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# Empirical Psycho-Aesthetics and Her Sisters: Substantive and Methodological Issues—Part I

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VLADIMIR J. KONEČNI

## Introduction

This article is in two parts, with part II to appear in the next issue of *JAE* (Spring 2013). Part I (with six sections), in this issue, has two related objectives. The first objective is to examine a number of key substantive, methodological, and science-practice issues related to the field designated here as *empirical psycho-aesthetics*. The second objective is to present an outline of its origin and discuss certain important features of several related fields—experimental philosophy, cognitive-science-and-art, (cognitive) neuroscience of art, and neuroaesthetics. To a certain extent, the comparative goal is approached through the analysis of several recent significant controversies. Throughout the discussion, the concerns of both philosophical and empirical aesthetics are represented. In part II, in the next issue of *JAE*, empirical psycho-aesthetic research on a variety of problems in different art domains—more specifically, five groups of studies relevant to the discussion initiated here—will be described in considerable detail; this will be followed by concluding remarks that concern the article as a whole.

With regard to my own theoretical, research, and methodological work, the origin of this two-part article can be traced to my position paper “Empirical Psycho-Aesthetics: On the Trade-Offs among Art Theory, Psychological Theory, and Methodological Concerns” (1997).<sup>1</sup> At the time, the neuroscience of art and music was in diapers but already seeking attention.

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### 1. Empirical Aesthetics Is in Fact Empirical Psycho-Aesthetics

Empirical aesthetics has existed for some 150 years. Its origin is in the work of the University of Leipzig professor Gustav Theodor Fechner (1801–1887), who thought of it as a new “aesthetics from below.” Along with Wilhelm Wundt and Hermann von Helmholtz, Fechner was a founder of experimental psychology and, specifically, of one of its subfields, psychophysics—in which he is credited with the demonstration of the nonlinear relationship between the physical intensity of a stimulus and the corresponding psychological sensation. His generalizations were (a) that because certain phenomena of mind were quantifiable, experimental psychology could become a genuine science, and (b) that this also implied the possibility of measurement of certain aesthetic phenomena.<sup>2</sup> Fechner essentially positioned aesthetics from below as a rival to Immanuel Kant’s aesthetics that was based exclusively on (so-called) “armchair speculation.”

Not only in its origin but also to this day, empirical aesthetics has for all purposes been a branch of empirical psychology, one of its two oldest branches. There is an active body called International Association of Empirical Aesthetics (IAEA) with many hundreds of members worldwide, very few of whom are philosophers—or, for that matter, neuroscientists, with or without the “cognitive” prefix. Most of the practitioners for at least the last fifty years have been psychologists-aestheticians, who have carried out empirical work on questions of aesthetics and the arts—by experimentation in the laboratory and various “field” locations, by using surveys and self-reports, by measuring artworks in various ways, and by conducting historiometric analyses on archival data. On the IAEA website (<http://www.science-of-aesthetics.org>), one reads that it “was founded [by Daniel E. Berlyne and Robert Francès] as a union of psychologists who investigate the underlying factors that contribute to an aesthetic experience, as well as aesthetic behaviors, using scientific methods.” Members interested in the aesthetics of music have always constituted a (small) minority and usually belonged to music-psychology associations in addition to IAEA.

Addressing the breadth of the field, the description on IAEA’s website continues: “[Included] are studies into the human capacity to perform aesthetic judgements, to be creative and to receive aesthetic stimuli of a great amount of different fields: music, poetry, paintings and other visual arts, dance [and] new forms of aesthetics [such] as video and computer-animated displays.” However, as, or more, important than the considerable breadth is the question of methodology. According to IAEA: “As to scientific methodology, all those methods used in the experimental psycho-biological and empirical social sciences are among the approaches valid for research in the arts and related fields.”

