

Examining speech recognition with the use of adaptive gain receivers and ReSound Multi Microphone technology

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This project compliments a previous investigation that studied the GN Hearing's Multi Microphone's behavior when used in tandem with digital modulation (DM) technology, which discussed and confirmed the preservation of the adaptive gain benefits of digitally modulated receivers when coupled to a Multi Microphone. The intention of this study is to explore and confirm that patient speech recognition scores obtained with the use of adaptive gain receivers coupled to the Multi Microphone, remain uncompromised between the two technologies.

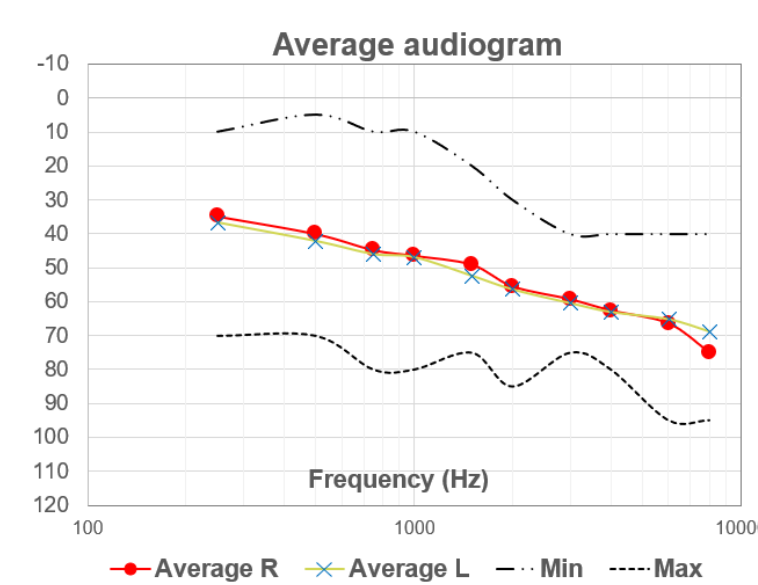
Phase I (2017) Objective validation of equipment

Examine adaptive gain advantage exists and/or benefit is reserved for users of the particular manufacturer's hearing aids

Phase II (2020) Subjective validation of equipment

Examine speech recognition scores obtained with the use of adaptive gain receivers coupled directly to hearing aids versus an adaptive gain receiver coupled to the ReSound Multi Microphone

Design and Methods



Equipment: Phase I

- ReSound LiNX²
- Phonak Sky V M13
- Roger 15 integrated receiver
- Phonak Roger X universal receiver
- ReSound audioshoe
- Roger Pen transmitter
- ReSound Multi Mic

Equipment: Phase II

- ReSound Quattro 962 RIE x2
- ReSound remote control
- Phonak Roger X universal receiver x3
- ReSound audioshoe x2
- Roger Touch Screen transmitter
- ReSound Multi Microphone

