

# Progress from Analytic to Global Perception of Modulations

with Increased Familiarity with Music

W. Jay Dowling

Rachna Raman

The University of Texas at Dallas

We present three experiments using Toiviainen and Krumhansl's (2003) continuous probe-tone method to track listeners' perception of tonal modulations. Listeners hear music in one ear and a steady probe in the other, continuously rating how well the probe goes with the music. The excerpt repeats 12 times, using each of the 12 possible semitones. We construct tonal hierarchy profiles for 10-s segments throughout the piece, and correlate them with the profiles for the keys involved. Shifts in key are reflected in the pattern of those correlations. In Study 1 Indian and Western music teachers heard South Indian classical songs. Only Indian teachers were familiar with the songs. Surprisingly, differentiation of modes in modulations was clearer for the Westerners. We thought perhaps greater familiarity led to more global perception, in which a piece is heard not as sharply modulating but as blending a cluster of different keys throughout. In Study 2 highly trained Western musicians heard 2-min Haydn quartet excerpts. We compared performance during the first three trials in which they were unfamiliar with the pieces with the last three trials where they were more familiar. Differentiation of the keys was greater at first, and later became more global. In Study 3 we manipulated familiarity strongly with student orchestra members in three sessions: before encountering the piece they were to learn, in the middle of rehearsals, and after performing the piece. However, there was little change in their responses from beginning to end, perhaps because their active involvement maintained their analytic mode. In conclusion, there is some tendency for musicians to hear a piece more and more as a unified whole with increasing familiarity, but not always. In some cases they form a holistic representation of the piece as a cluster of related keys, rather than as a sharply differentiated sequence of individual episodes.