Does semantic context facilitate perceptual clarity?

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Giving people an opportunity to hear an unintelligible noise-vocoded (NV) sentence after they know its identity produces pop-out, a clearer percept of the NV sentence (Davis, Johnsrude, Hervais-Adelman, Taylor, & McGettigan, 2005), which can be measured using a magnitude-estimation procedure (Wild, Davis, & Johnsrude, 2012). Pop-out appears to occur when the auditory system is able to match input with top-down predictions that can be used to perceptually ‘organize’/’explain’ that input. Semantically coherent sentences (e.g. “his new clothes were from France”) are more predictable than matched anomalous sentences (e.g. “his great streets were from Smith”), raising the possibility that semantic information may also give rise to popout. In the present study we investigated how the magnitude of the pop-out effect produced by prior knowledge in the form of identical text cues (100% predictable) compared to that produced by semantic coherence. Twenty normal-hearing native Swedish-speaking participants listened to Swedish NV (1, 3, 6 and 12 bands) and clear sentences, and rated the clarity on a 7-point Likert scale. The sentences were semantically coherent or anomalous. Each spoken word was preceded (200 ms) by either its text equivalent or a consonant string of matched length. We observed the expected main effects of speech quality and text cues on clarity ratings (Wild et al., 2012). Semantically coherent sentences were rated as clearer than anomalous sentences, even when both types of sentences were preceded by identical text cues, suggesting that the effect of semantic context on perceptual clarity is not entirely due to greater predictability.

References