The Relationship Between Musical Structure and Emotion in Classical Piano Scores: A Case Study on the Theme of La Folia

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Background

Sloboda (1991) related structural elements such as sequences and unexpected harmonies to emotional responses. Juslin (2000) explored the relationship between basic emotions and the musical surface (tempo, dynamics, articulation). Gomez & Danuser (2007) examined relationships between several structural features and both self-reports of felt pleasantness and arousal and different physiological measures. Zbikowski (2010) explored relationships between remarkable passages (dissonances, modulations) and emotion. Previous studies exhibit several limitations, e.g. some musical factors (highly dissonant harmony, unfamiliar rhythmic patterns) were not represented, correlation between factors poorly considered, and verbal reports not regarded.

Classical models of music emotion include dimensional approaches (as a mixture of two core dimensions, valence and arousal). Thayer (1989), the circumplex model (Russell, 1980), categorical approaches (discrete sets of universal and innate basic emotions (Izard, 1972), or clusters of words grouped by similarity of meaning; GEMS: Geneva Emotional Modelling System, Zentner et. al., 2008). Recent approaches to the study of emotion stressed the importance of embodied cognition (Colombetti, 2013).

Aims

We explore the relationship between musical structure and emotion on different variations of the Portuguese theme of La Folia.

Methods

Participants 18 participants, age = 40.5 ± 16.1%, 13 males and 5 females, 12 musicians and 6 non-musicians; mother-language = 13 Slovak, 4 Italian, 1 Swedish.

Materials Recordings of the first 8 bars of 44 variations of the Theme of La Folia.

STAGE 1 – REAL MUSIC DESIGN: commercial recordings of 20 variations (5 Baroque-style by A. Scarlatti, 5 Classical-style by C. P. E. Bach, 5 Romantic-style by F. Liszt, 5 post-Romantic style by S. Rachmaninov), with different combinations of 21 factors (structure and performance parameters).

STAGE 2 – CONTROLLED DESIGN: 24 variations, arranged and recorded in a deadpan performance by the first author, with selected combinations of 4 factors (average pitch variation / register, harmonic tension, rhythmic complexity, note density).

Music analysis: Hemdrum (Huron, 1995), the Bisesi et al. accent model, the Margulis (2005) model of melodic expectation, the MIR Toolbox (Lartillot, 2014).

Procedure Participants rated each piece on a scale from 1 to 5 in terms of the 11 predictors for music emotion included in the valence/annusibased emotion model and in the first-order GEMS model (in their mother-language: joyful activation, nostalgia, peacefulness, power, sadness, tension, transcendence, wonder).

Results

Average and maximum Pearson’s correlation between all pairs of raters, across all of the music examples, for all of the models: for music emotion (DA: valence/arousal model GEMS: 1”; order Geneva Emotional Modelling System 1 and 2) compared to the real music design and the controlled design, respectively.

Conclusions

There exist significant correlations between structural parameters and descriptors for emotions in both models. In the real music design, correlations are higher for register (more wonder), melodic range (less peacefulness and tenderness, more tension and wonder), melodic tension (less wonder), harmonic tension (more nostalgia, peacefulness and tenderness), and note density (less peacefulness, more tension and wonder). In the controlled design, correlations are higher for dissonance (less valence, peacefulness and tenderness) and note density (more arousal, less peacefulness).

The average Pearson’s correlation between all pairs of informants and across all music examples is comparatively lower for Exp. 2 than for Exp. 1, where they are higher for arousal, nostalgia and peacefulness.

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References