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Effects of pitch and spatial separation on selective attention in anechoic and reverberant environments

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Subjects identified a random, spoken sequence of five monotonized digits (F_0 = 100 Hz) presented from 0° azimuth. A monotonized masking sentence (F_0 = 84, 89, 94, 100, 106, 112, or 119 Hz) was presented simultaneously from either 0° and +90° azimuth (chosen randomly on each trial). The same talker recorded both target and masker speech. KEMAR-derived transfer functions simulated either a reverberant or anechoic environment. In contrast to previous studies, in the anechoic condition, differences in pitch provided little benefit and differences in location gave improvements explainable by improvements in the target-to- masker ratio at the acoustically better ear. In reverberant conditions, differences in target and masker location improved performance more than differences in pitch; however, performance was best when there were differences in both location and pitch. Results suggest that when a target utterance is easy to segregate and select (such as in anechoic space when the target is a digit sequence embedded in a competing sentence), high-level attributes such as pitch and location do not improve the ability to selectively attend in a speech-on-speech task. However, in more challenging, reverberant conditions, location and pitch cues can aid segregation and/or selection.