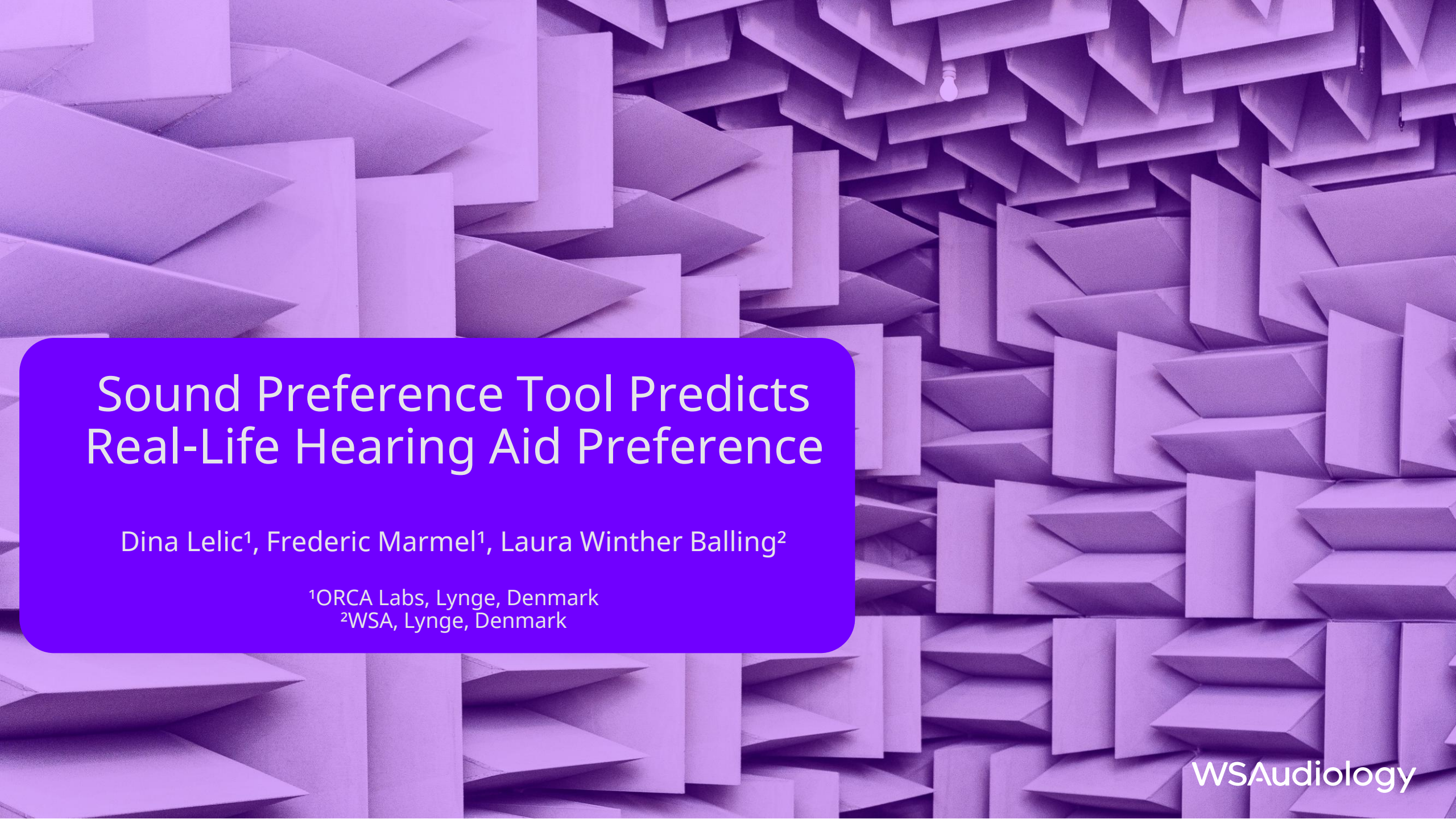


The background of the slide is a dense, repeating pattern of purple, pyramid-shaped acoustic foam panels. These panels are arranged in a staggered, three-dimensional grid, creating a textured, geometric surface. The lighting is even, highlighting the sharp edges and facets of the foam.

Sound Preference Tool Predicts Real-Life Hearing Aid Preference

Dina Lelic¹, Frederic Marmel¹, Laura Winther Balling²

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²WSA, Lynge, Denmark

Why Sound Preference?



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- Clinical audiology aims to enable seamless participation in everyday life - > effective communication, enjoyment of music, awareness of surrounding environments, etc.

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- Clinical experience shows that no single hearing aid solution provides an optimal experience for all users
- Different hearing aids have different sound designs -> should we fit hearing aids that match the user's sound preference?

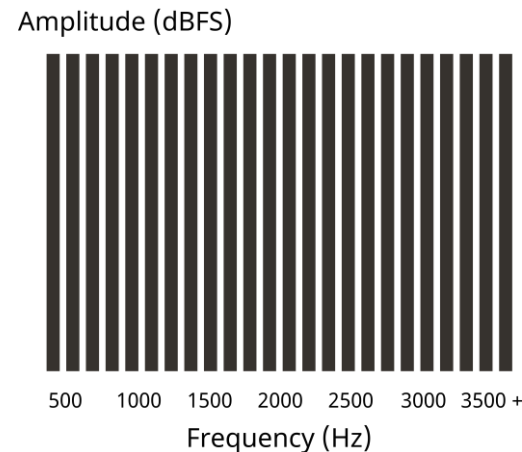
Why Sound Preference?

Hearing aid sound design is the sum of many signal processing choices:

- Filter banks
- Compression schemes
- Noise reduction
- Beamforming
- Fitting rationale
- Fitting software settings
- Customer app settings
-

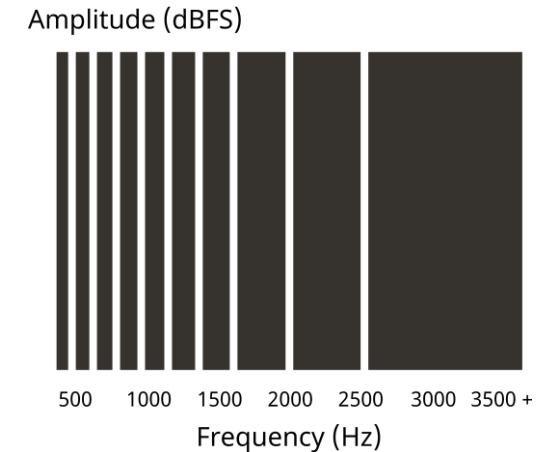
Two different sound designs:

→ *Frequency-domain filter bank*



- Uniformly spaced, narrow filters enable high-resolution parallel spectral analysis
- Efficient processing favors processing power

→ *Time-domain filter bank*



- Variable-width filters mimic the logarithmic nature of the filters in the human cochlea
- Keeps signal processing delay low

Why Sound Preference?

Two independent studies showed that people can be grouped by sound preference (Balling et al. 2026)

Online listening study (hearing aid recordings)

Guided walk study (real devices)

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Online listening study (hearing aid recordings)

- n = 248 participants
- 10 audio scenes
 - Speech in noise
 - Ambience with speech
 - Speech in quiet
 - Non-speech
- Rendered in an ambisonics lab, recorded on a mannequin
- Signia IX (Frequency-domain) and Widex Allure (Time-domain) hearing aids

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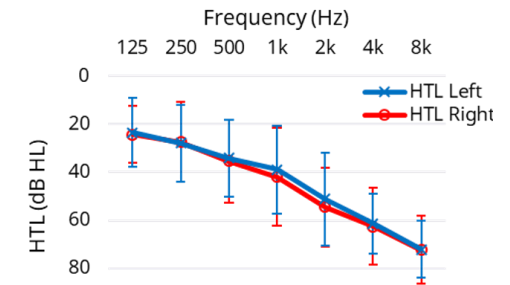
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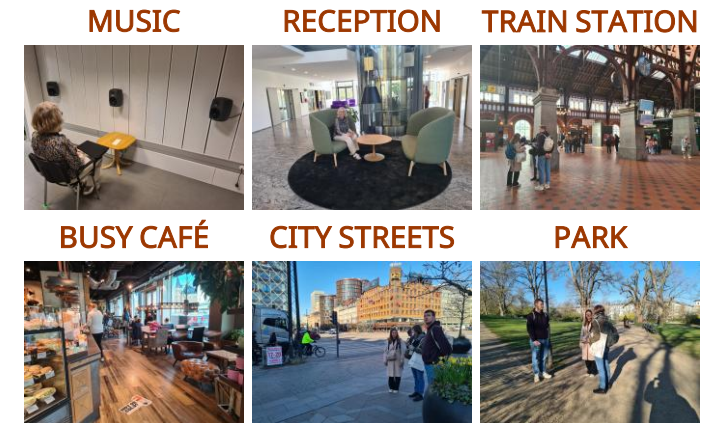
- n = 28 participants

