

A Layered, Bounded, Integrated Approach to Research on the Arts across Disciplines

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ABSTRACT

Cooperation among arts scholars is thought to be hampered by the division of research on the arts into two cultures, one scientific, one humanistic. This article proposes an alternative model for arts research, wherein multiple levels of explanation focused on well-bounded phenomena integrate research across academic disciplines. Two case studies of research that fit the model are presented.

A boom in scientific and humanities-based research into the arts (amply evident in the pages of this journal) leaves scholars across the academy grappling with the challenge of how best to combine their efforts. Since correctly sizing up a challenge is crucial to surmounting it, I first posit that a powerful yet mistaken meme governs interactions between scientists and humanists. According to the meme, the sciences and the humanities are “two cultures” that must be “bridged.” To take two recent examples, the neuroscientist Eric Kandel gives his book *Reductionism in Art and Brain Science* the subtitle *Bridging the Two Cultures*, while the film scholar Murray Smith gives his defense of a naturalized approach to film the title *Film, Art, and the Third Culture* [1,2]. Inasmuch as the two-cultures meme tends to secure the very silos that scholars endeavor to escape, the remedy is to replace it with a more nuanced model that situates research on the arts within a space that is layered and bounded. Such a space can integrate research in the sciences with research in such fields as art history, ethnomusicology and literary studies. (“Arts research,” in which artists do research through art, is a separate matter, for another occasion.)

NOMOTHETIC AND IDEOGRAPHIC

To illustrate how the two-cultures meme shapes thinking about research into the arts, consider the reaction to Semir Zeki’s *Inner Vision: An Exploration of Art and the Brain* [3]. Zeki takes credit for coining the word *neuroaesthetics*, his

book made a splash, and the controversy around its reception is revealing.

Vision comprises a suite of systems that extract the stable features of scenes and objects from light energies, and Zeki argues that works of visual art exploit this functional specialization of vision. Cézanne’s paintings appeal because they isolate the system for processing three-dimensional shape information. Calder’s mobiles appeal because they isolate the workings of regions of the visual cortex that are responsible for seeing motion. Each succeeds because his work plays off the architecture of vision, and Zeki defends the hypothesis that the “general function of art” is the same as that of the brain, namely to represent “essential, non-changing aspects of the visual world” [4].

Much reaction to Zeki takes issue less with the details of his argument and more with his ambition to understand visual art as a strictly neurobiological phenomenon [5–7]. Zeki clearly loves Cézanne and Calder, and he strives to share what he sees in them. He embodies Blake Gopnik’s portrait of the scientist who “wants to practice a kind of art criticism and interpretation, helping all of us to be better art lovers by getting us to understand what’s most basic to appreciating art” [8]. For Zeki’s critics, however, science is just not up to the task. Gabrielle Starr, a literary scholar sympathetic to scientific research into the arts, wonders “for how much of the complexity of (reading) Tolstoy can [the neurosciences] account, and how might they differentiate (reading) Tolstoy from Dickens or Keats? How many factors would a rich explanatory model that could do this require? Ten thousand? A whole genome?” [9].

Some old-fashioned terminology articulates the clash of two cultures underlying the reaction to Zeki. On the one hand, science is “nomothetic,” concerned with generalized regularities. On the other hand, the humanities are ideographic, concerned with what is specific to individual artworks. As long as science is nomothetic and the humanities are ideographic, no hypothesis about the “general function of art” can yield a richly specific interpretation of a painting by Cézanne or a Calder mobile.

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ACCOMMODATION AND SPECIALIZATION

Familiar strategies for bridging the two cultures go along with the picture of science as nomothetic and the humanities as ideographic.

One bridging strategy is mutual accommodation: Science and the humanities round out and complement each other, each contributing a distinct perspective to a total understanding of the arts. Smith, speaking for the humanities, characterizes the humanities as engaged in criticism, “a kind of thick discourse, blending descriptive, explanatory, and evaluative claims,” and science offers to “explain why the techniques of practitioners work as they do” [10]. The same accommodation strategy is recommended by Steven Pinker, a scientist: “The promise of science is to enrich and diversify the intellectual tools of humanistic scholarship, not to obliterate them . . . there can be no replacement for the varieties of close reading, thick description, and deep immersion that erudite scholars apply to individual works” [11].

