SELF-REPORT MEASUREMENT OF SEGMENTATION, MIMESIS AND PERCEIVED EMOTIONS IN ACOUSMATIC ELECTROACOUSTIC MUSIC

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MENU

-ACOUSMATIC ELECTROACOUSTIC MUSIC

- SEGMENTATION
    - Experiment 1
    - Experiment 2

- MIMESIS
    - Experiment 3

- PERCEPTION OF EMOTIONS
    - Experiment 4

- DISCUSSION

ACOUSMATIC ELECTROACOUSTIC MUSIC

What is "Electroacoustic Music"?

"any music in which electricity has had some involvement in sound registration and/or production other than that of simple microphone recording or amplification" (Landy ,1999)

+

"it involves manipulation of sounds with an artistic purpose" (Truax,1999)

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Electroacoustic Music is produced by the manipulation of sound taking full advantage of electroacoustic technology. (me, now)

ACOUSMATIC MUSIC = Music that is perceived only aurally, meaning that it is not possible to see the sources of the sounds.

ACOUSMATIC ELECTROACOUSTIC MUSIC = Electroacoustic Music diffused by loudspeakers. It is not possible to see the source of the sounds being heard.

ACOUSMATIC ELECTROACOUSTIC MUSIC

Why is it interesting to study?

- Because I like it.

- Unfamiliarity in several dimensions:
  - As a genre.
  - Material: *sound objects* , e.g. spectral morphology, c.f. Schaeffer,1966,1967; Smalley, 1986, 1997; Delalande et al., 1996.
  - Structure, e.g. syntax c.f. Emmerson (1986)
  - As aesthetic, e.g. Reduced listening c.f. Chion (1983)

- Could trigger unique responses which would allow to learn more about human perception.

SEGMENTATION: Experiment 1

Indicate when there is a change in the music

Training stimulus :

Segmentation stimulus 1:

Segmentation stimulus 2:

SEGMENTATION

Chunking of a sound stream.

(c.f. Bregman, 1984; Cook, 1999)

SEGMENTATION: Experiment 1

Segmentation of an Acousmatic Music Excerpt

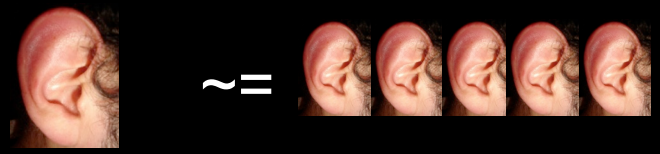
- **Aims:** segmentation task of an AEMusic excerpt: recording and analysis of self-response
- **Participants:** 22, 20 to 40 years (median was 26 years).
- **Stimuli:**
  - Training: Walk This Way (Tyler, S., Perry, J, 1975)
  - Comparison: Petzold ‘s, Minuet in G Major from Bach (Schulze, 1979)
  - EAMusic: Ciguri (Otondo, 2008)
- **Procedure:**
  - segmentation task, 5 trials
  - Free verbal response for trials
- **Apparatus:**
  - Input: Wiimote button, Microphone
  - Recording: Pd Aural (former Visuaural)

SEGMENTATION: Experiment 1

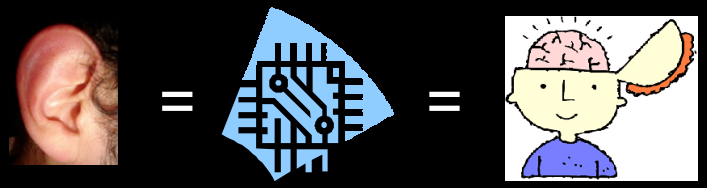
Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**
  - Comparison between ‚participants' and computed segmentation: finding a correspondence to audio features.

  - Measure variation of participants' responses within five listenings



  - Semantic analysis by clustering of free responses

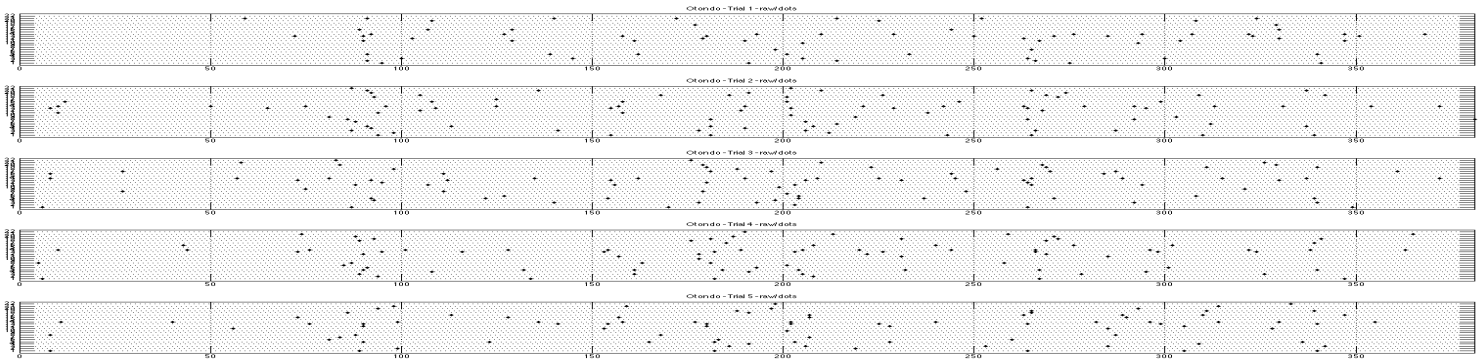


SEGMENTATION: Experiment 1 : Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**

  - ➢ Participants' segmentation:

✓ DATA



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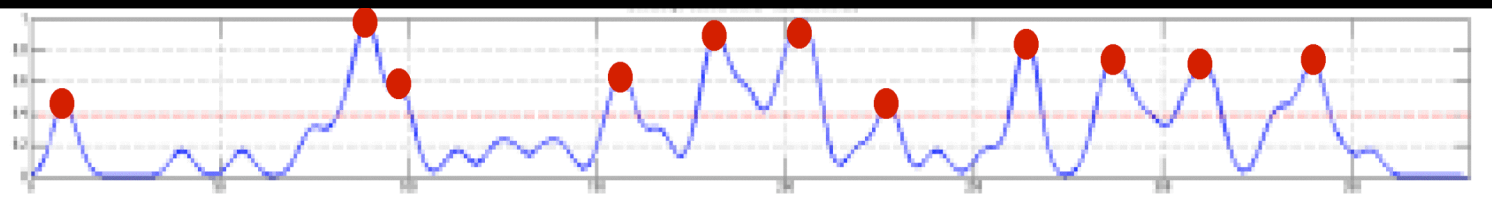
✓ KDE