Regular hearing aid users, but not of the hearing aids included in the study



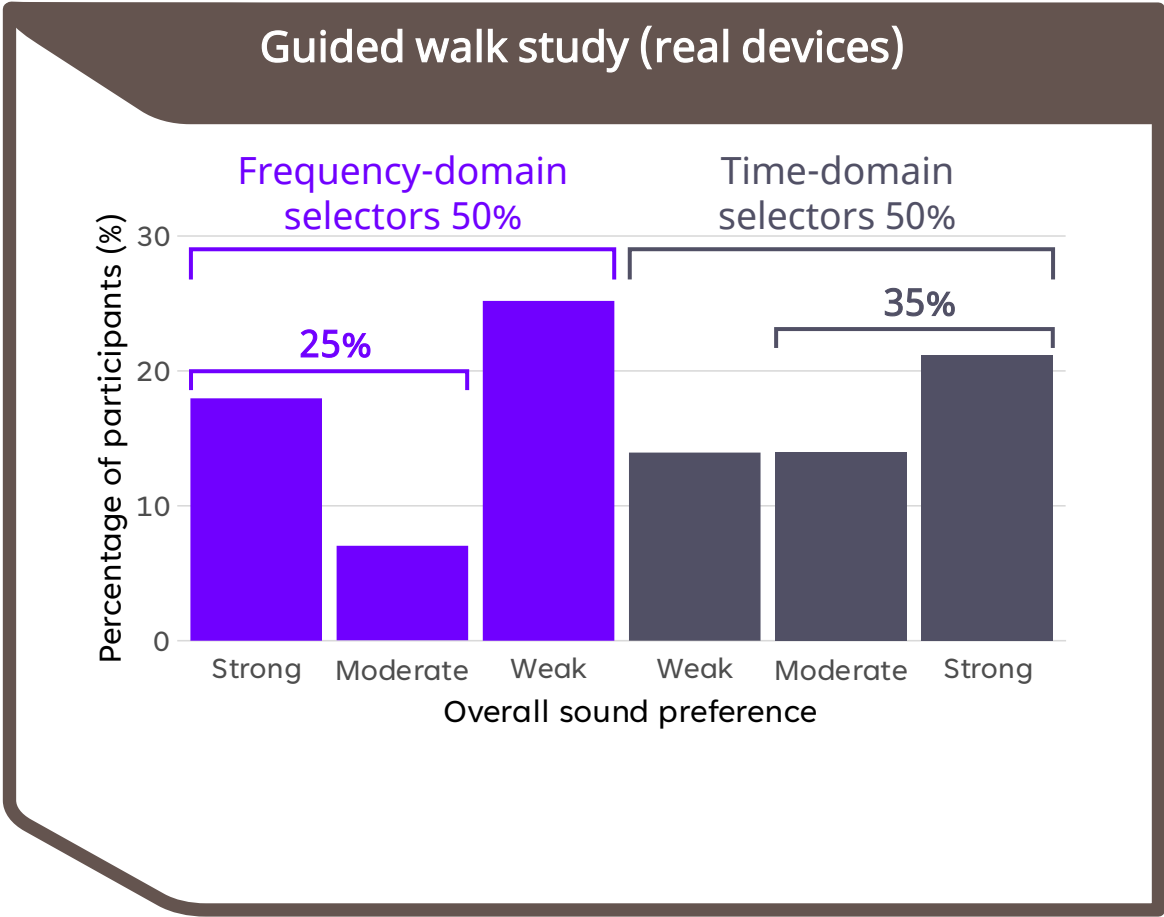
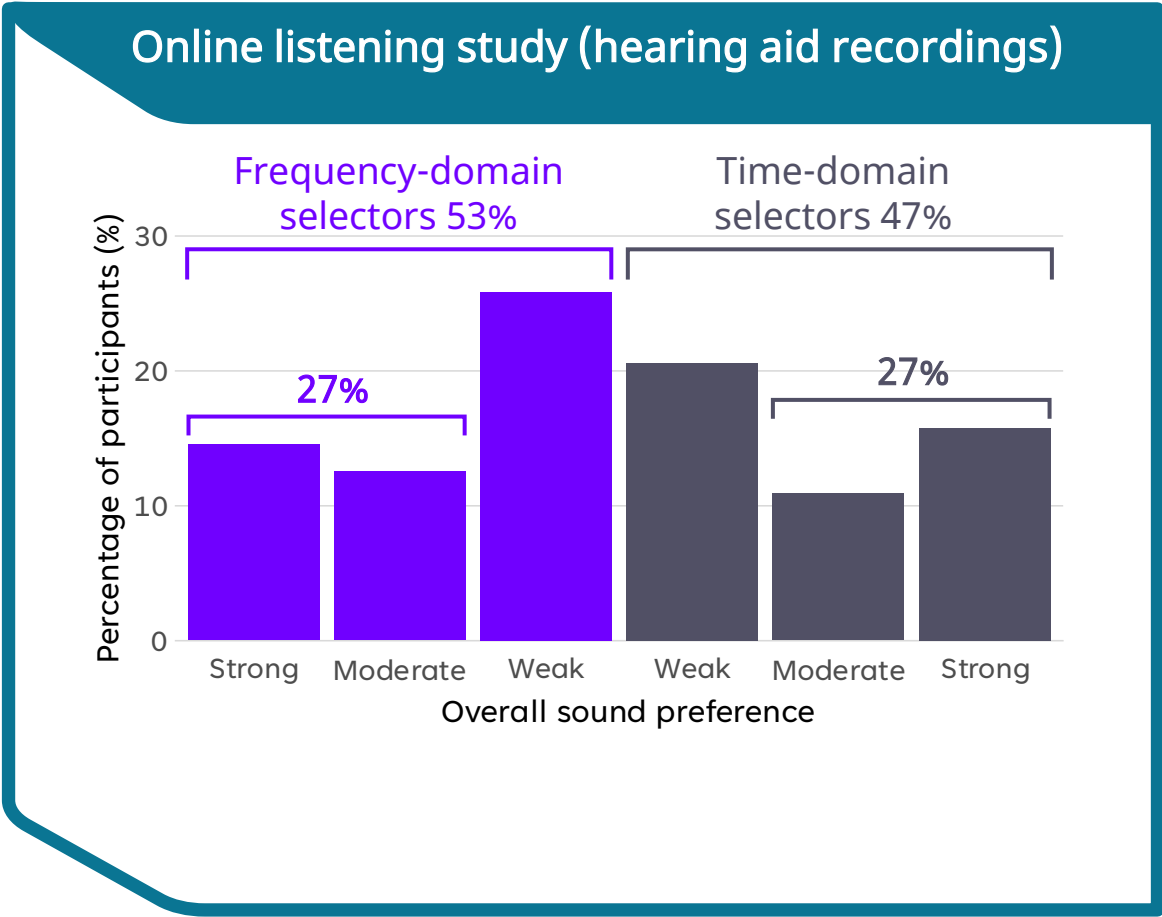
- 6 stops along a guided walk

Same hearing aids as used for online study recordings



Why Sound Preference?

