LEHIGH UNIVERSITY

The Departments of Psychology and Music

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Music Cognition: What Computational Models Can Tell Us

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"Music moves people involuntarily, even subliminally, and yet by means of the most apparently precise and rational techniques. If a few combinations of pitches, durations, timbres and dynamic values can unlock the most hidden contents of our spiritual and emotional being, then the study of music should be the key to understanding human nature" (adapted from Nicholas Cook, 1987).

In the spirit of the above quotation, this talk will begin with some visualizations of music, showing structures that influence our experience of music, whether or not we have explicit knowledge of the jargon. We will then consider how artificial intelligence (AI) and computational modeling can be used to identify both (a) patterns in music that people tend to find, and (b) patterns in music that people tend not to find. Successful modeling of (a) – and by extension of music cognition – has led to generative models whose output is difficult to distinguish from original human-composed pieces. We discuss two application areas: music therapy, specifically the development of models for the diagnosis and characterization of borderline personality disorder; and music education, specifically AI assistance in music composition.

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