Dantalle II Test Setup

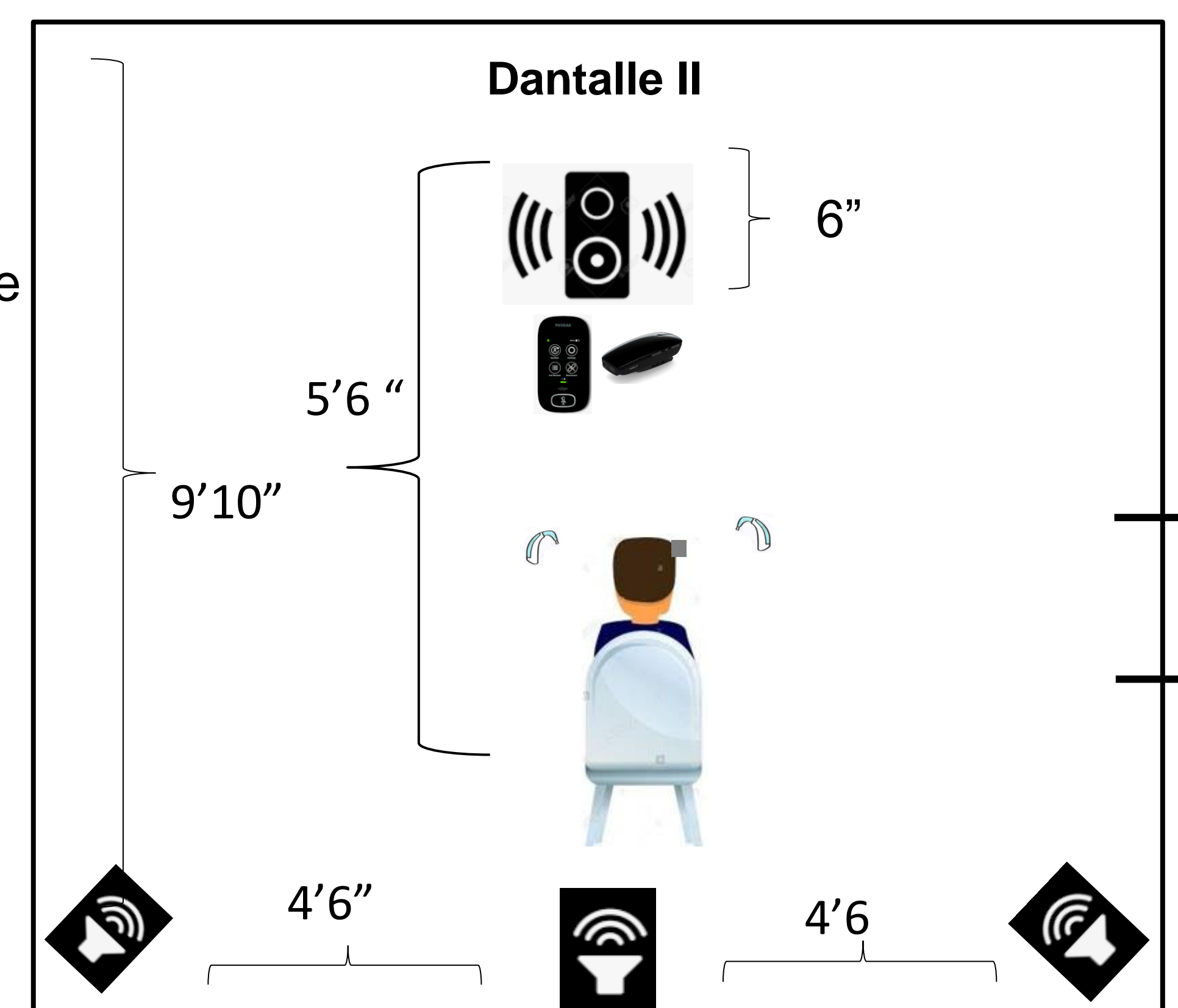
- Speech presented from front
- Starting level: 65 dB
- Speech level varied w/ performance
- 65 dB static noise

