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Psychoacoustic pitch analysis of common musical chords

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Psychological research on musical structure has assumed that perceived pitches correspond to musical notes. In fact, auditory perception depends on audible tones and noises in the auditory scene that vary in perceptual salience (Bregman, 1990). A C-major triad CEG typically has audible partials (spectral pitches) at B and D, and implied “virtual” pitches (missing fundamentals) at F and A (Terhardt et al., 1982).

In a psychoacoustic experiment, we presented typical trichords (3 simultaneous chromas) including major and minor triads (in semitones relative to the root: 047, 037), each in 3 inversions and 2 voicings (close/open); augmented (048) and diminished (036) triads; others (025, 035); and a tetrachord (major-minor 7th: 0,4,7,10). The audible partials of each chord were predicted using a psychoacoustic model. In each trial, two successive chords were heard, one including the target partial and one not, and participants rated how different the chords were.

Results contribute to a psychological theory of music. A typical musical chord has about ten audible partials. Audible partials that are not octave-equivalent with notes may be added to the trichord to form a tetrachord.

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