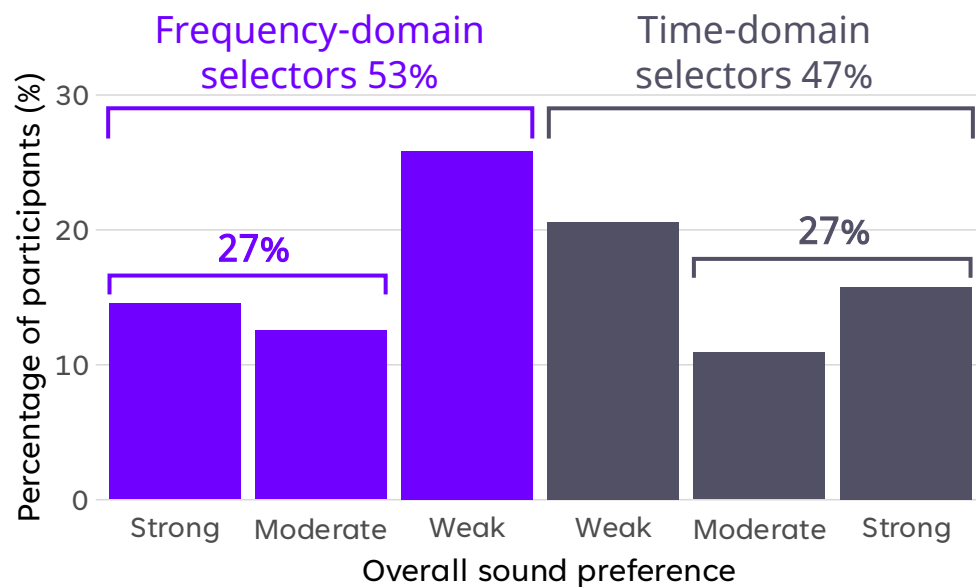
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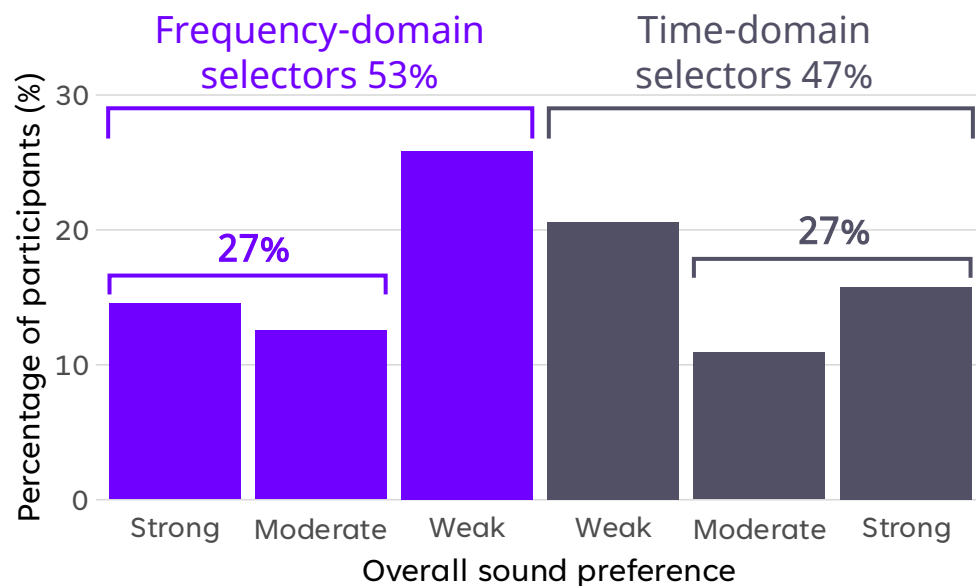


Guided walk study (real devices)

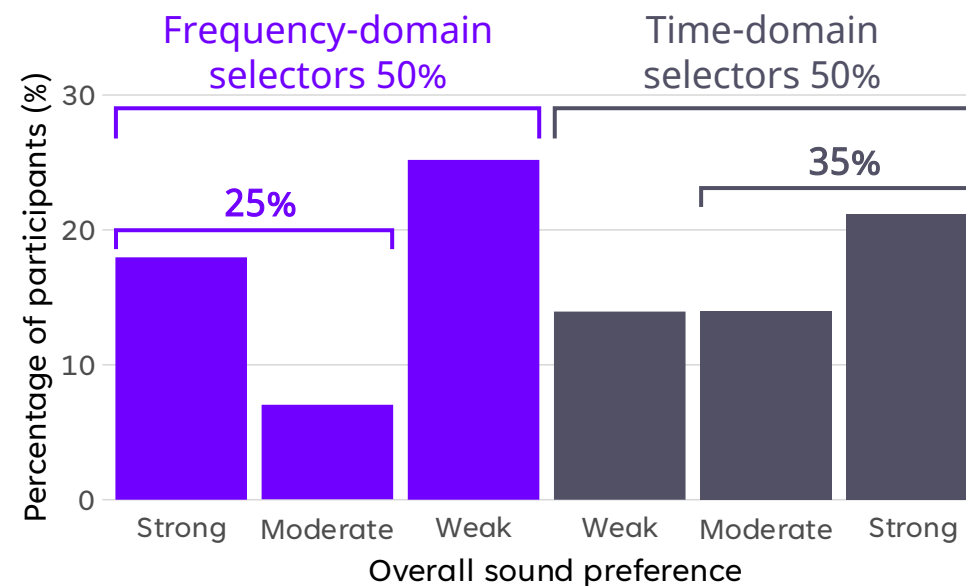
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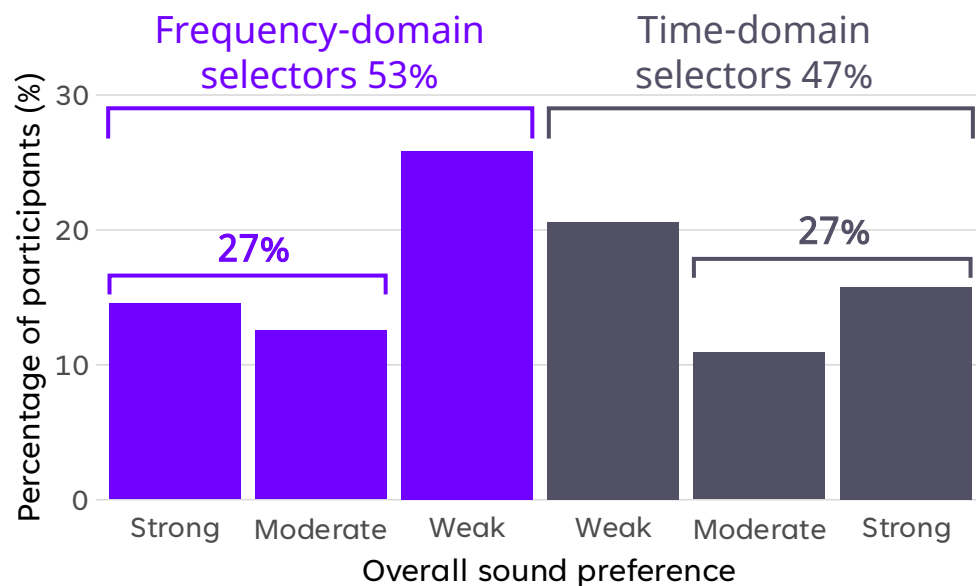


