Comments on Comments by Cupchik and Jacobsen

Both Cupchik and Jacobsen point to important issues in studying emotion in an aesthetics context, providing valuable suggestions for some of the central theoretical and methodological choices to be made in future research.

Cupchik correctly places our "route" approach into the category of cognitive appraisal theories that attempt to understand the evaluative mechanisms, functioning as recursive sequential processing of different cues that underlie specific emotional reactions (although we differ on the assumed similarity to the core affect theory defended by Russell and Barrett). He opposes this approach to a Gestalt perspective suggesting "an emergent, coherent, and holistic integration among the different domains that resonate in parallel to the work". A central concern with this approach is how the relevant "Gestalten" might be constituted. Are there pre-existing templates and if so how are they established and how many of them are there? What is the effect of an "emergent" dynamic process underlying the emotion episode on a (static) Gestalt, particularly as aesthetic experiences change as music and poetry performances unfold? Would it not be feasible to consider that the Gestalt changes as the manifold sequential evaluation processes evolve in the course of an aesthetic performance? Especially as appraisal processes (contrary to some popular assumptions) are extremely rapid and highly interactive (see Gentsch, Grandjean, & Scherer, 2015; Scherer & Moors, in press, for a review of recent EEG studies). Appraisal theory assumes that the emotion components (appraisal results, action tendencies, physiological changes, and motor expressions) are centrally represented and constantly fused in a multimodal integration area with continuous updating as events and appraisals change. This central integrated representation (a Gestalt?) often becomes conscious as a fuzzy emotion category and can be communicated by emotion words, expressions, or metaphors (see Scherer, 2009, p. 1309). We believe that this theoretical framework is highly applicable to aesthetic emotions (especially as elicited by music).

Cupchik also raises the issue of the set of emotions that should be used in this kind of research. We believe that these need to be appropriate for the aesthetic domain (see Schindler et al., 2017, for the result of our collaboration with an interdisciplinary group of researchers). This is why, rather than using the small number of standard emotion terms, in our opera study we used the set of terms for aesthetic emotions specifically adapted to the context of classical music validated in a number of large scale studies by our group (Coutinho & Scherer, 2017; Zentner, Grandjean & Scherer, 2008).

Cupchik suggests that a "deeper emotional response might be predicated on a personally meaningful plot embedded coherently within the music, staging, and so forth." This nicely fits the central assumption of appraisal theory, namely that the emotion-eliciting evaluation often depends on the individual's values and preferences (as well as on the "aesthetic distance" as conceptualized and studied by Cupchik and colleagues). At the same time, we share styles, values, beliefs, and cultural attitudes with other individuals, both past and present. This explains why aesthetic objects and performances created at various periods in history continue to produce similar aesthetic emotions and why, in some cases, there are collective emotional experiences (as in opera). Future work will need to find the right balance between examining intra- and interpersonal effects of aesthetic stimuli, which requires detailed measurement of listener preferences, values, and musical training (see Chin, Coutinho, Scherer, & Rickard, 2018).

Jacobsen enlarges the perspective to cover recent work in aesthetic domains that have attempted to investigate aesthetic appreciation in an ecologically valid way. This nicely demonstrates the increasing concern with complementing purely experimental approaches with fieldwork in the production and reception settings for the different arts. He proposes a distinction between settings, sensors, and tasks, providing some pertinent examples. Future research will have to examine specific limitations for each of these for different aesthetic domains. For example, the use of facial expression indicators is limited by ambient lighting, lacking in the dark spectator space during an opera performance. One solution might be the use of noninvasive thermal imaging to detect facial action units (Jarlier et al., 2011) but this is probably not feasible outside of the laboratory. In contrast, many of the currently fashionable sensors, either via smartphones or smart watches, might be profitably used in the future to unobtrusively measure physiological and behavioral indices (at least for those participants in aesthetic performances willing to download the required apps for timing and recording). Before investing in such new technologies, it is useful to consider the utility of the measurements for the assessment of different dimensions of affective processes. For example, many physiological variables such as heart rate and skin conductance that can now be tracked via sensors, allow to infer little else than non-specific arousal (Kreibig, 2010), which may not be central for assessing aesthetic emotions. In contrast, facial expressions allow very reliable assessment of positive valence (due to zygomaticus activation) or disgust reactions but are not very indicative for arousal or feelings of power and control (see Scherer & Moors, in press, for a review). Furthermore, it is unlikely that facial expressions can differentiate amongst the large variety of affective responses experienced in operatic performances. Generally, it is rather likely that the aesthetic emotions that are assessed by questionnaire (e.g., the AESTHEMOS, Schindler et al., 2017) are too subtle to be reliable differentiated by behavioral sensors.

Jacobsen outlines the limitations for each of the domains (settings, sensors, and tasks) requiring to weigh the respective advantages and disadvantages for ecological validity and experimental/statistical control. Given the enormous effort and expense involved in studies conducted in the field, one cannot expect a rapid growth of research efforts in this essential but clearly underdeveloped domain. One possibility is to encourage *team research*, in which a consortium of researchers, ideally with different types of expertise, combine their resources to conduct a series of coordinated studies based on a common theoretical framework. In this fashion, the limitations of any one design could be compensated by the affordances of another design, allowing to estimate the relative effects on the results and allowing more precise planning of the next steps. Sharing resources also allows more ambitious planning with respect to both ecological validity and methodological rigor. The benefit of this kind of team research has been clearly demonstrated in the natural sciences. Given the proper conditions, it could greatly invigorate research on emotion processes in many different naturalistic aesthetic contexts.

References

Chin, T.C., Coutinho, E., Scherer, K. R., & Rickard, N. S. (2018). MUSEBAQ: A Modular Tool for Music Research to Assess Musicianship, Musical Capacity, Music Preferences and Motivations for Music Use. *Music Perception, 35(3)*, 376–399. DOI: <https://doi.org/10.1525/MP.2018.35.3.376>

Coutinho, E. & Scherer, K.R. (2017). Introducing the GEneva Music-Induced Affect Checklist (GEMIAC): A brief instrument for the rapid assessment of musically induced emotions. *Music Perception, 34(4),* 371-386.

Gentsch, K., Grandjean, D., & Scherer, K. R. (2015). Temporal dynamics and potential neural sources of goal conduciveness, control, and power appraisal. *Biological Psychology, 112*, 77-93. DOI: 10.1016/j.biopsycho.2015.10.001

Jarlier, S., Grandjean, D., Delplanque, S., N’Diaye, K., Cayeux, I., Velazco, M., Sander, D., Vuilleumier, P. , & Scherer, K.R. (2011). Thermal analysis of facial muscle contractions. *IEEE Transactions in Affective Computing*, 2(1), 2-9. doi:10.1109/T-AFFC.2011.3

Kreibig SD. (2010). Autonomic nervous system activity in emotion: a review. *Biological Psychology*, 84(3), 394–421

Scherer, K. R., & Moors, A. (in press). The emotion process: Event appraisal and component differentiation. *Annual Review of Psychology*.

Schindler, I., Hosoya, G., Menninghaus, W., Beermann, U., Wagner,V., Eid, M., & Scherer, K. R.. (2017) Measuring aesthetic emotions: A review of the literature and a new assessment tool. *PLoSONE, 12(6*):e0178899.https://doi.org/10.1371/journal.pone.0178899

Zentner, M., Grandjean, D., & Scherer, K. R. (2008). Emotions Evoked by the Sound of Music: Characterization, Classification, and Measurement. *Emotion, 8(4)*, 494-521.