

scholars, providing fresh perspectives on the play by looking at the philosophical questions that it conjures—questions about agency, the power of language, the nature of femininity. But precisely because it examines the play as the birthplace for such questions, the book has much to offer to nonspecialists as well—to students and researchers who are interested in the relationship between philosophy and literature more broadly.

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HUSTON, JOSEPH P., MARCOS NADAL, FRANCISCO MORA, LUIGI F. AGNATI, and CAMILO JOSE CELA CONDE, eds. *Art, Aesthetics, and the Brain*. Oxford University Press, 2015, 544 pp., \$160.00 cloth.

Reviewing Huston, Nadal, Mora, Agnati, and Cella Conde's *Art, Aesthetics, and the Brain* presents me with a logistical puzzle. Stretching to 544 pages with twenty-five chapters covering seven sections, it would turn out to be quite the exercise to summarize each contribution, pointing out each chapter's novel impact and any missteps along the way. Instead, we would do well to evaluate the project holistically, determining its strengths, weaknesses, the intended audience for such a dense work, and just what philosophers—particularly those working in aesthetics—might glean from it. This gives us a rough outline to follow over the next few pages; however, before I begin to summarize the strengths of the anthology, let me reiterate just what the editors aimed to achieve with their selections and gesture at a verdict.

As the editors note that their entry is one into a crowded market of materials on empirical aesthetics, they offer four editorial justifications to help differentiate their project from the rest (p. vi):

1. A breadth of examples where neuroscientific methods are “used to understand the biological foundations of art and aesthetics”
2. A combination of “general and specific” approaches to the “relation between art, aesthetics, and the brain”
3. Incorporating nonvisual arts, including music and dance
4. Including work from disciplines as diverse as philosophy and engineering

Measured by these four criteria, their work is a success; especially evident by the *excellent* contributions of those authors deploying the methods of cognitive neuroscience to dance and music and by the gener-

ous reviews of the literature on offer. However, the anthology's demonstrable breadth hampers attempts to thread a philosophically rich, or coherent, narrative, and instead it can appear as a mosaic of isolated viewpoints with little interaction or interplay among the vivid themes on display.

As prefaced above, the seven contributions covering the cognitive neuroscience of dance and music were some of the strongest in the anthology, often engaging with one another, and present a clear case that each of these artforms should continue to receive thoroughgoing, serious treatment in empirical aesthetics. As an example, take Emily Cross's chapter, “Beautiful Embodiment,” which introduces the “Cognitive Neuroscience of Dance” section. Cross begins with an anxiety-provoking thought exercise: imagine being midway through your daily commute, suddenly to have an instantaneous transformation of your run-of-the-mill train station by a *flashmob* of coordinated commuters dancing (pp. 189–190). This transformation of quotidian contexts by everyday lay performers drives her research question; “how might our own dance abilities (or lack thereof) influence how we perceive performers who excite and impress us?” (p. 190) Working through a series of neuroimaging studies, Cross argues that our motoric expertise of an action sequence is a consequence of our perceptual embodiment of that action (p. 193–194), and this leads us to an animated discussion of the aesthetics of action and the effects of (motoric) virtuosity and fluency that may be applicable to other media. Reviewing seminal work on mirror neurons by Gallese and Hayes, Cross argues that observers are partial to fluid, virtuosic action, in part because of the activation of our sensorimotor systems—perhaps drawn to the challenge of mirroring the skill and grace on display (pp. 196–197).

Cross's emphasis on embodiment and the pluripotency of mirror neurons is further reflected in Beatriz Calvo-Merino's excellent overview of the mirror neuron literature in her own chapter, “Sensorimotor Aesthetics.” Likewise Christensen and Jola's eight-paged table chronicling eighteen studies in empirical aesthetics that use movement stimuli functions as a gem of a review and supports their trenchant, but constructive, critique of the lack of ecological validity in empirical aesthetics: “due to attempts of experimental control and scientific reductionism, and partly due to a lack of knowledge of the subject matter, art in general . . . and dance in particular has been employed in such a manner that it was no longer recognizable as either art or dance” (p. 224). Continuing the theme, Corrigan and Schellenberg provide an excellent introduction to the influence of personality—including the infamous “big-five” traits—individual differences (for instance, political persuasion), and emotion on musical preferences. Rounding out the

section on music, Lehne and Koelsch's chapter privileges lower-level features, such as "tension" and "resolution," of music and dynamic media more generally as entry points into an audience members' evaluative and motivational responses, and this appeal to emotive states engendered by music is echoed in Elvira Brattico's succinct discussion of the social contexts and factors of musical performance. For those interested in how we perceive the features of music and dance and how these perceptions interact with and help form our evaluations of these art forms, these chapters signal a helpful path through dense empirical findings.