- Over 25% moderate-to-strong preferences for each sound design, in both studies

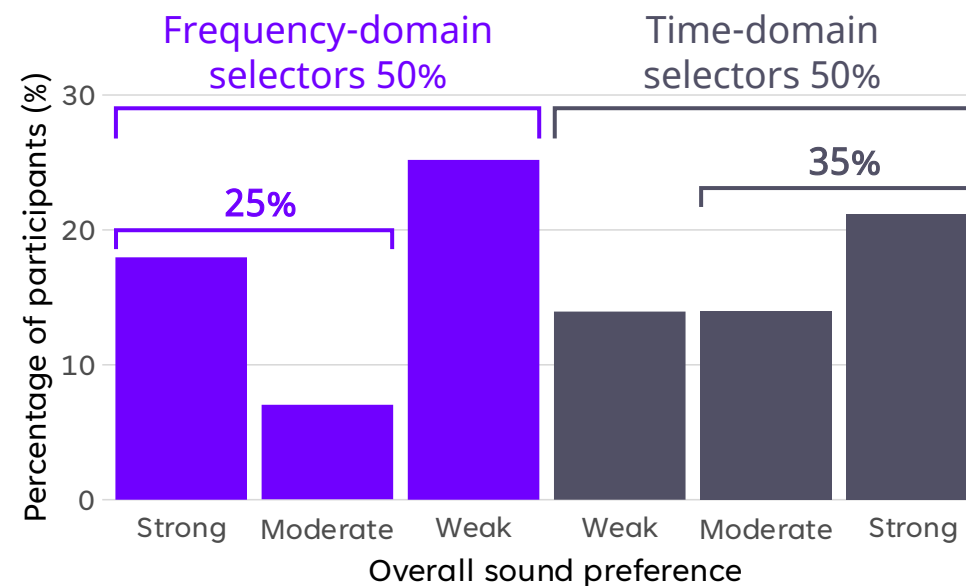
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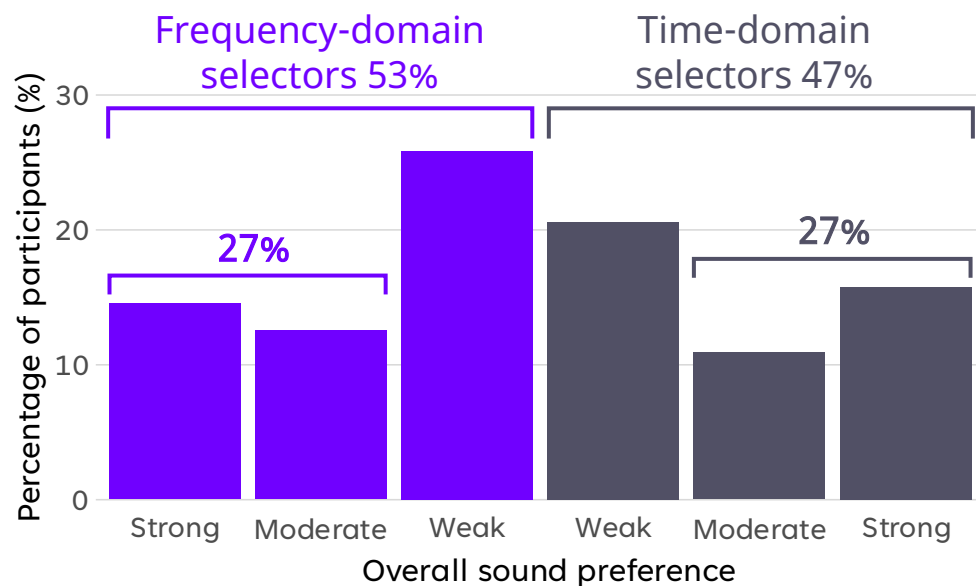


- Over 25% moderate-to-strong preferences for each sound design, in both studies
- Guided walk: both devices are well-fitted high-end HAs
-> remarkable how many people have a preference for one sound over the other

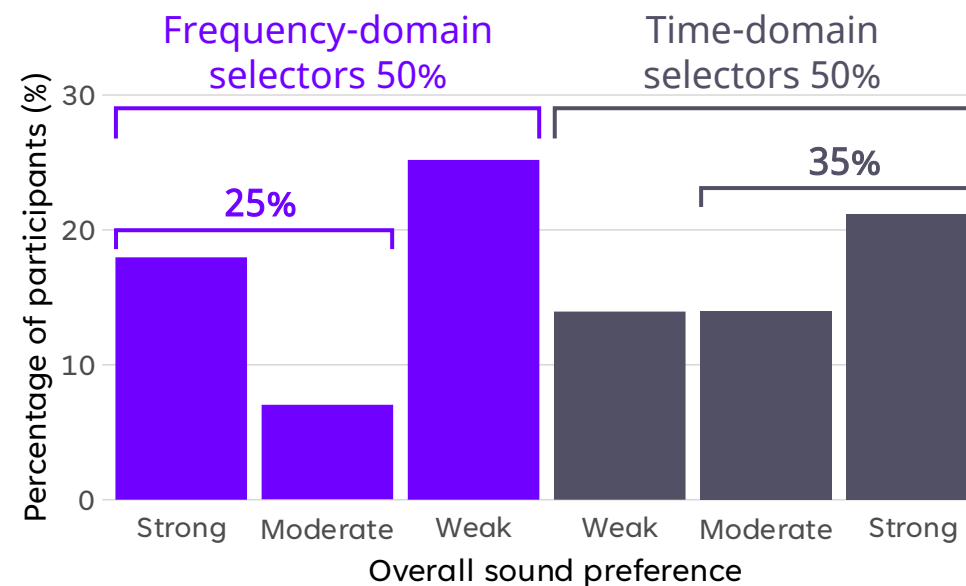
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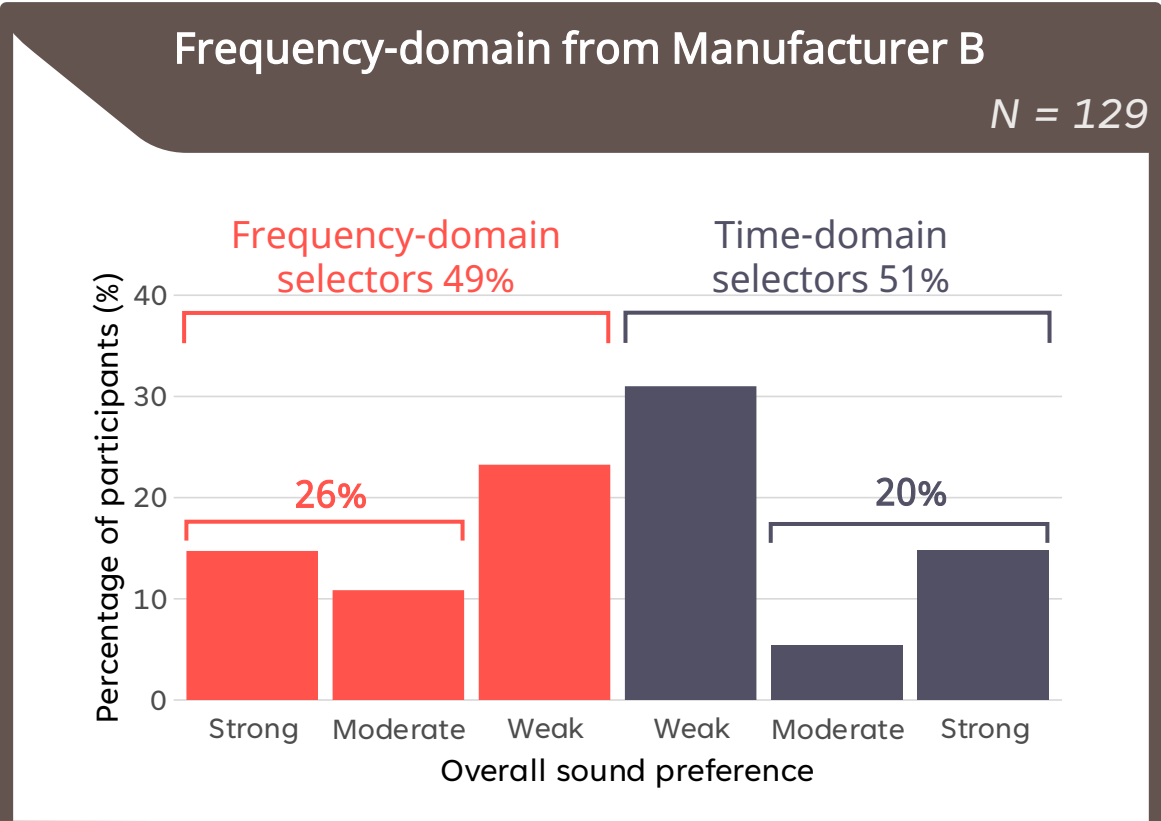
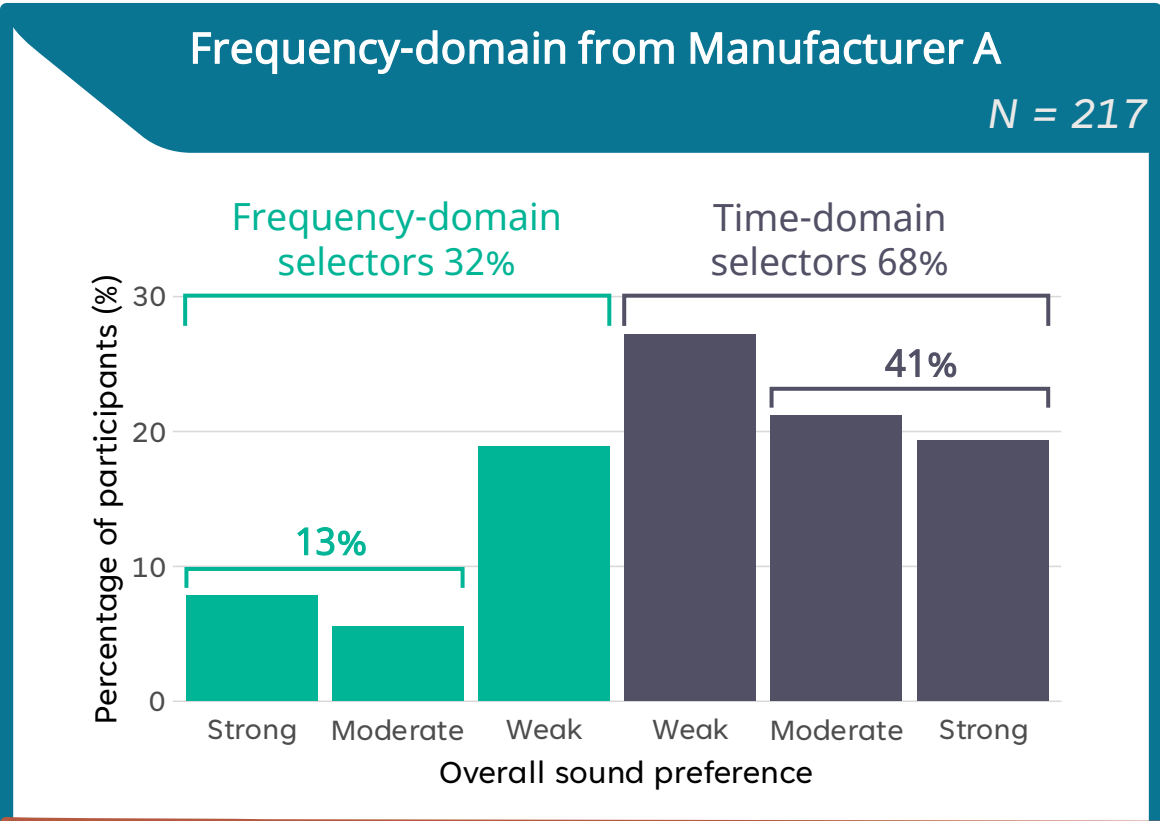
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- Guided walk: both devices are well-fitted high-end HAs
-> remarkable how many people have a preference for one sound over the other
- Preferences independent of demographic or lifestyle factors

