Looking after Mona Lisa: Philosophical Methods, Enigmatic Expressions, and Electromyography

William P. Seeley

Bates College

Author’s Note: Correspondence concerning this paper should be sent to William Seeley, Department of Philosophy, Bates College, Lewiston, 75 Campus Avenue, ME 04240, (wseeley@bates.edu).
Looking after Mona Lisa: Philosophical Methods, Enigmatic Expressions, and Electromyography

Methods are in the air. The rise of experimental philosophy has given us pause and caused (at least some of) us to take stock of the old ways. And there is a serious sense in which this is odd. Philosophers may be a bit conservative and out of step at times, but we are no strangers to scientific methods. We have had 40 years, give or take, of successful interdisciplinary collaboration in cognitive science. Researchers in philosophy of mind, philosophy of biology, philosophy of psychology, and applied ethics, just to name a few, make regular reference to the results of empirical studies. So what’s the rub? Why all this fuss? I suppose the first place to look is the public persona of the experimental philosophy movement itself. After all, it boasts a proper name and a mascot (which is more than most research fields). The mascot is a burning chair. The burning chair symbolizes a disdain for armchair ornithology, or, if I might borrow from AI and malaprop a bit, the GOLFCART assertion in analytic philosophy that *good old fashioned conceptual analysis is right*. In and of itself the sentiment expressed by this intuition is virtuous (and I wonder whether, at base, anyone objects to it). Concepts are just that, concepts, the building blocks of the way we, to be a bit metaphorical, perceive things. We perceive things relative to our goals. We have to. Cognition didn’t arise in a vacuum. It evolved in lock-step with our bodies and in the service of the apical goals of survival and reproduction. Concepts, as a result, reflect a range of tacit biases, even when they are abstract and putatively value neutral (the capacity to engage in abstract reasoning performs a function in the pursuit of apical goals and so reflects biases of its own sort). This entails that when armchair analyses of ordinary usage are abstracted from real time behavior there is a risk that we might reify behavioral biases rather than reveal genuine ontological distinctions – we may miss the world-joints. This is where the proper name comes in. Experimental philosophy is often abbreviated *X-Phi*. What’s in a name? This one has the ring of an extreme sport, a departure from, or denial of, the regular rules of the road (notice that the phonetic spelling is key here – the Greek acronym ξΦ has none of these
implications in English). So why are methods in the air? Well, X-Phi has thrown us out of the ordinary field of play. We need new rules and a new sense of the boundaries and yard markers. At least I claim this assertion is implicit in the name.

All of this is well and good. However, I can imagine folks engaged in what passes as armchair analyses agreeing with nearly all of it. Everything turns on how one interprets conceptual analysis. Conceptual analysis is an analysis of linguistic behavior. Linguistic behavior has a function in our cognitive economies, it helps us sort things into categories, or discriminate Xs from Ys. These kinds of discriminations are essential to planning and performing actions, and so contribute to the apical goals and well being of an organism. Or, put another way, our linguistic categories reflect the kinds of discriminations we make in our ordinary commerce with the world. So why engage in conceptual analysis? The best reason I can think of is that it is a means of uncovering the basic ontological categories that ground us in our environment, drive our behavior, and define our ecological niche. Conceptual analysis construed this way is a valid form of empirical enquiry - a way to carve the world at its joints. It may sit more comfortably in anthropology or field linguistics than experimental psychology. But, it doesn’t, in itself alone, entail the regular risks of a Cartesian Theater. I take it that this general intuition, albeit dressed up a bit to sound experimental, underlies the lasting influence of the linguistic turn in analytic philosophy. Of course none of this invalidates the experimental philosopher’s intuitions either.

We need a way to ground conceptual analysis in the murky universe of real behavior and particular contexts. We need to be able to distinguish world-joints from spurious conceptual biases. But these worries are hardly orthogonal to the ordinary methods of analytic philosophy. So what’s so extreme about X-Phi? Maybe very little. Maybe all we are after is a more concrete commitment to collaboration with more empirically minded disciplines in conceptual analysis. After all, it’s common practice to make reference to experimental results from psycholinguistics and experimental psychology in philosophy of mind and philosophy of language (at least that’s
how I learned to do analytic philosophy). But if this is it then there isn’t much of a question about methods.

