all age-related hearing losses result in similar findings on the audiogram, as described above.

Specifically for aging adults experiencing an acquired hearing loss, those individuals must adapt to listening to a distorted signal or coping with hearing less clearly than they remember. The consequences of hearing loss on quality of life have been well researched. One of the greatest negative effects hearing loss has on the individual is difficulty in communication. The severity of hearing loss is significantly associated with hearing handicap and self-reported communication difficulties, with difficulties increasing with severity of hearing loss (Dalton et al., 2003; Gopinath et al., 2012). Furthermore, hearing impaired elderly have shown significantly more depressive symptoms, lower scores of self-efficacy, increased feelings of loneliness, and a smaller social network size when compared to normal hearing peers (Kramer, Kapteyn, Kuik, & Deeg, 2002). When learning to adapt to a change in hearing, the individual must learn a new relationship between sound and language pattern and modify perceptual skills to cope with the reduced input of information (Boothroyd, 2010).

An important role of the audiologist is to assist these patients as they cope with the effects hearing loss has on quality of life. Traditionally, this is done through adjustment counseling**,** fitting with hearing aids and/or assistive listening devices, and teaching communication strategies. It is the responsibility of the clinician to present all of the available treatment options to the patient. However, the decision is ultimately up to the patient on the course of action he or she would like to take. It has been suggested that when deciding on audiologic intervention, if any, adults consider convenience, expected adherence and outcomes, financial costs, perceived hearing disability, nature of intervention, other people's experiences and recommendations, and preventive and temporary solutions (Laplante-Levesque, Hickson, &

Worrall, 2010; Cox, Alexander, & Gray, 2005; Saunders & Cienkowski, 1996). Additionally, Carson (2005) found the themes of contrasting/comparing, cost/benefit, and control when adults seek help for their acquired hearing loss.

A common and effective way to evaluate the subjective consequences hearing loss has on quality of life is through handicap-focused questionnaires. These questionnaires provide a self-report of the perceived amount of difficulty hearing loss has caused on hearing ability or how activities and participation have been limited due to hearing difficulty. Smith, Pichora-Fuller, Watts, & More (2011) state that self-efficacy questionnaires measure confidence in current capabilities, which allow the clinician to assess beliefs in multiple listening situations or benefit from hearing aids. Thus, it may be beneficial for clinicians to assess the patient's communication self-efficacy and use the responses as a counseling tool tailored to the individual needs of the patient.

Ease of communication can be enhanced through the use of amplification and communication strategies; however, the individual must be willing and able to put in the effort to make changes. The topic of effort particularly applies to adults with acquired hearing loss who may not have had trouble communicating and listening in the past and must now learn to accept and adapt to the changes in their hearing status. According to Bandura (1986), individuals have many thoughts that impact the action they take, but the most prevalent influence is one's own judgment of their capabilities to exercise control over events that affect their lives.

Perceived self-efficacy (PSE) refers to beliefs in one's capabilities to carry out the actions needed to produce given achievements. If an individual believes he or she does not have the power to produce results, they will not attempt to make changes occur (Bandura, 1997). As it relates to individuals with hearing loss, self-efficacy can be evaluated to assess activity

limitations and participation restrictions as well as motivation to use amplification. It has been suggested that those with higher levels of PSE take greater responsibility for assisting their health needs in a variety of areas and put forth more effort to persevere through obstacles (Rodin, 1986; Smith & West, 2006). A person experiencing hearing loss may have a high level of PSE if he or she takes the initiative to schedule a hearing evaluation and pursue amplification. An important aspect to keep in mind is that amplification alone does not necessarily bring about clear speech understanding; the hearing aid user must still put in effort to bring about communication success. On the other hand, a person may be self-efficacious if he or she believes in their ability to apply strategies when experiencing a communication breakdown, not needing the assistance of hearing devices. Jennings, Cheesman, & Laplante-Leveesque (2013) state that if adults with acquired hearing loss have been properly educated on all of the communication strategies to manage themselves in difficult listening environments, have strong beliefs in their capabilities to use those techniques, and the courses of action to meet the demands of those situations, they may be more likely to take on rather than withdraw from challenging environments. Additionally, a strong sense of self-efficacy "prompts the use of assertive, consistent conversational repair strategies, requests for clear speech with communication partners, and effective use of visual cues to enhance communication" (Gregory, 2011).

PSE comes from Bandura's social cognitive theory. According to this theory, self-efficacy can develop from four domains. The first source of information individuals learn self-efficacy from is mastery experience. In essence, this concept refers to an increase in confidence in skills after a success and a decrease in these beliefs after a failure. One could learn from their mistakes to ensure a future success. Bandura (1997) explains, "After people become convinced

that they have what it takes to succeed, they persevere in the face of adversity and quickly rebound from setbacks." Individuals with hearing loss may feel confident in their ability to use communication strategies and learn how to adapt to difficult communication situations from past experiences. Also, hearing aid users may have practiced changing the settings on their devices to bring about success in difficult listening environments.

Another source of self-efficacy is vicarious experience. This is the perception one has on their abilities, based on their observations of the experiences of others (Smith & West, 2006). As it relates to hearing loss, if the patient sees or learns from the success of another individual with hearing loss, they may feel empowered to work toward a similar outcome. People often compare themselves to others in similar situations. Bandura (1997) asserts that modeling is an effective tool for promoting a sense of personal self-efficacy.

Verbal Persuasion is the third source of self-efficacy. This is when others express faith in the capabilities of another (Bandura, 1997). Feedback can be an effective tool in shaping someone's confidence in their abilities. For instance, a patient may feel discouraged about their abilities to hear conversation in an environment with background noise, but has been working hard to improve the situation. If a family member witnessed improvements in the patient's speech understanding, encouraging feedback highlighting the improvements noted can be used to increase the patient's PSE. The individual may then feel more confident in their abilities, and continue working toward success in those difficult listening situations.

The final source of self-efficacy is known as physiological and affective states. According to Bandura (1997), people are more likely to expect success when they are not overwhelmed with anxiety and stress or in a poor mood. In a difficult listening situation, one may be more likely to find communication and listening success by maintaining a calm attitude,

trying again, or taking a break and addressing the problem when ready. If the individual becomes overwhelmed and frustrated, they may not feel particularly self-efficacious and not be in the mood to work toward the positive outcome.

