Effects of non-stationary noise on consonant identification

Consonant perception has typically been measured using consonant-vowel (CV) syllables presented in a stationary noise masker at various signal-to-noise ratios (SNRs). Recently, a microscopic speech perception model was proposed (Zaar and Dau, 2017) and shown to account well for consonant perception data obtained in stationary noise. However, unlike stationary noise, real-life interfering sounds typically exhibit strong fluctuations. The present study therefore investigated the effects of highly non-stationary noise on consonant perception and assessed the predictive power of the model in such conditions. Normal-hearing listeners were presented with 15 Danish CVs in 5-Hz interrupted noise at SNRs of −20, −10, 0, and 10 dB. Five different CV onset times with respect to the noise bursts were considered, differing in the amount of induced simultaneous and forward masking. As expected, the consonant recognition scores were inversely related to the amount of simultaneous masking. However, even with minimum simultaneous masking, a substantial loss of consonant recognition was observed at low SNRs, suggesting a forward masking effect. The model, which employs adaptive processes in the front end, accounted for these experimental data to a large extent. The experimental paradigm and the model may be useful for assessing temporal effects of hearing-aid algorithms on consonant perception.

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