I propose that a more fruitful place to look for the issue at hand is in a distinction between meta-analysis and data collection. This might not be quite the right way to say it. But if we allow ourselves a little leeway in our definition of meta-analysis I think it will allow us to capture the general direction of things. I take it that meta-analysis can refer to one of two general types of activities. First, it refers to the kinds of literature reviews one finds in journals like *TRENDS in Cognitive Sciences, Current Issues in Biology, or Current Perspectives in Psychological Science*. This kind of meta-analysis is quite familiar to those of us who are empirically minded philosophers. It is a form of technical science-journalism, a general discussion of results and research trends that helps clarify concepts, organize alternative hypotheses, and frame the problem space of a sub-domain within a research field, e.g., emotional attention, emotional contagion, or facial mimicry and social coordination. Meta-analysis also refers to a type statistical analysis in which one systematically compares and evaluates methods and results from a range studies that address a common research hypotheses. In this context meta-analysis enables researchers to more accurately evaluate effect sizes and root out potential sample biases. The traditional role of philosophers within cognitive science is related to these two projects: a meta-analysis of the language used to frame theories, and research results, with an eye to rooting out inconsistencies and conceptual biases. Of course we often explicitly allow our own conceptual biases to guide this task. We don’t usually play the role of a neutral arbitrator. Rather we use conceptual analysis to shape the discussion, to drive it towards one theoretical path instead of another (even when we recognize that this may make us rationalists in empiricists’ clothes).

Interpreted this way the constructive project of philosophy within the cognitive sciences is derivative. It is at best the project of an investigative journalist; at worst, or at least its most mundane, that of a data janitor. Don’t get me wrong. We are well positioned within this
framework to make productive theoretical contributions exactly because we adopt a broad, overarching top-down perspective on a range of research questions. However, we are always working with someone else’s results. We are always watching, waiting to see if the data confirms our intuitions (given the way we do things it always seems analytic they will, by the way). This is worrisome because it means that, at least to some degree, the kinds of questions we can ask are constrained by the kinds of questions and research methods that are antecedently available in the literature of a different discipline. Of course the question here isn’t a question of the role of philosophy within cognitive science. It’s a question about shifting methodologies within the mainstream of philosophy. But I would argue that this matter illustrates the issue at hand. The trouble is that if we restrict ourselves to meta-analyses there will always be a question of fit between the empirical data available and the kinds of questions we ask as philosophers. In this regard the move from meta-analysis to data collection constitutes a genuine shift in the waters. It is an attempt to borrow, modify, or independently generate a set of methods appropriate to the kinds of questions we want to ask. And this is important. Methods are everything in empirical matters. Methods frame the correct interpretation of the data and constrain the degree to which results generalize. When we borrow results from the general discussion sections of research papers we take a risk. Even if we are carefully sensitive to research methods, if the scope of our interests is broader than the scope of the study, than the narrow environment of the relevant experimental manipulations, there is a valid concern that we might invalidly generalize the results in question. So it behooves us to attend carefully to the methods of data collection…and perhaps more importantly to generate experimental methods suited to the scope of philosophical questions.

There is a flip side to all of this. We are outsiders looking in on empirical research. Frankly, this makes us bad journalists. Experimental methods are a hands-on affair. Understanding experimental results is as much, if not more, a matter of understanding practice as
it is understanding theory. In the absence of this knowledge what happens between the *Theory and Background* and *Discussion* sections of a research report can look like a laundry list of procedures and equations. The only way to get this kind of understanding is to roll up your sleeves and get your elbows dirty – just as the only way to develop a sound methodology of one’s own is to dive in and see how the world pushes back. So what’s the upshot of all of this? Well, we don’t need to be empirically minded philosophers. I see no reason we can’t keep going about our business. After all, conceptual analysis is just an analysis of linguistic behavior. And this is no less an empirical analysis than any other. However, I take it that there is also no question about the promise and potential that experimental methods hold for willing philosophers. And for this we need to know about data collection in order to do our meta-analysis well.

