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Options in engagement: One listener's different responses to the same music

Finn Upham

NYU Steinhardt
Steinhardt School of Culture, Education, and Human Development

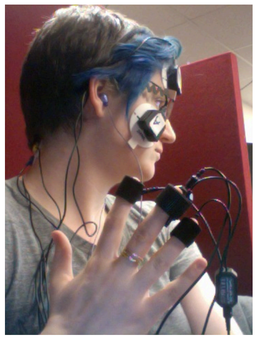
Abstract

If everything was known about the piece of music and the musical history and habits of a given listener, could we model her experience through a single listening? Using examples from the solo responses project, this poster identifies factors which contributed different responses to the same stimuli. The solo responses project is a case study in responses from a single subject to repeated presentations of diverse collection of musical works (25 stimuli, 84 minutes). Twenty four session of continuous ratings of felt emotion, post-listening notes, and data from seven physiological sensors capture contrasting responses which appear to be related to changes familiarity with the music, emotional susceptibility (mood), interpretation, and attention.

Data set: Solo Response Project

Goal: look at consistency and variability of response in one person. Responses discussed here:

- Felt emotion ratings Valence and Arousal: collected in computer interface, point and click in 2D square.
- sEMG of Corrugator: captures brow furrowing, associated with negative valence stimuli.
- sEMG of Zygomaticus: captures duchene smiles, associated with positive valence stimuli.
- sEMG of Trapezius, on the back of the neck: captures head nodding activity and shoulder tension.



Analysis

The following four factors are demonstrated using individual stimuli, with all responses sorted into two sets according to numerical criteria.

The felt arousal and valence ratings are presented with each mean and rating change activity levels, the two sets distinguished by colour.

The sEMG sensor data, RMS signals, low pass filtered, are presented in raster plots, with the set division marked by a horizontal line, with the threshold crossing activity of each set ploted below.

The differences discussed are in terms of coordination, averages, and overall intensity.

Interpretation

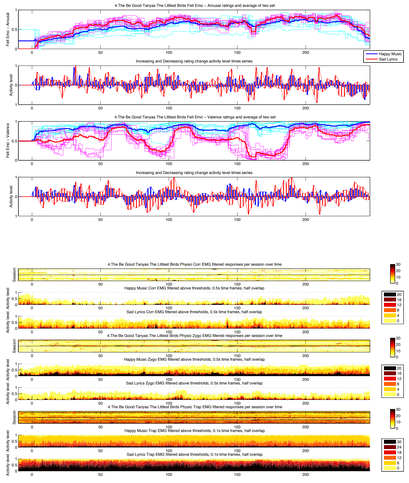
Familiar bluegrass tune: Littlest Birds by The Be Good Tanyas. Initially associated music with happy mood, but with focused listening exposed sad lyrics and narrative.

In figure, response sessions sorted by mean valence (above and below median).

Ratings show greater coordination for sad lyric sessions. Obviously valence is lower for sad condition, but the difference depends on the verse.

sEMG Corrugator is more active and coordinated for sad sessions, sEMG zygomaticus less active in sad sessions.

Why is sEMG trapezius more active in the sad sessions?



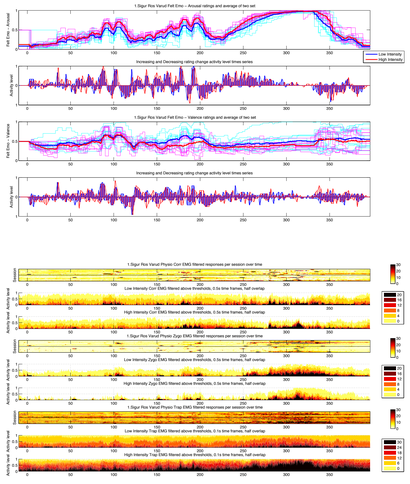
Intensity

Unfamiliar postrock epic: Varuo by Sigur Ros. This music features long build up with added lines and interesting vocals.

This piece stimulated many extreme responses (up to nausea), though not always. And yet arousal ratings were very stable. In figure, response sessions sorted by mean arousal (above and below median).

Surprisingly, even the small differences in arousal ratings distinguished responses with high and low sEMG trapezius activity.

Note that sEMG zygomaticus was also less active during high intensity sessions.

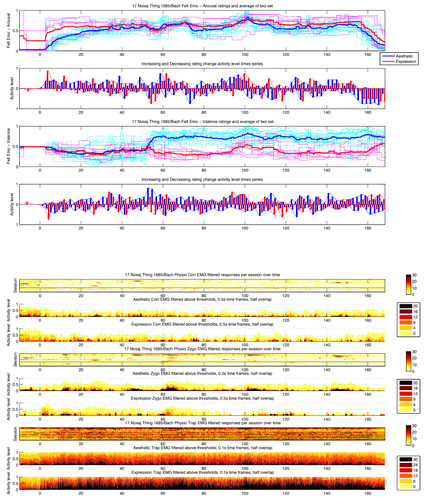


Empathy vs Aesthetics

The familiar dubstep/lowend electronic piece 1685/Bach by Nosaj Thing, this piece is dark in timbre, with heavy bass and beat.

Some sessions my response was focused on the dark (negative) expression, other times I was engaged in the technical details, enjoying the timbres.

In these sessions, sorted by mean valence above or below 0.5, the distinction of aesthetic focus resulted in more coordinated and intense zygomaticus activitation, while the negative set showed more intense trapezius activity.



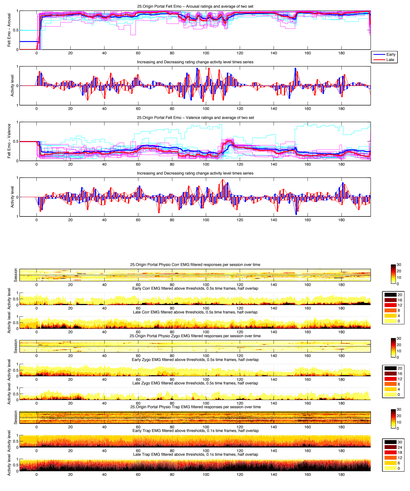
Familiarity

The unfamiliar technical death medal piece Origin, by Portal, was new to the listener in terms of piece and genre.

In the figure, responses are as the first 12 and the last 12 sessions of the experiment.

The ratings of felt emotion are very similar, however the later sessions show more coordinated rating changes, suggesting better timing and consistency of response with practice and knowledge.

Corrugator activity increased in the later sessions, while zygomaticus decreased, but most stark in the intense and highly coordinated head nodding behaviour in the trapizius.



Variability across listenings: Ratings vs Physiological Responses

Ratings of felt emotion were much more consistent across listenings than physiological signals. Why?

- Subjective emotion vs expressive
- Absolute intensity in body, relative intensity in cognitive assessment
- Time to expression: ratings quick cognitive, physio variable
- Deleted context: subjective cogntive assessment ignores factors like fatigue, interupting sneezes,

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Contact: finn@nyu.edu

http://soloresponseproject.com