

Identifying neurophysiological biomarkers of adaptation to noise



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Joaquin T. Valderrama^{1,2,3,#}, Francisco Sánchez-Martínez¹, Miriam Marrufo-Pérez^{1,2,4,5},
Enrique A. Lopez-Poveda^{4,5,6}

¹ Department of Signal Theory, Telematics and Communications, University of Granada, Granada, Spain

² Research Centre for Information and Communications Technologies, University of Granada, Granada, Spain

³ Department of Linguistics, Macquarie University, Sydney, Australia

⁴ Institute of Neuroscience of Castilla y León, Salamanca, Spain

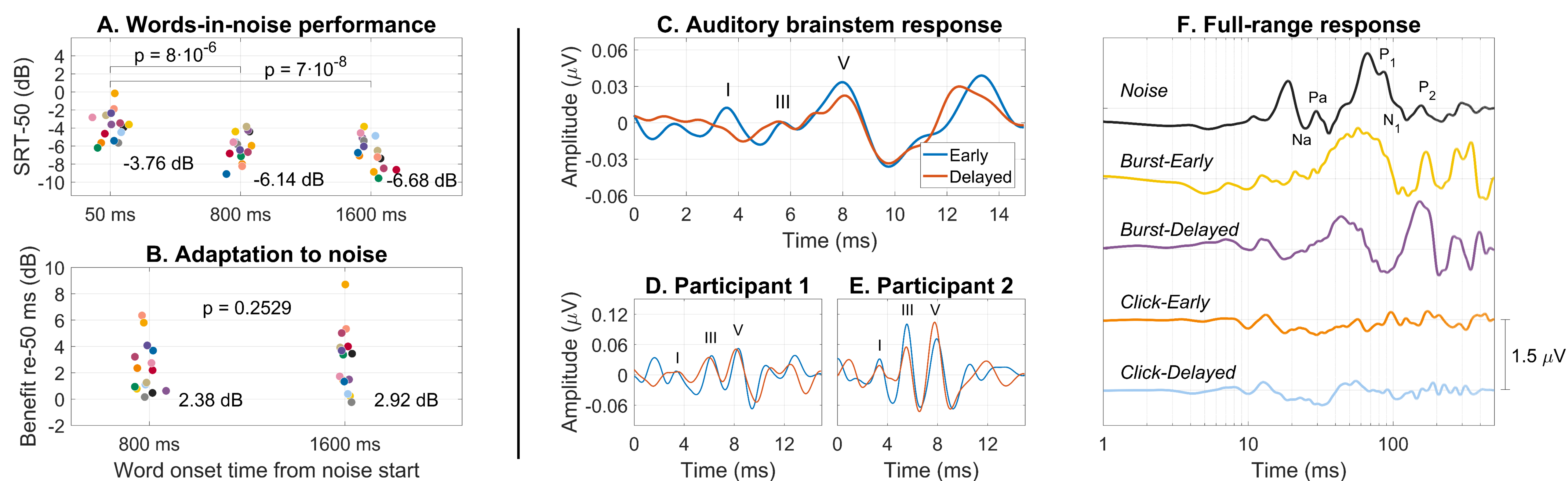
⁵ Institute for Biomedical Research of Salamanca, Salamanca, Spain

⁶ Department of Surgery, Faculty of Medicine, University of Salamanca, Salamanca, Spain

jvalderrama@ugr.es



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Motivation

- Human listeners 'adapt to noise', as they show better word recognition when words are delayed in the noise.
- This study aimed to characterise the neural adaptation mechanisms underlying this phenomenon.

Conclusions

- Behavioural results showed that neural adaptation occurs rapidly, with limited additional improvement beyond 800 ms.
- Neurophysiological results suggest that broadband clicks may not be optimal for characterising adaptation mechanisms.