Why Sound Preference?

Two repetitions of the online study, using alternative manufacturers for the frequency-domain hearing aid, confirmed our previous result: people can be grouped by sound preference



- Fitted to N3-hearing loss using manufacturers' fitting rationale. Overall sound levels equalized.
- Similar pattern observed: 40-50% moderate-to-strong preferences for a distinct sound design

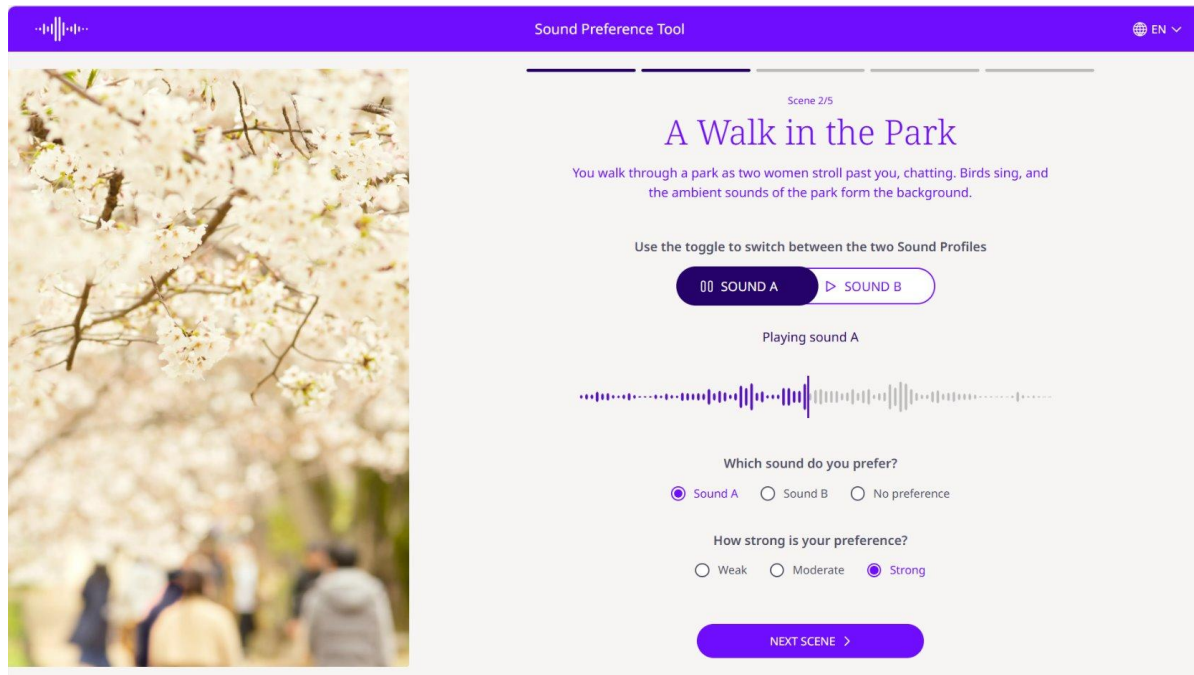
The Sound Preference Tool (SPT)

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- 5 audio scenes presented with **idealized renderings** for the two sound designs:
 - Not tied to specific devices, but corresponding to sound philosophy of two different hearing aid brands
 - Precisely illustrates the differences between how each sound design would present a scene
 - Renderings tailored for N3 hearing loss (moderate loss: Bisgaard et al., 2010)



Going for a Drive



A Walk in the Park



Cooking in the Kitchen

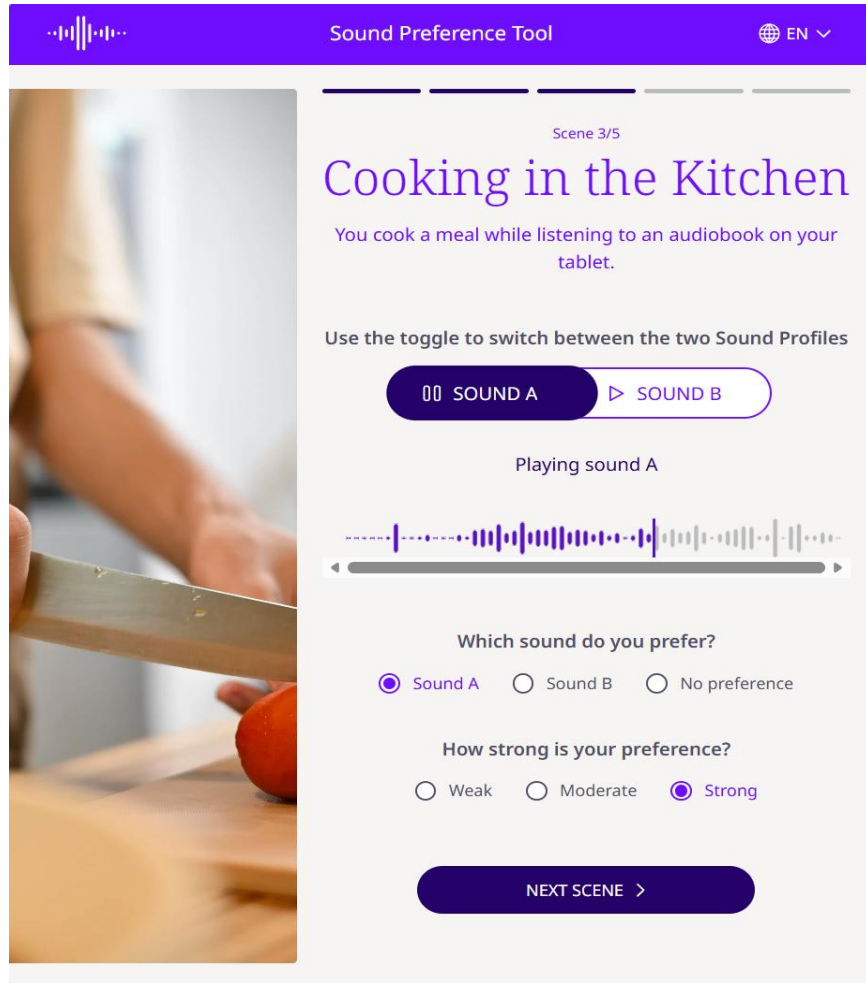


Enjoying a Night Out



Solo Piano

The Sound Preference Tool (SPT)



