

# Thought Conductors – Towards a non-reductionist music cognition research

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SYSTEMATIC MUSICOLOGY: Perception and Cognition of Music			
28.04. JONNA VIGNER University of Oxford "The emerging role of the brain in music"	05.05. RICHARD WIDESS University of London "Cognitive functions and South Asian music"	12.05. IAN CROSS University of Cambridge "The nature of music"	19.05. FERNANDO BRAVO Tel Aviv University "What can neuroscience tell us about music?"
02.06. WOLFGANG University of Hamburg "Music and the brain: a cognitive perspective"	09.06. MICHAEL ROETH University of Hamburg "Musicality, memory and music psychology"	16.06. SEBASTIAN KLOTZ University of Leipzig "Musicality, memory and music psychology"	23.06. HANS-CHRISTIAN University of Hamburg "Music and the brain: a cognitive perspective"
30.06. MARKUS NEUMANN University of Hamburg "The perception of musical time"	07.07. OLIVER University of Hamburg "The perception of musical time"	 <b>MUSIKWISSENSCHAFT DRESDEN</b> <small>AN DER UNIVERSITÄT DRESDEN</small> <b>RESEARCHE IN MUSIC COGNITION AND ACoustics</b>	
14.07. DAVE TORAL University of Cambridge "The brain in music"	21.07. TIL REICH University of Hamburg "The brain in music"	<b>ÖFFENTLICHE RINGVORLESUNG / AQUA</b> Institut für Kognition und Musikwissenschaft August 2025, 10:00 at: Musikwissenschaftliches Institut, Leipzig 01 Dienstag 18.30-20.00 weitere Informationen: www.musikwissenschaft-leipzig.de	

# Questions

- ④ How can functional and contextual methodologies be combined in order to achieve a richer understanding of music perception?
- ④ Do culturalistic and empirical paradigms of listening share any common ground?
- ④ Which methodologies acknowledge the technological mediatedness of auditory objects?

# Starting points

- ⊙ conceptual
- ⊙ interventionist
- ⊙ dialogical
- ⊙ variantological (cf. Siegfried Zielinski, UdK Berlin)

# Music Cognition Research at a cross-roads:

- Refined, high-res functional empiricism / danger of a new positivism
- Ecologically inspired research: post-functionalism

# Tendencies that complement the functionalist paradigm

- evolutionary perspective (Georg KNEPLER, Ian CROSS)
- cognition & action perspective, (Peter KELLER)
- music & embodiment (Marc LEMAN)
- music and consciousness (David CLARKE & Eric CLARKE)
- *ecological* psychology of music (E. CLARKE)
- musical presence and consensuality (S. KLOTZ)

# Three set-ups

- (1) an artistic project that features EEG-driven bio-feedback to trigger pre-composed musical modules for 'live' performance (*Thought Conductor* by artEmergent; 1997/2001).
- (2) the autobiographical memory detection in music cognition studies, using fMRI (Petr JANATA, *Cereb. Cortex* 2009)
- (3) Empirical research on musical empathy, based on QCAE and time series responses of musicians and observers (Clemens WÖLLNER, *Psychology of Aesthetics, Creativity, and the Arts* 2012)





