

# **Tracking Modulations to the Dominant in Classical Minuets: A Concurrent Probe-Tone Study**

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## **Abstract**

Previously we used Toiviainen and Krumhansl's (2003) concurrent probe-tone technique to study listeners' tracking of modulations in Carnatic music (APCAM, 2013). With modulation, the correlation of probe ratings and the tonal-hierarchy profile for the initial key declines, and correlation with the new key profile increases. This reverses when the piece modulates back.

Here we apply that technique to the investigation of modulations in classical minuets. We used minuets in studies finding an improvement effect in recognition memory, in which the rejection of same-contour lures improved during the first 12-15 s of hearing a novel melody because the memory system has time to bind the melodic contour to the musical scale (Dowling & Tillmann, 2014; Tillmann et al., 2013). This led us to investigate the time course of formation of the tonal hierarchy representation involved.

In Study 1, 84 musicians and 84 nonmusicians rated one of the 12 probe tones continuously while hearing the first eight measures of one of two minuets (one modulating and the other not). A Latin square to control the order of presentation of the probe tones, so that each probe was rated an equal number of times on each of the 12 trials with a minuet. Thus, we could look at the development of the profiles across trials. The tonal profile of the initial key emerged

clearly during the first three trials, as assessed by correlation. There was some tendency for the correlation of responses with the profile for the dominant to increase following the modulation, but there was no tendency for the correlation with the initial tonic to decrease. This agrees with earlier results suggesting that a conventional modulation to the dominant does not strongly alter the sense of tonal center very much. In Study 2 we are currently replicating Study 1 with six minuets.