soundpreference.net/

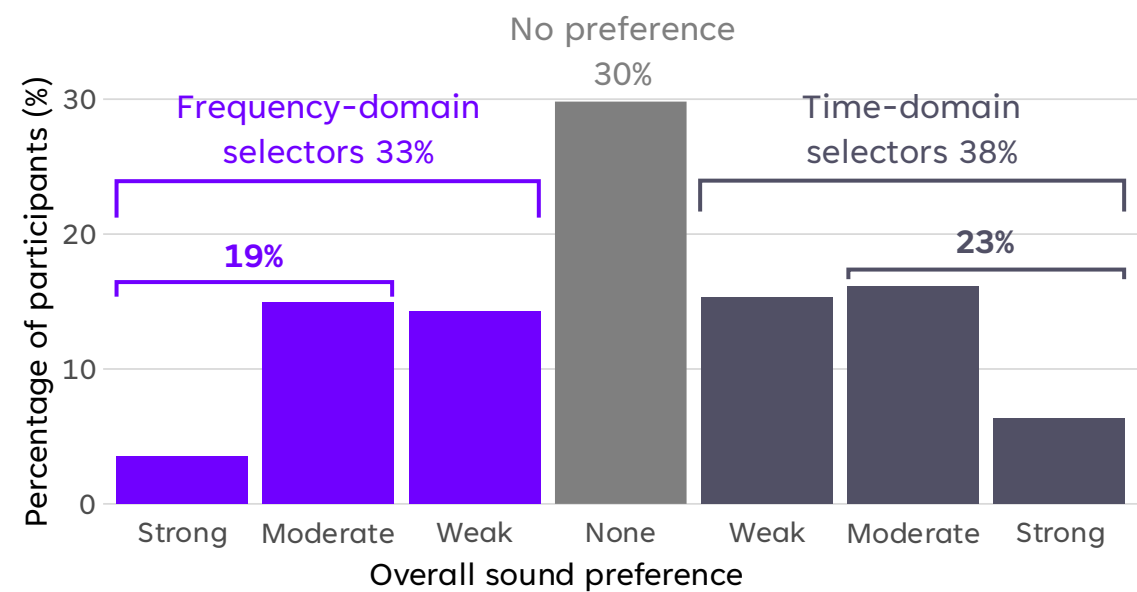
- The two sound profiles are randomly labeled as ‘Sound A’ and ‘Sound B’
- “No preference” option included to give clients autonomy
- Instructions focus on making the tool **pleasant to use** and encouraging clients to **listen carefully** to the **aspects of the sounds** that are **relevant** to them **personally**
- After judging all scenes, clients reminded of their by-scene preferences before giving their **overall preference**
- At the end, **soft recommendation** issued in the form of summary statement about expressed preferences and **nudge to share preferences with hearing care professional**
- All outcomes can be used to **anchor conversation** about preference and experience
- Available in multiple languages

Clinical evaluation of the Sound Preference Tool (SPT)

- 43 clinicians @ 28 clinics (Spain)
- 512 experienced and 501 new hearing aid users
- Differences with previous preference distributions expected as “no preference” is a response option

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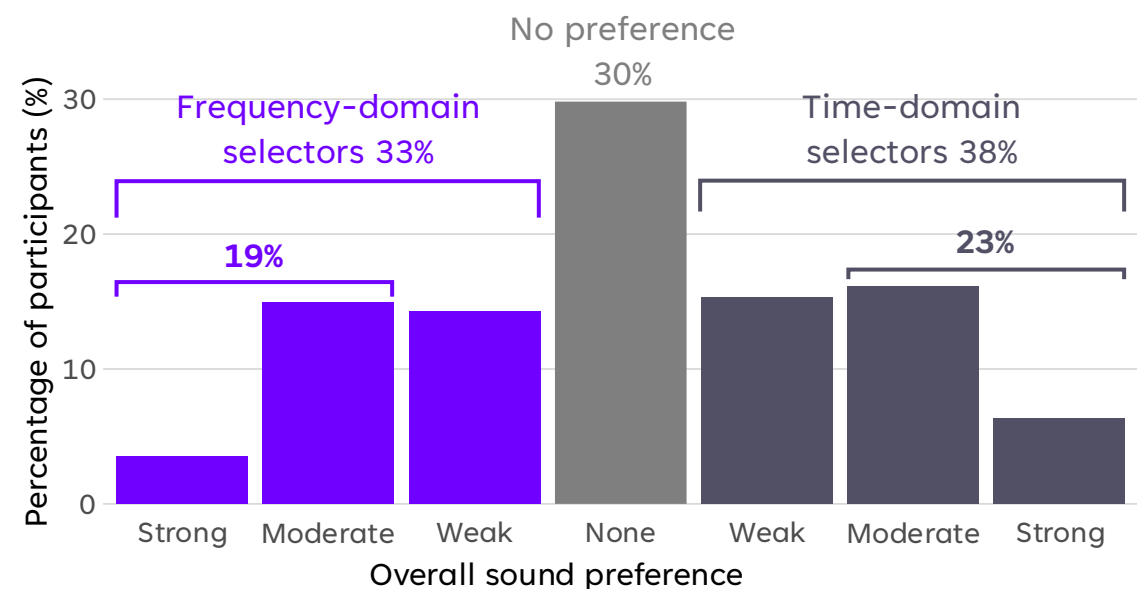
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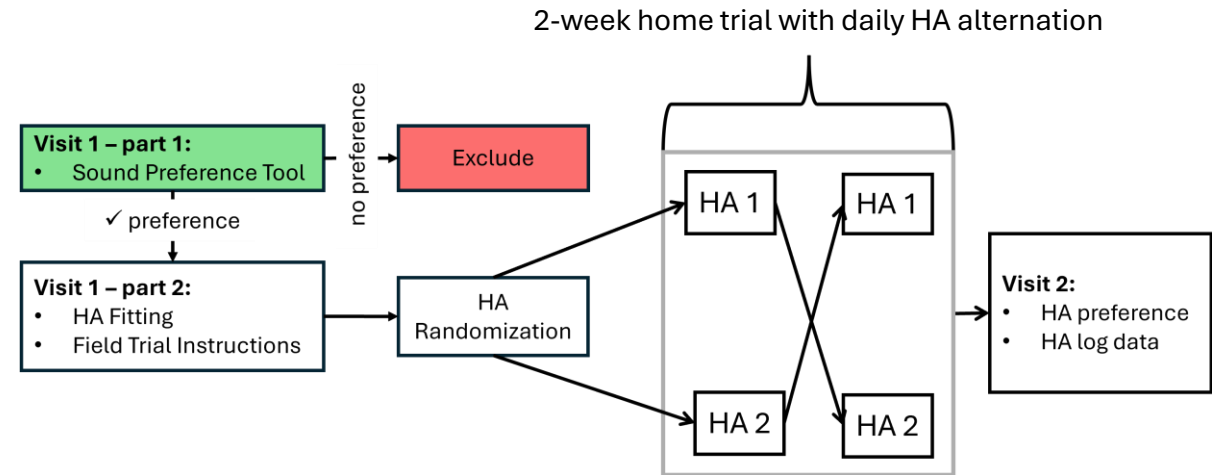


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Clinicians reported that the SPT fosters more patient-centered discussions, aids decision-making, and promotes a broader approach to recommendations - > the SPT has a strong potential value in clinical practice

Can the Sound Preference Tool predict real-life hearing aid preference?