Evaluating PSE in the field of audiology is a relatively new area being addressed. Since adults with acquired hearing loss require modifying their behavior to overcome the consequences of hearing loss, self-efficacy is an important area to be evaluated. Several questionnaires have been developed to examine various areas of self-efficacy in individuals with hearing loss. Current audiology-related self-efficacy questionnaires include the Measure of Audiologic Rehabilitation Self-Efficacy for Hearing Aids (MARS-HA; West & Smith, 2007), the Listening Self-Efficacy Questionnaire (LSEQ; Smith et al., 2011), the Self-Efficacy for Tinnitus Management Questionnaire (SETMQ; Smith & Fagelson, 2011) and the Self-Efficacy for Situational Communication Management Questionnaire (SESMQ; Jennings et al., 2013). As described by Jennings et al. (2013), the SESMQ was designed to examine the effectiveness of group audiologic rehabilitation on PSE in average listening settings for adults aged 50 years and older with acquired hearing loss, whether or not they use hearing aids. To the knowledge of the investigator, the SESMQ has not been used to look specifically at self-efficacy differences in hearing aid users and non-users. Therefore, the goal of this study is to determine if listening and communication self-efficacy differs in adults with acquired hearing loss who either use hearing aids or do not use hearing aids.

METHODS

Participants

Participants were recruited from the Washington University School of Medicine Division of Adult Audiology at the Central Institute for the Deaf. Inclusion criteria for this study encompassed adults with acquired sensorineural hearing loss aged 50 years or older who either currently use hearing aids or do not use hearing aids. Adults using Osseo-integrated devices or cochlear implants alone, or in addition to a traditional hearing aid, or adults using assistive listening devices alone were not eligible to participate in this study. Furthermore, all participants were fluent English speakers. Sixteen participants were recruited in total, eight hearing aid users (group A) and eight non-hearing aid users (group B). Group A consisted of three males and five females with a mean age of 78.75 years (SD= 7.03). Group B consisted of two males and six females with a mean age of 69.63 years (SD= 11.26). This study received ethical clearance from the Institutional Review Board at Washington University School of Medicine. All participants signed an informed consent document prior to partaking in this study.

Experimental Procedures

Questionnaires

Following a scheduled appointment with their audiologist, the participants filled out two questionnaires. Since the quality of life effects of hearing loss can be so subjective, a brief personality assessment of the study participants was warranted. To cover this aspect of the study, the participants completed the Big Five Inventory (BFI). This 44-item questionnaire represents five broad personality dimensions including extraversion, agreeableness, conscientiousness, neuroticism, and openness (John & Srivastava, 1999). A literature review by John, Naumann, &

Soto (2008) provides conceptual definitions for each of these personality domains. Extraversion is described as energetic, sociable, and assertive. Agreeableness is described as altruism, trust, and modesty. Traits such as thinking before acting, planning, and prioritizing tasks are related to conscientiousness. Neuroticism is defined as negative emotionality, anxiousness, nervousness, and sadness. Finally, characteristics of openness include originality and open-mindedness. To complete this questionnaire, participants were asked to rate statements on a 5-point scale ranging from 1 (disagree strongly) to 5 (agree strongly).

The primary outcome measure for the purpose of this study, the SESMQ, gives 20 specific situations where an individual may have trouble hearing and communicating. The questions include interactions with familiar and unfamiliar talkers in private and public environments (Jennings et al., 2013). Jennings et al. (2013) also describe the two sub-scales associated with the SESMQ: the hearing ability scale (SESMQH) and the confidence (PSE) scale (SESMQC). With each item on the questionnaire, the participants were asked to rate how well they can hear in that given situation from 0 (not well at all) to 10 (very well). They then rated how confident they are in managing themselves in that situation from 0 (not confident at all) to 10 (very confident). These responses correspond to the SESMQH and SESMQC, respectively. Jennings et al. (2013) report that the total score on each of the two scales ranges from 0-200, with higher scores suggesting greater hearing ability and greater confidence.

All participants were asked to fill out the BFI according to their beliefs about their personality. Participants belonging to the hearing aid group were asked to complete the SESMQ according to their aided hearing abilities and confidence. The non-hearing aid users were asked to complete the SESMQ based on their unaided listening abilities and confidence. All instructions were given to the participants and they were allowed to fill out the questionnaires in

private. The investigator was available nearby to answer questions regarding the study, should any arise. On average, the questionnaires took 20 to 30 minutes to complete. Current audiograms documenting hearing thresholds for the participants were also obtained from the audiology clinic. Participants were not given compensation for taking part in this research study.

Statistical Analyses

All statistical analyses were performed using IBM SPSS V. 22.0 software. The significance level for each of the tests was p= 0.05. P values lower than 0.05 were considered statistically significant. The focus of statistical analysis was on the following results:

- Pure-tone averages (PTA) for groups A and B
- Average word recognition scores (WRS) for groups A and B
- Subjective answers for the five personality domains in the BFI for groups A and B
- Subjective answers for the two subtests of the SESMQ for groups A and B

RESULTS

Participant Demographics

Table 1 displays each participant's gender, age, and whether or not he or she is a hearing aid user.

Audiometric Testing

Audiometric data for eight participants in group A and five in group B were available for analysis. After averaging current audiometric thresholds from the participants belonging to each group, it is suggested that hearing sensitivity is similar between groups A and B. One component of the audiogram that was analyzed utilizing an independent samples t-test was the PTA. PTA is described as the average of the hearing thresholds for 500, 1000, and 2000 Hz. Average PTA's for group A were 36.5 (SD = 13.04) and 37.13 (SD = 11.89) for the right and left ears, respectively. Average PTA's for group B were 48.4 (SD = 14.05) and 37.4 (SD = 7.13) for the right and left ears, respectively. No statistically significant differences for right and left ear PTA's between the two groups were found. Statistical results are as follows: t (1.565); p= .148 (right PTA); t (-0.46); p= .954 (left PTA). Figure 1 displays this information visually. Because of a hearing loss's effect on speech understanding, an important component to a comprehensive audiometric test is word recognition testing, which can be done in quiet or in noise (Beattie, Barr, & Roup, 1997). Therefore, WRS were analyzed in this study. The presentation level in dB HL was determined as the "most comfortable level," by the audiologist performing the test, which was most typically 40 to 50 dB SL regarding the speech reception threshold. The average WRS for group A was 80.75% (SD= 16.10) for the right ear and 79.5% (SD = 20.02) for the left ear. The average WRS for group B was 79.6 % (SD = 7.80) for the right ear and 86.4% (SD =

