Polyphonic Timbre Perception & Cognition: Across disciplines and cultures

SMC Summer School 2007

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The aim of this research is to investigate the relation between polyphonic timbre and the behavioral and neurophysiological responses caused by it in the listeners. The proposed plan will initially deal with a behavioral study, which investigates the association of semantic descriptors to inherent timbral features of music (selected from a cross-cultural music palette to avoid familiarity) described by them. This could help determine salient features involved in polyphonic timbre perception. The study can then be extended by examining the neurophysiological responses to find out if there exists a way of mapping these responses to behavioral responses via computational analysis. In addition, cross-cultural music excerpts that evoke similar responses can be analyzed to check for salient timbral features. This may lead to creating models of polyphonic timbre perception that can be validated by comparing the actual responses to the ones predicted by the model for new sets of stimuli . The results of this work could be applicable in the fields of new musical interfaces, music information retrieval and possibly in music therapy.

Questions
Behavioral + Computational + Neurophysiological

What are the most salient features of polyphonic timbre perception in a cross-cultural context?

What are the (dis)similarities in music tagged with the same descriptor? How can we bridge the "semantic gap"?

What are the salient timbral features that determine preference and how do they vary cross-culturally?

Is there any causal link between the individual's neurophysiological reactions to timbral features of music and the individual's behavioral preference for them?

Is there a possibility to create a "timbre space" for each individual combining timbral features of music that evoke certain kind of central and autonomic nervous system reactions and behavioral responses from an individual?