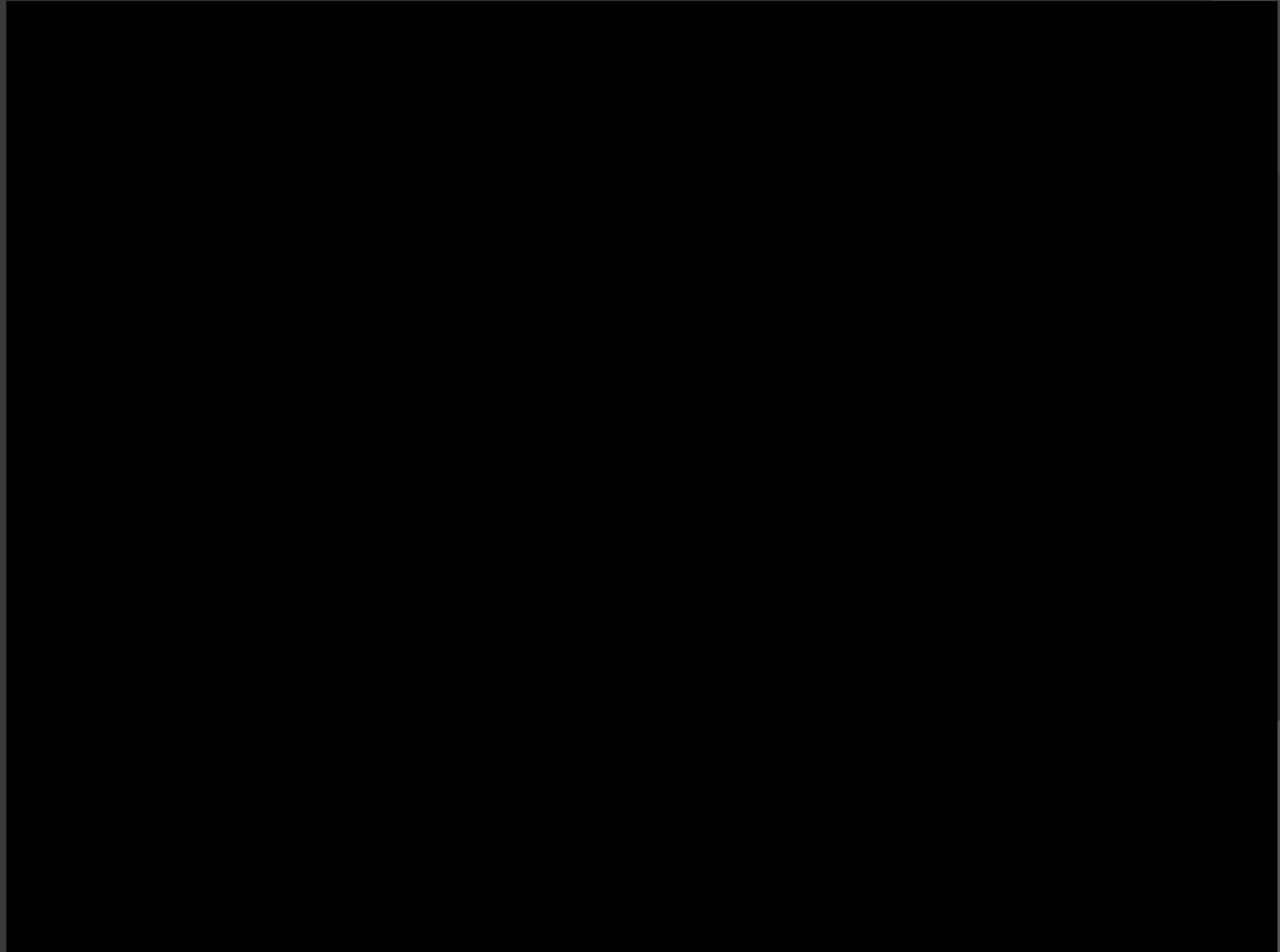








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