Embodied meaning in musical gesture
Cross-disciplinary approaches

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Listening for embodied meaning

1. Phenomenology 1st, 2nd person
2. Expressive music therapy 1st, 2nd, 3rd person
3. Receptive music therapy 1st, 2nd, 3rd person
4. Neuroscience 3rd person
1.1 Phenomenology - Open Listening
1st & 2nd person

Piece for string quartet  30 seconds
*Listen twice*
What did you hear?
*Tell your neighbor*  One minute
Emerson String Quartet

Webern: Bagatelle op. 9, no. 1  0’30

Thomas Clifton 1976, 1983
1.3 Intensive listening:
Phenomenological variations

*Open listenings*

*Focused listenings: descriptions*

*Hermeneutical listenings: interpretations*

*Dialogues*

Christensen 2012: 42-63
1.4 Intensive listening
1st & 2nd person

*Multiple repeated listenings:*
First person descriptions and interpretations

*Dialogues: Intersubjective evaluations of the multivariable musical experience*

Ian Cross 2005:30; Aksnes & Ruud 2008:55
2.1 Expressive music therapy
Improvisation, one minute.
Therapist: drums. Autistic boy: cymbal

Wigram et al. 2002: 253-256

gesture
expression
interaction
2.2 Methods for description and interpretation of gesture, expression, and interaction 1st, 2nd, 3rd person

Lawrence Ferrara 1984; Even Ruud 1987
Overview in Christensen 2012: 26-42
2.3 Expressive music therapy
Parent-child improvisation
1st, 2nd, 3rd person

Goal: Assessment and development of parental competences

Jacobsen 2012
Jacobsen, McKinney & Holck 2014
2.4 Method: Interaction analysis

Jacobsen 2012:162

Interaction Analysis

Gesture

Music

Child

Parent

Music

Cylinder

Gesture

Clinical family 2

1 parameter ending (rhythmic, dynamic or melodic)
2 parameter ending
3 parameter ending
Musical imitation
Imitation and continuation
Smile
Big smile
Laughing
Continues until
Continues+stops
Fading
Pauses
Looking at therapist
Looking at partner
Looking away from partner
Move/touch own instr.
Looking at own instr.
Looking at partners instr.
Pointing with hand or instr. at partner
Sitting facing partner
Sitting parallel
Sitting facing away

10s
20s
30s

Mmm

Your turn!

Are you done?

Good

One more
3.1 Receptive music therapy
Music listening in a relaxed state

GIM: Guided Imagery and Music
The client describes

*music-induced images, memories, body sensations, emotions, narratives*

The therapist guides with sparse comments
3.2 Method: Correlations between

Musical gestures and structures

and

Experienced imagery and narrative

Grocke 2007; Bonde 2004: 257-268
4.1 Neuroscience

Music listening activates motor planning in Cortex

PMA: Premotor Area
SMA: Supplementary Motor Area

Zatorre et al. 2007
4.2 Neuroscience
Music listening activates the Basal Ganglia and Cerebellum

Zatorre et al. 2007
4.3 Neuroscience method: fMRI scanning during music listening

3rd person
4.4 Neuroscience method: EEG  3rd person
4.5 Two different kinds of music:

Beat-related music
Music in free flow

“The mind is capable of organizing temporal patterns without reference to a beat” (Patel 2008:98)

Beat-related entrainment: Grahn & Rowe 2009
The vestibulo-ocular reflex (Ito et al., 1970). The diate adaptive timing of the classically conditioned, eye-blink sequences. Moreover, the inferior olive has been suggested to me-of metrical rhythmic sequences to timing of isochronous se-

activity in a perceptual timing task when they contrasted timing an isochronous beat. Xu et al. (2006) found similar inferior olive apparent beat in contrast to the timing of regular sequences with

activation for auditory timing of irregular sequences without an 2006; Liu et al., 2008). Here, we observed significant inferior olive studies of perceptual timing based on visual sequences (Xu et al.,

 timing signals (Welsh et al., 1995). Forming a dynamic network capable of producing accurate

receive climbing fiber afferents from the olivary cells, thus inhibitory input from the cerebellar Purkinje cells, which in turn functional subgroups. The deep cerebellar nuclei receive in-
tions between olivary cells and organize them into dynamic,

dee brainstem nuclei, which synapse directly on the gap junc-

coefficient is controlled by GABAergic projections from the

These oscillations are synchronized by electrical coupling be-
tween the olivary cells and organize them into temporally co-

able them to generate a timing signal (Llina ´s and Yarom, 1981).

The inferior olive has remarkable cellular and network properties that make it an ideal generator of temporal patterns (Yarom and Cohen, 2002; Jacobson et al., 2008). The intrinsic voltage-gated

threshold membrane potential oscillations at

conductances present in olivary neurons sustain rhythmic sub-

Cohen, 2002; Jacobson et al., 2008). The intrinsic voltage-gated

report a functional dissociation in perceptual timing with no

temporary to this dissociation in timing of movements, here we involve the cerebellum and that temporal control of rhythmic

such as the temporal control of a series of discrete movements requiring an explicit or discrete representation of time intervals

beat in the sequence to be timed. The authors suggested that tasks

being associated with the processing of a temporal regularity or a

tasks such as duration discrimination and "emergent timing" as

4.6 Two networks for auditory timing timing, respectively.

A glass brain image in MNI space showing activations for absolute, duration-based timing

Local maxima for relative, beat-based timing are shown at

Table 2. Stereotactic MNI coordinates for relative, beat-based timing

p 0.001 (uncorrected).
5. Suggestions for Cross-disciplinary approaches
5.1. Cross-disciplinary approach

Extending studies of guqin music to neuroscience

5.2 Cross-disciplinary approach
Neuroscience and music therapy

Systematic comparisons in fMRI:
*Predominant gestural music in free flow*
versus
*Predominant beat-related music*

including audio and video recordings of
music therapy improvisations,
music from different continents,
contemporary art music
5.3 Cross-disciplinary approach
Phenomenology, linguistics, sound analysis, neuroscience

Comparison of gestural timing in music and spoken language

Kotz & Schwartz 2010; Schwartz et al. 2013
The comparison between synchronized and non-synchronized acts showed statistical differences in interbrain phase synchronies for all frequency bands analyzed (alpha-mu, beta, and gamma) except for the theta band. Designing specific interbrain statistical analyses, we were able to show that the alpha-mu rhythm was the most robust interbrain oscillatory activity discriminating behavioral synchrony vs. non-synchrony in the centroparietal regions of the two interacting partners. The alpha-mu band is considered as a neural correlate of the mirror neuron system functioning [57]. Specific frequencies of this band (9.2–11.5 Hz) over the right centroparietal region have been proposed as a neuromarker of social coordination [19]. The symmetrical pattern found for the model and the imitator possibly reflects a coordinated dynamics of hand movements. The pattern however became asymmetrical in the higher frequency bands and should be seen as a brain-to-brain top-down modulation reflecting the differential roles of model and imitator. This is consistent with motor transient activities involved in the beta band [57] and the implication of gamma in attentional processes, perceptual awareness and cognitive control [34,58].

The other contrasts performed complement these findings. The absence of a significant difference between imitative and non-imitative episodes during spontaneous imitation assesses that...
Thank you for listening!

What are your questions and suggestions?
References


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