$$\hat{f}_h(x,h) = \frac{1}{nh}\sum_{i=1}^{n} K\left(\frac{x - X_i}{h}\right)$$



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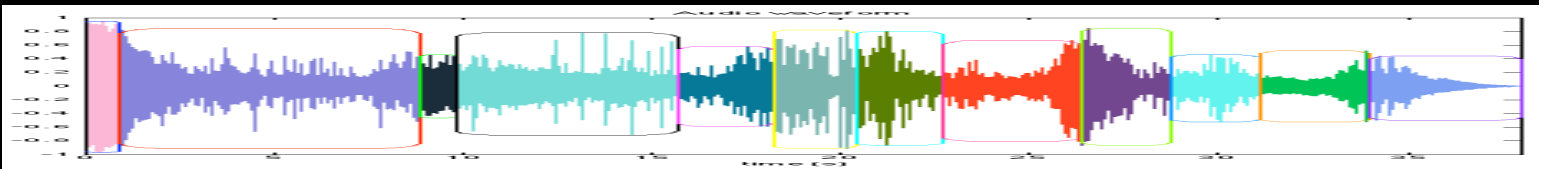
✓ AUDIO

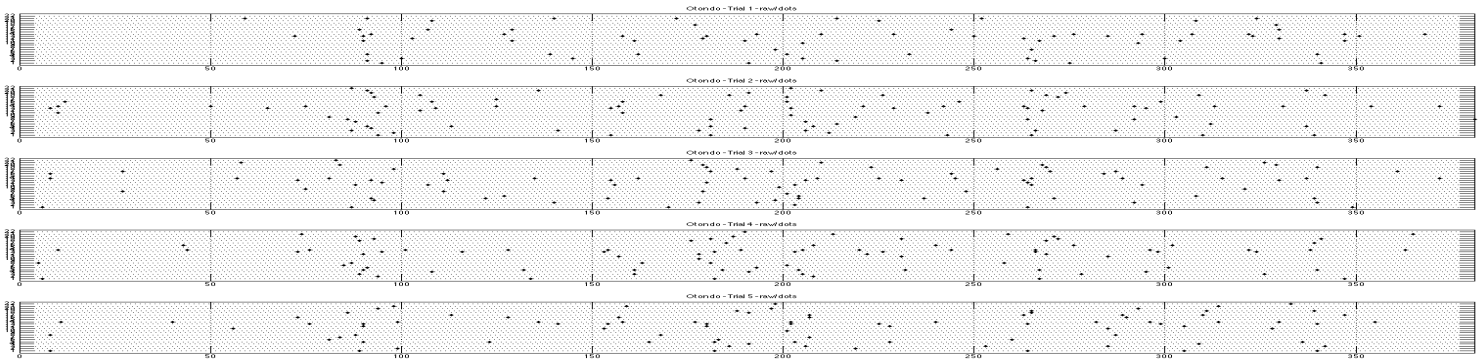


SEGMENTATION: Experiment 1 : Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**

  - Participants' segmentation:

✓ DATA



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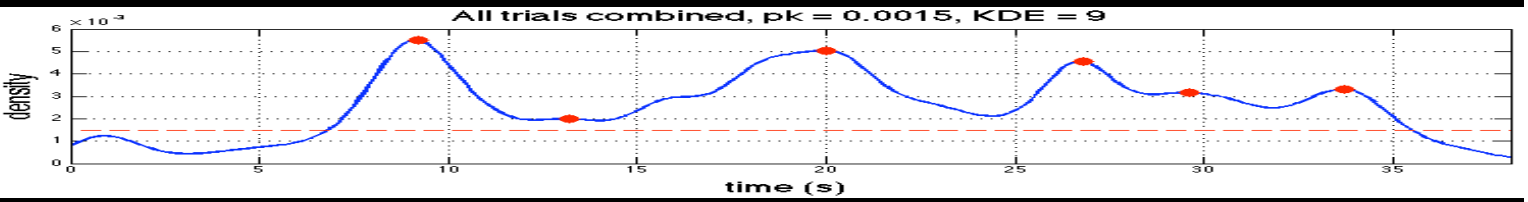

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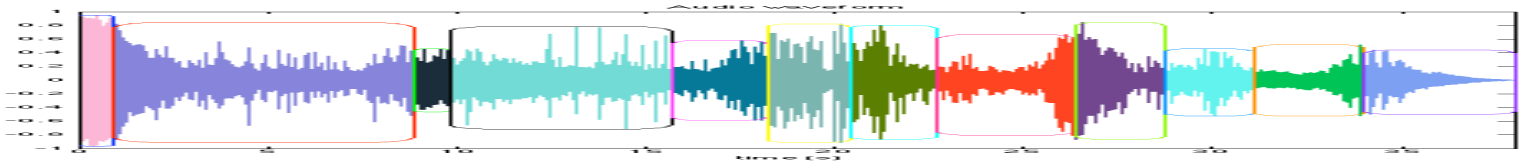
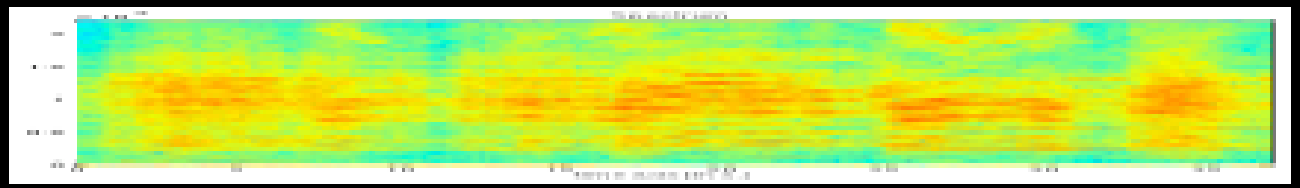
✓ AUDIO



SEGMENTATION: Experiment 1 : Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**
  - ➢ Computed segmentation: MIR Toolbox, Lartillot & Toiviainen (2007)

✓ SPECTRUM



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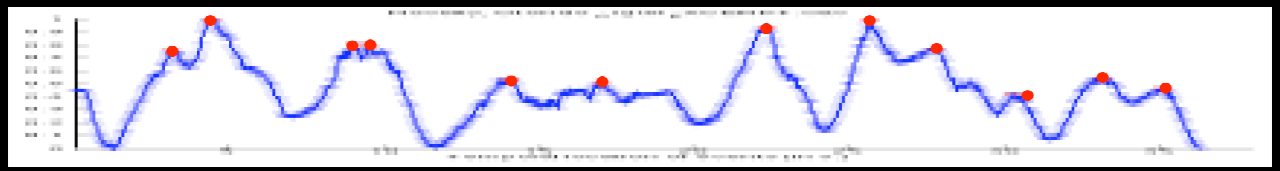
✓ NOVELTY



