

# Towards a brief domain-specific self-report scale for the rapid assessment of musically induced emotions

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## ABSTRACT

### Background

The Geneva Emotional Music Scale (GEMS; Zentner, Grandjean, & Scherer, 2008) is the first domain-specific model of emotion specifically developed to measure musically evoked subjective feelings of emotion (particularly in live performances). The scale consists of a list of 45 emotion terms pertaining to nine emotion factors or categories, describing a pervasive universe of feelings of emotion frequently experienced while listening to music (particularly in live performances). In this paper, we highlight and address two potential limitations of the GEMS. The first one is related to the fact that the GEMS comprises a high number of elements to be rated, an aspect that creates many difficulties in fieldwork studies where a rapid assessment is often necessary. The second, is the extent to which the GEMS may be consistently used to discern the emotions experienced while listening to music genres differing significantly from those that led to its development (especially due to an overrepresentation of classical music performances).

### Aims

Regarding the first limitation, we aim at the creation of a brief version of GEMS by describing each of the nine GEMS factors using fuzzy sets of emotion terms. Regarding the second, we evaluate the necessity of adding new terms to the present GEMS version in order to describe a emotional experiences reported during the Arcana Festival (a contemporary music festival that took place in Austria in July 2010) by various members of the audience, as well as participating musicians and composers. Our aim is to determine whether extra dimensions (or factors) are necessary to account for emotional experiences with contemporary music.

### Method

We conducted an empirical experiment (N=20) to obtain subjective judgments of pair-wise dissimilarity between the meaning of the emotional experience described by each GEMS term (27 in total, three concerning each GEMS factor) and also the new additional terms pertaining to contemporary music (12 in total, three per each new emotion category tested – aesthetic feelings, knowledge-related feelings, enthusiasm, and boredom). All possible combinations of terms were presented in random order to all subjects, resulting in 741 pairs of ratings. Due to the high number of ratings, the task was distributed over three (maximum one hour) sessions.

### Results

The ratings provided by the participants we stored in separate matrixes, each containing the dissimilarity ratings of each participant. Ratings were highly concordant across participants ( $\alpha = 0.96$ ), thus the responses were aggregated by calculating the arithmetic mean across all participants for each of the ratings and stored in a mean dissimilarity matrix. A divisive hierarchical clustering analysis (dHCA) on the dissimilarity matrix, indicated that the various terms memberships to particular GEMS factors are generally supported and that the nine GEMS factors are consistently segregated. Nevertheless, some terms do not pertain to the suggested factors. From the original list of 27 GEMS terms, five were removed because their meaning was closer to the semantic space formed by other factors, rather than the hypothesized one. The items removed were: “moved”, “feelings of vigor”, “agitated”, “animated”, and “dreamy”. In order to evaluate the semantic space occupied by the new emotions terms pertaining to contemporary we conducted a new dHCA. This time we used as input a new dissimilarity matrix containing the pairwise dissimilarities between the 22 selected GEMS terms plus the 12 new proposed terms. Results show that seven new emotion terms pertaining to three new categories (1) “feelings of harmony” and “feelings of clarity”; 2) “feelings of interest” and “feelings of discovery”; 3) “bored”, “indifferent” and “weary”) describe semantically different emotional experiences not covered by the current GEMS version.

### Conclusions

In this paper, and based on our results, we propose the creation of a short version of the GEMS consisting of nine rating items. Each item is defined by a fuzzy set of emotion terms (22 in total). In this way, the imprecision of assigning a single verbal label to describe each item is minimized, by maintaining the verbal richness of the original terms. Regarding the adaptability of the GEMS to describe emotional experiences with contemporary music, we found that at least three new dimensions of emotional meaning are necessary to consistently describe emotional experiences evoked by this genre: knowledge related feelings, enthusiasm and boredom. Thus we suggest the addition of these new dimensions to the instrument in studies involving contemporary music. Future work includes an investigation of semantic space of emotion labels, and the development of genre specific scales.

### Keywords

Music, emotion, measurement, GEMS.

## REFERENCES

Zentner, M., Grandjean, D., & Scherer, K. R. (2008). Emotions evoked by the sound of music: Differentiation, classification, and measurement. *Emotion*, 8(4), 494-521.