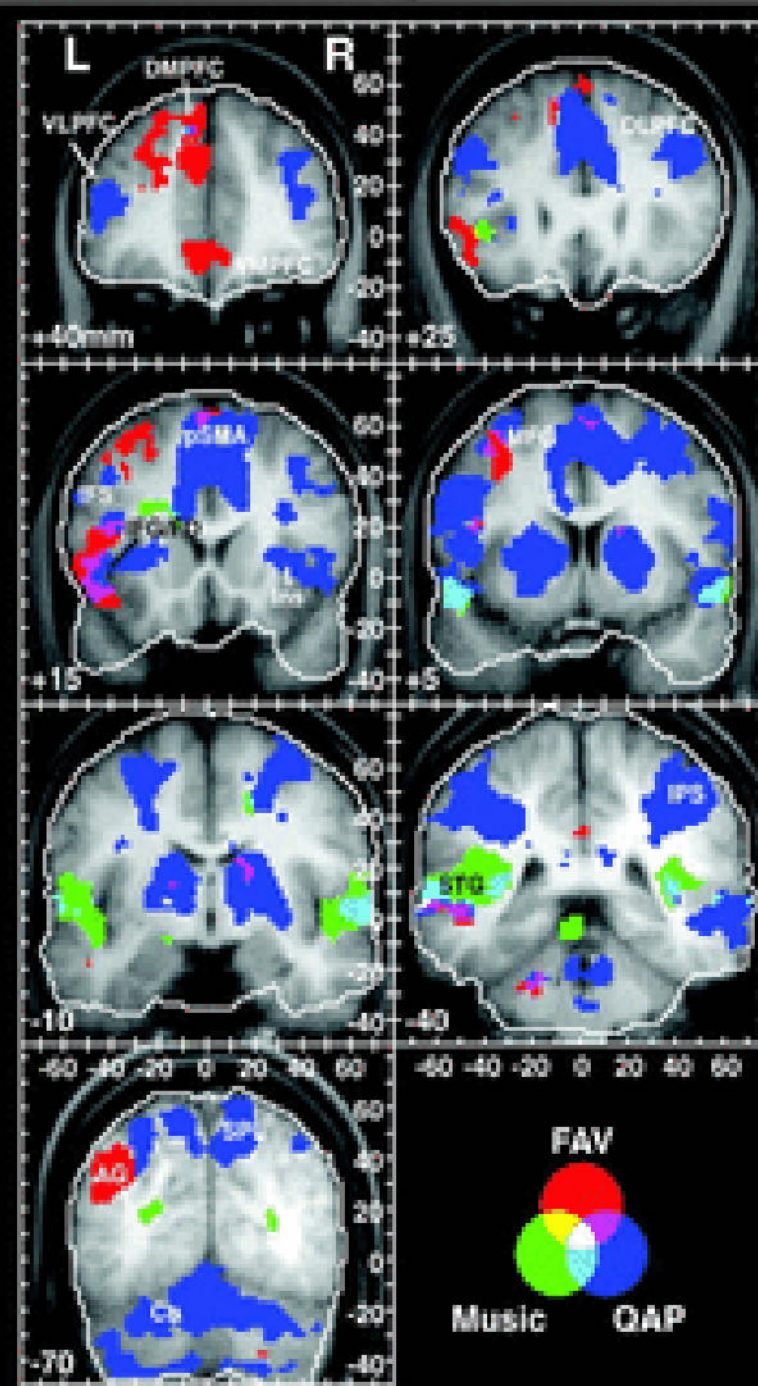
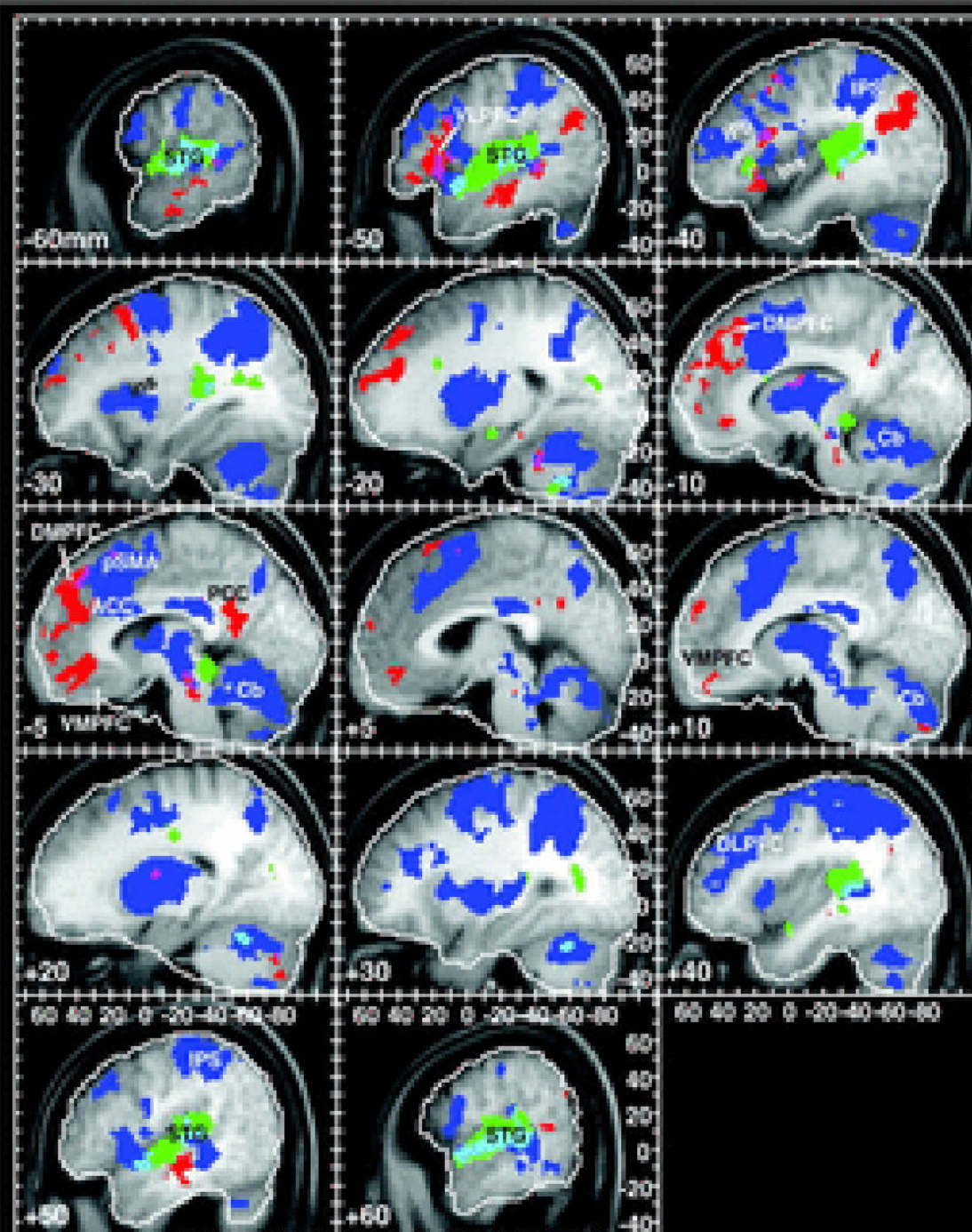
# Thought Conductor