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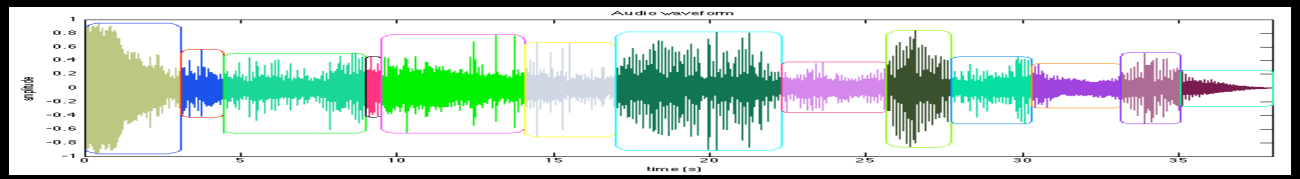
✓ AUDIO



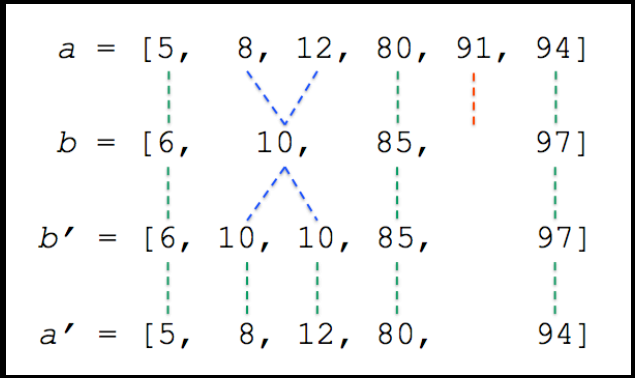
SEGMENTATION: Experiment 1

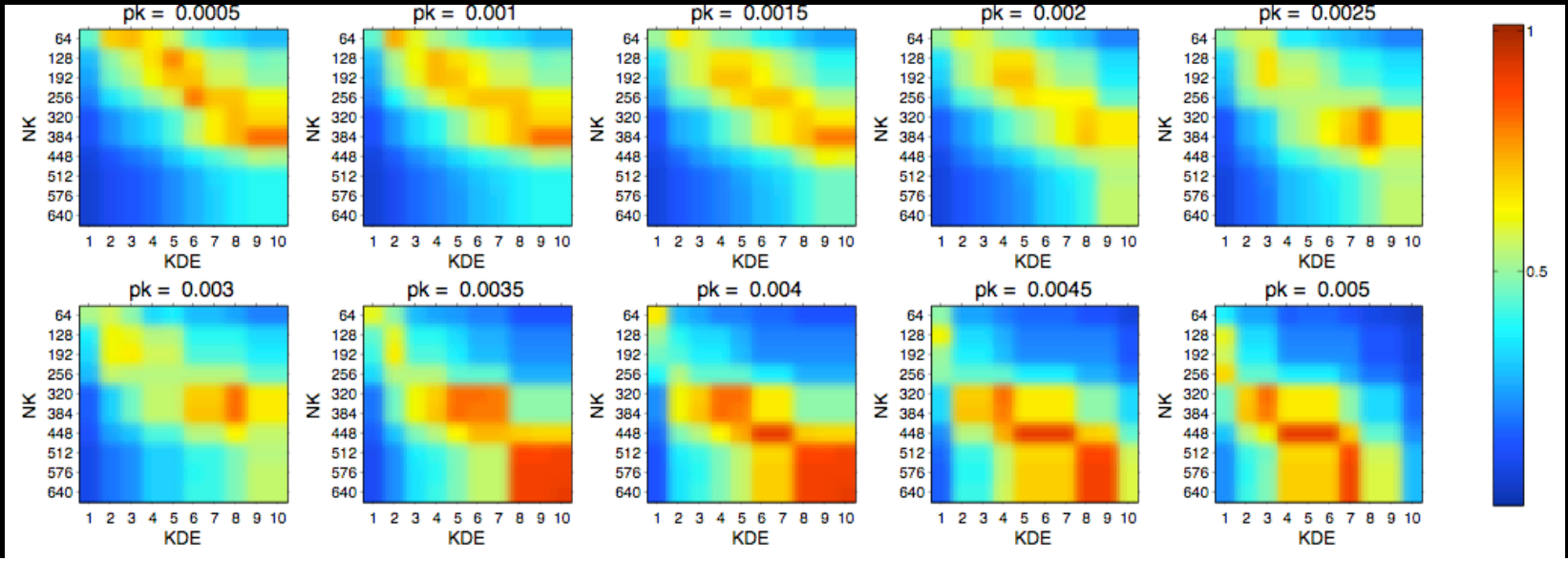
Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**
  - Find most appropriate parameters using BINSEQSI :
    - Density estimation of participants' segmentation:
      - ✓ Kernel Density Estimation window size
      - ✓ Peak Threshold
    - Computed segmentation of audio file::
      - ✓ Novelty function kernel window size

SEGMENTATION: Experiment 1, Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**
  - Find most appropriate parameters using BINSEQSI :

