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Presented at the Annual Meeting of the American Auditory Society, March, 2021

Introduction

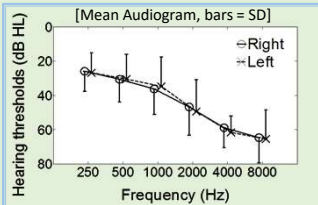
Hearing loss can have detrimental effects on communicative behavior, social and emotional well-being, and hearing-related quality of life (HRQoL). Research has demonstrated that use of hearing aids (HAs) can significantly improve patients' HRQoL; however, inter-individual outcomes vary substantially, even when hearing difficulties are similar. There is some suggestion that patient traits might mediate perceived benefits from amplification, yet evidence regarding the effects of these variables on perceived HRQoL is unclear. This research sought to determine the degree that patient traits such as age, hearing ability, working memory, and personality might predict perceived post-amplification change in HRQoL.

Method

Design: Single-blinded, repeated, crossover trial.

Participants:

45 adults (15 females) aged 61-81 years (M = 70.3), with bilateral mild to moderate sensorineural hearing loss.



Hearing aids:

- Participants were fitted with 4 pairs of HAs: Two devices of different technology levels from 2 different Brands.
- Self-reported HRQoL was assessed after 1 month of wearing each pair of HAs in daily life.

Predictors

- Age**
- Hearing ability:** Better ear pure tone average (BPTA)
- Working Memory:** The Reading Span Test (RST; Daneman & Carpenter, 1980)
 - The RST assesses storage and processing functions of working memory.
- Personality:** International Mini Markers (IMM; Thompson, 2008)
 - The IMM is based on the "Big-Five" personality traits: Neuroticism, Extraversion, Openness, Conscientiousness, and Agreeableness.

Outcome variable

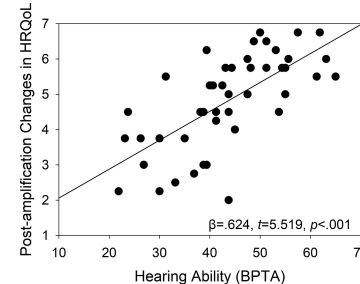
- Hearing-related Quality of Life (HRQoL):** A single-question self-reported measure (Cox et al. 2016) was used to assess HRQoL after 1 month of wearing each pair of HAs in daily life.
- For analysis, we calculated the aggregate change in HRQoL across all the HAs

Step 1. Do pre-amplification measures of patient traits predict post-amplification changes in HRQoL?

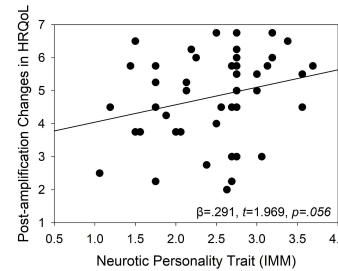
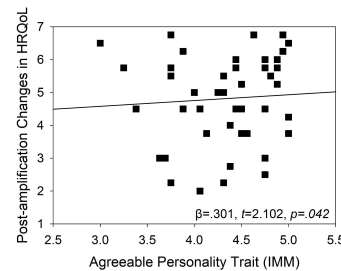
Backward stepwise regression analyses with all predictor variables resulted in a final prediction model that comprised hearing ability (BPTA) loss and two of the personality traits: Agreeableness and Neuroticism (Table below).

	BPTA (Hearing ability)	Personality (Agreeableness)	Personality (Neuroticism)
Coefficient	.624	.301	.291
t	5.519	2.102	1.969
p	<.001	.042	.056

Of these, hearing ability was the strongest predictor of HRQoL benefit. Yet two measures of personality also contributed to the model.



The scatter plots display the relationships between each predictor and changes in HRQoL.



Step 2. Do personality traits mediate the prediction of post-amplification changes in HRQoL?

After controlling for hearing ability, hierarchical regression analyses were performed first by adding Agreeableness and then Neuroticism. Adding agreeableness alone did not have any notable impact. However, when the agreeableness trait was added in the model in combination with the neuroticism trait, the model explained almost 6% additional variance in HRQoL benefit.

These effects were small but informative and approached statistical significance (R squared change = .060, p = .056). See the table below.

	R Square Change	F Change	Sig. F Change (p)
Model 1 (Hearing ability)	.457	36.257	<.001
Model 2 (Model 1+Agreeableness)	.014	1.096	<.301
Model 3 (Model 2+Neuroticism)	.046	3.878	<.056

Results and Discussion

Step 1. Do pre-amplification measures of patient traits predict post-amplification HRQoL? **YES**

- Out of 8 tested predictor variables, hearing ability and two personality traits were found to be significant predictors.
- Previous literature has demonstrated that hearing ability is inversely related to perceived benefit with HAs and our research supported these findings as hearing loss contributed the most to our prediction model. Individuals with greater degree of hearing loss tended to have a more positive change in HRQoL after one month of HA use.
- Agreeableness and Neuroticism were the two other predictors in the final model. Cox et al. (2007) also reported that these two personality traits were associated with self-reported HA outcomes. Statistically, individuals with high Neuroticism and high Agreeableness tended to have a more positive changes in HRQoL; however, these relationships were small.
- Neither age nor working memory were associated with post-amplification changes in HRQoL. This was somewhat surprising given that research has shown that working memory is a significant predictor for aspects of HA success such as HA benefit (e.g., Lopez-Poveda et al. 2017). However, this factor did not appear to impact HA users' perceived HRQoL benefit.

Step 2. Do personality traits mediate the prediction of post-amplification changes in HRQoL? **MAYBE**

- Unsurprisingly, the majority of variance in perceived HRQoL benefit was explained by unaided hearing ability. However, adding two personality traits (Agreeableness and Neuroticism) to the model explained an additional 6% of variance in that outcome, a change that approached statistical significance.

Conclusion

Evidence from health-related research has demonstrated that personality traits have an impact on health-related Quality of Life (e.g., van Straten et al. 2007). Our study lends some support to the hypothesis that personality factors might mediate post-amplification perceived changes in HRQoL in subtle ways. Future research should further tease apart the relative contributions of these personality traits to HRQoL and other aspects of HA success.

References

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