Mammals and music among others

crossmodal perception & musical expressiveness

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Stravinsky. *Rites of Spring*. This is when I was heavy into sampling. I remember playing this song, and when you’re looking for a sample either you’re picking the arm up to try to find something or you let it play for a minute. I was like, “This is a nice song,” and all of a sudden it got dark and I was like, “This song scares the crap out of me.” Then I went, “Ahhh, this song is really nice.” The way he designed that song, I say it was genius.

(Grandmaster Flash, *Nightline*, 2012).
A paradox: pure music

- expression = a communicative exchange
  - behaviors: postures, gestures, actions
  - publically display occurent emotions
  - one side of a communicative exchange
  - integrate, coordinate, social context
A paradox: pure music

• expression = a communicative exchange
  – behaviors: postures, gestures, actions
  – publically display occurent emotions
  – integrate, coordinate, social contex

• pure/absolute music
  – inanimate artifact
  – neither beliefs, desires, emotions, or behaviors
A paradox: pure music

- expression = a communicative exchange
  - behaviors: postures, gestures, actions
  - publicly display occurent emotions
  - integrate, coordinate, social context

- Note: no problem for music associated w/ text or narrative
Reorient the exchange

Pure music as a behavioral expression of:

- composers
- performers
- fictional personas

- sometimes, but…
- “professional” composers…
- abstract, no narrative center-focus
- begs the question: “How !?!”
Nonetheless the right direction:

An expressive communicative exchange:

• how do listeners acquire, represent, manipulate, and use information carried in the surface structure of a musical work to recover its expressive content?

• a question of:
  – perceptual cues
  – psychological mechanisms
Contour theory:
A theory about perceptual cues:

- the dynamic structure of the music *is analogous to*
  - the contour of the subjective feelings of emotions
  - reflected in the dynamic structure of expressive behaviors
    - rhythmic, harmonic, and tonal tension and resolution
    - blues compositions or augmented and diminished chords
  - is-recognized-in-the-music-as (no arousal)
Point-Light Displays

Embodied appraisals:

A model of psychological mechanisms

- the dynamic contour of expressive music
  - automatically & directly induces autonomic responses
  - temporal profiles resemble the contour of an expressed emotions
    - quick and dirty “low road” appraisals: primitive emotions
    - ebb/flow of tension/resolution: cognitive monitoring & recognition
- a mechanism to explain arousal where it occurs
Can a musical work, an auditory stimulus, really sound like the visual appearance of expressive bodily gestures, visual stimuli?
Davidson (1993): music & performance

- Deadpan, Projective, Exaggerated / Violin & Piano Soloists
- Auditory Only, Visual Only, Auditory-Visual
- performance videos = point light displays
- participants reliably perceive the degree of expressiveness
- carry information about manner and expressive intentions
• Krumhansl & Schenck (1997): music & dance
  – Balanchine’s *Minuetto from Mozart’s Divertimento No. 15*
  – continuous measures / (AO), (VO), (AV)
  – tension/emotion measures correlated within conditions
  – emotions correlated across conditions
  – AV can be modeled as a weighted, additive combination (AO + VO):

![Graph showing music and dance with measures and emotions expressed](image-url)
Krumhansl, Vines, & Chapados

- **Krumhansl & Schenck (1997):** music & dance
  - tension/emotion measures correlated within/across conditions
  - AV can be modeled as an additive interaction (AO + VO):
  - music & bodily movements convey the same expressive information
  - weighted additive crossmodal interaction
  - music played a greater role
- clarinet solo / continuous measure / AO, VO, AV
- (AV) modeled as an interaction (AO + VO):
  - perceived smooth & controlled body movements...
    dampened experienced tension relative to (AO)
  - perceived punctuated highly expressive movements...
    increased tension experienced tension relative to (AO)

Chapados & Levitin (2008)
- skin conductance correlated across three conditions
- (AV) modeled as an interaction (AO + VO)

Once again:
- music & bodily movements carry the same expressive information
- crossmodal interactions
These results suggest that there is an abstract dynamic quality, a contour, generally **diagnostic** for the content of an expressed emotion that can be realized in any of a range of media with adequate structure and temporal flexibility.
biased competition
Bar, 2009; Desimone & Duncan, 1996; Schyns 1998)

selectivity & diagnosticity
biased competition models
reciprocal attentional circuits
implement a perceptual recognition framework
– unimodal, sensorimotor, affective; inhibit / enhance / integrate
– dorsal / medial OFC (affective memory; gut reactions)
– ventral / lateral OFC (behavioral significance, multisensory integration)
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Diagnostic Recognition Framework

minimal sets of cues sufficient to determine the identity, shape, or affordances of objects and events in the environment (Schyns, 1998).

- selectivity
- information demands
- diagnostic cues
- perceptual recognition
Affective perception
(Pessoa, Kastner, & Ungerleider, 2002)

- attention is necessary for affective responses to emotion-laden stimuli (Pessoa et al, 2002).
Collapsing a distinction...

- The unfolding temporal, rhythmic, harmonic, and tonal *contour* of a musical work is a complex formal/compositional cue diagnostic for the expressive content that listeners perceptually recognize in the music.

- The capacity to recognize the expressive content of these cues in the music depends upon top-down attentional resources:
  
  - *embodied perceptual processes* responsible for both the appraisal of the *affective salience* of a stimulus in normal contexts and our *gut reactions* to it.
  
  - processes that are part of an integrated, sensorimotor-affective attentional circuit that integrates semantic, unimodal perceptual, and affective information in perception.
Taking stock

A model of musical expression that explains:

- key formal features/strategies of expressive music:
  - an expressive toolkit
  - robust structural features of the music

- and how they carry/communicate diagnostic information
  - we hear the emotion in the music, in its contour
  - we associate this emotion with a narrative/persona when the music depicts one – narrative cues are contextual cues that influence the diagnosticity of expressive cues carried in the work.

- perceptual recognition & arousal

- cortico-fugal attentional networks & imagination
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