In practice, this amounts to all the techniques of observation, stimulus manipulation and presentation, and measurement (at all levels of

sophistication, detail, and complexity) known and available to members of any decent *experimental psychology* department. This involves—as a minimum—laboratories in visual and auditory psychophysics, those of various branches of cognitive psychology (such as perception and psycholinguistics), and social-psychological laboratories (those devoted to the research on emotions, psychophysiology, and music, as well as to observation of different forms of behavior, including those relevant to aesthetics—artists at work, research participants observing art stimuli). In such an experimental psychology department (mine is an example), there are typically no philosophers (even of science) and no nonexperimenting theoreticians (psychologists in the area of judgment and decision making, and even those in mathematical psychology, typically also do research with human participants). Cognitive neuroscientists have been joining in the past fifteen years, but brain-scanning machines are located elsewhere on campus. As of this writing, imaging is not a part of an experimental psychologist's research arsenal, nor are average undergraduates trained in scanning techniques.

What I am maintaining is that the entire described range of instruments and techniques—from those used in visual psychophysics, via those in perception and psychophysiology, to those required for the presentation of visual stimuli to both laypeople and artists (and the recording of their creative behavior)—supports the *psychological* approach to aesthetics and the arts. These are instruments and techniques known to most experimental psychologists, whether or not they are interested in aesthetics. The procedures and the type of data emanating from them are known to them all. They discuss them in departmental colloquia and evaluate various job candidates and each other's graduate students using such procedures.

When I move to the discussion of the related areas mentioned at the beginning of the article, it will become clear why I consider it useful to outline at the outset the full range of experimental-psychology instruments and techniques. For the moment, all I wish to conclude is that the preponderance of the evidence indicates that *empirical aesthetics is in fact empirical psycho-aesthetics* and ought properly to be thus called. The purpose is not "turf defense" or capricious renaming but rather my belief that the clear specification of origin and method will make possible a dispassionate choice among competing claims when those arise in the subsequent sections.

## **2. Experimental Philosophy Is in Fact Empirical Philo-Aesthetics**

A recent arrival on the scholarly scene has been "experimental philosophy (of art)"—a term that I would claim is a misnomer. Philosophers of all people know what an experiment is supposed to entail, including as a minimum the manipulation of variables, random assignment of participants, hypothesis testing, and obtaining criterion measures. This is not what the practice in the experimental philosophy of art has tended to be. Most of the

work has been restricted to some type of measurement, for example, of base rates of some phenomenon of aesthetic interest in a sample (rarely representative or random) of respondents. Such data collection, though potentially valuable, is not an experimental procedure, and the term *empirical philosophy* of art would be more appropriate. Furthermore, because there is an incomplete overlap between “philosophy of art” and “philosophical aesthetics,” and the work so far has included domains such as natural locales and industrial design, which at times can be devoid of artistic pretensions or interest but can nevertheless be analyzed from an aesthetic standpoint, it would be more accurate to designate the emerging field as *empirical philo-aesthetics*.

It is easy to imagine collaboration in this area. For example, when a philosopher-aesthetician suspects that his *Gedankenexperiment* can be turned into a feasible real-world study, or she becomes reluctant to use philosophers’ excessively malleable “we” and wishes to obtain actual base-rate data on the existence of an aesthetic phenomenon, why not find a collaborator among the experimental psychologists interested in aesthetics instead of learning the nuts and bolts of research procedures, design, and statistics? Of course, skeptics about the usefulness of any research among philosophers, and skeptics about the usefulness of any armchairs among experimental psychologists, will not be easily convinced that something worthwhile can come from such collaborations.

### 3. Empirical Psycho-Aesthetics Is Not “Cognitive Science”

Experimental psychology is not “cognitive science.” There are many areas within experimental psychology that are not primarily concerned with cognition; and while there are important parts that are—cognitive psychology, cognitive development, psycholinguistics, to name a few—cognitive science is, of course, far broader and includes practitioners and contributions from many disciplines, from anthropology and ethology to computer science and neurology. For example, when the Cognitive Science Department was set up at my university (University of California, San Diego) in 1986, one of the first in the world, the specializations of the founding faculty who migrated from other departments reflected this breadth.