8.88) for the left ear. No statistically significant differences were found for the WRS in the right and left ears between groups. Statistical results are as follows: t (.172); p = .866 (right WRS); t (-.850); p= .415 (left WRS). Figure 2 displays this information graphically. Furthermore, pure-tone thresholds were averaged for the following frequencies on the clinical audiogram: 250, 500, 1000, 2000, 3000, 4000, 6000, and 8000 Hz. Focus was applied to the air conduction thresholds only since bone conduction thresholds matched within 10 dB of air conduction thresholds across the frequency range for each participant. The average audiometric data including PTA, WRS, and pure-tone thresholds are found in Table 2. Additionally, the average pure-tone thresholds for groups A and B are visually displayed in Figures 3 and 4, respectively.

Questionnaires

One participant did not complete the BFI due to a time constraint. Thus, seven BFI questionnaires from group A and eight from group B were used in the analysis. To score the BFI, responses pertaining to each of the five personality domains were averaged. The maximum score available for each category is 5. An independent samples t-test was conducted to compare the means of each personality domain on the BFI between groups A and B. No statistically significant differences were found for any of the personality domains between the hearing aid and non-hearing aid groups. Mean scores for extraversion were 3.66 (SD= 0. 514) for group A and 3.22 (SD= 1.20) for group B; t (.899); p = .385. Mean scores for agreeableness were 4.02 (SD= .87) and 4.05 (SD= .576) for groups A and B, respectively; t (-.063); p = .951. Mean scores for conscientiousness were 4.33 (SD = .348) for group A and 3.47 (SD= 1.19) for group B; t (1.95); p = .086. Neuroticism revealed mean scores of 2.19 (SD= .514) for group A and 3.06 (SD= 1.25) for group B; t (-1.791); p = .105. Finally, group A had a mean of 4.1 (SD= .69) and

group B had a mean of 3.45 (SD= 1.16) for openness; t (1.295); p = .218. This information is explained graphically in Figure 5. Specific data for each participant is available in Table 3.

SESMQ data was analyzed for all sixteen participants. An independent samples t-test was conducted to compare the mean scores for groups A and B regarding the subscales on the SESMQ. No statistically significant differences were found between the hearing aid and non-hearing aid groups. The mean scores for the SESMQH were 121.5 (SD= 29.54) for group A and 89.75 (SD= 39.44) for group B; t (1.823); p = .090. Furthermore, the mean scores for the SESMQC were 141.125 (SD= 38.96) for group A and 108.75 (SD= 41.85) for group B; t (1.601); p = .132. Equal variance was assumed for all measures in this statistical analysis. The results are shown visually in Figure 6. Individual SESMQ data for each participant is available in Table 4.

DISCUSSION

The hearing aid and non-hearing aid groups had similar hearing thresholds and speech understanding at a most comfortable level from the information obtained on the audiograms. The similarities are implied due to the lack of statistically significant differences after the independent samples t-tests regarding PTA and WRS. Moreover, individuals who are current hearing aid users scored themselves higher on extraversion, conscientiousness, and openness when compared to non-hearing aid users. Participants who are not currently using hearing aids scored themselves higher on agreeableness and neuroticism than the hearing aid users. However, the means did not differ significantly. Cox et al. (2005) believe in the importance of the personality domain of openness. These authors found that relatively lower scores on openness is a general characteristic of individuals choosing to use hearing aids. This current study found that, while not statistically significant, the hearing aid group had higher scores on openness than the non-hearing aid group. Cox et al. (2005) report that hearing-impaired individuals who are higher in openness may be more successful in using communication strategies and situational control to cope with their everyday hearing difficulties. The previous statement may apply to the non-hearing aid group in this study, as they feel they can use these strategies in place of the need of amplification. Since those who are current hearing aid users had higher scores of openness on average, they perhaps may feel more open and creative in various situations after having a restored ability to hear through amplification.

Furthermore, analysis of the average scores of hearing aid users and non-users on the self-efficacy measure revealed some trends. Based on merely comparing the mean scores, those adults with acquired hearing loss who do use hearing aids feel they have greater hearing ability

in difficult listening and communication environments on average than those who do not use hearing aids. The hearing aid group on average also has a higher level of self-efficacy and confidence in managing themselves in difficult listening situations than the non-hearing aid group. This is suggested because, as previously mentioned, higher scores (maximum of 200) reflect higher levels of self-efficacy. The results are somewhat contradictory to a study by Laplante-Levesque, Hickson, & Worrall (2011) in which adults with acquired hearing impairment with greater communication self-efficacy were less likely to choose hearing aids as a rehabilitative option when seeking help for the first time. Results cannot be directly compared, however, as this current study assessed adults who are established hearing aid users or non-hearing aid users. Unfortunately, these findings do not carry over to statistical significance when analyzed with the independent samples t-test. Thus, while differences in the average responses to the questions differed between the groups, any results were not statistically significant enough to reveal a true difference between hearing aid users and non-hearing aid users regarding personality and communication self-efficacy.

One reason for the lack of significant findings and a limitation in this study would be the small sample size. A larger number of participants would be necessary to obtain a large effect size and generalizability to a greater population of adult hearing aid users and non-hearing aid users. While the number of participants in each group was equal, a majority of the participants were female. Thus, future research in this area should include a larger number of participants that are equally distributed between males and females. An additional comparison could then be made to discern if PSE differs between males and females who either wear hearing aids or do not.

Additional research may also analyze individual participant data since this study primarily focused on the group means for each of the questionnaires. Personality and PSE is variable among individuals and it may be beneficial to look at individual differences more closely in the future. Furthermore, aspects such as general physical and mental health were not considered in this study. Future research may wish to contribute a test like the Mini Mental State Examination (M. Folstein, S. Folstein, & McHugh, 1975) to briefly screen cognitive function and its impact on the implementation of communication strategies or hearing aid use. Cognitive function could be a contributing factor to an individual's listening and communication PSE.