We conducted a study investigating whether hearing aids recommended by the SPT correspond to those ultimately preferred by users in daily life



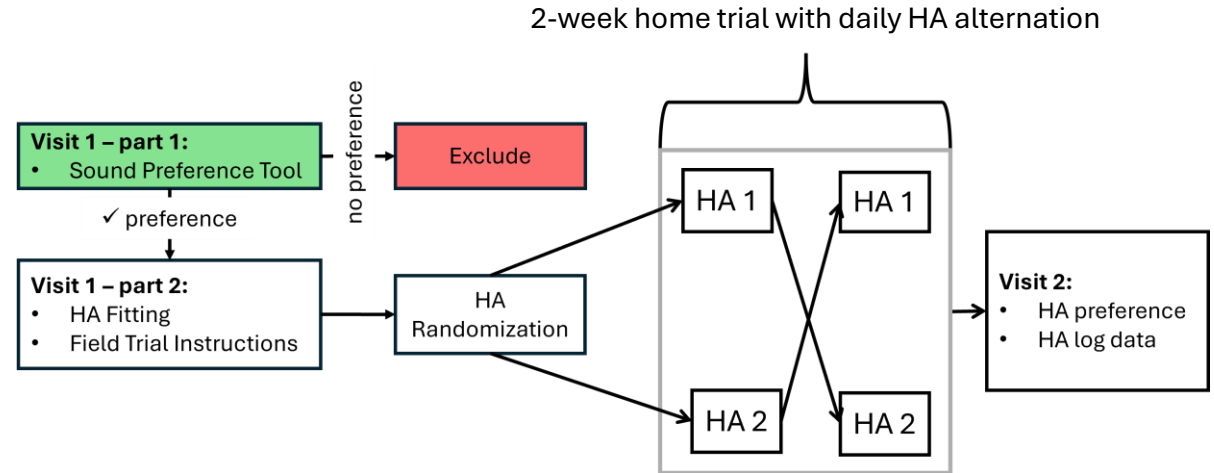
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■ Participants

- N = 17 hearing aid candidates
- Age: 69 ± 9 ; Gender: 9 f, 8 m
- 12 new and 5 experienced hearing aid users

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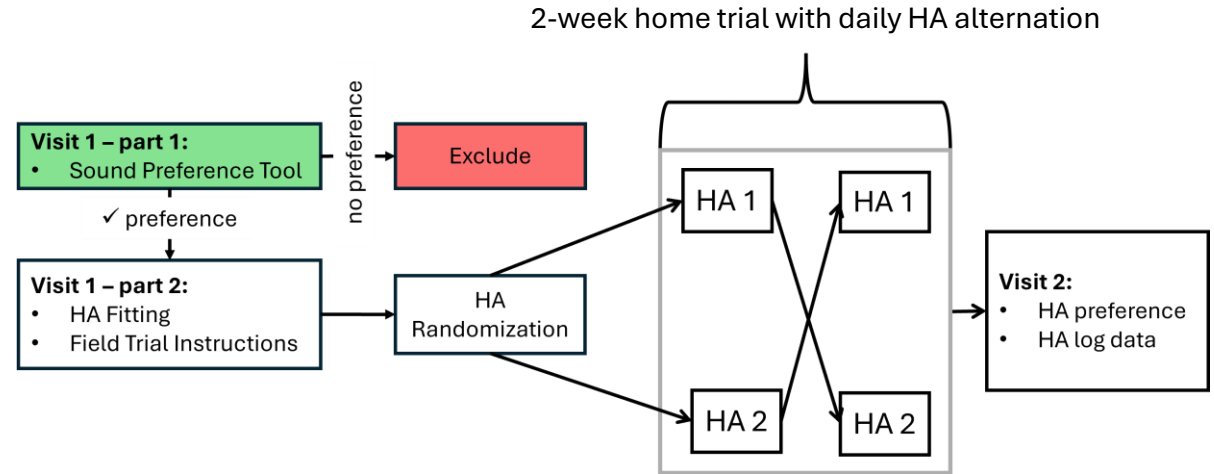
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■ Hearing Aids

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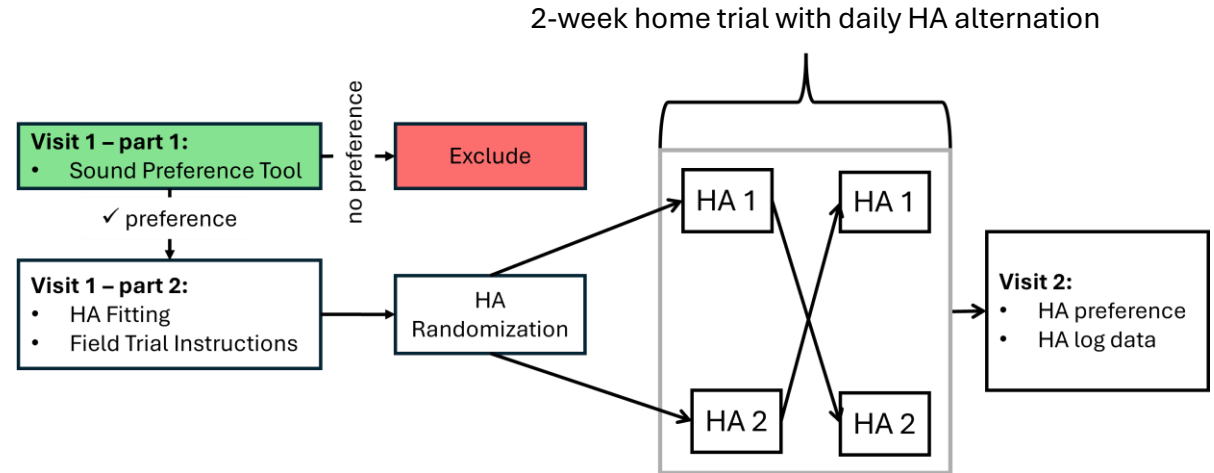
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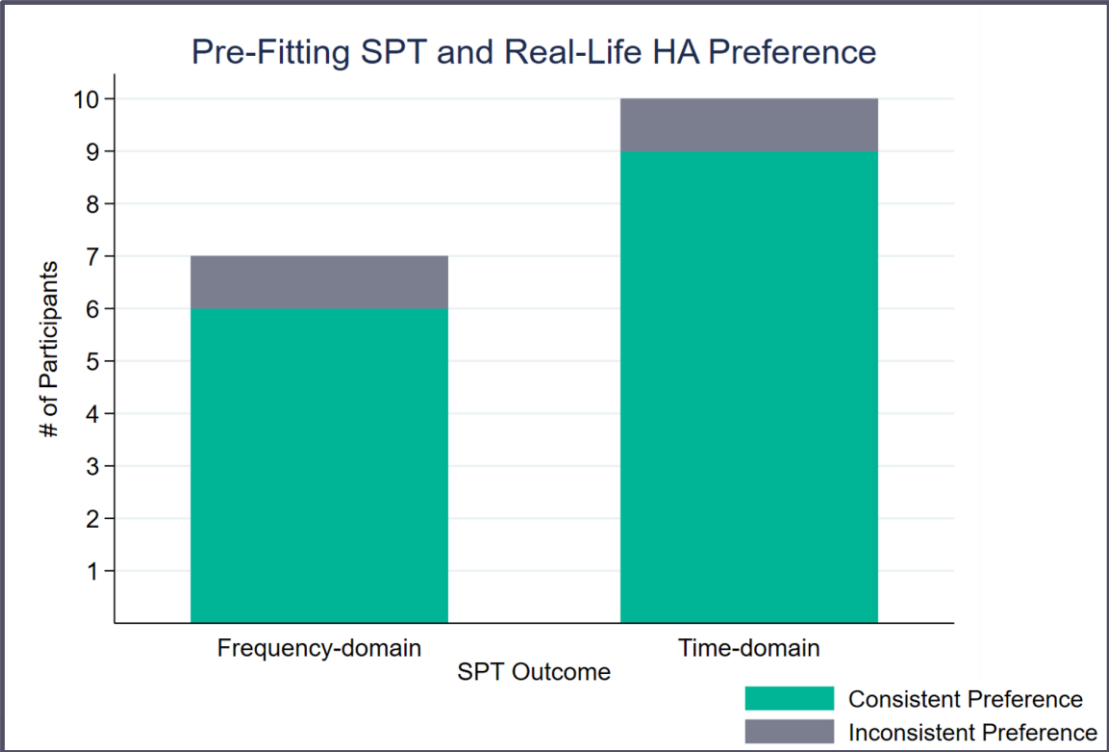
■ Participants were fitted binaurally with both hearing aid sound designs

- The hearing care professional informed participants which devices matched their SPT-based preference, though they were given the opportunity to trial both sound designs.