- ⊙ *A Becoming-together*, reciprocal prehensions (Mariam FRASER 2005)
- ⊙ Input/output become exchangeable
- ⊙ Self-practice: *bioglyphic* curves; production of differences, but no clear meanings
- ⊙ Empathic *bio-feedback* that exceeds our analytical capacities, yet yields music to listen to
- ⊙ Any causalistic listening attempt is contaminated: the subjective illusion is dismantled

## *Thought Conductor, II*

- ◎ Phantasies of monologic cybernetic control: are undermined through complex time-layering and the participatory and collective nature of the *Thought Conductor*









3T Siemens Trio whole-body MRI system at the UC Davis Imaging Research Center where the functional imaging tests by Petr Janata have been carried out. From: <http://ucdirc.ucdavis.edu/facilities/index.php>

## Petr Janata, hypothesis (2009)

The medial prefrontal cortex (MPFC) is regarded as a region of the brain that supports self-referential processes [...] I used *functional magnetic resonance imaging* [...] to test the hypothesis that music and autobiographical memories are integrated in the MPFC. [...] These findings [...] demonstrate the spontaneous activation of an autobiographical memory network in a naturalistic task with low retrieval demands.

(p. 2579)

# Figure caption (see above) from Janata, 2009

Figure 2. Summary of the activation patterns associated with the MusPlay, QAP, and FAV effects. The color legend for each of the effects of interest and conjunctions of effects of interest is shown at the bottom of the right panel. The statistical maps are thresholded at  $P < 0.005$  (uncorrected) and a 40 voxel extent for all effects. In this and subsequent figures the following apply. The lateral displacement (mm) of the anatomical slice shown in each subpanel is indicated in the bottom left corner. Negative values for the sagittal sections in the left panel denote positions in the left hemisphere. Negative values for the coronal sections in the right panel denote positions posterior to the anterior commissure. The tick values of the scales (in mm) are given relative to the anterior commissure. The white contour lines enclose the volume in which data were available for all subjects.

Abbreviations: STG, superior temporal gyrus; DLPFC, dorsolateral prefrontal cortex; DMPFC, dorsomedial prefrontal cortex; VLPFC, ventrolateral prefrontal cortex; VMPFC, ventromedial prefrontal cortex; IFG, inferior frontal gyrus; FO, frontal operculum; IPS, intraparietal sulcus; AG, angular gyrus; pSMA, presupplementary motor area; ACC, anterior cingulate cortex; PCC, posterior cingulate cortex; IFS, inferior frontal sulcus; MFG, middle frontal gyrus; Ins, insula; SPL, superior parietal lobule; and Cb, cerebellum.