The anthology is littered with troves of thorough reviews. Though I found those sections on dance and music the most useful, other sections are similarly charitable to their readers in laying out many of the relevant findings. The chapters in section 5, "Neuropsychology of Art and Aesthetics," come to mind; in particular Anjan Chatterjee's detailed recounting of a plethora of pathological cases where seeming cognitive deficits give rise to artistic ability, alongside Indre Viskontas and Suzee Lee's focused treatment of art production by those suffering with dementia. Although there is a relative dearth of cross-cultural research on any of the art forms reviewed across the book, Gesche Westphal-Fitch and Tecumseh Fitch's work on comparative aesthetics, both cross-culturally and across primate and even avian species provides a foundational overview for those who may be interested in the possibility of "animal aesthetics."

The wager to be made with projects as ambitious as *Art, Aesthetics, and the Brain*'s is that the diversity of viewpoints and contributions, though difficult to unite in a single narrative frame, will prevent or at least reduce the risk that any crucial element or aspect to the inquiry will be left unaddressed. However, it is clear to me that there are at least a few lacunae—both technical and sociological—that should have been filled.

Technically, two issues stick out. First, though there are hundreds of studies across many subspecialties of psychology and neuroscience discussed, from a generous skim I could not find a single neuroimaging study cited that utilizes the more advanced statistical technique of multivoxel pattern analysis, or MVPA. Although MVPA has become commonplace only in the last ten years or so, it offers a far more detailed window into which areas of the brain are recruited by any particular representation than earlier "univariate" neuroimaging techniques. Let me take a moment to analogize the difference in these methods, as any empirically friendly consumer of neuroimaging data ought to be sensitive to the difference between MVPA and earlier univariate analyses.

In a univariate experiment, an experimenter would posit a "region of interest" (ROI) in the brain, whose activation is hypothesized to play some functional role. For instance, in Spas Getov and Joel Winston's chapter, they posit that the "fusiform face area" (FFA)—a small patch of the underside of your temporal lobe—is responsible for processing facial information. In the simplest case, you then detect how activity in the ROI, measured by metabolic (in the case of fMRI) or electrical (in the case of EEG) signals, changes between some control and test condition. Perhaps your control condition is the image of a famous person, and your test condition is an image of dog. In this fictional case, you would find that activity in the FFA decreases for images of dogs, leading you to conclude that this region of the brain does not process dog-related information.

The epistemic foundation of this "univariate" doctrine has been challenged by MVPA, which crucially *does not* depend on a single "region of interest." Rather MVPA uses advanced statistical computation to detect how *multiple* areas of the brain respond to a given stimulus. To detect how the brain processes images of dogs, you would train an algorithm on many trials' worth of brain data where you know that the participant is processing images of dogs. The algorithm can then isolate a *pattern* of dog-related activation across the brain, which may then be compared with new data from other stimuli, for instance, providing insight into whether whole-brain representations of dogs are similar to whole-brain representations of cats. The lesson for the empirically curious who work through the neuroimaging literature is that earlier, univariate analyses likely harbor false negatives and should be treated with caution. Since almost all the neuroimaging work cited in the anthology comes from a univariate tradition, many of those arguments reliant on neuroimaging data (in particular those chapters in Section 2) may have to be revisited with newer techniques.

The second technical issue concerns the problem of *reverse inference*. Many arguments throughout the anthology depend on this common formulation; for instance, consider Brattico's claim: "familiar music has been shown to activate more limbic subcortical areas than unfamiliar music and even liked music. The positive affect derived from understanding [music] might be related to such a brain response" (p. 309). Here, a univariate task measured how brain activity differs between familiar and unfamiliar music, with familiar music showing increased activity in the limbic system. The enthymeme that generates our reverse inference is as follows: limbic system activation is associated with emotional stimuli. Because of its prior association with emotional stimuli, when the researchers find higher activation in the limbic system for familiar stimuli, they infer that

this increased activation is emotionally relevant. But it is plausible that one region of the brain participates in more than one function, and it is likely historically contingent that the limbic system was first identified as being involved with emotion, as opposed to familiarity. Only the chapter by Agnati, Guidolin, and Fuxe directly addresses the epistemic problem of reverse inference, ending with a pessimistic note that “it is not clear if such [neuroscientific] techniques can adequately deal with the interplay of such varied cognitive, affective, personal, social, and cultural factors” that arise in art and aesthetics (p. 435). However, a nuanced treatment of reverse inference is possible; for instance, Eduard Machery has argued that reverse inference, when meshed with a Bayesian statistical foundation, may yield valid inferences. Clearly, there is a path forward to a more stable epistemic foundation for neuroaesthetics once these two statistical and epistemic hurdles are managed.