Some participants voluntarily provided the investigator of this study with verbal feedback regarding the questionnaires. One participant mentioned that not all of the questions could apply to him or her. For instance, one question pertains to using a telephone booth; the participant felt that the question could not be properly answered since telephone booths have been replaced by cellular phones. Perhaps a future study with altered questions could be used, such as asking about cellular phone use in lieu of telephone booths. Many participants enjoyed filling out the questionnaires. These individuals reported that this study made them really think about their hearing abilities and confidence in handling difficult listening and communication situations. Some also expressed interest in discovering if their scores would increase following future appointments with their audiologist.

As Jennings et al. (2013) mention, the questions provided on the SESMQ may be used to identify specific situations and environments in which patients feel they have low PSE. These situations may then become goals for intervention and aural rehabilitation. This is beneficial in the clinical setting as the intervention route and counseling appointments are better tailored to fit the needs of the individual patient. To put it in other words, this questionnaire may be used to

understand what the patient knows regarding their hearing abilities, communication strategies, and hearing devices, and how they apply that knowledge in everyday life. Without a sense of confidence in their abilities, patients will not succeed. Furthermore, the SESMQ could become a pre- and post-intervention tool to assess if the form of intervention chosen by the patient enhances their hearing and communication ability and self-efficacy and, most importantly, enhances their quality of life.

CONCLUSION

The primary objective of this study was to determine if hearing and communication self-efficacy differs between adults with acquired sensorineural hearing loss who are either hearing aid users or non-hearing aid users. Results suggest that hearing and communication self-efficacy does not differ between these two groups when assessed using a subjective questionnaire. However, the author believes this measure may be beneficial clinically to help patients develop a sense of self-efficacy in difficult listening and communication environments through counseling and aural rehabilitation, regardless if they use hearing aids or not. Further research is warranted in the area of hearing loss and self-efficacy.

REFERENCES

Arlinger, S. (2003). Negative consequences of uncorrected hearing loss- a review. *International Journal of Audiology,* 42(2), 17-20. Retrieved April 14, 2015 from researchgate.net.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York, NY: W.H. Freeman and Company.

Bandura, A. (1986). *Social Foundations of Thought and Action*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Beattie, R.C., Barr, T., Roup, C. (1997). Normal and hearing-impaired word recognition scores for monosyllabic words in quiet and noise. *British Journal of Audiology*, 31, 153-164. doi:10.3109/03005364000000018).

Boothroyd, A. (2010). Adapting to changed hearing: The potential role of formal training. *Journal of the American Academy of Audiology*, 21, 601-611. doi: 10.3766/jaaa.21.9.6.

Carson, A.J. (2005). "What brings you here today?" The role of self-assessment in help-seeking for age-related hearing loss. *Journal of Aging Studies,* 19, 185-200. doi:10.1016/j.jaging.2004.07.001.

Cox, R.M., Alexander, G.C., & Gray, G.A. (2005). Who wants a hearing aid? Personality profiles of hearing aid seekers. *Ear & Hearing,* 26(1), 12-26. doi: 0196/0202/05/2601-0012/0.

Dalton, D., Cruickshanks, K., Klein, B., Klein R., Wiley, T., & Nondahl, D. (2003). The impact of hearing loss on quality of life in older adults. *The Gerontologist,* 43(5), 661-668. doi: 10.1093/geront/43.5.661.

Folstein, M. F., Folstein S., & McHugh, P. R. (1975). "Mini-Mental State" A practical method for grading the cognitive sate of patients for the clinician. *Journal of Psychiatric Research,* 12, 189-198. doi:10/1016/0022-3956(75)90026-6.

Gregory, M. (2011). Self-efficacy and successful hearing rehabilitation. *Hearing Review*, 18(8), 28-32. Retrieved April16, 2015 from www.hearingreview.com.

Gopinath, B., Schneider, J., McMahon, C.M., Teber, E., Leeder, S.R., & Mitchell, P. (2012). Severity of age-related hearing loss is associated with impaired activities of daily living. *Age and Aging,* 41, 195-200. Retrieved Februrary 22, 2014 from http://ageingoxfordjournals.org.

Huang, Q., and Tang, J. (2010). Age-related hearing loss or presbycusis. *Eur Arch Otorhinolaryngo,* 267, 1179-1191. doi:10.1007/s00405-010-1270-7.

Jennings, M.B., Cheesman, M.F., & Laplante-Levesque, A. (2013). Psychometric properties of the Self-Efficacy for Situational Communication Management Questionnaire (SESMQ). *Ear & Hearing*, 4(35), 221-229. doi: 0196/0202/14/352-0221/0.

John, O.P., Naumann, L.P., & Soto, C.J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: history, measurement, and conceptual issues. In O.P. John, R.N. Robins, & L.A. Pervin (Eds.), *Handbook of Personality: Theory and Research* (114-158). New York, NY: Guliford Press.

John, O.P., Srivastava, S. (1999). The Big Five trait taxonomy: history, measurement, and theoretical perspectives. In L.A. Pervin & O.P John (Eds.), *Handbook of personality: Theory and Research* (102-138). New York, NY: Guliford Press.

Kramer, S., Kapteyn, T., Kuik, D., & Deeg, D. (2002). The association of hearing impairment and chronic diseases with psychosocial health status in older age. *Journal of Aging and Health*, 14(1), 122-137. Retrieved January 16, 2015 from jah.sagepub.com.

Laplante-Levesque, A., Hickson, L., &Worrall, L. (2010). Factors influencing rehabilitation decisions of adults with acquired hearing impairment. *International Journal of Audiology*, 49, 497-507. doi:10.3109/14992021003645902.

Laplante-Levesque, A., Hickson, L., & Worrall, L. (2011). Predictors of rehabilitation intervention decisions in adults with acquired hearing impairment. *Journal of Speech, Language, and Hearing Research*, 54, 1385-1399. Retrieved August 2, 2015 from http://jslhr.pub.asha.org.

Rodin, J. (1986). Aging and health; effects of the sense of control. *Science*, 233, 1271-1276. doi:10.1126/science.3749877.

Saunders, G.H., & Cienkowski, K.M. (1996). Refinement and psychometric evaluation of the attitudes toward loss of hearing questionnaire. *Ear & Hearing*. 17(6), 505-519. Retrieved March 24, 2015 from ovidsp.tx.ovid.com.

