How do patient characteristics contribute to hearing aid self-efficacy?

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Presented at the Annual Meeting of the American Auditory Society, Scottsdale, AZ, March, 2019

Introduction

Research has demonstrated that hearing aid self-efficacy (HASE) impacts older hearing-impaired adults' decisions to consult about hearing loss, obtain hearing aids, continue using hearing aids regularly, and to be a successful and satisfied hearing aid user. Other variables that are shown to have similar effects on hearing aid outcomes are cognition, personality, and hearing aid experience.

Although all of these variables have been shown to be associated with various hearing aid outcomes, it is not clear how they are related to each other. This correlation analysis attempted to clarify the relationships between cognition, personality, hearing aid experience, and HASE for adults with hearing impairment. In addition, we attempted to identify whether any of these variables were related to participants' abilities to use and manipulate their hearing aids.

Method

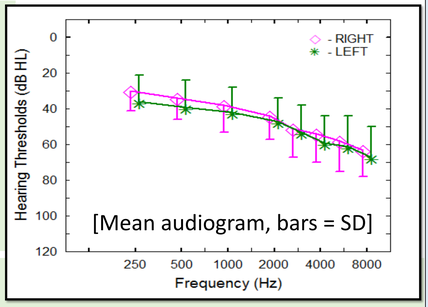
Assessments:

- HASE: Measure of Audiologic Rehabilitation for Hearing Aids (MARS-HA); (West & Smith, 2007)
  - The MARS-HA is a self-report questionnaire that assesses a person's ability to care for and use their hearing aids in various listening situations.
  - It has four subscales:
    - Basic handling: Basic operation of a hearing aid (e.g., battery removal)
    - Advanced handling: Trouble shooting hearing aids (e.g., managing feedback)
    - Adjustment: Acclimatization to the new device (e.g., getting used to the sound of one's own voice)
    - Aided listening: Listening in different situations (e.g., understanding on the phone)
- Cognition (working memory): The Reading Span Test (RST); (Daneman & Carpenter, 1980)
  - The RST assesses storage and processing functions of working memory.
- Hearing aid skills: Practical Hearing Aid Skills Test-Revised (PHAST-R); (Doherty & Desjardins, 2012)
  - The PHAST-R is a skill test that assesses the ability of a person to use and care for his/her hearing aids.
- Personality: International Mini Markers (IMM); (Saucier, 1994)
  - The IMM is based on the "Big-Five" personality traits: Neuroticism, Extraversion, Openness, Conscientiousness, and Agreeableness.
- Hearing Aid experience: Questions asked to the participants - 'Do you wear hearing aids? If yes, for how long?'

Analyses

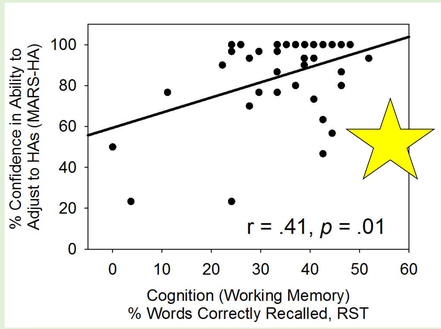
- Visual inspection of scatter plots and bivariate correlation analyses were performed to clarify the relationships among the variables.

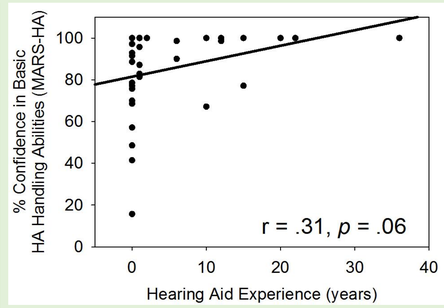
- **Participants**: 38 adults (24 females) age 46-82 (M=71 yrs), with at least a mild acquired hearing loss in one ear participated in this study. 18 were experienced hearing aid users.
- **Procedure**:
  - All assessments were completed in a single appointment. Participants were reimbursed for their time and effort.
  - Only the experienced hearing aid users received the PHAST-R.

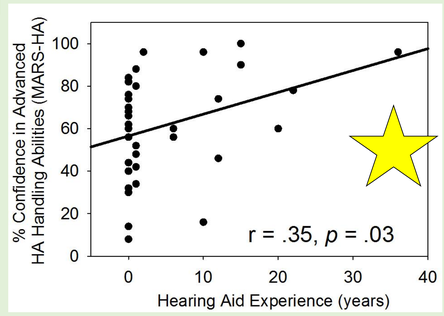


Q.1 What are the relationships between HASE and working memory, personality, & hearing aid experience?

- The table below demonstrates correlations between HASE and the other tested variables.
- The figures to the right display the plots for those correlations that were significant or approached significance.