Another bridging strategy proposes a division of labor. Since humanists have deep and intimate knowledge of individual cultural objects, they set the agenda for scientific research. Thus Smith writes that humanists “identify the problems that need addressing, pose the questions to be explored, and clarify the concepts through which the questions are articulated and on the basis of which empirical investigation should proceed” [12]. The psychologist Rolf Reber seconds the proposal: Philosophers and humanities scholars “define the *criterion* of what the experience is expected to be; scientists . . . provide a *test* of whether this criterion is fulfilled” [13].

The lesson is not that accommodation and division of labor are bad strategies. On the contrary, they have much to commend them. Yet neither strategy challenges the two-cultures meme. Perhaps new strategies will emerge if we challenge the meme?

WHERE THE MEME GOES WRONG

If the above two sections are on track, the two-cultures meme views science as nomothetic and the humanities as ideographic, and familiar strategies for bridging the two cultures follow this way of distinguishing them. So far, so good, unless the distinction misrepresents science or the humanities. In fact, it misrepresents both.

Obviously, some research is nomothetic—concerned with generalized phenomena—and some is ideographic—concerned with individual specificity. However, the nomothetic-ideographic distinction does not line up with the distinction between the sciences and the humanities. Some science is ideographic (e.g. natural history). More crucially, a great deal of humanities research is nomothetic, seeking to explain patterns across data. For example, postcolonial literary studies explain the incidence of certain themes, metaphors, personal stereotypes and genres as products of colonial social formations.

If humanities scholars are interested in the arts as historical and social phenomena, then their hypotheses are hypotheses of history, sociology, anthropology or econom-

ics. Nomothetic research in the humanities overlaps with, or belongs to, the social sciences.

What we need is a distinction between nomothetic research into the arts, which is at home in the sciences and the humanities alike, and the ideographic approach represented by art criticism. When we think about how to make this distinction, two questions arise: How are nomothetic generalizations relevant to art criticism, and how is art criticism relevant to nomothetic research? These are thorny questions as much for humanists as for scientists. Posing these questions exposes no gap between the sciences and the humanities; it exposes a gap between criticism and nomothetic inquiry. If we set criticism aside, there is but one culture of nomothetic research on the arts. No two cultures need bridging or the company of a third culture.

LAYERED, BOUNDED, INTEGRATED

The meme of two cultures paints a picture of what obstructs cooperation between scholars from different disciplines doing research on the arts, and it sets us up to seek cooperation via accommodation and division of labor. What does cooperation look like in an alternative, one-culture model?

Taken together, the sciences represent reality as layered. For example, a pattern of behavior explained in the vocabulary of psychology will be realized by some neurobiological mechanisms, which will be realized by some biochemical mechanisms, which are ultimately realized by some physical mechanisms. According to the standard model in philosophy of science, causal explanations that refer to phenomena at a relatively macro level are realized by causal patterns that refer to phenomena at a more micro level [14–16]. Figure 1 diagrams a toy example in which a biological explanation of a gene coding for a trait is realized at the biochemical level by an acid causing protein synthesis. Philosophers disagree about the details of the standard model, but they agree with scientists on the general picture that the sciences yield explanations, at different levels, of a layered world.

The standard model of layered levels of explanation suggests a new diagnosis of where Zeki overreaches. In attempting to understand visual art as a strictly neurobiological phenomenon, he leaves no room for historical and social explanations of artistic phenomena. He excludes a social level of explanation [17].

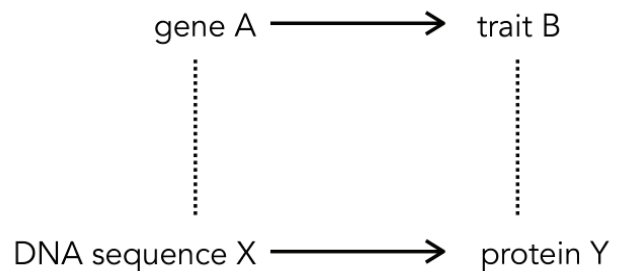


Fig. 1. Example of relationship between biological and biochemical levels of explanation. Arrows indicate causation; dotted lines indicate microlevel realization of macrolevel phenomena. (© Dominic McIver Lopes)

Zeki's overreaching in this way interacts with a second overreach, as he seeks grand explanation of all visual art as serving one "general function." The fact that there are many kinds of visual art, not just one, is easy to miss as long as one overlooks the social and historical factors behind specific artistic practices.