It follows that empirical psycho-aesthetics is also not “cognitive science.” This means that when philosophers of art talk of “cognitive science of art” or “science of art”—without mentioning empirical aesthetics, let alone empirical psycho-aesthetics—they are, in effect, excluding from consideration those results that have been obtained by the mentioned psycho-aesthetic methods and techniques. This is the necessary conclusion, on the assumption that my account to this point has been convincing and that these philosophers, in fact, do think seriously beyond mere names—to methodology and the conceptual core and scope. The error may be one of carelessness or of a lack of

familiarity with scientific methodology, but in either case it is unfortunate. Or it may be that by “cognitive science of art” some philosophers actually mean “cognitive neuroscience of art” or even “neuroaesthetics,” but those terms raise further issues that will be discussed later.

For the moment, I will stop briefly to give just one example. In a recent issue of the *Newsletter of the American Society for Aesthetics*, the philosopher W. P. Seeley wrote a widely discussed piece in the form a scholarly article with the title “What Is the Cognitive Neuroscience of Art . . . and Why Should We Care?”<sup>3</sup> In the following issue, the philosopher Roger Seamon responded; his very first sentence reads: “The science of art is as relevant to art as artistic representations are to science.”<sup>4</sup> Note that both “cognitive” and “neuro” in Seeley’s title were casually omitted by Seamon (for the sake, presumably, of a better-sounding, but factually dubious, analogy). More importantly, Seamon immediately went on to address some problems discussed by E. H. Gombrich in *Art and Illusion* as pertaining to “science of art,” without, at least overtly, realizing that the issues in question are perceptual, deeply psychological, and, specifically, *psycho-aesthetic* ones. (In section 3 of part II, I shall describe some research that demonstrates how Seeley himself contributed to the confusion, both in his initial article and in his response to Seamon.)

#### **4. Neuroscience of Art (Neuroaesthetics) Is a Branch of Empirical Aesthetics**

Neuroscience of art is at most some fifteen years old. Its core attribute is the reliance on a particular new research methodology: brain imaging. After Raymond Damadian created the first nuclear magnetic resonance imaging (NMRI) machine in 1972, and the setting up around 1980 of MRI machines in medical centers (by then without the “nuclear” that scared patients), *functional* MRI (fMRI) soon followed in the 1990s, after the discovery of the blood-oxygen-level-dependent (BOLD) contrast by Seiji Ogawa. In research, by imaging the change in blood-flow oxygenation (hemodynamic response) related to the energy use by brain cells, neural activity could be mapped in participants (confined to scanning machines) in response to stimuli presented visually or auditorily. Because of the comparative (only comparative!) ease of use, fMRI has dominated brain-mapping research. It is often combined with obtaining peripheral physiological measures and sometimes with other imaging techniques, such as EEG (electroencephalography) and MEG (magnetoencephalography). After the mature experimental psychologists and cognitive scientists had gradually acquired the basics of brain scanning in tutorials (often learning about the pitfalls the hard way, like any other students), perceptual-cognitive research flowed in abundance—but it is probably fair to say that the problems of art and aesthetics came at the tail end of that research.



Once one ignores the media-promoted “brain vogue,” it is easier to realize that the neuroscience of art (with or without the “cognitive” prefix) is fully *dependent on method*: it has no store of knowledge unique to it as an art discipline. Moreover, like all methods, imaging has serious limitations: respondents need to be stationary and solitary; the length of sessions is limited by the discomfort of confinement in the scanner; and many brain areas have multiple responsibilities. Noting that the presentation of a stimulus had an effect in a brain area that is “*also* responsible” (sometimes with an unknown degree of certainty) for some “*other* phenomenon of interest” is the type of merely correlational information that has led many incautious neuroscientists, psychologists, and philosophers to commit elementary inferential fallacies regarding causality.

Before turning to some telling reactions to the neuroscience of art by the “non-neuro” aestheticians, I shall devote a few words to the term “neuroaesthetics.” Seeley, who prefers the term “cognitive neuroscience of art,” says this: “I am often surprised by the degree to which the folks I interact with on the neuroscience side of these endeavors are committed to a core aestheticism. In this regard the term ‘neuroaesthetics’ isn’t just a name. It reflects an ideological bias about the nature of art. And this is a sticking point.”<sup>5</sup> Analogous remarks have been made by John Hyman and James Croft (to whom I shall return), and it is easy to agree with these philosophers’ opposition to what may be described as the “fundamentalist” version of the neuroscientific epistemic stance.