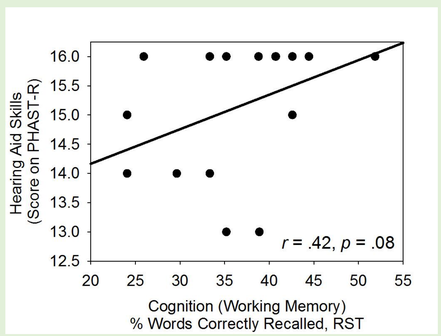


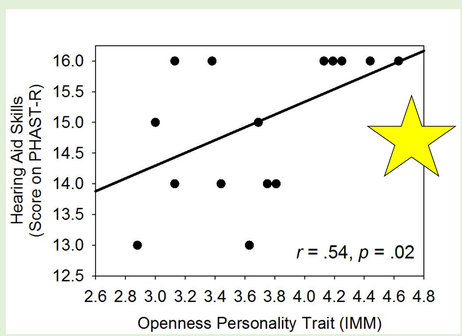
Hearing Aid Self-Efficacy Subscale (MARS-HA)	Hearing Aid Experience (years)	Working Memory (RST % score)	Personality (IMM)				
			Extrovert	Openness	Neurotic	Conscient	Agreeable
Basic Handling	*r* = .313 *p* = .055	*r* = .198 *p* = .234	*r* = .186 *p* = .265	*r* = -.085 *p* = .611	*r* = .226 *p* = .173	*r* = .078 *p* = .640	*r* = .060 *p* = .721
Advanced Handling	*r* = .354 *p* = .029	*r* = .030 *p* = .856	*r* = .054 *p* = .748	*r* = .118 *p* = .479	*r* = -.192 *p* = .248	*r* = .121 *p* = .470	*r* = .036 *p* = .829
Adjustment	*r* = .106 *p* = .526	*r* = .414 *p* = .010	*r* = .114 *p* = .497	*r* = -.072 *p* = .668	*r* = .030 *p* = .857	*r* = .228 *p* = .169	*r* = .125 *p* = .455
Aided Listening	*r* = -.001 *p* = .997	*r* = .142 *p* = .394	*r* = .151 *p* = .367	*r* = -.118 *p* = .481	*r* = .047 *p* = .781	*r* = -.085 *p* = .614	*r* = -.046 *p* = .786

Q.2 What are the relationships between experienced hearing aid users' skills and patient characteristics?

- The table to the right demonstrates the correlations between experienced hearing aid users' practical hearing aid skills and measured patient traits.
- The figures to the right display the plots for those correlations that were significant or approached significance.

	Hearing Aid Experience (Years)	Working Memory (RST % Score)	HASE				Personality				
			Basic Handling	Advanced Handling	Adjustment	Aided Listening	Extrovert	Openness	Neurotic	Conscient	Agreeableness
r	-.283	.420	-.026	.124	.042	-.296	-.094	.538	-.073	.026	-.019
p	.255	.083	.917	.623	.868	.233	.711	.021	.774	.918	.941





Results and Discussion

Q.1a What was the relationship between HASE and working memory (WM)?

- Self-efficacy for adjusting to hearing aids was greater for participants with better WM scores (r = .414, p = .01).
- Individuals with poorer WM likely require greater cognitive resources to perform daily tasks successfully, including those related to HA use. As such, these individuals might have experienced less success in adjusting to prior novel experiences, negatively influencing their SE in this area.

Q.1b What was the relationship between HASE & personality?

- No systematic relationships were observed for any personality traits and HASE subscales.

Q.1c What was the relationship between HASE & hearing aid experience?

- Self-efficacy for handling hearing aids was shown to improve with years of experience using hearing aids (basic handling: r = .31, p = .06; advanced handling: r = .354, p = .029).
- With regular use, patients develop mastery over the tasks associated with daily hearing aid use, resulting in more confidence in their abilities over time.
- Although this trend was observed for basic handling tasks (e.g., changing a battery) those with less experience had notably less confidence in their abilities to perform more advanced handling tasks (e.g., troubleshooting a hearing aid).

Q.2 What were the relationships between experienced hearing aid users' skills and patient characteristics?

- Practical hearing aid skills were found to be better for those with high scores for the Openness personality trait (r = .538, p = .021).
- It has been postulated that those with high scores for Openness are likely to have more success in learning skills and strategies related to amplification (Cox, Alexander, & Gray, 2005).
- It is also of interest to note that hearing aid skills tended to be better for participants with better WM (r = .420, p = .083). This trend did not reach statistical significance due to the smaller sample size.
- Consistent with previous research, HASE was not associated with actual hearing aid skills (Dullard & Cienkowski, 2014).

Conclusions & Future Directions

- Patient characteristics have been shown to impact outcomes with hearing aids. These results demonstrate that cognition (WM) and hearing aid experience overlap with different aspects of HASE.
- Although cognition and experience are difficult to modify directly, HASE specifically can be targeted with audiologic intervention. Researchers have speculated that HASE-based interventions might result in better hearing aid outcomes.
- Future research should evaluate the effectiveness of self-efficacy based interventions and identify whether patient characteristics play a role in mediating outcomes.

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Acknowledgements

The Institute of Intelligent Systems (IIS) at the University of Memphis: Travel Award for the conference
Memphis Hearing Aid: For assistance with participant recruitment

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