

The benefits of low processing delay for first-time hearing aid users

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→ Motivation

Processing delay in modern hearing aids typically ranges from 4–10 ms and can negatively impact perceived sound quality due to comb filtering. Here we investigate whether reducing processing delay from 8 ms to 0.5 ms improves satisfaction and preference in first-time hearing aid users during everyday use.

→ Methods

Participants:

52 first-time HA users (age 67.5 years, SD: 7.2)

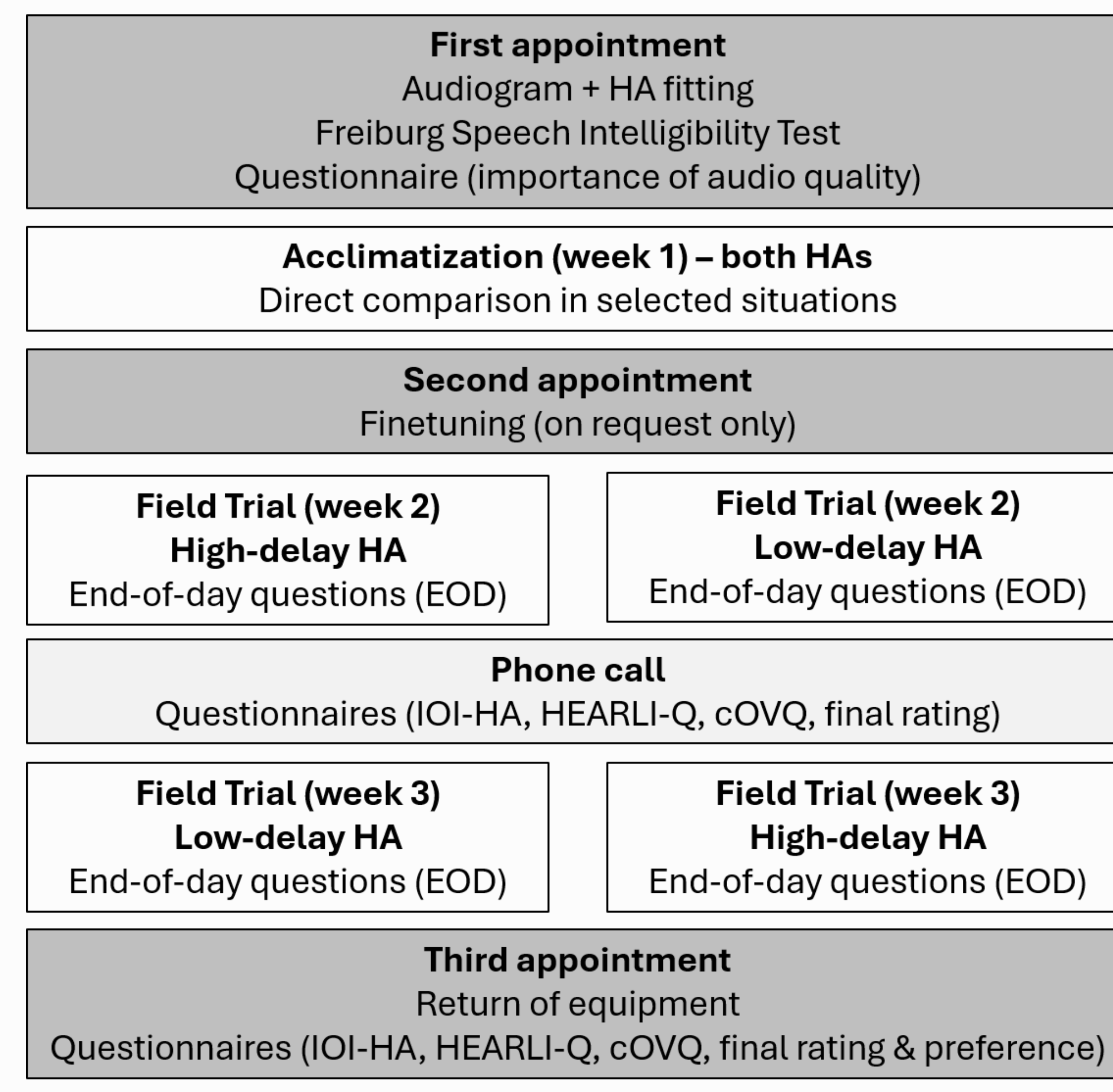
Hearing aids: Widex Allure

- Low delay (LD): 0.5 ms delay (Pure Sound Program),
- High delay (HD): 8 ms delay (Pure Sound Program with delay altered by adding extra samples in signal chain)