## 5. Some Reactions to the Neuroscience of Art by Philosophical Aestheticians

There is no doubt that most experimental psychologists, including psychoaestheticians, are pleased to receive information about the brain areas that are activated by stimuli for which other measures (e.g., behavioral, self-report, peripheral-physiological) already exist. The addition of information about the central level raises the fascinating possibility of *vertically integrated, multilevel* theories about significant phenomena. But note this key proviso: the addition of data from the higher centers, while very welcome, does not in any way diminish the importance of observations of behavioral, self-report, and psychophysiological responses to the stimuli in question; nor can it replace functional theories and phenomenological accounts of *aesthetic experience*—which is, as one has learned from Fechner and seen in the IAEA mission statement, one of the focal concerns of psycho-aesthetics.

Reactions to the neuroscience of art in philosophical aesthetics have varied in both the visual-art and music areas, occasionally being negative or dismissive (sometimes with good reason). Peter Kivy has strongly (and I believe correctly) criticized Laura Sizer for relying—in her defense of Noël

Carroll's position on mood and absolute music—on (in any case, only partly relevant) neuroscientific speculations about music processing by Jamshed J. Bharucha, Meagan Curtis, and Kaivon Paroo.<sup>6</sup> In the sharpest (and, again, largely justified) rebuttal to date issued by a philosopher of art to a neuroscientist's (or neurologist's, as V. S. Ramachandran prefers) "theory of [visual] art," John Hyman has dismissed the Ramachandran-Hirstein views as the "Baywatch Theory of Art."<sup>7</sup> Interestingly, Hyman was able to dispute successfully not only Ramachandran's and William Hirstein's familiarity with the basics of philosophical aesthetics but also their use of a specific psychological research finding in animal learning (the peak-shift effect) in building their theory—making his critique more potent and convincing.

Hyman's carefully reasoned criticisms of key ideas in Semir Zeki's *Inner Vision* are milder on the surface but equally uncompromising. Hyman traces Zeki's statement that "artists are in some sense neurologists, studying the brain with techniques that are unique to them," to a lecture given by Helmholtz in 1871; and he concludes, on the basis of a detailed critique, that this is "a very weak idea" if it is to serve as the foundation of a "neurological theory of art . . . [the] prospect [of which] is utterly implausible."<sup>8</sup> Hyman provides equally cogent reasons for concluding that Zeki's notion of "ambiguity" (Hyman prefers "imaginative multiplicity") is only one of many very general attributes, all of which may contribute to "great art" in one situation or another, but each of which, when promoted by itself as the central attribute, is rather disappointing and trivial.

In an article that asks, "Do current attempts to use neuroscience to explore art meet rigorous interdisciplinary quality criteria?" James Croft applies several sensible standards of interdisciplinary epistemology and concludes that most of the recent endeavors in neuroaesthetics fail them. Croft approvingly discusses Hyman's critique of Ramachandran and Hirstein and adds his own highly skeptical view of the value of Zeki's recent musings about Michelangelo's difficulties in realizing "synthetic brain concepts." Having quoted Zeki at length, Croft writes: "Note how little the word 'brain' adds to the above argument. It can happily be removed and the form of the argument is entirely unchanged." But Croft's most scathing comments are reserved for Colin Martindale's "A Neural-Network Theory of Beauty." Croft's judgment is that Martindale blends "a thin approach to aesthetics with neuroscience," reaching the (justifiable) conclusion that the "neurological information supplied by Martindale adds practically nothing to our understanding of beauty, the stated goal of the enterprise."<sup>9</sup>

Several comments are in order. First, neuroscience enthusiasts among philosophers have nevertheless adopted, albeit with some modifications, the "artist as neurologist" view that Hyman criticized and are promoting it as a "general model for a cognitive neuroscience."<sup>10</sup> Second, Anjan Chatterjee has suggested that Hyman's and Croft's critiques were quite

properly directed at “speculative science . . . [that] trades on neuroscience,” but that they did not (or should not?) challenge the hands-on neuroaestheticians’ work.<sup>11</sup> However, as I shall show in section 4 of part II of this article (in the case of Anne J. Blood’s and Robert J. Zatorre’s 2001 research on “chills” induced by music), even competent hands-on work can fall short of the desirable in how it is interpreted and promoted—both by its authors and others.<sup>12</sup>