Schuknecht, H.F. (1964). Further observations on the pathology of presbycusis. *Archives of Otolaryngology,* 80(4), 369-382. Retrieved March 24, 2015 from http://archotol.jamanetwork.com/.

Smith, S.L., & Fagelson, M. (2011). Development of the self-efficacy for tinnitus management questionnaire. *Journal of the American Academy of Audiology*, 22(7), 424-440. doi:10.3766/jaaa.22.7.4.

Smith, S.L., Pichora-Fuller, M.K., Watts, K.L., & More, C.L. (2011). Development of the listening self-efficacy questionnaire (LSEQ). *International Journal of Audiology*, 50, 417-425. Retrieved April 4, 2014 from informahealthcare.com.

Smith, S.L., & West, R.L. (2006). The application of self-efficacy principles to audiologic rehabilitation: a tutorial. *American Journal of Audiology*, 15, 46-56. doi:10.1044/1059-0889(2006/006).

West, R.L., & Smith, S.L. (2007) Development of a hearing aid-self-efficacy questionnaire. *International Journal of Audiology*, 46(12), 759-771. doi:10/1080/14992020701545898.

Participant	Age	Gender
A1	72	Male
A2	85	Female
A3	73	Female
A4	89	Female
A5	85	Male
A6	73	Female
A7	72	Male
A8	81	Female
B1	72	Female
B2	64	Female
B3	68	Female
B4	88	Female
B5	76	Male
B6	78	Female
B7	57	Female
B8	56	Male

Table 1

Participant demographics

Group	PTA	WRS	250 Hz	500 Hz	1000 Hz	2000 Hz	3000 Hz	4000 Hz	6000 Hz	8000 Hz
A Right Ear	36.5 (13.04)	80.75% (16.10)	28.75 (9.91)	31.25 (10.27)	36.875 (12.80)	41.875 (21.03)	50 dB (17.32)	(56.875) (10.67)	68.125 (8.84)	71.875 (23.44)
A Left Ear	37.13 (11.89)	79.5 % (20.02)	22.5 (14.40)	28.75 (13.02)	38.125 (11.32)	44.375 (15.91)	53.125 (7.99)	60 (9.26)	71.25 (11.57)	78.75 (15.30)
B Right Ear	48.4 (14.05)	79.6 % (7.79)	32 (19.56)	43 (18.57)	51 (14.75)	51 (12.94)	55 (15.41)	65 (17.68)	73 (16.81)	74 (13.87)
B Left Ear	37.4 (7.13)	86.4% (8.88)	21 (10.84)	29 (13.42)	38 (10.37)	45 (12.75)	47 (14.83)	56 (8.94)	64 (6.52)	70 (9.35)

Table 2

Mean PTA (dB HL), WRS, and pure-tone thresholds (dB HL) for the right and left ears for both participant groups. Standard deviations for each value are listed in parentheses.

Participant	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
A1	4.625	3.0	4.55	2.0	4.8
A2	3.125	4.88	4.5	1.375	3.3
A3	3.875	4.66	4.44	1.875	3.8
A4	3.5	3.3	4.6	2.5	3.3
A5	3.125	4.55	3.88	3.0	4.8
A6	3.75	3.0	3.77	2.37	3.9
A7	3.62	4.77	4.55	2.25	4.8
Mean Group A	3.66 (0.514)	4.02 (0.874)	4.327 (.348)	2.196 (0.514)	4.1 (0.692)
B1	3.625	4.33	2.44	3.125	3.5
B2	4.625	4.44	4.55	1.625	4.2
B3	4.125	3.88	2.55	4.375	2.4
B4	1.12	4.3	1.66	4.25	1.2
B5	3.25	4.44	4.88	3.125	4.0
B6	4.0	4.55	4.55	1.375	4.9
B7	3.25	3.55	3.11	4.5	3.5
B8	1.75	2.89	4.0	2.125	3.9
Mean Group B	3.218 (1.20)	4.047 (0.5756)	3.467 (1.19)	3.0625 (1.25)	3.45 (1.155)

Table 3

Individual participant data for the five personality domains of the BFI as well as mean scores for each group. Standard deviations are listed in parentheses.

Participant	SESMQH	SESMQC
A1	149	188
A2	110	168
A3	141	137
A4	143	145
A5	77	83
A6	81	83
A7	122	161
A8	149	164
Mean Group A	121.5 (29.53)	141.125 (38.96)
B1	56	109
2B	125	143
B3	61	59
B4	54	54
B5	76	131
B6	71	72
B7	163	161
B8	112	141
Mean Group B	89.75 (39.96)	108.75 (41.85)

Table 4

Individual participant data for the two components of the SESMQ as well as group means.

Standard deviations are listed in parentheses.