Methods

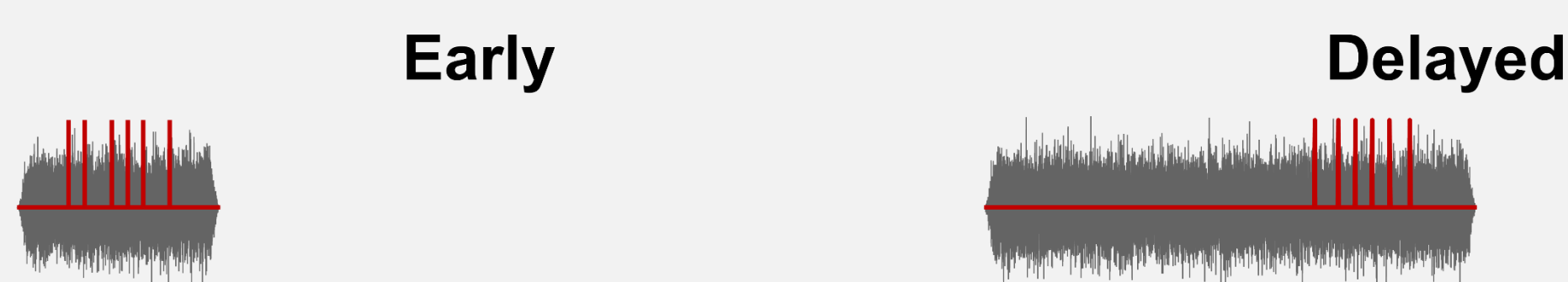
Behavioural measures

- Participants:** 15 normal-hearing adults (19–46 y/o, 7 female).
- Stimuli:** Vcoded words.¹ Noise: Speech-shaped noise at 60 dBnHL.
- Conditions:** Words at 50 ms, 800 ms, and 1600 ms after noise onset.



Neurophysiological measures

- Participants:** 12 normal-hearing adults (20–40 y/o, 8 female).
- EEG recording system:** Duet (Intelligent Hearing Systems, Miami).
- Stimuli:** 1667 bursts of 6 clicks (65 dBnHL, ISI = 6–12 ms).
- Noise:** Additive Gaussian white noise at 60 dBnHL.
- Conditions:** Bursts at 40 ms and 500 ms after noise onset.
- ABR and full-range responses estimated via deconvolution.²



Results

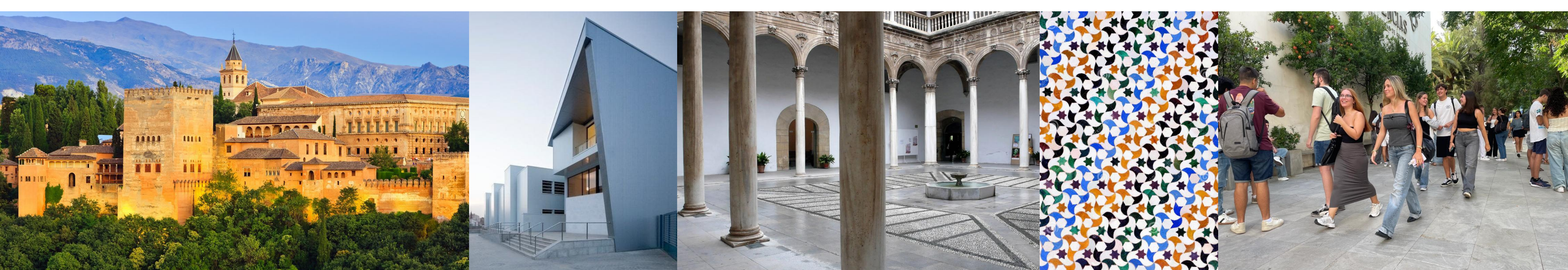
Behavioural measures. Panel A shows the mean 50% speech reception thresholds (SRT-50) for each participant across the three conditions. Panel B shows that delaying the word from noise onset resulted in an improvement of 2.38 dB at 800 ms and 2.92 dB at 1600 ms.

Neurophysiological measures. Panel C shows similar grand-average ABR morphologies in both conditions. Statistical analysis revealed comparable amplitudes and latencies for waves I and V. Panels D and E show examples of individual ABR traces. Panel F shows that noise onset elicited robust middle- and late-latency components; bursts elicited similar response waveforms in both conditions; middle- and late-latency components were adapted in click-evoked responses.

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- de la Torre A, Sanchez I, Alvarez IM, Segura JC, Valderrama JT, Muller N, Vargas JL (2024). Multi-response deconvolution of auditory evoked potentials in a reduced representation space. *The Journal of the Acoustical Society of America* 155, 3639–3653. doi: [10.1121/10.0026228](#).

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Poster



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