The lesson is that reality is not only layered but also bounded into discrete phenomena. As long as we think only in terms of acids and proteins, we will fail to see genes and the traits they encode. As long as we think only in terms of the neurobiology of perception, we will miss the social formations that make sense of different kinds of art—from impressionism to ukiyo-e to photography in the pictorialist tradition.

In Fig. 2, rows represent levels of explanation and columns represent kinds of art whose boundaries are drawn so as to foster integration. Integration occurs when researchers in different disciplines converge on a common conception of the phenomenon that they are trying to explain, even if they disagree about how to explain it [18]. Bounding and layering facilitate integration. Making space for all levels of explanation, including social explanation, means converging on a more fine-grained conception of what is to be explained than some "general function of art."

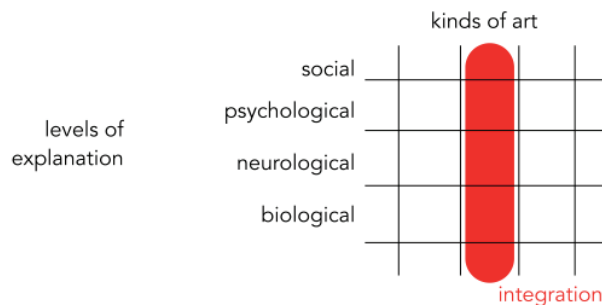


Fig. 2. Example of a layered, bounded, integrated program of research on the arts. (© Dominic McIver Lopes)

INTEGRATION: CASES

For two examples of research into the arts that nicely fit the proposed model, consider work by the art historian Michael Baxandall and the psychologist James Cutting. While each examines a different artistic phenomenon, both are sensitive to how an explanation of a well-bounded phenomenon at one level ties into explanations at other levels.

Baxandall's topic is the "period eye," which is a "conformity between discriminations demanded by a painting and skills of discrimination possessed by the beholder" [19]. In different periods, spectators differ in their interpretation skills, category concepts and habits of making inferences and drawing analogies. Since variations in cognitive style impact attention, hence appreciative experiences, they better equip some spectators to meet the demands of images in a period. Inasmuch as a painter can only ask spectators to use the skills they have, spectators' visual capacities are the painter's medium [20].

Most delightful is what Baxandall says about the capacity of members of the quattrocento merchant class for commercial gauging. In a time before standardized measures, anyone involved in business learned geometrical methods for gauging quantities. Baxandall quotes a contemporary textbook:

There is a barrel, each of its ends being 2 bracci in diameter; the diameter at its bung is 2 1/4 bracci and halfway between bung and end it is 2 2/9 bracci. The barrel is 2 bracci long. What is its cubic measure?

This is like a pair of truncated cones. Square the diameter at the ends: $2 \times 2 = 4$. Then square the median diameter $2 \frac{2}{9} \times 2 \frac{2}{9} = 4 \frac{76}{81}$. Add them together: $8 \frac{76}{81}$. Multiply $2 \times 2 \frac{2}{9} = 4 \frac{4}{9}$. Add this to $8 \frac{76}{81} = 13 \frac{31}{81}$. Divide by 3 = $4 \frac{112}{243}$. . . Now square $2 \frac{1}{4} = 2 \frac{1}{4} \times 2 \frac{1}{4} = 5 \frac{1}{16}$. Add it to the square of the median diameter: $15 \frac{5}{16} + 4 \frac{76}{81} = 10 \frac{1}{129}$. Divide by 3: $5 \frac{1}{3888}$. Add it to the first result: $4 \frac{112}{243} + 5 \frac{1}{3888} = 9 \frac{1792}{3888}$. Multiply this by 11 and then divide by 14: the final result is $7 \frac{23600}{54432}$.

He then dryly remarks, "It is a special intellectual world" [21]. What is special is the dizzying arithmetic, but also what precedes it, the automatic and comprehensive analysis of complex forms into combinations of regular geometrical solids. Quattrocento Italian merchants brought their geometer's skill to looking at pictures that were made to be looked at with the same trained eye.