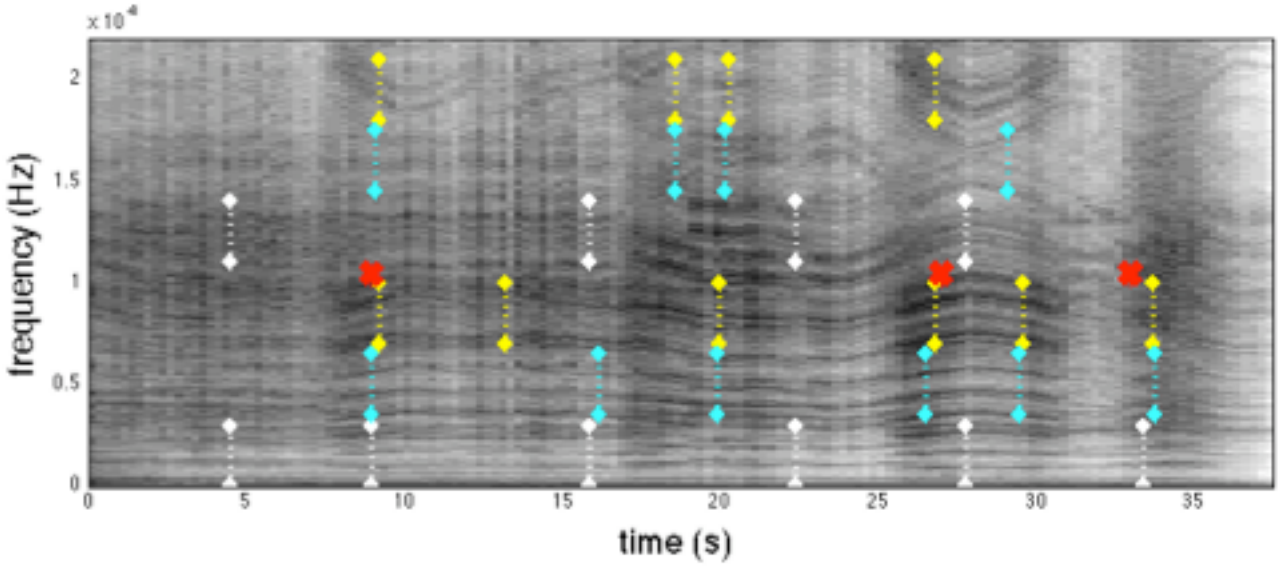




SEGMENTATION: Experiment 1

Segmentation of an Acousmatic Music Excerpt

- **Data Analysis:**
  - Find a correspondence to audio features:

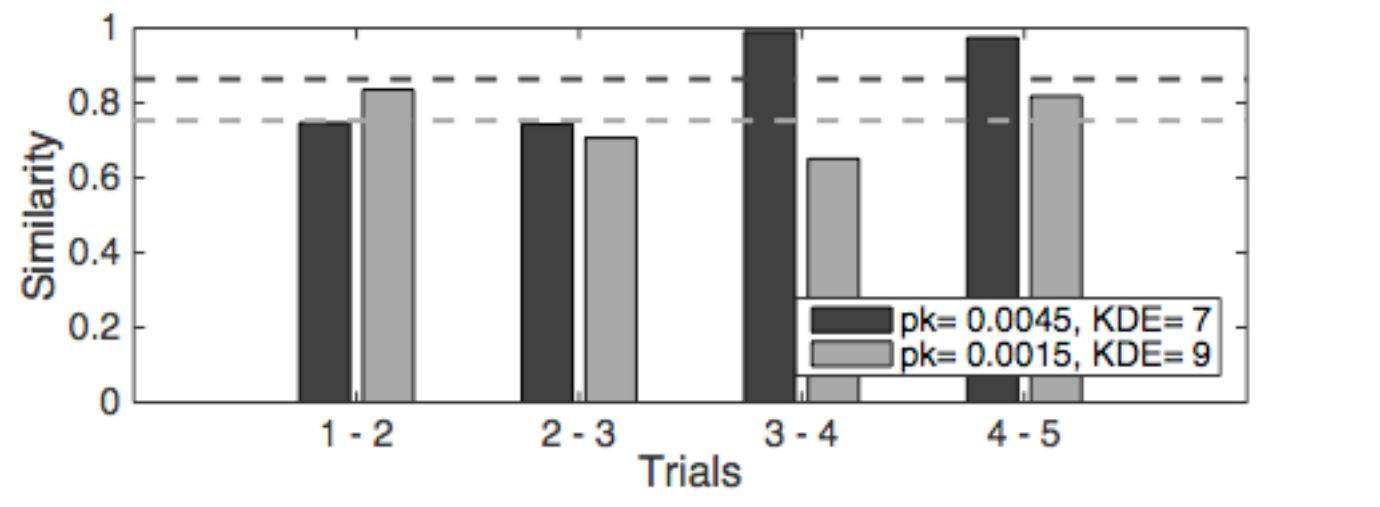


All trials	pk = 0.0045
Last trial	KDE = 7
Computed	NK = 448
All trials	pk = 0.0015
Last trial	KDE = 9
Computed	NK = 384

SEGMENTATION: Experiment 1

Segmentation of an Acousmatic Music Excerpt

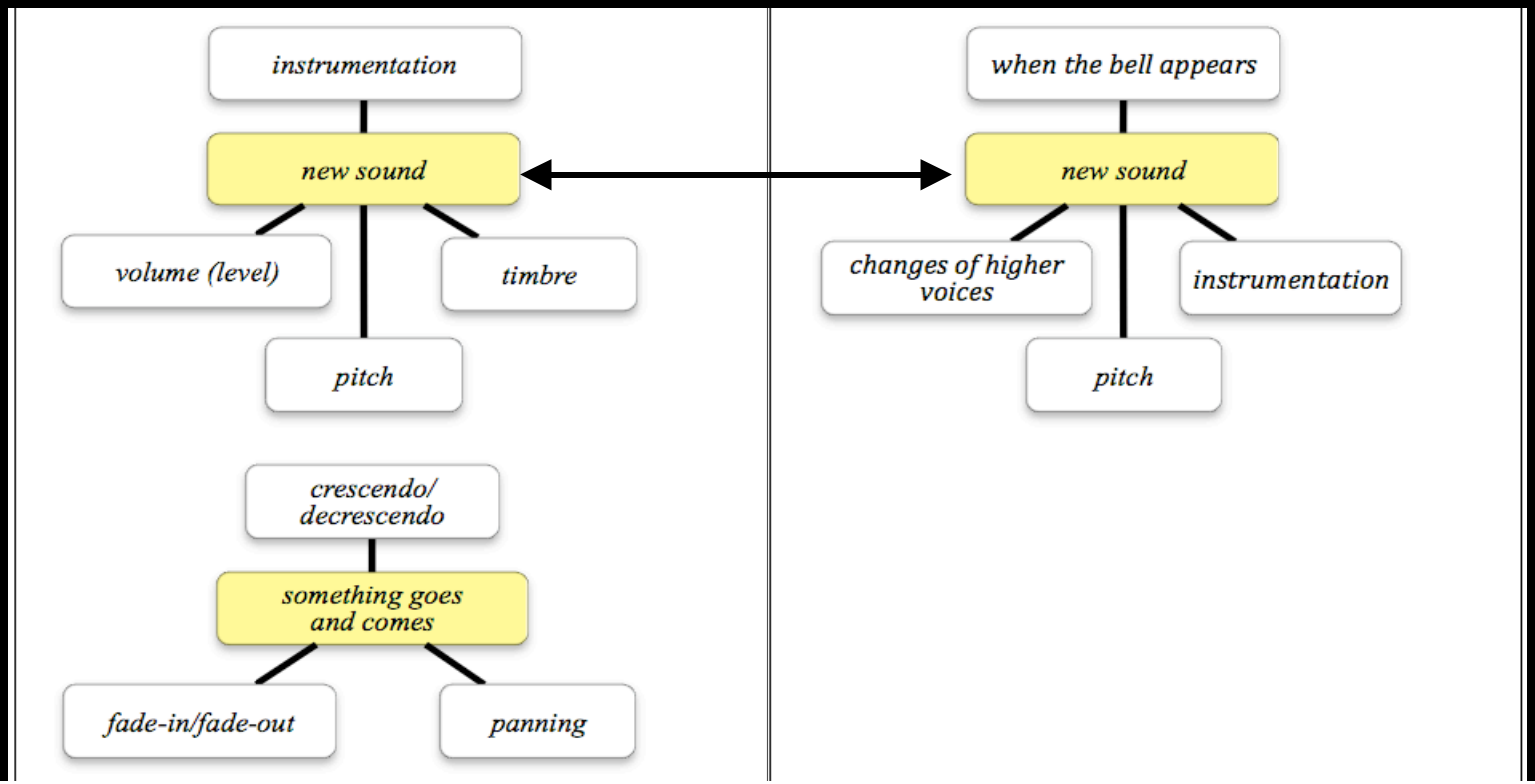
- **Data Analysis:**
  - Measure variation of participants' responses within five listenings:



SEGMENTATION: Experiment 1

Segmentation of an Acousmatic Music Excerpt

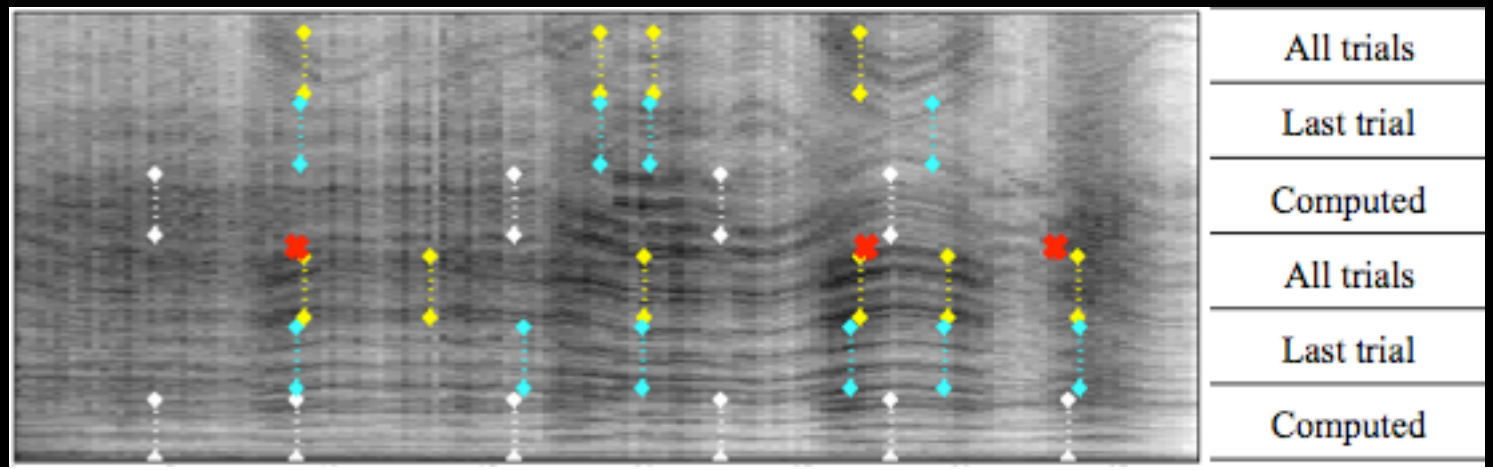
- **Data Analysis:**
  - Semantic analysis by clustering of free responses:



SEGMENTATION: Experiment 1

Segmentation of an Acousmatic Music Excerpt

- **Results:**
  - Novelty Function of the Spectrum seems an appropriate perceptual model for segmentation, although more testing is needed --> Experiment 2
  - Variation of responses through repeated listening, no evidence (yet) of tendency.
  - “New sounds and sounds that come and go”: Correspondence between participants strategies of segmentation and the self-report segmentation. --> Experiment 3
  - What streams are participants segmenting to? --> Experiment 2



SEGMENTATION: Experiment 2

Indicate when there is a change in the music

Stimulus: 

SEGMENTATION: Experiment 2

Segmentation of a Single-Layered Acousmatic Stimulus

- **Aims:** segmentation task of a single-layered acousmatic stimulus : recording and analysis of self-response
- **Participants:** 21, 21 to 49 years (median was 26 years).
- **Stimuli:**
  - Concatenated Sounds from catalog
- **Procedure:**
  - segmentation task, 3 trials (each trial followed by emotion rating tasks of Experiment 4)
- **Apparatus:**
  - Input: Wiimote button
  - Recording: Pd Visuaural

SEGMENTATION: Experiment 2

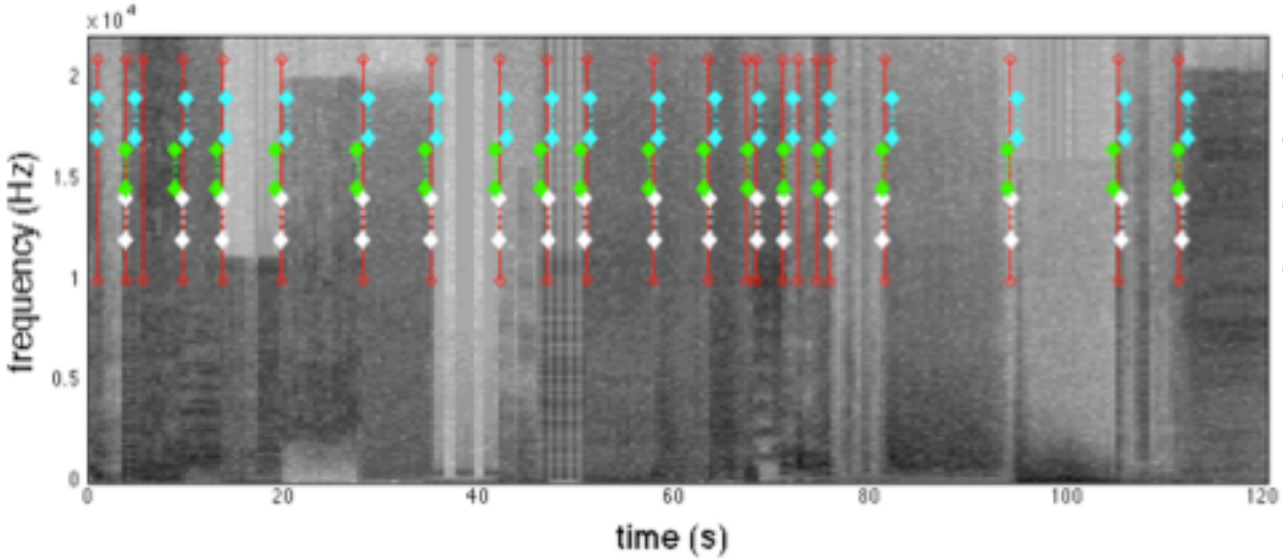
Segmentation of a Single-Layered Acousmatic Stimulus

- **Data Analysis:**
  - Comparison between participants' and computed segmentation: finding a correspondence to audio features. (Same as experiment 1)
  - Measure variation of participants' responses within three composed listenings (Same as experiment 1)
  - Instead of semantic analysis by clustering of free responses Experiment 3 was devised

SEGMENTATION: Experiment 2

Segmentation of a Single-Layered Acousmatic Stimulus

- **Results:**
  - Novelty Function of the Spectrum is a perceptual model for segmentation.
  - This method allows to measure reliably with a resolution of 4 seconds
  - An effective means of counteracting system delay is needed.