This brings me to the real point of the paper. Methods are in the air. The question at hand is a question of the contribution of new methods in experimental philosophy to the more general conception of what it is that we do in philosophy. My argument is that there is a significant methodological distinction to be drawn between meta-analysis and data collection as approaches to philosophy. If I am right I am not sure that meta-analysis is the right way to approach questions about the value of experimental methods to philosophy. A better approach may be to dive in and get to work. My field is philosophy of art. My interest is in neuroscience of art. There is currently a large and growing body of research within neuroscience of art. However, its focus is not quite a match to the range of issues of interest to philosophers of art. There is an entrenched aestheticism within the field that is indefensible from the perspective of philosophy of art. It’s not that aesthetics don’t matter. They often do. It’s just that the degree to which they matter is determined by the role they play. Aesthetic effects (or properties if you prefer) are cheap. The world is replete with them. But the bulk of these effects/properties have no artistic salience, e.g., the dynamic, neon, day-glo yellow of the hood on my rain jacket (it’s designed to make me visible amidst grey rolling mountains of sea water - of course I only wear it in the woods). What determines the
potential artistic salience of an aesthetic effect is its functional role within the artwork, the way it is used to convey the content of the work. So what is a neuroscientifically minded philosopher to do?

There is an important sense in which philosophy of art and cognitive science are natural bedfellows. The interdisciplinary field of cognitive science can be defined as the study of the way organisms acquire, recognize, manipulate, and use information in the production of behavior (ARMUI). Artworks are a class of stimuli intentionally designed to trigger a range of cognitive, perceptual, and affective responses in viewers. Why? This is how they convey their content. Artworks don’t wear their content on their sleeves. Rather we engage artworks and recover their content in interpretation. How? We reflect on the range of cognitive, perceptual, and affective responses they induce in us. This entails that questions about our understanding and appreciation of artworks in a range of media are questions about the way we acquire, represent, manipulate, and use information in our engagements with them (ARMUI again). Therefore, cognitive science can be used to articulate the contents of particular artworks by modeling the psychological processes that underwrite our engagement with them. One might object that these kinds of explanations apply equally well to questions about the ways in which folks recover information from artworks, advertisements, and facial expressions. If so one might argue that they would not suffice to explain how certain artifacts function as artworks per se. However, no one is suggesting that philosophy of art reduces to neuroscience of art. Rather the suggestion is that philosophers of art might benefit from a rapprochement in methods. Theories in philosophy of art are directed at explanations of artistic practices. Artistic practices intrinsically involve engagement with artworks. Therefore, whatever else we want to say, any adequate theory of art must be sensitive to the ways real consumers engage with particular artworks. Cognitive neuroscience can be used to model psychological processes involved in our engagement with artworks. Therefore it can be used to help us understand them. More particularly, these kinds of studies can contribute to
theories of art in two ways. They can help clarify, confirm, or adjudicate between art critical judgments about the artistically salient semantic or aesthetic features of particular artworks. The results of these kinds of studies of the range of ways we engage with particular artworks can, in turn, be used to generate experiments, motivate novel theories, and adjudicate debates between existing theories within the philosophy of art.

There is a methodological virtue to this case study approach to experimental aesthetics. Real artworks are hard to work with in the laboratory. The trouble is that artworks just aren’t enough alike. What one wants in an experimental manipulation is, ideally, to hold some salient range of variables fixed against which to study variance in another. If this can’t be done researchers can’t be sure of the etiology of the observed behavior. If they can’t be sure of this they can’t draw conclusions from their results. Consider, for instance, studies of aesthetic responses to landscape paintings. If there is significant variance in the palettes, brightness contrast, and composition within the range of works used we cannot be certain which of these variables, or combinations among them, is responsible for measurable aesthetic responses. Of course we could manipulate the works to eliminate color or brightness differences. But then we aren’t studying artworks per se anymore. Now this may not really be such a big problem in the end. Lab stimuli are theoretical constructs, artifacts designed to simulate some feature of the world that the experimenter has antecedently identified as important. However, starting with particular artworks, particular case studies that can serve as pilots from which to build experiments, is a means to ensure that these antecedent theoretical biases are grounded in real artwork contexts.