There are also significant sociological gaps present in the anthology; specifically I noticed how nearly every single stimuli, artwork, art form, or genre under consideration was an example taken from a singularly Eurocentric, white, and classed perspective (Westphal-Fitch and Fitch’s chapter serving as a notable exception). In an anthology with such a broad aim, some explicit diversity of artworks and, by extension, diversity in the participants serving in these studies, is warranted. Leder and colleagues make a good point about the role of context in their chapter, “Aesthetic Appreciation,” but what struck me was their citation of Brian O’Doherty’s description of galleries as “white spaces.” And yet, once I was finished with the book I could not help but find this an apt, general label for the kind of art under discussion. Perhaps this may serve as a genuine call that more empirical aesthetics must be done outside of the gallery and *outside of white spaces*. While investigations of visual aesthetics and art make up the majority of the anthology, not a single chapter was dedicated to photography, film, fiction, or mass art, that is, the kind of aesthetic and artistic experiences *most* people engage with in their daily lives.

Edmund Rolls’s “Neurobiological Foundations of Art and Aesthetics” strikes me as particularly outmoded. Rolls grounds a theory of the aesthetic on Darwinian principles of natural and sexual selection, reducing beauty to the perception and appreciation of those fitness enhancing features, which he describes as a litany of “Female preferences: factors that make men attractive,” including: athleticism, resources, power and wealth, status, age, ambition and industriousness, testosterone-dependent features, symmetry, dependability and faithfulness, risk taking, and odor (pp. 460–461). Naturally, Rolls

gives a list of “Male preferences: what makes women attractive and beautiful to men,” including: youth, beautiful features (!), body fat, fidelity, and “attractiveness at the time of ovulation” (pp. 461–462). Continuing to generalize, Rolls argues that the further a given artwork lies from these “biological foundations” of aesthetics, the less inherent, or somehow innate, aesthetic value a work has: “[where] art becomes very abstract, as in some of the work of Mark Rothko, perhaps [*only*] those especially interested are those who have expertise themselves in what is being achieved technically, such as the painting of colors by Rothko” (p. 464). These arguments lead Rolls to mediate on just why there are not as many women artist, painters, poets, and the like as their male equivalents (p. 466). Here, Rolls offers the following “thoughts,” including that women’s and men’s brains have been subject to different selective pressures, which may have led men to be better at problem solving, and hence more *creative*, thanks to natural selection (p. 466). While Rolls admits, citing Virginia Woolf, that the gendered difference in artists may be due to circumstance, he just as quickly entertains the possibility that women “take” to literature because of the “adaptive value of gossip to women” (p. 466).

Rolls’s arguments fail to grapple with recent, less-gendered explanations—for instance, Rebecca Jordan-Young’s landmark book *Brain Storm: The Flaws in the Science of Sex Differences*, which masterfully takes on many of these supposed gendered differences, particularly those resting on hormonal foundations. Moreover, a charitable reading of Woolf gives us far more testable hypotheses about why there might not be as many women painters as there are authors. As Woolf writes in *Professions for Women*, “For ten and sixpence one can buy paper enough to write all the plays of Shakespeare—if one has a mind that way. Pianos and models, Paris, Vienna and Berlin, masters and mistresses, are not needed by a writer. The cheapness of writing paper is, of course, the reason why women have succeeded as writers before they have succeeded in the other professions.”


Just who is this anthology for, and what is a philosopher to make of it? Likely, if you work in empirical aesthetics you will already be well familiar with many of the names and arguments in this book, but the anthology still serves a functional role: the literature reviews contained throughout the chapters—with the notable dearth of MVPA and cross-cultural work—are an excellent justification alone to find a copy, and it would serve any scholar of aesthetics with strong empirical leanings, if not some empirical background in neuroscience or cognitive psychology, well. For the pure-at-heart philosopher, it is more difficult to home in on the exact utility of the collection, and to some extent it will depend on

how amenable or sensitive their research project is to empirical formulations and results.