Last trial	
raw	pk = 0.0015
lag offset	KDE = 9
Computed	NK = 256

MIMESIS: Experiment 3

Indicate source and action

Stimulus 1: 

Stimulus 2: 

Stimulus 3: 

MIMESIS

Imitation + Representation

MIMESIS : Experiment 3

Recognition of Source and Action in Sounds

- **Aim:** observe mimesis of sounds
- **Participants:** Same as Experiment 2
- **Stimuli:**
  - Discrete Sounds from catalog
- **Procedure:**
  - Recognition of Sound source and action for each discrete sound presented from a randomized list.
- **Apparatus:**
  - Input: Computer keyboard
  - Recording: Pd Visuaural on-screen questionnaire

MIMESIS: Experiment 3

Recognition of Source and Action in Sounds

- **Data Analysis:**
  - Observation of participants' answers:

✓ *e.g. "water", "wave", "sea", "boat", ''splashing", "Someone slowly swimming in still water ", "Rowing"*

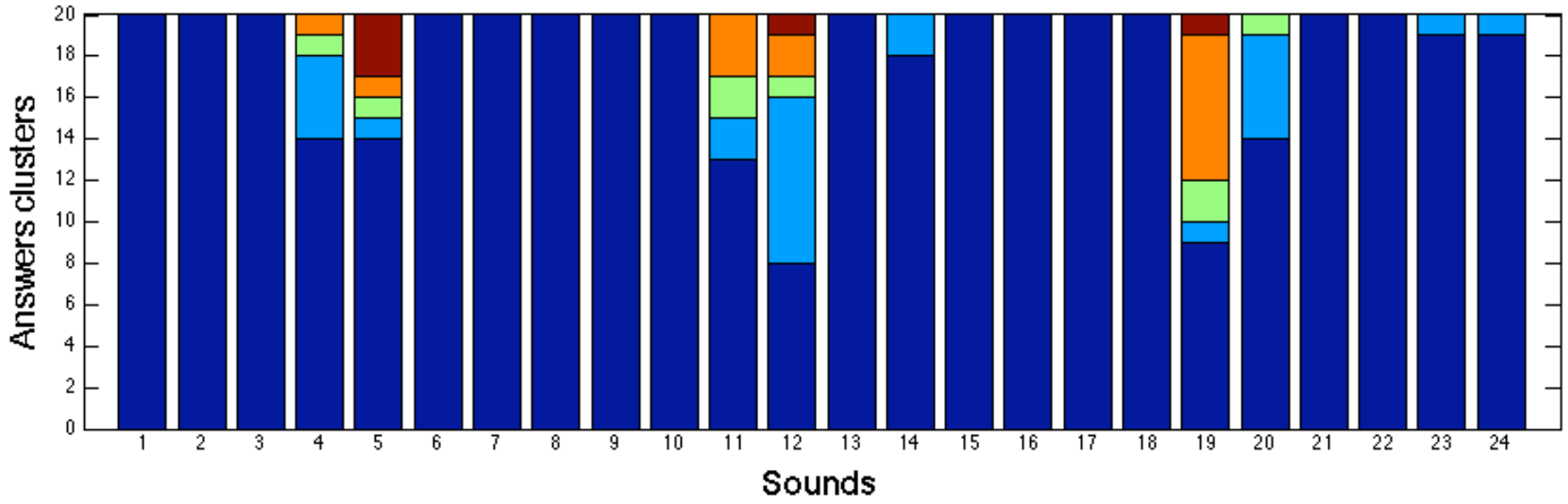
✓ *e.g. "human", "man", coughing"*

✓ *e.g. "whispering" , "demon says. where are you?", "Gollum makes a horrible swal lowing noise in his throat""*

MIMESIS: Experiment 3

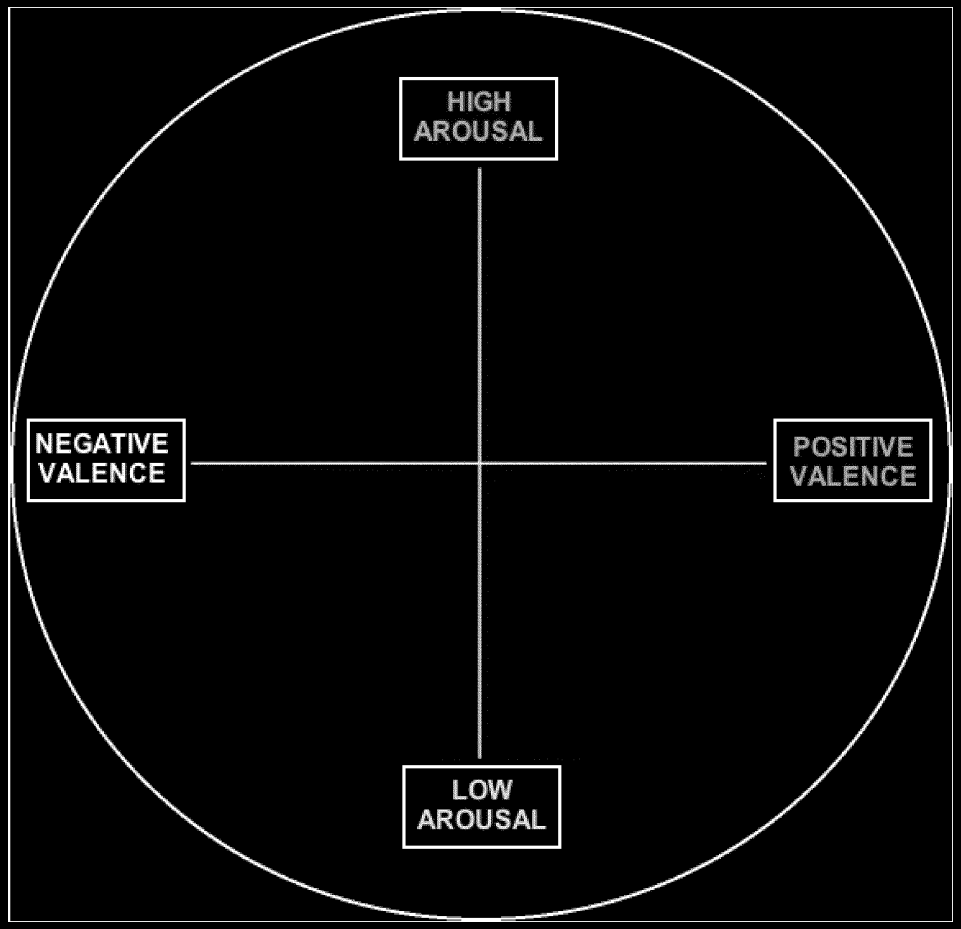
Recognition of Source and Action in Sounds