The third point is that both Seeley (with regard to the work in perception, cognition, and information processing in visual art and music) and Chatterjee (with regard to emotion) vastly understate the fund of knowledge that exists on these topics in empirical psycho-aesthetics, while simultaneously exaggerating the accomplishments and potential of the neuroscience of art.<sup>13</sup> In addition, in the previously mentioned exchange between Seamon and Seeley, one observes multiple examples of a kind of thesis substitution in which the discussion and examples utilize standard psycho-aesthetic concepts and procedures—only for both writers, especially Seeley, to leap to “neuroscientific” claims when the time comes for conclusions to be drawn.<sup>14</sup>

What is perhaps more surprising is that Hyman, when discussing the Ramachandran-Hirstein art-is-caricature idea, does not mention the concepts of incongruity and distortion that have been investigated by psycho-aestheticians. Also, when discussing Zeki’s notions, Hyman stops at Helmholtz and does not enrich his critique by acknowledging, as an example, the complex relationship between pleasingness and interestingness of artworks (first studied by Daniel Berlyne) when he mentions these dimensions of judgment. Nor does Hyman discuss the impact of stimulus (including artwork) variables such as complexity, novelty, and good continuity that are relevant for dealing with ambiguity (or “imaginative multiplicity”) in visual illusions—even though there is a store of information on these issues in empirical psycho-aesthetics going back to Rudolf Arnheim (and, again, Berlyne). In fact, a close rereading of Berlyne’s forty-year-old book, *Aesthetics and Psychobiology*, may be regarded as an urgent task for all of the above-mentioned aestheticians and neurologists.<sup>15</sup>

After all, Croft, like Hyman, does not acknowledge even the elementary relevant aspects of empirical psycho-aesthetics, which could considerably deepen and broaden his critique of the various neuroscientific culprits that are mentioned. For example, like Hyman, Croft does not seem to realize fully that brain imaging is the methodological tool of the neuroscience of art. And so, also like Hyman, Croft appears not to realize that the end product of imaging—data about the more-or-less specific location of brain activity when certain art stimuli are presented to research participants (locations used for many other activities also)—is not informative about the quality of participants’ aesthetic experience.

Yet Croft, like almost everyone involved in either philosophical or psychological aesthetics, recognizes the central place of experience in aesthetic investigations (e.g., in the first sentence of his abstract). Meanwhile, with the help of painstakingly accumulated methodological sophistication in dealing with the various types of participants' self-report—the only currently available gateway to *aesthetic experience* available to researchers—empirical psycho-aesthetics can obtain access to private aesthetic episodes as well as is currently humanly possible. An objective observer would probably be forced to conclude that the behavior vis-à-vis empirical psycho-aesthetics of the philosophical aestheticians whose views I have presented here is rather odd. I shall resume this discussion in the next section.

## **6. Empirical Psycho-Aesthetics: A Neglected Partner of Philosophical Aesthetics?**

The most common sentiment in the long tradition of empirical psycho-aesthetics—one that is prevalent to this day—is hope for cooperation with philosophical aesthetics, or at least as peaceable a division of labor as possible, along obvious lines. Conscientious empirical psycho-aestheticians have labored on the construction of various types of aesthetic stimuli, paying attention, when possible, to issues of ecological validity; they have used multiple methods when this was opportune; they have done what they could for their experimental work not to oversimplify aesthetic objects and phenomena; and in a certain, admittedly modest, proportion of cases, they have paid attention to philosophers' concerns.<sup>16</sup>

In general, the quiet, steady progress of psycho-aesthetics has been underappreciated in the philosophy of art, although, and this is a curious phenomenon, a greater amount of genuine interest could have been shown by philosophical aestheticians even while they remained behind their favorite barricade—that the truly important questions in aesthetics cannot, by definition, be addressed by empirical methods. “Experimental philosophy” has perhaps caused minor discomfort to some philosophical aestheticians, but it is a development that they can gradually accommodate.