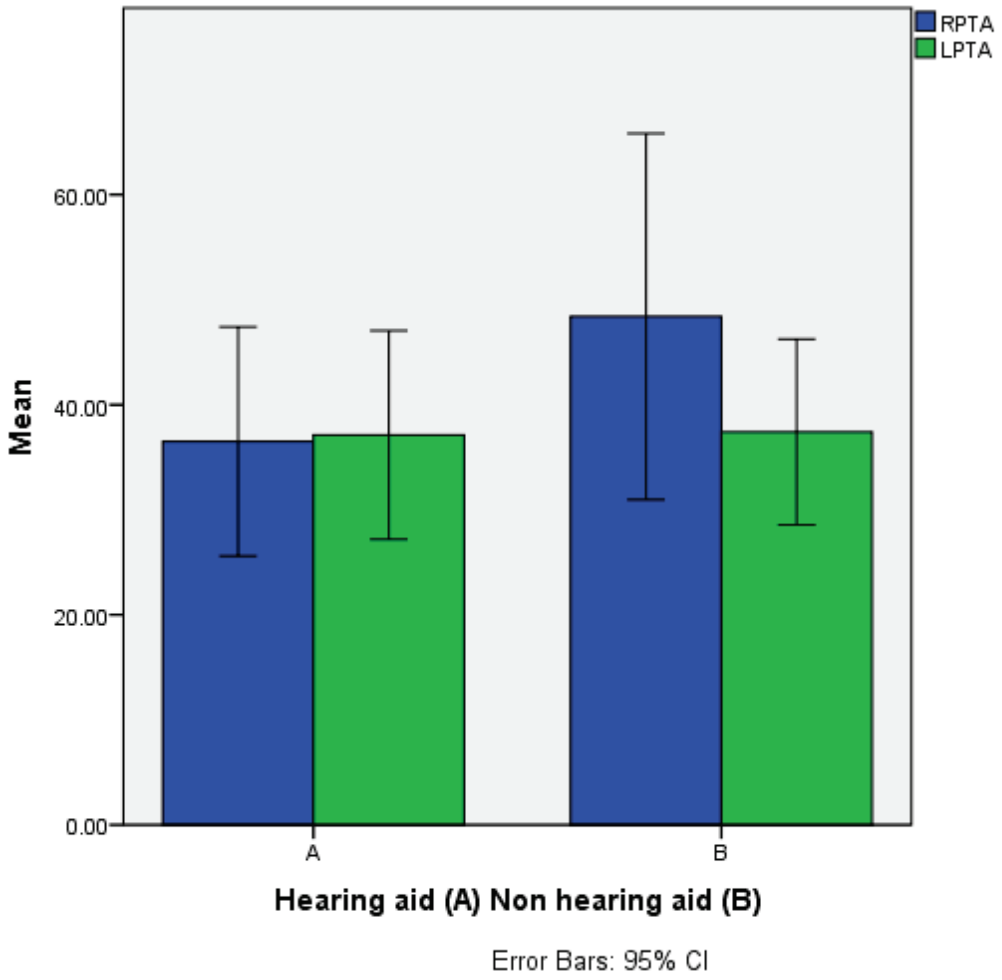

Figure 1

Mean right and left ear PTA's for groups A and B

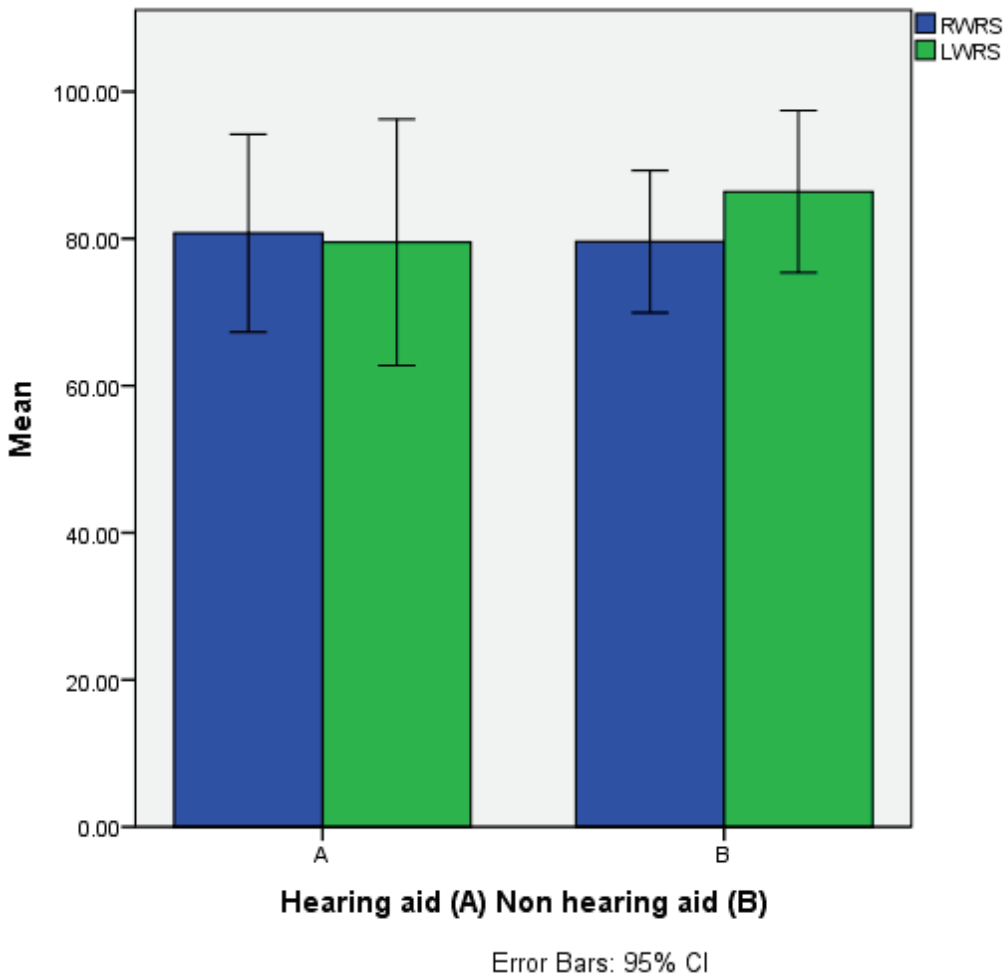

Figure 2

Mean right and left ear WRS for groups A and B