- **Results:**
  - Clustering of participants' answers:



PERCEPTION OF EMOTIONS: Experiment 4

Rate Activation and Valence



Stimulus 1:

Stimulus 2:

Stimulus 3:

PERCEPTION OF EMOTIONS

Sounds put together make musical structure which is closely related to emotional response (Sloboda, 1991).

PERCEPTION OF EMOTIONS: Experiment 4

Continuous and Post-Hoc Perception of Emotions in a Single-Layered Acousmatic Stimulus

- **Aim:** compare continuous and post-hoc measurement of perceived emotions
- **Participants:** Same as experiment 2 and 3
- **Stimuli:**
  - Discrete and Concatenated Sounds from catalog
- **Procedure:**
  - Valence evaluation: continuous (Wiimote) 3 trials and post-hoc (Questionnaire)
  - Activity evaluation : continuous (Wiimote) 3 trials and post-hoc (Questionnaire)

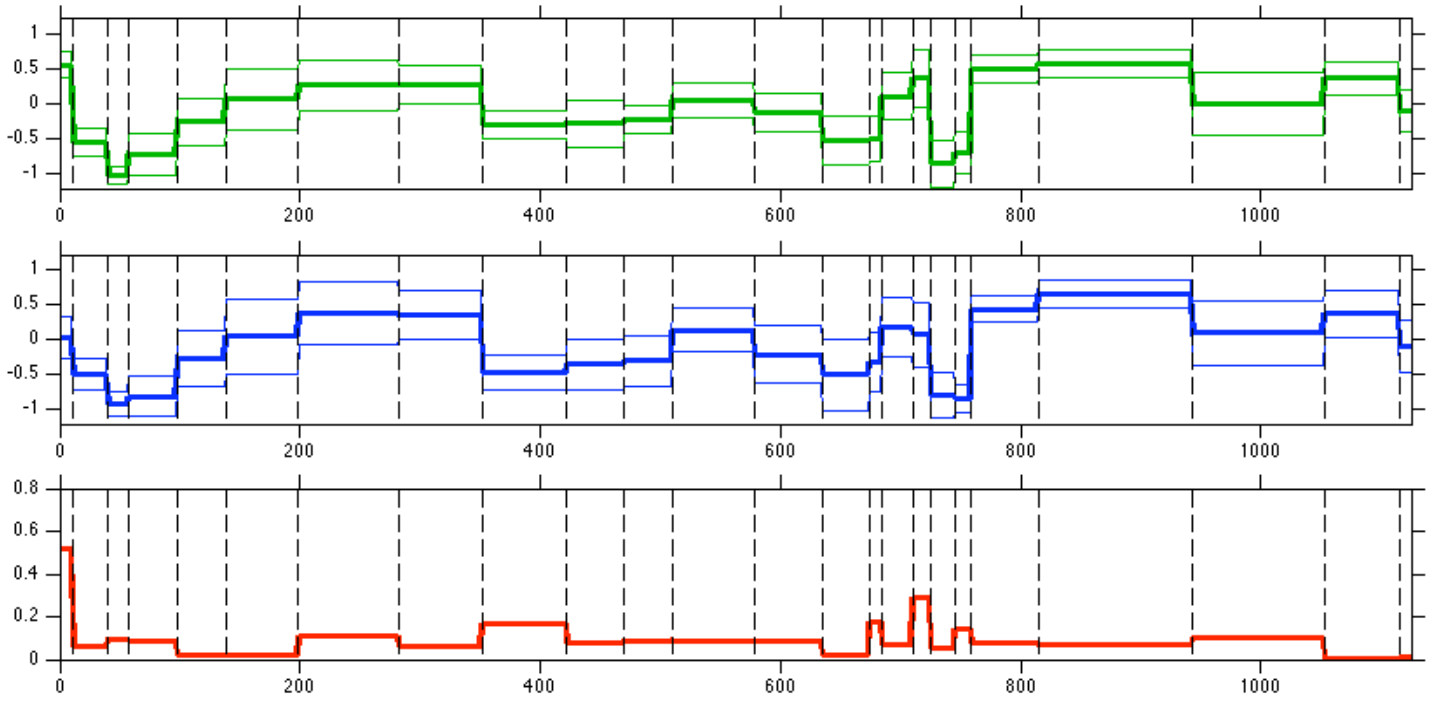
  (c.f. Posner, Russell & Peterson, 2005)
- **Apparatus:**
  - Input: Wiimote accelerometer and computer keyboard
  - Recording: Pd Visuaural

PERCEPTION OF EMOTIONS: Experiment 4
Continuous and Post-Hoc Perception of Emotions in a Single-Layered Acousmatic Stimulus

•Data Analysis:

- Comparison between ‚participants' post-hoc and continuous measurements of **Valence**:

- ✓ Post-hoc
- ✓ Cont.
- ✓ Diff.

