The effects of amplification on listening self-efficacy in adults with sensorineural hearing loss

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INTRODUCTION

Self-efficacy is the confidence in one’s ability to successfully undertake behaviors to achieve specific goals1,2. This goal of this study was to examine the effects of amplification on listening self-efficacy, or the belief listeners have in their ability to plan and perform actions necessary to understand speech in different listening situations. We hypothesize that improving audibility through hearing aids will improve listening self-efficacy. We further hypothesize improvement will be greatest in one-on-one conversations in quiet and focused attention on a single speech source, with less improvement when listening in complex auditory scenes. Possible sources of variability in results such as patient- and device-centered factors explored. Should patient- or device-centered factors be associated with improved listening self-efficacy, better rehabilitation models and techniques could be developed.

METHODS

Listening Self-Efficacy Questionnaire (LSEQ):  
18 items, 3 subscales and 1 global score: dialogue in quiet (DQ), directed listening (DL), complex listening (CL), global self-efficacy (SE) averaged across all items.  
• Higher scores indicate greater listening self-efficacy.

Hearing Aid Status:

Verifit test-box measures and real-ear measurements were taken to quantify hearing aid performance.  
• Audibility (Speech Intelligibility Index; SII). Rear ear response to a 65 dB speech input.  
• Noise reduction (dB of gain reduction). Test box with “Air Conditioning” stimulus at 70 dB.  
• Directionality (average dB difference between the front and back microphones across frequency). Stimulus at 70 dB, signal-to-noise ratio of 0 dB.  
• Hearing aid experience and use information from items 16, 17, and 18 of the Satisfaction with Directionality (average dB difference between the front and back microphones across Noise reduction (dB of gain reduction). Test box with “Air Conditioning” stimulus at 70 dB).  
• Greater hearing aid use (either lifetime or daily; Fig 3 & 4) was associated with greater improvement in aided listening self-efficacy (Fig 6).

RESULTS

A linear mixed model was fitted to the data with hearing aid status (unaided, aided) and subscale (DQ, DL, CL, SE) as within-subject factors. Between subject factors included patient-centered (age, gender, PTA, personality) and device-centered (lifetime/current/daily hearing aid use, SII, directionality, noise reduction) variables. Interactions were included first, but removed from the model if non-significant. Only complete datasets were included in the analysis (n=165).

CONCLUSIONS

• Listening self-efficacy was higher than unaided listening by approximately 28% (Figure 1).  
• The improvement in aided listening self-efficacy did not depend on a particular listening environment (Figure 1).  
• Greater degrees of hearing loss were associated with poorer listening self-efficacy, but were also associated with the most improvement between unaided and aided conditions (Figure 2).  
• Greater hearing aid use (either lifetime or daily; Fig 3 & 4) was associated with greater improvements in listening self-efficacy. The causal characteristics of this relationship are unknown and require further study.  
• Higher levels in the conscientiousness domain of personality result in larger increases in listening self-efficacy with hearing aids (Fig 5). Higher levels of Neuroticism were associated with poorer listening self-efficacy (Fig 6).