The arrival (not to say advent) of the neuroscience of art has been quite a different kind of story. And while empirical psycho-aestheticians, most of whom have psychology as their home department at universities, quickly learned about the potential and limitations of brain imaging, and that this new field tended to be rather loud in the long tradition of emerging fields, many philosophical aestheticians were stunned. They were overwhelmed by the amount of new information that they needed to acquire quickly, impressed by the new method, intimidated by its medical origin, and, above all, shocked by the flash and bombast with which “mere neurologists” each proclaimed *The Scientific Theory of Art*. And not only were people who seemed to know

very little about art suddenly pontificating about it, but they also had the media at their beck and call each time they said “brain”—which was practically all the time. (It is also interesting to note that some neuroscientists and neurologists are in the habit of saying that “the brain does X” and even that “the brain thinks or feels X,” thus giving it an independent status within the person; but that is an old and separate philosophical problem.) Figuratively speaking, neuroscientists told the world, standing in front of brain images and scanners, about “The Secret of Beauty” and “Why We Love Music.”<sup>17</sup>

It is in this context, I think, that one should view the articles by Hyman, Croft, and also, at a more popular level, Raymond Tallis.<sup>18</sup> These articles are a belated but justifiably strong response to excess in the neuroscience of art. It is nevertheless all the more surprising that Hyman and Croft have not imported and assimilated psycho-aesthetic findings in order to enrich their critiques.

Instead, philosophers of art seem to be relieved when they can say something positive about a “neuroaesthetic finding,” and the ideal candidate is one that is straightforward and interesting, yet not threatening or couched in grandiose terms. Margaret Livingstone’s research on Mona Lisa’s smile fulfills all of these criteria.<sup>19</sup> The research is clearly linked to aesthetics and to painting by reference to E. H. Gombrich’s discussion of the smile in terms of Leonardo’s use of the technique of *sfumato*. Presumably for all of these reasons, and restricting myself to philosophers I have already cited, Carroll, Moore, and Seeley in their paper, and Croft and Seeley, respectively, in theirs, all go out of their way to praise Livingstone’s Mona Lisa research highly. However, the fact is that her finding is an application of basic vision psychophysics—the type of work one does in a vision laboratory in a psychology department. It could have been obtained long before the birth of neuroaesthetics. And it does not remotely involve brain scanning. Nor does Livingstone mention either neuroaesthetics or imaging in her letter in *Science*. The finding is an issue of perception, spatial resolution, and focus at, or away from, Mona Lisa’s mouth. Furthermore, Livingstone’s finding would be even more convincing if she formally used research participants to confirm it (which I do not believe she did). But even without the use of participants, Livingstone’s Mona Lisa finding clearly belongs to the domain of empirical psycho-aesthetics. I shall return to this work in section 1 of part II of this article.

A somewhat analogous example was recently provided by the philosophical aesthetician Vincent Bergeron. In the same breath with favorably mentioning Vittorio Gallese’s (in my opinion, speculative and far-fetched) claims regarding “action simulation” by “mirror neurons” in humans, Bergeron, with equal approval, discusses Jane Davidson’s sound research on the contribution of visual information to how research participants evaluate the “expressive intensity” of musicians performing on the violin and piano. Davidson’s work is a fine example of empirical psycho-aesthetic research in the area of music performance and has nothing

to do with neuroaesthetics; the juxtaposition may give a false impression to the casual reader.<sup>20</sup>

In part II of the article, empirical psycho-aesthetic research that is highly relevant for many of the topics mentioned so far will be discussed in detail. The research addresses numerous different problems of aesthetics—some classical, some new—in half a dozen art domains and using diverse methods and research participants.