There are philosophically interesting discussions interspersed throughout the book, for instance, on the perceptual effects of indeterminate artworks (p. 152), the aesthetics of action (pp. 196–197), the uniqueness of dance as a media (pp. 238–239), the paradox of repeated exposure (p. 291), and the utility of phenomenology in perceptions of time and musicality (Chapter 25). However, the most robust philosophical arguments are found early on, in the first section on *Foundational Issues*. William Seeley's contribution, "Art, Meaning, and Aesthetics," is by far the most engaging philosophical work, where he mounts a thorough defense of why we ought to consider art as an interesting category to treat from a neuroscientific perspective in the first place (p. 29). *Prima facie*, there should be no reason why the brain treats art any differently from another artifactual kind—in quite a close possible world we could have an anthology on *Espresso, Caffeination, and the Brain*. Seeley counters this view by arguing that artworks are unique in that they serve as "attentional engines . . . intentionally designed to direct attention to those aspects of their formal compositional structure, that carry information about their content" and the category they belong in (p. 28). Still, Seeley's clarification strikes me as too broad—after all, advertisements are a paradigmatic example of attentional engines—and what of social media and memes, which do nothing but capture and direct attention to the structure and category of a given post or tweet.

I am not convinced, yet, that neuroscience of art comes in at the right "level" of analysis, at least while there is still much work to be done on the lower-level properties—those sudden chills and flutters of elation—that may be elemental to an aesthetic experience. The role of social and environmental context also must be taken into account; since being taken into a lab and shown an image of *Guernica* on a seventeen-inch LED screen is, at least in my limited experience, radically different than standing in front of the twenty-five-foot real deal. To do empirical aesthetics correctly, we will have to follow participants to the gallery, or the concert venue, or the street corner—wherever art happens—to actually measure aesthetic effects. Finally, besides the need to replicate these findings at a cross-cultural scale, using a diverse array of art forms, we need to tackle the epistemological considerations that abound. Does being shown a forged, or a participatorially made, or a computer-generated artwork change our aesthetic experience of a work? Given the ease of computer mediated forgeries, especially in photography and now in video with the rise of "deepfakes" created by machine learning, this seems like a salient question

at the border of aesthetics and epistemology that cognitive neuroscience may be well suited to solve. Clearly, there is a lot of work yet to be done.

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DESTRÉE, PIERRE, and PENELOPE MURRAY, eds. *A Companion to Ancient Aesthetics*. Hoboken, NJ: Wiley-Blackwell, 2015, xiv + 538 pp., 26 b&w illus., \$195.00 cloth.

What could it mean to speak of ancient aesthetics? The phrase has seemed at turns obvious and impossible. We are heirs to splendid examples of ancient Greek and Roman art and influential reflections on their composition, beauty, emotional power, and value. How could there not be *ancient aesthetics*? Yet, famously, ancient Greeks and Romans had neither the concept of art nor the philosophical discipline of aesthetics that continues to incline our approach to their achievements. While some formative theorists of the discipline, from Shaftesbury and Batteux to Herder, Baumgarten, and Schiller, understood what they were doing as continuous with, or even an attempt to recover, ancient forms of experience, the terms of experience had changed with the times. We are pressed to find Athenians, Romans, and Alexandrians admiring paintings in galleries, wondering whether an artifact is an artwork, debating whether beauty is a subjective or an objective property, or evaluating music apart from song and dance and architecture, sculpture, embroidery, and poetry apart from civic and religious life. So how could ancient *aesthetics* be more than an anachronism? This familiar problem of historical interpretation is compounded when inquiring with a concept so tied to lived experience as aesthetics and into the experience of something so culturally bound as art, leading many to wonder: how can we pursue aesthetics in even western antiquity without imposing familiar categories onto an unfamiliar world? And if we can, what would it mean to speak of *modern aesthetics* with this fuller history in view? To ask now after ancient aesthetics is to ask after aesthetics's past but also its possible futures.

The present seems ripe to take up these questions. Just as energy has been renewed recently to aesthetic issues within the philosophy of art and beyond—from the wide range of beauty and disgust to the aesthetics of the body, race and gender, and non-Western cultures—scholars of ancient Greece and Roman cultures have renewed aesthetics to the forefront of classical scholarship, a consequence of the "material turn" within the field. The study of ancient aesthetics