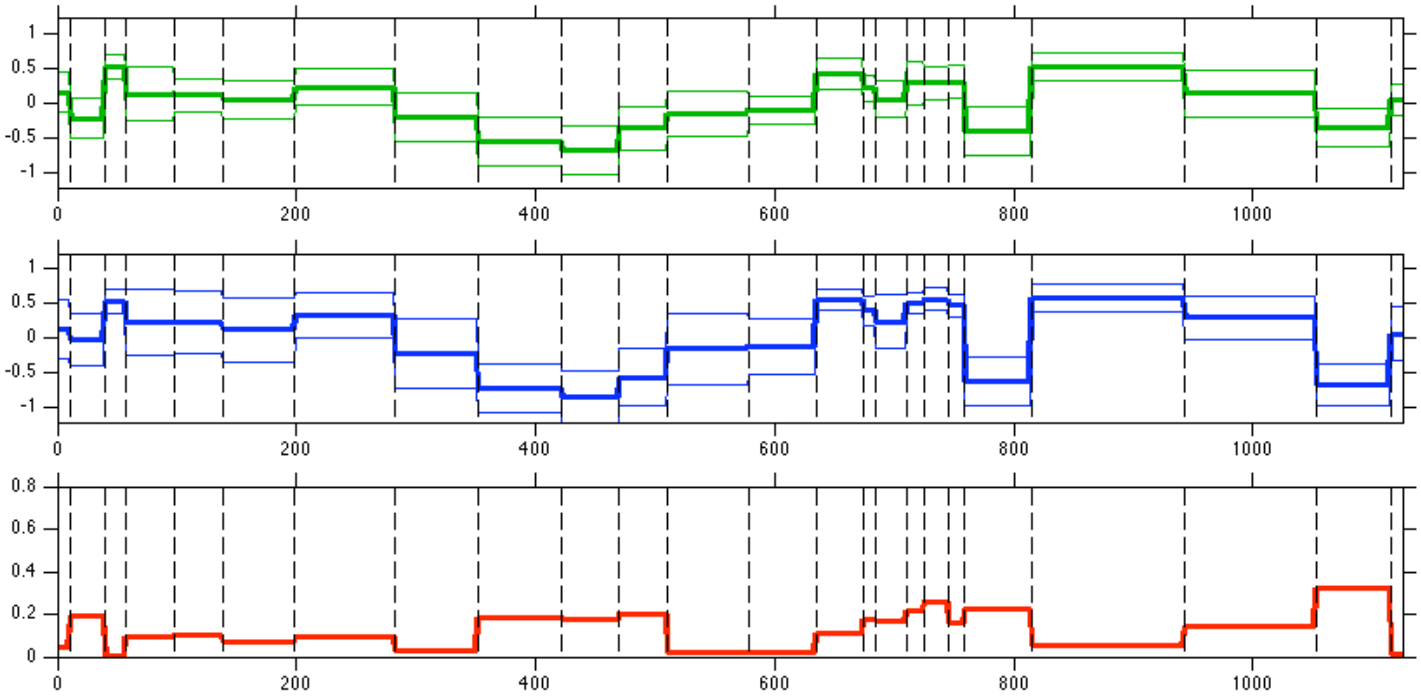


PERCEPTION OF EMOTIONS: Experiment 4
Continuous and Post-Hoc Perception of Emotions in a Single-Layered Acousmatic Stimulus

•Data Analysis:

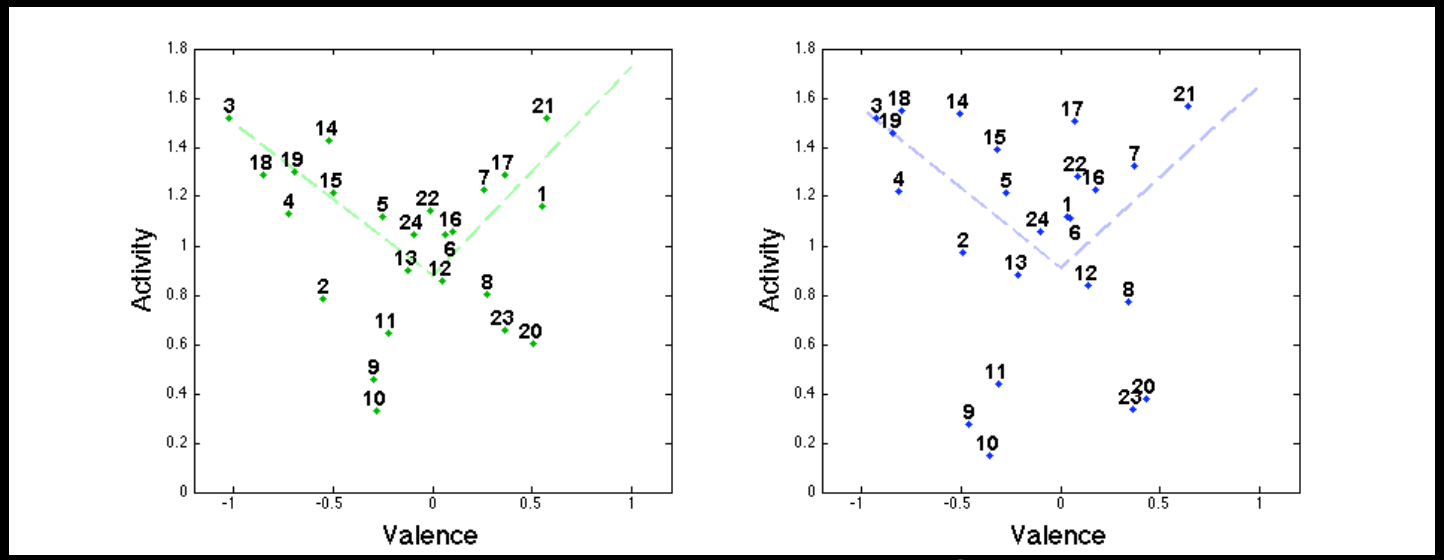
- Comparison between ‚participants' post-hoc and continuous measurements of **Activity**:

- ✓ Post-hoc
- ✓ Cont.
- ✓ Diff.



PERCEPTION OF EMOTIONS: Experiment 4
Continuous and Post-Hoc Perception of Emotions in a Single-Layered Acousmatic Stimulus

- **Results:**
  - Continuous and Post-Hoc measurements are remarkably similar
  - Averaged Continuous and Post-Hoc measurements of Valence and Activity show a V-shaped relationship as the best fit curve obtained by polynomial regression. Same as Bradley and Lang (2007).



Post-Hoc Continuous

DISCUSSION

•Sound-object chunk segmentation, context, narratives and their meaning

•Self report segmentation, usable range over 4 second: Supra-chunk level

FUTURE WORK

•Intra-chunk level needs better resolution than self-report (c.f. Leman & Godoy, 2010), supra-chunk level might be OK

•Intra-chunk could benefit from brain activity measurement (EEG (portable), MEG (I advocate for this machine, tho not portable), not sure about FMRI), maybe EMG?, eye tracking or such other smart appparatus.

•Find correspondences to body gestures (tekee nyt)

WATCH THE FULL MOVIE HERE:

https://jyx.jyu.fi/dspace/handle/123456789/43811

(mind the document is full of typos and nonsense)

ACKNOWLEDGEMENTS

- University of Jyväskylä Music Dept.
- http://guides.library.uncc.edu/c.php?g=173523&p=1142476

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