## NOTES

1. Vladimir J. Konečni, "Empirical Psycho-Aesthetics: On the Trade-Offs among Art Theory, Psychological Theory, and Methodological Concerns" (keynote address,) 32nd Annual Conference of the Australian Psychological Society, Cairns, Queensland, October 1997.
2. G. T. Fechner, *Vorschule der Ästhetik [Elementary Aesthetics]* (Leipzig: Breitkopf und Härtel, 1876).
3. W. P. Seeley, "What Is the Cognitive Neuroscience of Art . . . and Why Should We Care?" *Newsletter of the American Society for Aesthetics* 31, no. 2 (2011): 1–4.
4. Roger Seamon, "A Response to W. P. Seeley, 'What Is the Cognitive Neuroscience of Art . . . and Why Should We Care?'" *Newsletter of the American Society for Aesthetics* 31, no. 3 (2011): 5–6.
5. Seeley, "What Is the Cognitive Neuroscience of Art?" 2.
6. Peter Kivy, "Moodology: A Response to Laura Sizer," *Journal of Aesthetics and Art Criticism* 65 (2007): 312–18; Laura Sizer, "Moods in the Music and the Man: A Response to Kivy and Carroll," *Journal of Aesthetics and Art Criticism* 65 (2007): 307–12; Noël Carroll, "Art and Mood: Preliminary Notes and Conjectures," *The Monist* 86 (2003): 521–55; Jamshed J. Bharucha, Meagan Curtis, and Kaivon Paroo, "Varieties of Musical Experience," *Cognition* 100 (2006): 131–72. For a discussion of the mentioned issues, see Vladimir J. Konečni, "Music, Affect, Method, Data: Reflections on the Carroll v. Kivy Debate," *American Journal of Psychology* (in press).
7. John Hyman, "Art and Neuroscience," in *Beyond Mimesis and Convention*, ed. R. P. Frigg and M. C. Hunter, Boston Studies in the Philosophy of Science 262 (Boston: Springer, 2010), 245–61, see p. 250; Vilayanur S. Ramachandran and William Hirstein, "The Science of Art: A Neurological Theory of Aesthetic Experience," *Journal of Consciousness Studies* 6 (1999): 15–51.
8. Hyman, "Art and Neuroscience," 254, 257, 260; Semir Zeki, *Inner Vision: An Exploration of Art and the Brain* (Oxford: Oxford University Press, 1999), 10.
9. James Croft, "The Challenges of Interdisciplinary Epistemology in Neuroaesthetics," *Mind, Brain, and Education* 5 (2011): 5–11, my quotes are from pp. 5 and 7–8; Semir Zeki, *Splendors and Miseries of the Brain: Love, Creativity, and the Quest for Human Happiness* (Chichester, UK: Wiley-Blackwell, 2009), see p. 103; Colin Martindale, "A Neural-Network Theory of Beauty," in *Evolutionary and Neurocognitive Approaches to Aesthetics, Creativity and the Arts*, ed. C. Martindale, P. Locher, and V. M. Petrov (Amityville, NY: Baywood, 2007).
10. Seeley, "What Is the Cognitive Neuroscience of Art?" 1; see also Noël Carroll, Margaret Moore, and William P. Seeley, "The Philosophy of Art and Aesthetics, Psychology, and Neuroscience: Studies in Literature, Visual Arts, and Music," in *Aesthetic Science: Connecting Minds, Brains, and Experience*, ed. Arthur P. Shimamura and Stephen E. Palmer (Oxford: Oxford University Press, 2012). For their part, Skov and Vartanian, in stating, "[n]ot only do we hope that puzzles in aesthetics can be solved by insights from biology, but that the contribution can be truly bidirectional," seem to accept implicitly the "artist as neurologist" view and to limit neuroaesthetics to solving