I would like to close this paper with a short sketch of a research proposal in experimental aesthetics. It is often asserted that the aesthetic qualities of the Mona Lisa include the dynamic quality of her expression. Margaret Livingston has argued that this is, in a sense, true. Leonardo used a technique called sfumato to render the expression of the figure in the painting, the corners
of her mouth and eyes. Sfumato is a formal technique in which artists blur the sharp edges that define object features in a painting so that these boundaries disappear into the broad contours of soft, “smoky” shadows. Livingstone filtered a reproduction of Leonardo’s painting in order to separate out the low, middle, and high spatial frequency information used to depict Mona Lisa’s face. The sfumato contours that define Mona Lisa’s smile were more apparent in the images representing low and middle spatial frequency information in the painting than the sharp lines of the high spatial frequency image. Therefore, critical formal features defining Mona Lisa’s smile are depicted only in low and middle spatial frequency information. The spatial resolution of human vision decreases dramatically as one moves from the center of the visual field towards the periphery. This difference in spatial resolution between central, or foveal, and peripheral vision is explained by the fact that the receptive fields of peripheral retinal neurons are dramatically larger than those of their foveal counterparts. The result is that foveal neurons are sensitive to sharp, narrow luminance boundaries that carry high spatial frequency information, but are unable to register coarse, broad luminance gradients, like contours rendered in sfumato, that carry low and medium spatial frequency information. Conversely, the wider receptive fields of neurons in the peripheral field are well suited to record the latter category of contours, but are nearly blind to high spatial frequency information. Livingstone argues, as a result, that when one foveates on, or directs one’s attention to, Mona Lisa’s smile it disappears. However, the smile reappears in a viewer’s parafoveal and peripheral field when he or she looks away.

Livingstone argues that these facts entail that Mona Lisa’s expression varies systematically with the eccentricity of a viewer’s gaze from the center of the painting. This suggests a way to test her theory. Facial EMG studies using the International Affective Picture System have demonstrated that we mimic the expressions depicted in photographs of faces. These studies have demonstrated that the perception of pictures depicting angry, fearful, or happy faces produces a similar responses in facial muscles that participants are not aware of and that
they cannot consciously suppress, e.g., enhanced *corrugator supercilii* (frown) and *zygomaticus major* (smile) muscle activity for angry/fearful versus happy faces respectively. We hypothesize as a result that, if Livingstone’s theory is sound, one ought to find measurable changes in zygomaticus major activity as a viewer’s gaze varies in eccentricity from Mona Lisa’s smile. How could one test this hypothesis? One could measure zygomatic major activation while participants identified the shapes of a set of small targets superimposed on the painting (triangle, square, circle) whose position varied in eccentricity across trials. Alternatively, we could ask participants to track a target. Or perhaps better we could ask them to fixate on a range of peripherally presented targets and covertly attend to her smile. If zygomaticus major activity across these tasks matched our prediction, these data would confirm a long standing art critical intuition about our engagement with the Mona Lisa and contribute to debates about the role of mental simulation in our engagement with artworks more generally.

Of course it’s possible that all this would work out in the lab, confirming our prediction. . . or that it wouldn’t. What kinds of variables would be decisive in this regard? One critical question involves the mechanisms that underwrite facial mimicry: is it an automatic, reflexive motor response to observed facial expressions, does it involve some antecedent emotional processing, or does it involve an interaction between the two. If the former is the correct interpretation we predict a straightforward mimicry response as gaze direction moves away from the center of the painting. However, if emotional processing plays a significant role there is a question about the valence of Mona Lisa’s expression – is it sufficiently positively valenced to induce a measurable response in zygomaticus major. Our sneaking suspicion is that the interactive account is the right one. In ordinary contexts fast reflexive responses to expressive face contours induce facial mimicry, which in turn is responsible for affective appraisals that enhance (or suppress) further motor and affective responsiveness, which reinforce or modulate facial mimicry, and etc.. This model preserves the intuition that affective responses can function
as direct non-cognitive reactions to behaviorally significant stimuli in real time contexts, accounts for interactive effects of prior attitudes and emotional states on rapid facial reactions, and is consistent with the mediating role of fronto-thalamic networks in gut reactions and affective attention. However, despite my nagging intuitions, nothing here is analytic. The only way to find out is to wade in and see. So what’s left? Well, it’s time to dig up some equipment, carve out an experimental philosopher’s room of one’s own, and get to work. A large closet, a reasonably fast computer with a high resolution display, and a BIOPAC introductory psychophysics lab unit will do - all we really need is a ground channel, a channel for zygomaticus major, a pool of willing participants . . . and perhaps the patience to learn some software and a new set of methods.
Endnotes:


2. There is a narrower philosophical conception of the field that is associated with information science and the computational theory of mind. See Dustin Stokes, “Aesthetics and Cognitive Science,” *Philosophy Compass* 4, 2009: 715-733, for a discussion of the distinction between these two views of cognitive science and its relevance to empirically minded philosophy of art.