# Cluster of Methods

Regressor tables, composite statistics, interpolation curves, model-based clustering, expectation-maximisation algorithms, statistical approximations, and composite visualizations of brain activations in fMRI

→ generate the new 'scores' which frame listening

# Technological Agency: the case of fMRI

MRI as used by Janata: Its technical features and capabilities determine how listening is being looked at and in which cultures of measurement it is being contextualized.

# Technological Agency, II

- ⦿ Technological actors generate a ‘specificity’ of data and a technologically-driven evidence that needs to be balanced against approaches that cultivate non-specificity and ambivalence



# Listening as distributed, mediated practice

- regard listening not as a subject/object-relationship available to human minds and ears from which 'content' can be drawn analytically,

but

- as a cultural practice that leads to peculiar arrangements of technologies, social roles, scientific and aesthetic procedures

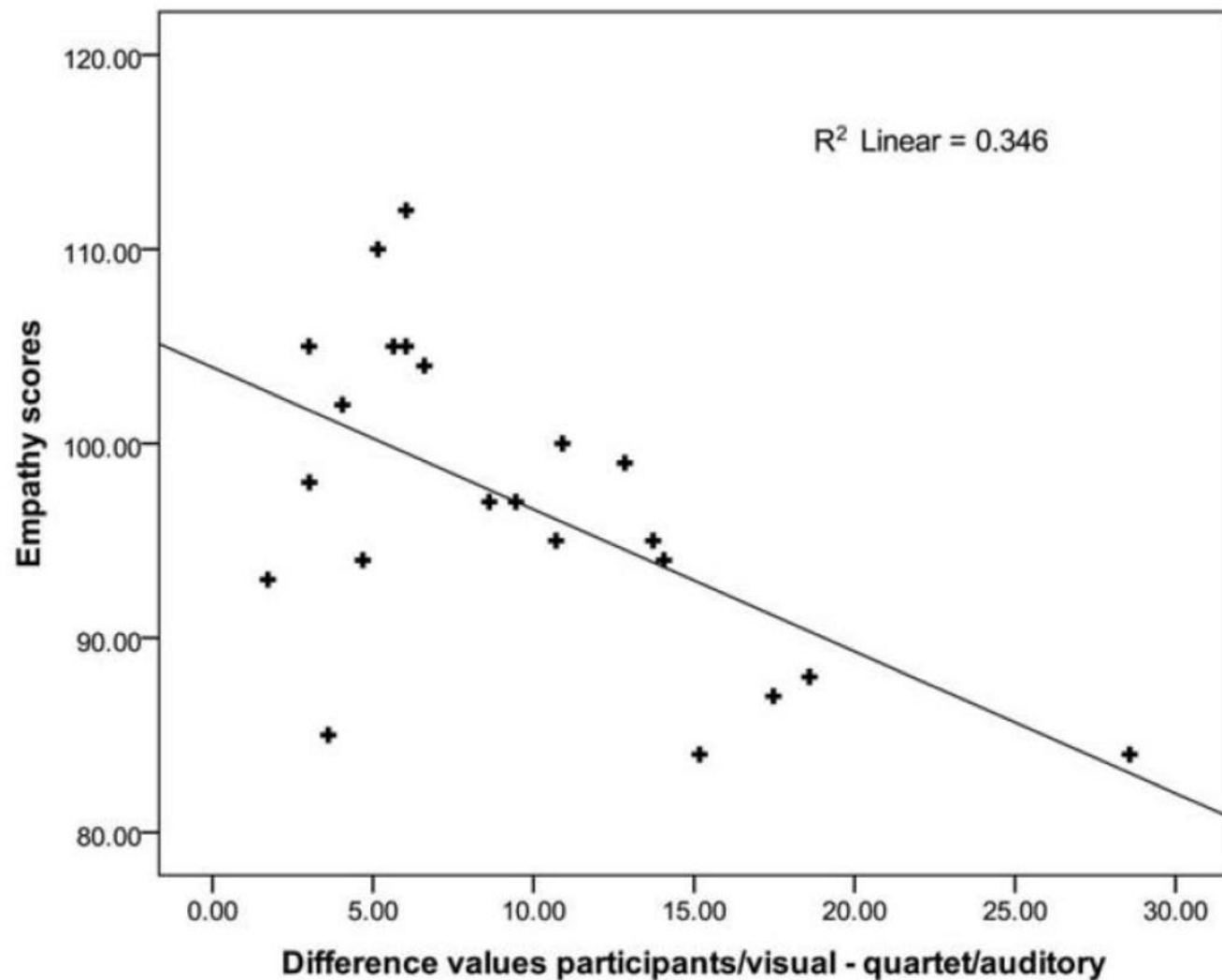


Figure 5. Correlations between overall empathy and visual-auditory differences scores.