- "puzzles." Martin Skov and Oshin Vartanian, *Neuroaesthetics* (Amityville, NY: Baywood, 2009), 6.
11. Anjan Chatterjee, "Where There Be Dragons: Finding the Edges of Neuroaesthetics," *Newsletter of the American Society for Aesthetics* 31, no. 2 (2011): 4–6.
  12. Anne J. Blood and Robert J. Zatorre, "Intensely Pleasurable Responses to Music Correlate with Activity in Brain Regions Implicated in Reward and Emotion," *Proceedings of the National Academy of Science* 98 (2001): 11818–23.
  13. Seeley, "What Is the Cognitive Neuroscience of Art?" 2; Chatterjee, "Where There Be Dragons," 5.
  14. Seamon, "A Response to W. P. Seeley," 5–6; W. P. Seeley, "The Science of Art Is as Relevant to the Philosophy of Art as Artistic Representations Are to Science: A Reply to Roger Seamon," *Newsletter of the American Society for Aesthetics* 31, no. 3 (2011): 6–7.
  15. Daniel E. Berlyne, *Aesthetics and Psychobiology* (New York: Appleton-Century-Crofts, 1971). One would do much worse than read Berlyne's erudite book by relying on a recent article that ambitiously attempts (in some sixteen sections on seven journal pages) to build no less than a "framework for the psychology of aesthetics." Perhaps the title of the final section, "A Psychological-Aesthetic Utopia," is appropriate, given the disproportion between the thinness of the material and the extravagant range of topics—see Thomas Jacobsen, "Bridging the Arts and Sciences: A Framework for the Psychology of Aesthetics," *Leonardo* 39 (2006): 155–62.
  16. Occasionally the attention to philosophers results in excessive humility, perhaps especially undesirable when *artistic value* is at issue. For example, the psychologist Rolf Reber wrote: "[P]hilosophers . . . define the *criterion* of what the [aesthetic] experience is expected to be [and] psychologists . . . provide a *test* of whether this criterion is fulfilled." R. Reber, "Art in Its Experience: Can Empirical Psychology Help Assess Artistic Value?" *Leonardo* 41 (2008): 367–72, see p. 367; italics in the original. The philosophical aesthetician Vincent Bergeron, who has expressed appreciation for the achievements of "empirical aesthetics," disagrees with Reber's proposal of a division of labor and instead advocates full cooperation; see V. Bergeron, "What Should We Expect from the New Aesthetic Sciences?" *Newsletter of the American Society for Aesthetics* 31, no. 2 (2011): 6–7. See also V. Bergeron and Dominic McIver Lopes, "Aesthetic Theory and Aesthetic Science: Prospects for Integration," in *Aesthetic Science: Connecting Minds, Brains, and Experience*, ed. Arthur P. Shimamura and Stephen E. Palmer (Oxford: Oxford University Press, 2012).
  17. See Croft, "Challenges of Interdisciplinary Epistemology," for related information.
  18. Raymond Tallis, "The Neuroscience Delusion: Neuroaesthetics Is Wrong about Our Experience of Literature—and It Is Wrong about Humanity," *Times Literary Supplement*, April 9, 2008, [http://entertainment.timesonline.co.uk/tol/arts\\_and\\_entertainment/the\\_tls/article3712980.ece](http://entertainment.timesonline.co.uk/tol/arts_and_entertainment/the_tls/article3712980.ece) (accessed January 10, 2012).
  19. Margaret Livingstone, "Is It Warm? Is It Real? Or Just Low Spatial Frequency?" *Science* 290 (2000): 1299. Also see M. Livingstone, *Vision and Art: The Biology of Seeing* (New York: H. N. Abrams, 2002), 71–73.
  20. Vincent Bergeron, "What Should We Expect from the New Aesthetic Sciences?" *Newsletter of the American Society for Aesthetics* 31, no. 2 (2011): 6–7; Jane W. Davidson, "Visual Perception of Performance Manner in the Movements of Solo Musicians," *Psychology of Music* 21 (1993): 103–13. Neuroscientists Molnar-Szakacs and Overy have extended V. Gallese's speculations further; see Istvan Molnar-Szakacs and Katie Overy, "Music and Mirror Neurons: From Motion to 'E'motion," *Social, Cognitive, and Affective Neuroscience* 1 (2006): 235–41. For his part, the aesthetician Tom Cochrane is responsible for an even more speculative extension; see Tom Cochrane, "Expression and Extended Cognition," *Journal of Aesthetics and Art Criticism* 66 (2008): 329–40. Recently, Cochrane's speculations were criticized in detail in Vladimir J. Konečni, "Constraints on Manipulations of Emotions by Music: A Critique of Tom Cochrane's Assumptions," *Philosophy Today* (in press).