Double-blind

- Tester & Operator

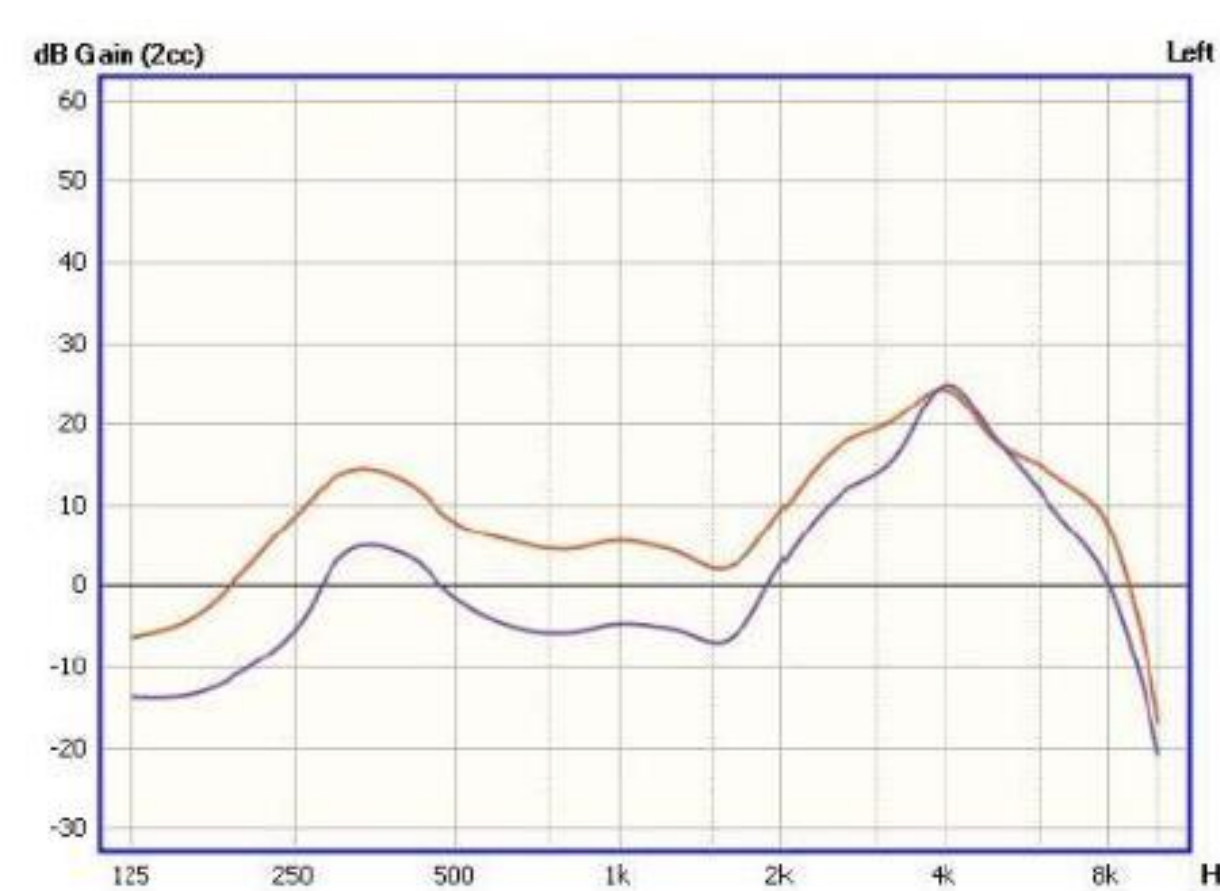
Conditions

- Counter-balanced, randomized
 - HA only
 - Adaptive rxs/audioshoe
 - Adaptive rxs/MM
 - MM only

