

The Benefit of Exposure to Consistent Reverberation Varies Across Rooms and Phonemes.

Eleni Vlahou^{1,2}, Norbert Kopčo^{1,2}, Kanako Ueno³ & Barbara Shinn-Cunningham²

1 Institute of Computer Science, P. J. Šafárik University

2 Center for Computational Neuroscience and Neural Technology, Boston University

3 School of Science and Technology, Meiji University

Past studies showed that exposure to consistent reverberation facilitates phoneme perception. However, only a few speech sounds have been used, typically with modest amounts of reverberation. Thus, it remains unclear whether the effect generalizes to diverse sounds, representative of everyday speech, in challenging listening environments.

Here, we used a wide range of consonants, encompassing voicing, manner, and place contrasts. Eighteen listeners heard VC syllables in two simulated rooms with strong reverberation or in anechoic space. In each trial there was an initial “carrier” phrase, consisting of 2 or 4 VC syllables, followed by a target VC syllable. Listeners had to identify the final, target consonant. The carrier was presented in the same room as the target, in a different room or in anechoic space. The carrier length (2 or 4 syllables) was randomly varied in Exp. 1 (high uncertainty) and fixed within each block in Exp. 2 (low uncertainty). To investigate the time course of adaptation to reverberation, four participants underwent three additional sessions (Exp. 3).

Performance, averaged across consonants, was significantly improved for the same carrier condition, independent of carrier length and uncertainty. The effect was consistent across rooms, but weaker in the more reverberant room. Analyses at the feature-level for this room showed better performance in the same carrier condition for place and manner of articulation, but not for voicing. There was no evidence of improved adaptation to reverberation with continued exposure (Exp. 3).

In line with previous studies, our results suggest that short-term exposure to a consistent room facilitates the perception of a wide range of speech sounds. However, the effect varies substantially across different rooms and phonemes, and may be diminished for certain sounds presented in very challenging listening environments.

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