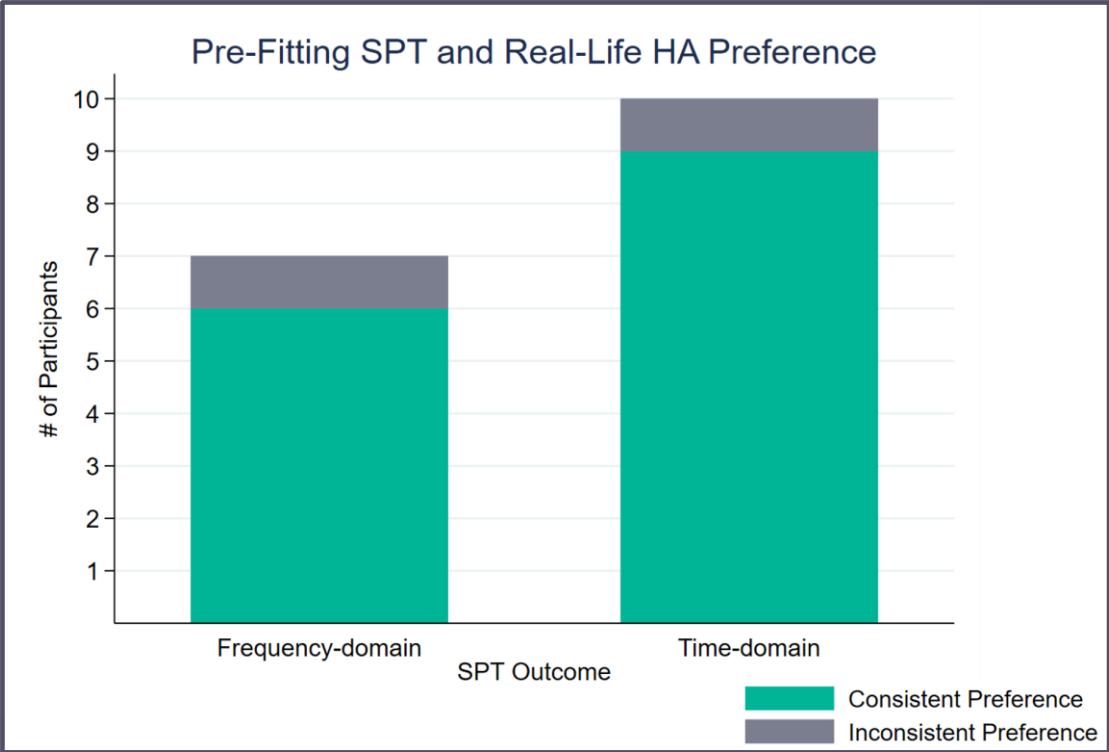
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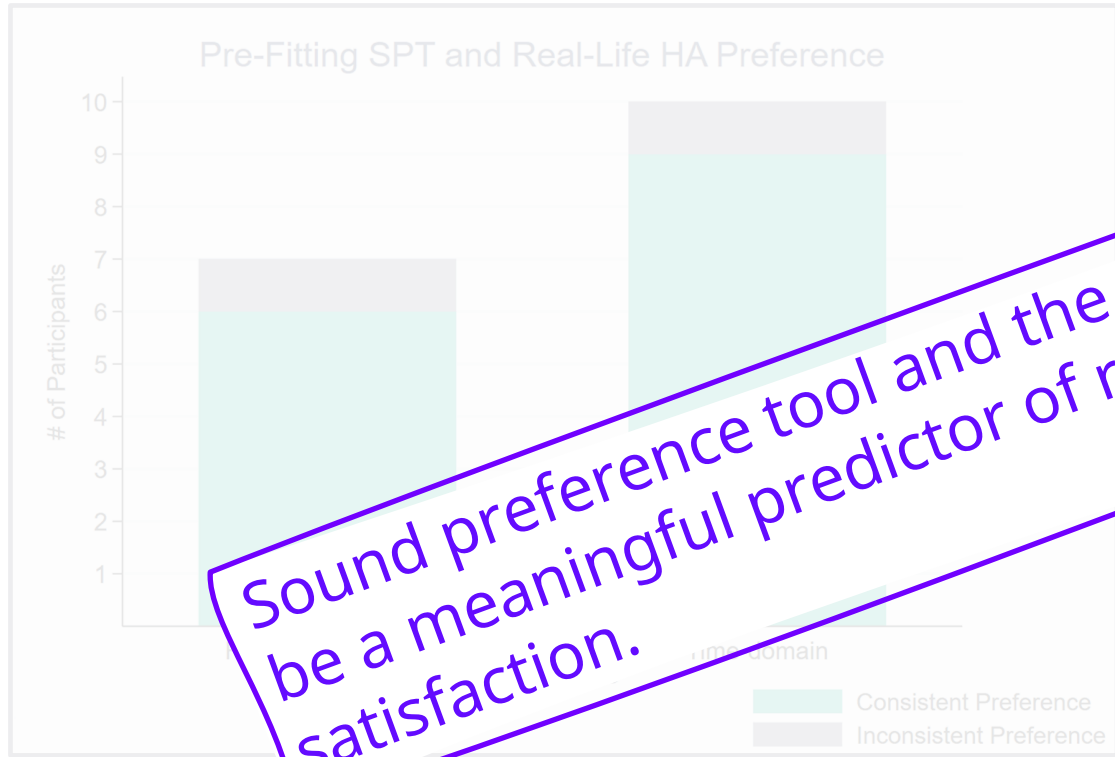
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Reasons for hearing aid preference varied.	
HA 1	HA 2
• Wind noise was quieter • Better noise cancellation • Less noise from knives in the kitchen • Loud sounds were more pleasant • Softer in sound • Noise from the grandchildren was not as noticeable • Less noise for both large and small gatherings • Less wind noise when touching the hearing aid with [unclear abbreviation] • Better reverberation • Less metallic sound • Appropriate sound in noisy environments • Clearer • Feels less “stuffy”	• Own voice was better and spoke lower because of this • Heard noisy surroundings better • Speech understanding was better from further away • The sound seemed to help more • More depth, e.g. birds, soft sounds, the beach with the wind • It's a pleasant sound • More direct sound • It's a feeling that it's better • More natural • A slightly quieter sound

Same words, different meanings

Can the Sound Preference Tool predict real-life hearing aid preference?



Sound preference tool and the associated counselling may be a meaningful predictor of real-world device choice and satisfaction.

HA 1	HA 2
• Wind noise • Better • ...	• ... varied. • ... is better and spoke • ... of this • ... noisy surroundings better • Speech understanding was better from further away • The sound seemed to help more • More depth, e.g. birds, soft sounds, the beach with the wind • It's a pleasant sound • More direct sound • It's a feeling that it's better • More natural • A slightly quieter sound

Conclusions

- Hearing aid users can be grouped by sound design preference
- Preferences for a hearing aid sound design can be quickly and easily explored in the clinic
- Exploring sound preferences in the clinic could foster more patient-centered discussions, aid decision-making, and promote a broader approach to recommendation
- The high correspondence between SPT outcomes and real-life hearing aid preference supports the notion that incorporating sound preference into the fitting process may enhance personalization
- The reasons given for preference vary widely, as people have different sound experiences and different expectations. People are not living in the same acoustic world, and having conversations about sound preference in the clinic can help us understand their world
- Traditional hearing aid fittings often prioritize audibility and speech intelligibility, sometimes at the expense of subjective listening experiences -> the SPT may provide a structured and efficient way to integrate personal preferences into clinical decision-making, complementing existing fitting protocols



THANK YOU FOR LISTENING!

For more information & updates:
soundpreference.com