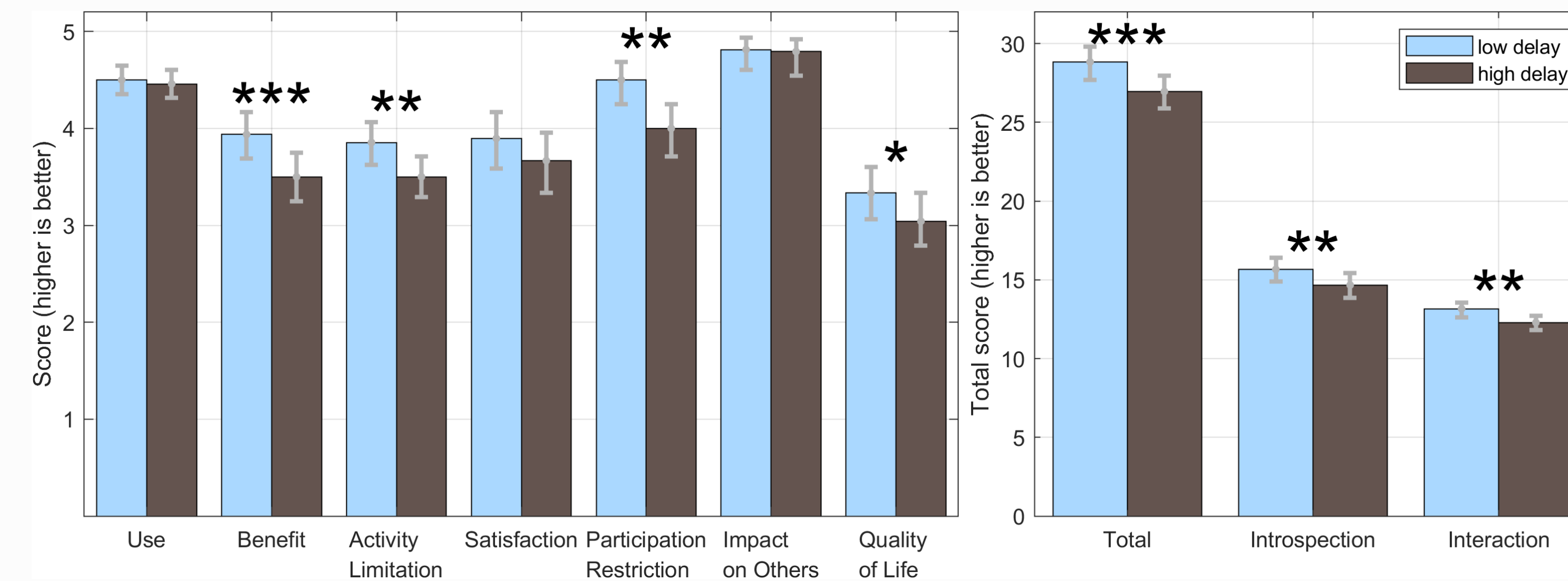
Experimental procedure:

Week 1: direct comparison of both HAs in selected situation

Week 2+3: randomized cross-over design



→ Results: IOI-HA

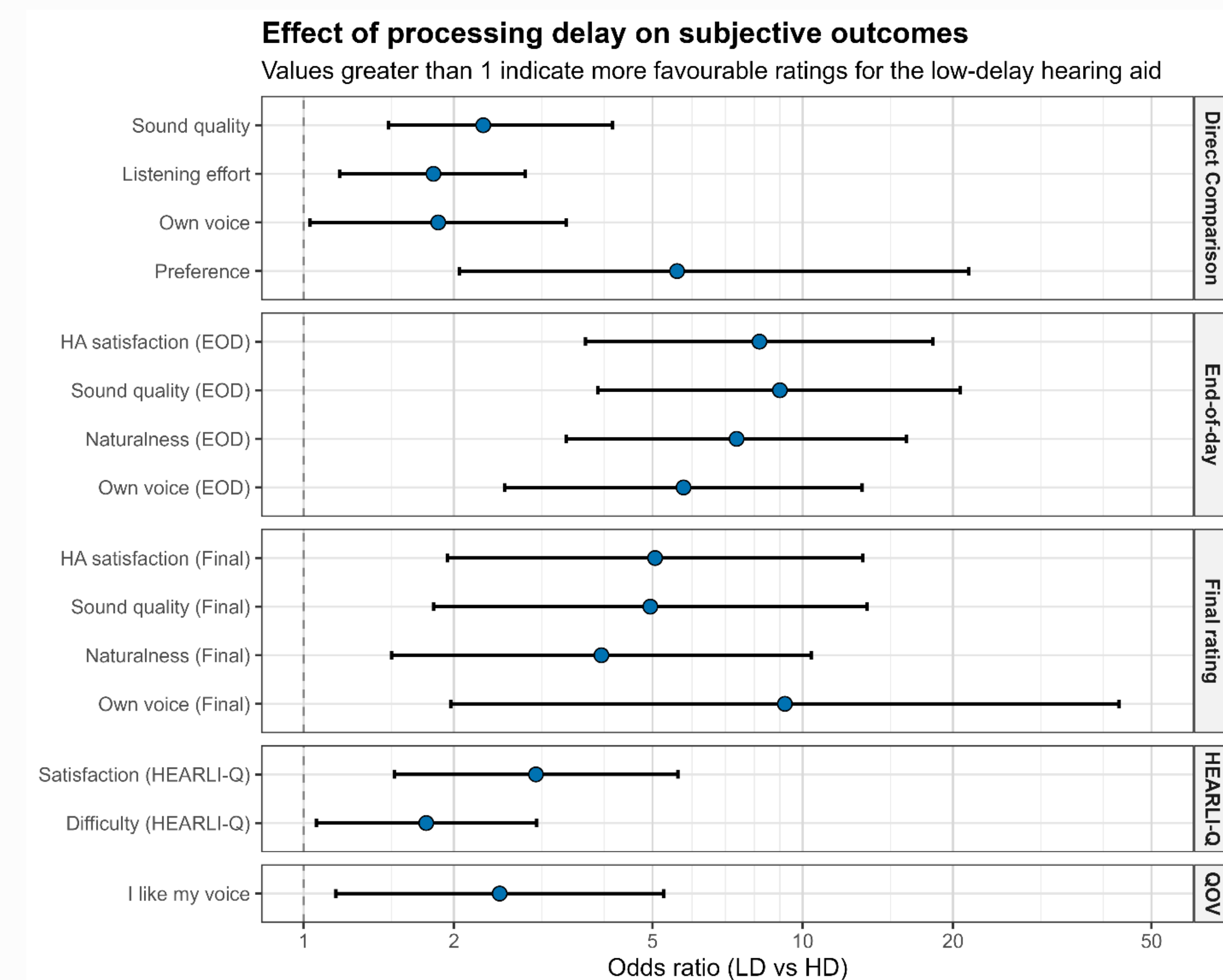


Compared to HD devices, LD devices yielded significantly higher

- Total scores (Hedges' $g = 0.50 \pm 0.27$)
- Introspection factor (Hedges' $g = 0.36 \pm 0.23$)
- Interaction factor (Hedges' $g = 0.54 \pm 0.33$)

Intermediate-sized effects for Benefit, Activity Limitation, and Participation Restriction. Small effect for Quality of Life.

→ Results: Direct comparison, EOD & Final Rating



Preference was analyzed using a generalized linear mixed model with a binomial link. All other odds ratios were computed using cumulative link mixed models with participant as a random effect. For end-of-day, direct comparison, and HEARLI-Q, a participant-specific random slope for delay improved the model fit.