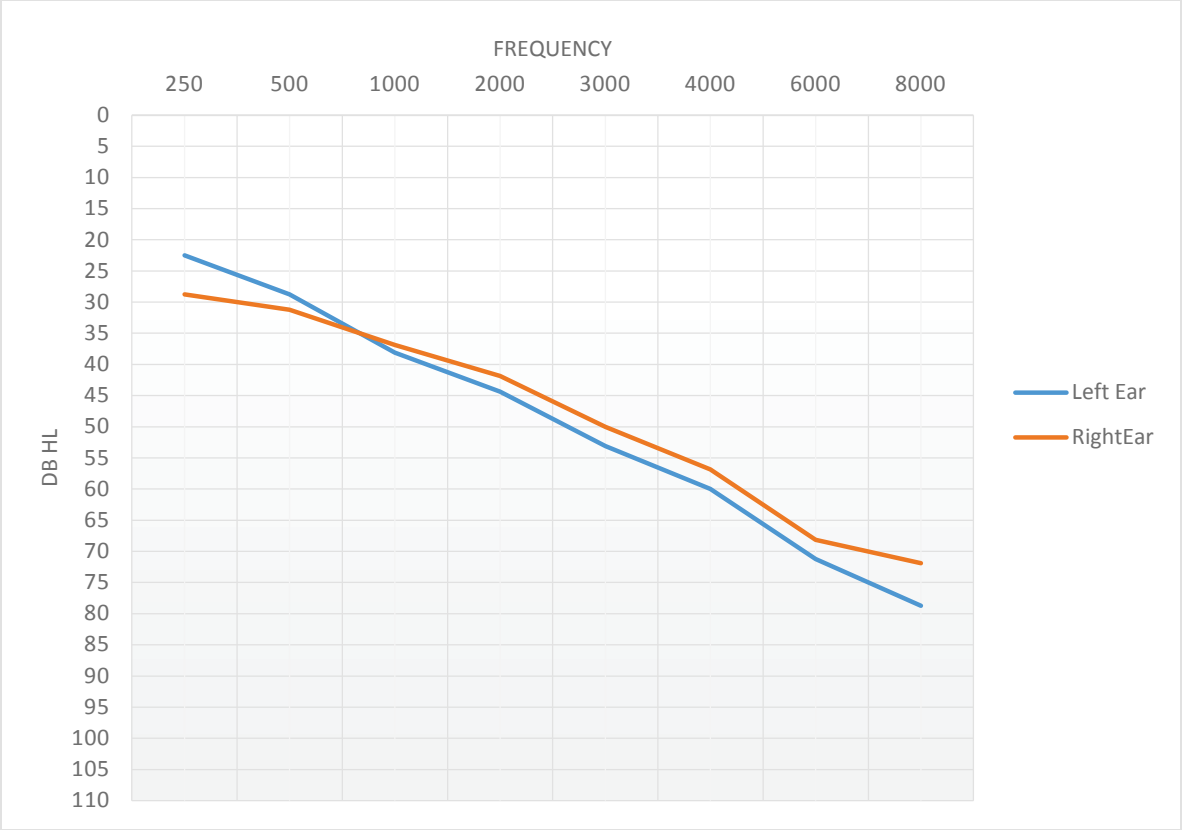

Figure 3

Average air conduction pure-tone thresholds for group A

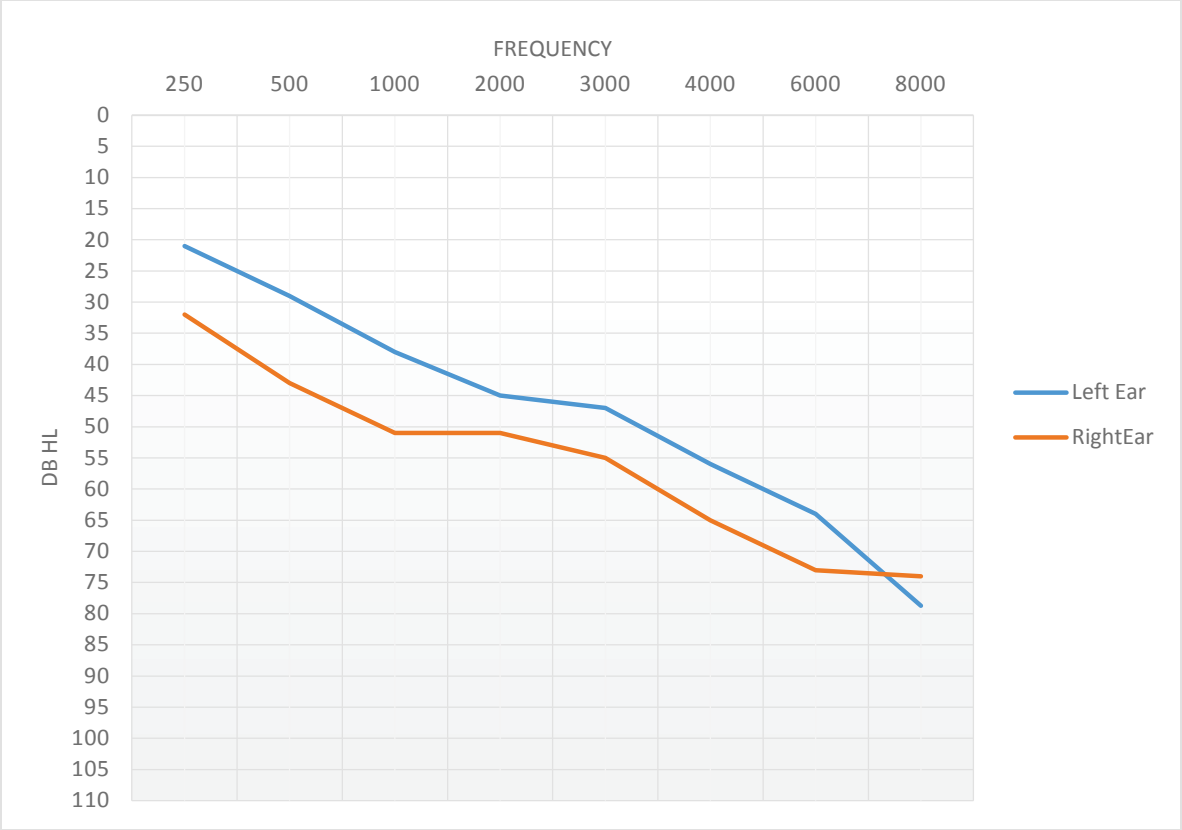

Figure 4

Average air conduction pure-tone thresholds for group B

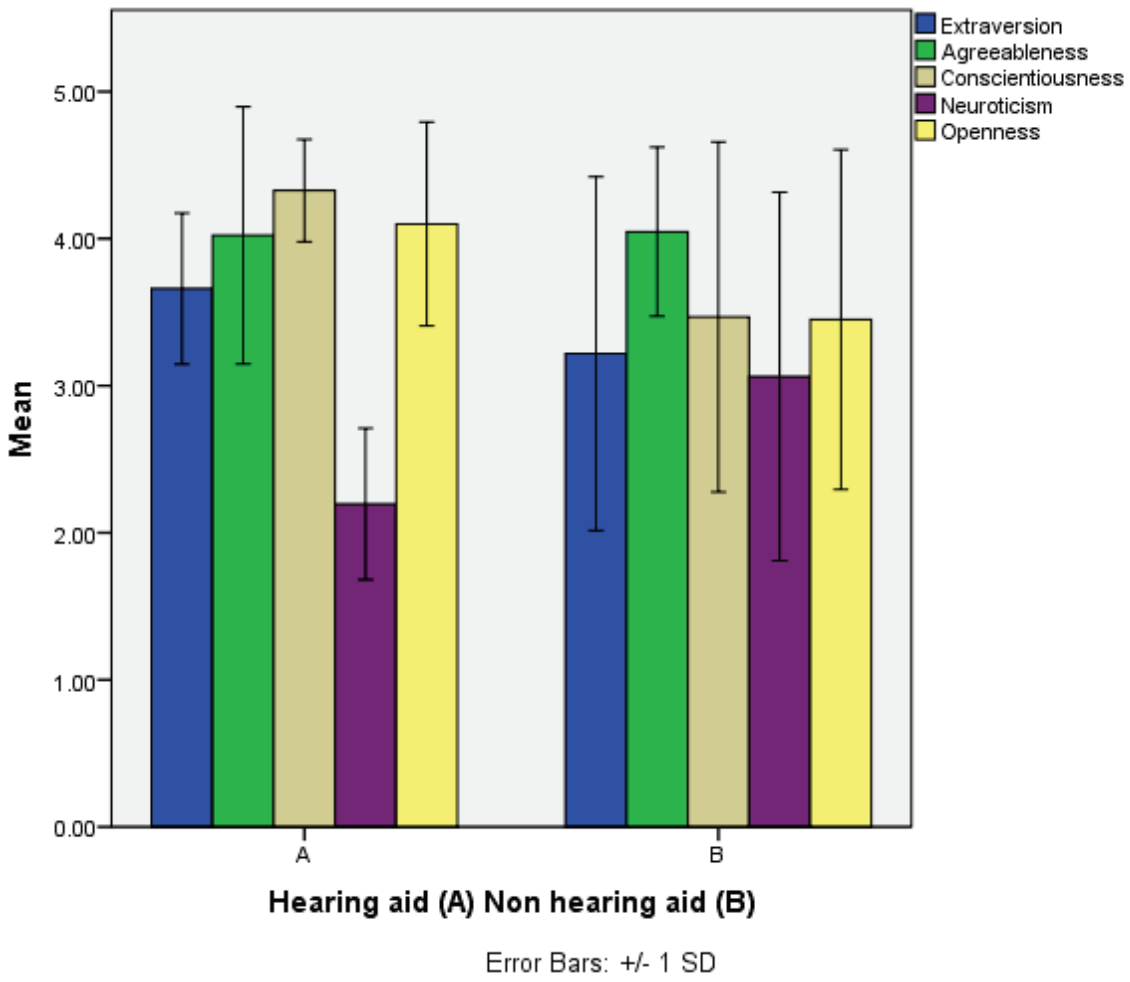

