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Perception of simultaneous sentences with frequency-shifted voiced excitation

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Identification of key words in one of two simultaneous sentences is substantially improved when the sentences differ in fundamental frequency (F0). When the sentences are constructed to be almost continually voiced, identification can improve from 20% at 0 semitones difference to 80% at 8 semitones difference (J. Bird & C.J. Darwin 1998 in *Psychophysical and Physiological Advances in Hearing*, Ed A.R. Palmer et al., Whurr, London, pp. 263-269). We recorded the same monotone sentences as Bird and Darwin. These were first resynthesised using PSOLA to give a range of harmonic F0 differences (0, 1, 3 & 10 semitones) and then additionally resynthesised by LPC with the LPC residual frequency shifted by 25% of F0, to give excitation with inharmonic but regularly spaced components. Experiment 1 showed that frequency-shifted sentences gave the same large improvement with nominal F0 difference as did the harmonic sentences, although overall performance was about 10% poorer. Experiment 2 replicated the finding by Bird & Darwin that swapping the F0 difference across spectral regions only reduced the improvement in recognition for large F0 differences, and extended this finding to frequency-shifted voiced excitation. The results extend the range of perceptual phenomena originally attributed to harmonic processing.