Cutting's topic is the formation of the impressionist canon [22]. Assuming that a canon comprises the most often reproduced works, Cutting identifies the impressionist canon by surveying books in the Cornell University library. He then measures preferences for impressionist paintings, which he finds not to be a function of whether the paintings are included in the influential collection of Gustave Caillebotte, or whether they are displayed in the Musée d'Orsay, or whether they are prototypically impressionist, or based on the subjects' training in art history. Rather, his finding is that preferences are mostly a function of mere exposure, hence simple frequency of appearance in the environment. As Cutting explains, "We digest images voraciously, even without noticing. A very small proportion of these images are from the impressionist corpus and canon. Nonetheless, we respond to their occurrence in our future interactions with impressionism. We like the ones we have seen before" [23]. If Cutting is correct, mere exposure is an important mechanism for transmitting and entrenching artistic culture.

Both studies work within a layered and bounded research space. Working top down, Baxandall sees the aesthetics of a painting practice within a social group as realized by the learned perceptual expertise of members of the group, and he clearly regards perceptual expertise as a psychological competence. Meanwhile, Cutting works bottom up, explicating the workings of a psychological mechanism, mere exposure, that realizes a social process, namely canon-formation. Cutting offers humanistic art scholars a tool for understanding cultural transmission; Baxandall invites scientists to study the mechanisms that underlie social transactions within some social practices. Layering and bounding foster integration.

BOUNDING THE ARTS

Integration occurs when scholars in different disciplines attempt explanations, at multiple levels, of a well-bounded phenomenon. Disciplinary methods and training already ensure explanations given at multiple levels: Historians will do history, after all, and neuroscientists will do neuroscience. The challenge remains to ensure that phenomena are well bounded. Phenomena are well bounded when they are categorized so as to invite research at every level. So we need a general framework that can be used to assemble a working conception of any kind of art and that makes an explicit call for research at all levels of explanation.

A recently proposed framework for generating conceptions of “art kinds” is fit for this purpose [24]. According to the framework, we should think of any art kind as a class of works that share a medium and belong to a social practice that is constituted by norms centered on the medium. This formula packs in some key ideas.

First, an art kind is a class of works bounded so as to capture its role in empirical hypotheses. Not all classes of works are art kinds in this sense. The class of artworks made on a Tuesday afternoon is not an art kind because there are no true empirical generalizations about works made on Tuesday afternoons. Since there are true empirical generalizations about the class of works that are nineteenth-century novels in English, they form an art kind. Art kinds include art forms (music, dance, painting), genres (still life, horror), traditions (Hollywood and Bollywood) and styles (rococo, modernist).

Second, works in an art kind share a medium. Every artwork is an artifact, made by someone who endows it with features to be apprehended by others. Obviously, the features endowed and manipulated vary systematically from one art kind to the next. A painter works with the visual configuration of a surface, a horror writer works with an audience’s propensity to respond to certain characters and events with a mixture of disgust and fear, a Bollywood director works with the tropes of her tradition, and a modernist architect works with a restricted vocabulary of forms and materials. In the

visual arts, “media” are materials, such as paint or clay. Speaking more broadly, a medium is a combination of resources (e.g. paint, the diatonic scale, language, affective dispositions) and techniques (using brushes, playing instruments, versifying, depicting monsters), where the techniques unlock what the resources afford [25]. As long as medium = resource + technique, the horror writer’s medium is a tool of narration that is used to tell stories that afford horror responses.

Finally, a social practice consists in a pattern of behavior that is explained by agents complying with a norm, where a norm is a rule of action with which agents comply because they expect others to also comply [26,27]. Attending musical concerts is a social practice that consists in agents performing various actions, such as sitting quietly and listening, because they know that is what is expected of them by composers, performers, impresarios and other audience members. According to the proposed framework, an art kind involves norms concerning how the technical resources of a medium are to be used. In fifteenth-century Italian painting, artists are expected to mark surfaces and audiences are expected to perceive them in a manner that engages certain geometrical analysis skills.

How do the three elements of the framework invite integrated research? First, an art kind is a class of items bounded to promote explanations at multiple levels. Second, the concept of a medium conceives features of works as inputs to and outputs of cognitive processes. To explain the medium, we need psychology and the brain sciences. Finally, social practices point to culture—to interactions among agents, over time, governed by expectations. To explain the practice, we need the historical, anthropological, sociological and economic hypotheses of scholars in the humanities.

The time has come to retire the meme of two cultures. Research into the arts should not be seen as divided into two cultures that need bridging; there is only culture made up of multiple, converging lines of inquiry, some in the sciences, some in the humanities.

Acknowledgments

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