Figure 5

Mean scores for the five personality domains of the BFI for groups A and B

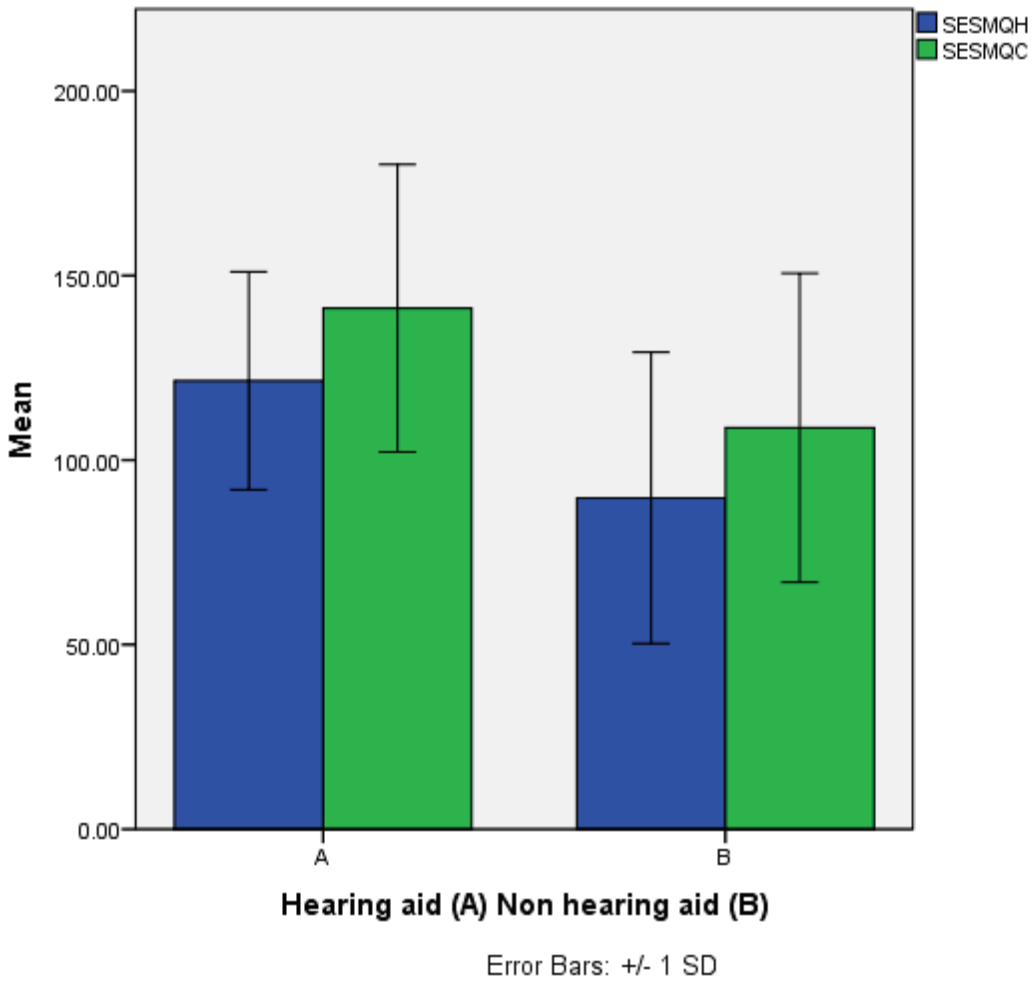

Figure 6

Mean scores for the two subtests of the SESMQ for groups A and B