

## Three-chord harmonic sequences with unexpected out-of-key endings: are they suitable stimuli for eliciting N400 responses?

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Music-elicited N400 responses are usually obtained by using musical targets consisting of short musical excerpts in combination with word primes. The N400 obtained in response to those stimuli is believed to reflect the processing of extra-musical meaning, with reference to the relationships between concepts conveyed by music and words semantics. The aim of this study was to verify whether a completely musical stimulus (i.e., with music as prime and music as target) is able to elicit N400 responses as well. For this purpose we employed a new stimulus composed of the minimum number of chords necessary and sufficient to enable the subject to predict a plausible closure of the sequence (priming) and, at the same time, to provide him/her with the closing chord of the sequence (target), either congruous (probable closing) or not (improbable closing) to the tonal context. Subjects had to discriminate and recognize the irregular targets (i.e., the out-of-key endings of the sequence) according to a classic odd-ball paradigm. ERP components were extracted from 19-channels EEG traces recorded from eight healthy subjects. The statistical reliability of ERP components was assessed by means of non-parametric Wilcoxon test. Moreover, both the corresponding surface electric fields (2D scalp-maps) and cortical current densities (sLORETA) were studied. In all subjects participating in the study, together with the classical ERAN, N5, and P600/LPC components, a N400 wave was also obtained. We deem that this is a true N400, given the complete overlapping of polarity, latency, and topographic distribution to the classic N400 waves. Furthermore, our chord-primed chord-elicited N400 seems to share with the word-primed music-elicited N400 certain generators that are located on the posterior part of both the right medial temporal gyrus (BA 21/37) and the superior temporal gyrus (BA 22). This suggests that even chord-primed chord targets can convey extra-musical meaning