

Comment

Aesthetic emotions goals

Comment on “The quartet theory of human emotions: An integrative and neurofunctional model” by S. Koelsch et al.

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Review by Koelsch et al. [10] presents an interdisciplinary theory of emotions, including a neurobiological emotion theory originating in four core emotional systems. The Quartet Theory (QT) includes specifically human emotions and considers the role of language for emotions. This comment considers questions about how the QT can address aesthetic emotions, what class of emotions they are, and what their function in cognition is. Can QT help defining aesthetic emotions neurally and functionally? Such a definition of aesthetic emotions would be necessary for their scientific exploration, because as widely used today there is no definition, aesthetics is defined through art, and art through aesthetics. Since contents of many art museums are not accepted as art by many artists and admirers of art, it is not clear what should be the subject of aesthetic emotions research.

Perlovsky [14,22] defined aesthetic emotions by extending the Grossberg–Levine [6] theory of drives and emotions. The original theory defines drives as neural mechanisms measuring bodily needs [13]. When a need exceeds a certain level, a neural signal is sent to the brain decision region, and appropriate actions are taken to satisfy the need. The neural signals indicating needs and motivating its satisfaction are perceived as emotions (or corresponds to emotional states). This Grossberg–Levine theory [6] was extended to the instinct for knowledge, neural mechanisms measuring similarities between mental representations and sensory signals, or more generally between bottom-up and top-down neural signals. These neural signals correspond to aesthetic emotions. Near the “top” of the mental hierarchy [1,5] aesthetic emotions are perceived as emotions of the beautiful [22]. Experimental results confirm existence of these emotions [24]. It seems it is possible to establish relations between the QT and this theory of aesthetic emotions.

According to the above theory, aesthetic emotions are related to the beautiful near the “top” of the mental hierarchy. At lower hierarchical levels, they are not related to emotions of the beautiful, they are related to satisfaction of the knowledge instinct. In this way the above theory is an extension of the Kantian aesthetics [9]: aesthetic emotions are related to knowledge. Their purpose is to motivate knowledge. For humans and other higher animals the knowledge instinct and aesthetic emotions are necessary for survival, they are conditions of satisfying bodily needs, and therefore more important than any other instincts or emotions.

The knowledge instinct is not limited to one similarity measure. At every level of the hierarchy the knowledge instinct drives resolution of multiple contradictions in knowledge. These contradictions are called cognitive dissonances

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[3,4,7]. They are emotionally unpleasant; these emotions are related to knowledge and according to our definition are aesthetic emotions. Emotions of cognitive dissonances are “opposite” to aesthetic emotions corresponding to the knowledge instinct; cognitive dissonances interfere with acquiring new knowledge. New knowledge emerges by differentiation of some previous knowledge and therefore contradicts existing knowledge to some extent [20]. According to theory of cognitive dissonances these contradictions are emotionally unpleasant, they are discarded quickly, momentary, and often unconsciously [8]. Which aspects of QT can explain theory of cognitive dissonances?

This process of discarding new knowledge is fundamental for the entire culture, because if knowledge is discarded, no culture would evolve. Usually language is the source of new knowledge, therefore language would be the first affected. Every word should lead to a cognitive dissonance and would have been discarded. A comprehensive theory of emotions such as QT must therefore explain the role of emotional mechanisms of cognitive dissonances in their interaction with language as well as mechanisms that has made possible evolution of cultures and languages. Language has met cognitive dissonances not only in its historical evolution, but also in its everyday use: often people do not notice, ignore new words contradicting their established knowledge. What is the mechanism that despite cognitive dissonances motivates listening in a conversation, motivates connecting word sounds to their meanings? A hypothesis advanced in Perlovsky [19,21] suggests that this motivation resides in prosodial emotions, “the melody of speech.” These prosodial emotions are the only motivational mechanisms acting fast enough so that the meaning of words are not discarded. This seems to be a challenge for QT to explain these emotional mechanisms of prosody. Can QT provide neural mechanisms supporting these (or other) motivational mechanisms for everyday conversations?

These prosodial emotions motivating connections of word sounds to their meanings, evolved from pre-human vocal sounds [16–18,20]. This is a conclusion of the mathematical–cognitive model of the brain–mind operations [14,15]. Language required vocal sounds with high semantic contents and controllable low emotionality. At the same time overcoming strong cognitive dissonances required voice with high-emotional vocal sounds of songs [19,23]. Eventually, songs evolved into music. The cognitive purpose of music evolution has been and remains to help overcoming cognitive dissonances. This prediction of the theory have been proven experimentally [2,11,12,24]. This theory suggests that the number of musical emotions is as large as the number of cognitive dissonances (thousands and more). It would be a great advancement in understanding aesthetic emotions (emotions related to the knowledge instinct, emotions of cognitive dissonances, emotions of prosody connecting word sounds with their meanings, and musical emotions) if this theory can be unified with the Quartet Theory of Human Emotions.

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