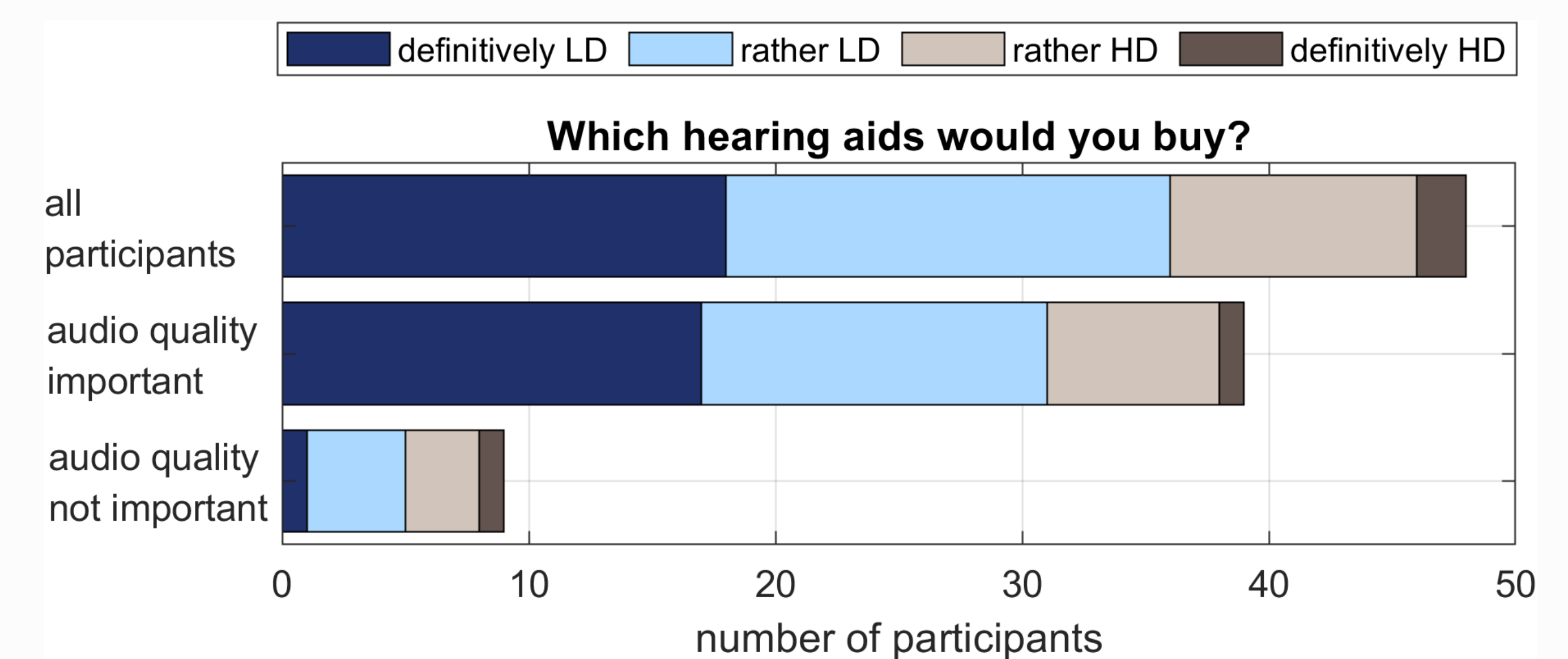
→ LD consistently favoured in a multitude of measures

→ Advantage of the LD devices was evident not only in situation-specific assessments such as the direct-comparison task and HEARLI-Q, but also in retrospective evaluations summarizing experiences across an entire day or week.

→ Results: Final Preference

Overall 75% of participants preferred LD

79% of participants for whom audio quality is important, and 56% of participants who do not value audio quality preferred LD.



→ Conclusion

Overall, the findings show that first-time users prefer a processing delay of 0.5 ms over a typical 8 ms delay.

This indicates that reducing processing delay improves early user experience and, in turn, can support first-time hearing-aid adoption.

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