Clemens Wöllner, "Is Empathy Related to the Perception of Emotional Expression in Music?", in: *Psychology of Aesthetics, Creativity, and the Arts* 2012, Vol. 6, No. 3, p. 220.

information transmitted. In the current study, four musicians were recorded during a performance of Vaughan Williams' first string quartet. The same musicians provided continuous expressiveness ratings to multimodal presentations of a musical excerpt taken from the recording. It was assumed that (a) expressiveness judgments of the visual actions (i.e., performance body movements) correspond to judged musical intentions, and (b) that continuous musical judgments were related to acoustical measures of intensity (cf. Schubert, 2004). Second, relationships between independent observers' expressiveness responses and the quartet's own expressive intentions were investigated and related to empathy. It was hypothesized (c) that expressiveness responses correlate with the quartet's intentions across multimodal conditions (cf. Davidson, 1995). If empathy plays a role in the perception of emotional expression in music, (d) then individuals with higher empathy scores should be more accurate at estimating expressiveness in music performance.

# The emerging topic of music as social cognition

- ⦿ From *stimulus* processing to *situation* processing
- ⦿ Nexus listening/action/perspective taking
- ⦿ musical *affordances*
- ⦿ Communication/recognition of *intentionality*
- ⦿ Prosocial behaviour
- ⦿ Agentive understanding (Andie McGUINNESS/Katie OVERY)



# In summarizing

- ⊙ An artistic project that exposes key monitoring and generating strategies concerning audio imagination and musical mediation (artEmergent)
- ⊙ Two set-ups that empirically validate complex constructs (JANATA, WÖLLNER)
- ⊙ Contextualize new artistic and experimental designs within post-functional, non-reductionist approaches

# Challenges of future research in systematic musicology

How to experimentally address:

- the multi-functionality of musical dimensions (CROSS 2009)
- non-fixity relations
- imaginative, non-modular conjunctions
- stimulus dis-ambiguation (LEMAN et al. 2008)

→ *Thought Conductor*: cultivates ambiguity on many perceptive, technological and conceptual levels



# Toward a Critical Neuroscience of Music

- ⊙ the situated brain
- ⊙ Contextualize neuroscientific objects of inquiry as part of a critical enterprise
- ⊙ Start to 'assemble' evidence (Bruno LATOUR)
- ⊙ Allow for more hybrid experimental set-ups
- ⊙ Analyse multiple epistemic cultures at work (Jan SLABY/Suparna CHOUDHURY, *Crit Neuroscience* 2012)

# A plea for investigative variants

- ⦿ fully acknowledge the operative agency and the intermediary potential of technologies
- ⦿ This may lead to a re-calibration of the *empirical*, of *causality* and of assumed *naturalistic* practices



## Selective Bibliography

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Fraser, Mariam, “Making Music Matter”, in: *Theory, Culture & Society*. Special Issue on: *Inventive Life: Approaches to the New Vitalism*, February 2005 vol. 22 no. 1, pp. 173-189.

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- Slaby, Jan & Suparna Choudhury, “Proposal for a Critical Neuroscience”, in: Choudhury/Slaby (eds.), *Critical Neuroscience: A Handbook of the Social and Cultural Contexts of Neuroscience*, First Edition, London 2012, pp 29-51.
- Wöllner, Clemens, “Is Empathy Related to the Perception of Emotional Expression in Music? A Multimodal Time Series Analysis”, in: *Psychology of Aesthetics, Creativity, and the Arts* 2012, vol. 6, no. 3, pp. 214-223.

# Resources

- ◎ [http://www.udk-berlin.de/sites/content/topics/research/variantology/index\\_eng.html](http://www.udk-berlin.de/sites/content/topics/research/variantology/index_eng.html)
- ◎ <http://www.artemergent.org.uk/tc/tc2.html>