



Commentary

Scientific aesthetics: Three steps forward

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Leder and Nadal (2014, this issue) examine the current state of scientific aesthetics through the lens of a prescient psychological model proposed 10 years ago. These retrospective points to several future directions of which I touch on three: the nature of aesthetic emotions, the time course of emotions in aesthetic episodes, and the relationship of art and evolution.

Leder, Belke, Oeberst, and Augustin (2004) proposed a psychological model of aesthetic experience that proved to be prescient. The model was componential, proposing several processing stages—perception, implicit memory integration, explicit classification, cognitive mastering and evaluation, and ongoing emotional evaluation. It was unlike earlier models that often proposed single explanatory factors. This componential approach was timely for psychological aesthetics and was being applied in other psychological domains and in neuroaesthetics (Chatterjee, 2004). As Leder and Nadal (2014, this issue) point out in their 10-year retrospective, the mid 2000s were a critical inflection point in the evolution of scientific aesthetics. Advances in experimental methods offered new assays and neuroscience had turned its attention to aesthetics (Livingstone, 2002; Zeki, 1999). The goal of any retrospective is to look back, to clear the way forward. Leder and Nadal identify aesthetic emotions, the time course of aesthetic experiences, contextual factors that influence aesthetic encounters, biological underpinnings, and integration of evolutionary theory as important domains to be explored. In the spirit of their enterprise, I will touch on three questions that arise from their rich discussion.

1. What makes an aesthetic emotion distinct from other emotions? While empirical data for emotions in aesthetic experiences will continue to accumulate, addressing this question is a matter of conceptual clarity rather than elegant experimentation. Since a dedicated aesthetic module does not exist in the brain and aesthetic experiences emerge from interactions of sensory-motor, emotion-valuation, and knowledge-meaning brain systems (Chatterjee & Vartanian, 2014), we can borrow from Duchamp in recognizing that, like any object, any emotion can be aesthetic if placed on the right pedestal. Walking down a dark alley at night in a large American city might evoke fear and anxiety. The film version of the same scene can transform that fear and anxiety into an aesthetic experience; one is not compelled to rush out of the movie theatre in a panic. From this example, we might infer that an emotional state that drives us to act in everyday situations, but does not do so because of the specific context of its presentation, is characteristic of an aesthetic

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emotion. The root of this idea traces back to 18th century notions of disinterested interest as advocated by the Third Earl of Shaftsbury and Kant. What would it mean to be emotionally invested and disinterested at the same time? Perhaps disinterest represents the lack of action; the emotion does not propel the viewer to approach or avoid or acquire or consume. This claim does not mean that art cannot produce emotions that incite action. The claim is to suggest that those emotions per se are not aesthetic. With respect to pleasure, neuroscience offers one such possible dissociation of emotion from action. Berridge, Robinson, and Aldridge (2009) have identified two related reward systems referred to as “liking” and “wanting.” Liking refers to the direct experience of pleasure and is mediated by opioid and cannabinoid neurochemical systems. Wanting refers to the desire for objects and is tied to actions devoted to satisfying those desires. It is mediated by dopaminergic neurochemical systems. Liking without wanting might be the biological correlate of one kind of disinterested interest, a pleasurable aesthetic emotion.

2. How do emotional experiences change over the course of an aesthetic episode? Leder and Nadal (2014, this issue) point out that while study on the emotional appraisal of art is beginning to surface (Silvia, 2005) much more needs to be done. How might the very beginning and the lingering aftermath of aesthetic episodes work biologically? The most immediate emotional response to art would be reflexive emotions triggered automatically, whether they are pleasure or fear or anxiety or disgust. These reactions produce quick changes in pupil size, heart rate, and skin conductance, signatures of our autonomic nervous system with its cortical control through areas like the insula and its sympathetic and parasympathetic neuronal outflows. At the other end of aesthetic durations are moods that art can induce in the viewer. These emotional states last well beyond direct physical contact with a work of art. Powerful artworks produce feelings of euphoria or melancholy or anger that take their time to dissipate. The proper empirical methods to characterize these prolonged emotional states whether they are represented in shifts of large-scale neural connectivity or changes in hormonal tone coursing through our bloodstream remain to be worked out.

3. How does art fit into evolutionary theory? Evolutionary theoreticians of art typically adopt one of two positions. One position, motivated by the observation that art-like behaviours seem universal, is that art making and appreciation is an adaptation that gave our Pleistocene progenitors a survival or a replication advantage. The other position, motivated by the observation that art is highly variable and culturally contingent, regards our pre-occupation with art as an exaptation, an epiphenomenon of other adapted mental modules. Again, clever experiments and more data will not adjudicate between these positions. My view (Chatterjee, 2014) developed in *The Aesthetic Brain: How We Evolved to Desire Beauty and Enjoy Art* is that the question of whether art is an adaptation or an exaptation might be the wrong question. It pre-supposes that art is one thing to be explained. By using an analogy of the neural underpinnings and behavioural properties of songs sung by the Bengalese finch, a bird that evolved from the white rumped munia while bred in captivity for its plumage (Deacon, 2010), I propose a third way to think about art and evolution. The key is to examine complex behaviours that might start as adaptations but can drift when selection constraints on those behaviours are relaxed. Reformulating the question of whether art is an adaptation or an exaptation to what is the nature of art when produced under conditions of restricted selection versus conditions of relaxed selection may be a more profitable way to probe the relationship of art and evolution.

In summary, Leder and Nadal are to be commended for their retrospective of an influential psychological model of scientific aesthetics. The model continues to serve as a scaffold on which scientific aesthetics can build fruitfully.

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