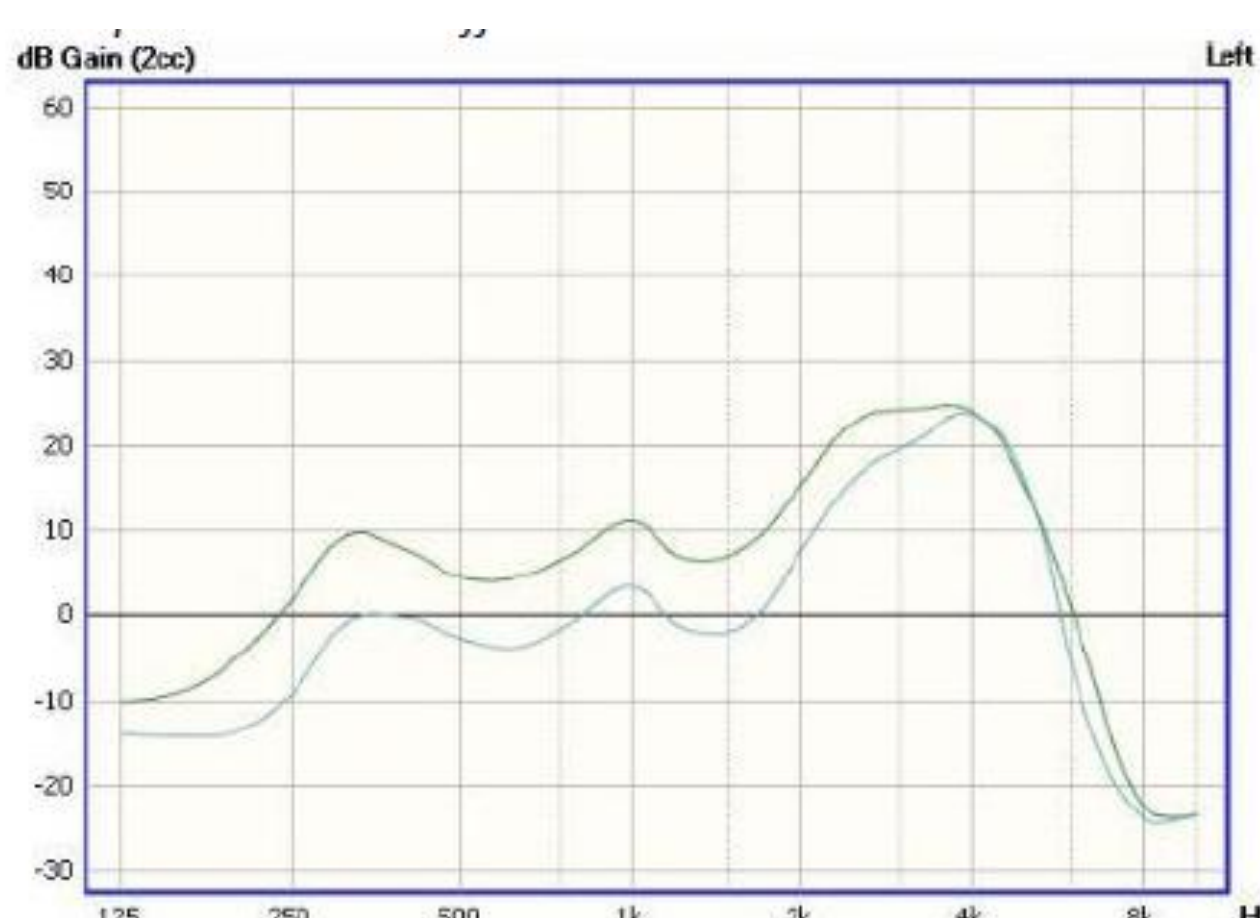


Results

Phase I: 2017; Objective validation

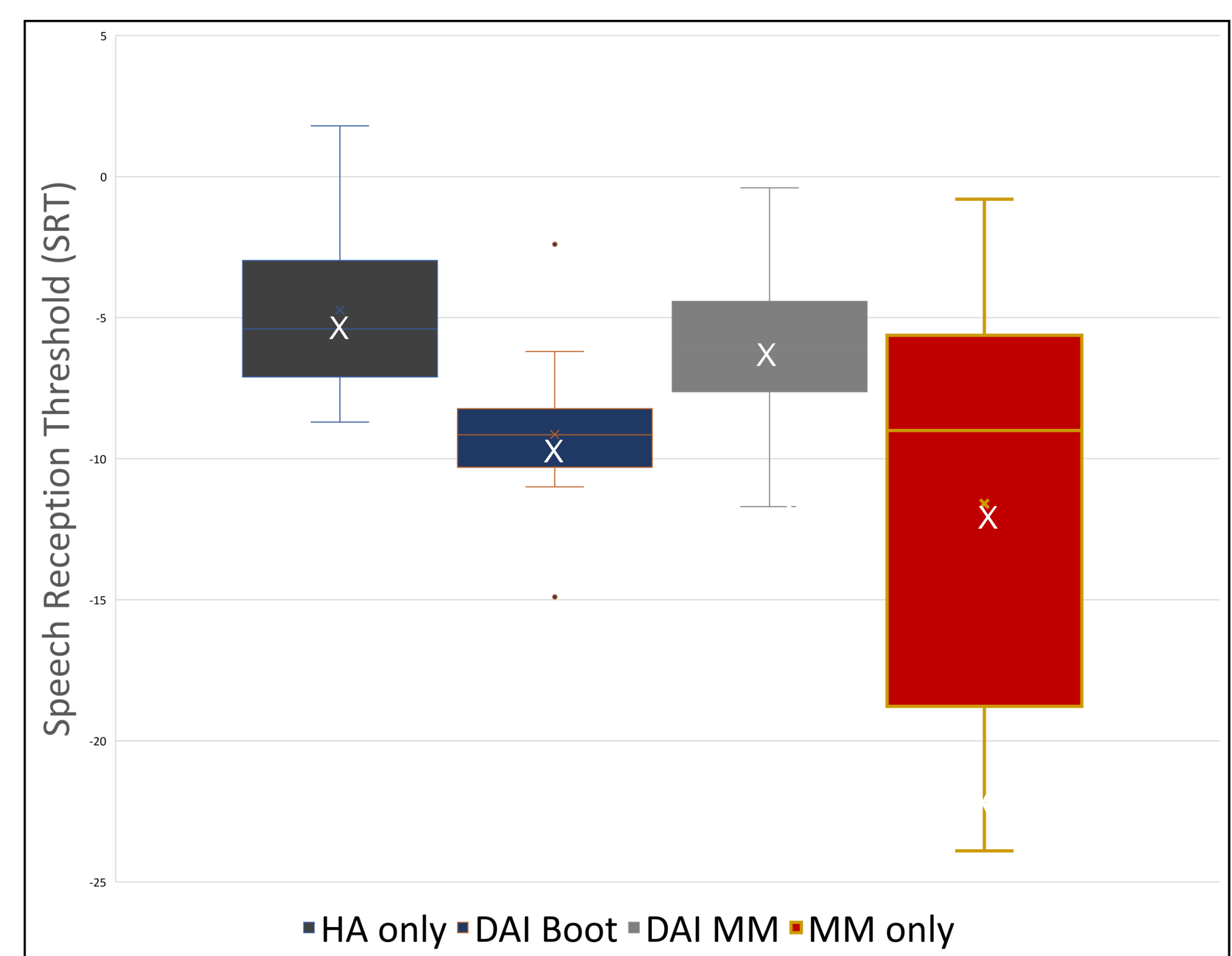


The Purple curve measured with ISTS babble at 75 dB SPL with pink noise and is the pre-adaptive gain adjustment. Red curve shows the post-adaptive gain adjustment for ISTS babble at 75 dB with pink noise. The difference between the two curves shows adaptive gain benefit.



ReSound LiNX² hearing instrument with adaptive gain receiver via MM. Blue curve measured with ISTS babble at 75 dB SPL with pink noise and is pre-adaptive gain adjustment. Green curve shows post-adaptive gain adjustment for ISTS babble at 75 dB SPL with pink noise. Difference between two curves shows preservation of adaptive gain benefit.

Phase II: 2020; Subjective validation



Data analysis with ANOVA & post hoc analysis with Tukey Kramer multiple comparison test:

- No significant differences between adaptive gain rxs via audioshoe or via Multi Microphone
- No significant differences between adaptive gain rxs via audioshoe and Multi Microphone only.
- Multi Microphone only is significantly better than HA only
- Adaptive gain rxs via audio shoe are significantly better than HA only
- Multi Microphone only is significantly better than adaptive gain receivers via Multi Microphone

GN Hearing and ReSound technology have shown proven benefits when using the Multi Microphone on speech recognition in the presence of noise. The preservation of the adaptive gain advantage seen by competitors is possible when using ReSound hearing instruments with receivers streaming through ReSound Multi Microphone technology. Verification is necessary when you are mixing manufacturers technology.