

Art and Neuroscience

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1. I want to discuss a new area of scientific research called neuro-aesthetics, which is the study of art by neuroscientists. The most prominent champions of neuro-aesthetics are V.S. Ramachandran and Semir Zeki, both of whom have both made ambitious claims about their work. Ramachandran says boldly that he has discovered “the key to understanding what art really is”, and that his theory of art can be tested by brain imaging experiments, although he does not describe these experiments, or explain what results the theory predicts (Ramachandran and Hirstein 1999, 17). Zeki, who originally coined the term “neuro-aesthetics”, claims to have laid the foundations for understanding “the biological basis of aesthetic experience”, and to have formulated a “neurobiological definition of art” (Zeki 1999, 2, 22).

If these claims are true, we are at the dawn of a new age in the study of art. Up to now, most of the people studying art have been historians, some of whom can read Latin, but hardly any of whom have mastered even the rudiments of brain science. And aesthetics has been in the hands of philosophers, who still disagree among themselves about ideas that were stated in the fourth century BC. Neuro-aesthetics is different. As Ramachandran (2000, 19) says: “These ideas have the advantage that, unlike the vague notions of philosophers and art historians, they can be tested experimentally”. So, is neuro-aesthetics the next big thing? I want to assess its prospects, starting with Ramachandran.

2. As I have said, Ramachandran claims to have discovered “the key to understanding what art really is”. He also calls this key “[a] universal rule or ‘deep structure’, underlying all artistic experience” and “a common denominator underlying all types of art” (1999, 16). He writes as follows:

The purpose of art, surely, is not merely to depict or represent reality—for that can be accomplished very easily with a camera—but to enhance, transcend, or indeed even to *distort* reality. . . . What the artist tries to do (either consciously or unconsciously) is to not only capture the essence of something but also to amplify it in order to more powerfully activate the same neural mechanisms that would be activated by the original object (1999, 16f).

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By “the original object” Ramachandran means the object represented by an artist: for example, a man or a woman, the interior of a room, a landscape, and so on. His hypothesis is that the works of art we enjoy activate the neural mechanisms that are normally activated when we see the kinds of objects which they represent, but they activate these mechanisms more powerfully.

But why should a distortion of reality have this effect? Ramachandran’s answer, which he describes as “the key to understanding what art really is”, is that this is an example of a psychological effect called “peak shift”. He writes as follows:

If a rat is taught to discriminate a square from a rectangle (of say, 3:2 aspect ratio) and rewarded for the rectangle, it will soon learn to respond more frequently to the rectangle. Paradoxically, however, the rat’s response to a rectangle that is even longer and skinnier (say, of aspect ratio 4:1) is even greater than it was to the original prototype on which it was trained . . . this principle holds the key for understanding the evocativeness of much of visual art (1999, 18).¹

Ramachandran’s favorite example of peak shift in art is the way in which the female figure was represented by classical Indian sculptors. Figure 1 shows an example from the twelfth century, a sculpture of the goddess Parvati. This kind of sculpture, Ramachandran says, is essentially “a caricature of the female form”. And he adds this:

There may be neurons in the brain that represent sensuous round feminine form as opposed to angular masculine form and the artist has chosen to amplify the “very essence” of being feminine by moving the image even further along the male/female spectrum. The result of these amplifications is a “super stimulus” in the domain of male/female differences (1999, 18).

So Ramachandran proposes a generalization about art and then postulates a mechanism to explain the generalization. The generalization is that “the purpose of art . . . [is] to enhance, transcend, or indeed even to *distort* reality. . . . not only capture the essence of something but also to amplify it”. More pithily: “all art is caricature” (1999, 18). And the mechanism which explains the biological function of art is peak shift. In combination, these things explain a profound and pervasive part of human life in terms of a simple physiological mechanism, which can be demonstrated in the laboratory with a rat, square, a rectangle and some cheese.

This is quite enough to damn the theory, in some people’s eyes. It is brazenly reductionist, and that, some people think, is a bad thing. This is of course has been a well-established view of modern science since the Romantic movement. For example, it is expressed in following lines by William Blake (1982, 478):

¹Following the description of peak-shift as “a common denominator underlying all types of art” (1999, 16) and “the key to understanding what art really is” (1999, 17), the more cautious phrase “the evocativeness of *much* of visual art” may signal a quiet step in reverse. (As the philosopher J.L. Austin once said, there’s the bit where you say it and there’s the bit where you take it back.) However, even the qualified claim is an exaggeration. The trouble is that the claim that *some* art is caricature is neither very exciting nor very new.



Fig.1 *The goddess Parvati, Chola, twelfth century AD Private collection*

The Atoms of Democritus
And Newtons particles of light
Are sands upon the Red sea shore
Where Israels tents do shine so bright

For my own part, I love Blake's poetry but I do not accept his anti-scientific world-view. I do not believe that modern science drains enchantment from the world, or (as Keats put it) that all charms fly at the touch of cold philosophy. In my view, explaining complex phenomena in terms of simple mechanisms, or explaining a variety of phenomena in terms of a single mechanism, is a good thing. Furthermore, Blake's verse reminds us that we cannot accept reductionism in science that is more than a century old, and reject it in more recent scientific work. This is not an intellectually defensible position. Anyone who uses the word "reductionist" as a term of abuse should ask themselves whether Darwin's theory of natural selection and

Newton's theory of universal gravitation are reductionist theories, and whether we should reject them for this reason, if they are.

So I do not believe that Ramachandran's theory of art should be dismissed on the grounds that it is reductionist. If the enjoyment of art really can be explained by peak shift, discovering this is a stunning intellectual achievement, a formidably impressive piece of science. Unfortunately, however, Ramachandran's theory has three fatal weaknesses. First, Ramachandran seems to have misunderstood the peak shift effect. Second, the theory is not really about art at all. It is really about why men are attracted to women with big breasts. And third, the theory is based on an extremely limited knowledge of art. I shall comment on these points in turn.

3. I begin with the peak shift effect. One kind of psychology experiment which was popular about fifty years ago involved training a bird to peck when it saw a light with a certain color or when it heard a sound with a certain pitch. The bird was rewarded each time it responded to this particular stimulus by pecking at a target, and then once it had learned to do this, it was tested with a range of different stimuli including the training stimulus. The solid line in Fig. 2 represents an experiment where pigeons were trained with a 550 nanometer light, and then tested with different lights, some with higher wavelengths and some with lower wavelengths. The training stimulus is called S+, and as the figure shows, the bird's response decreased more or less uniformly as the stimulus became less similar to S+.

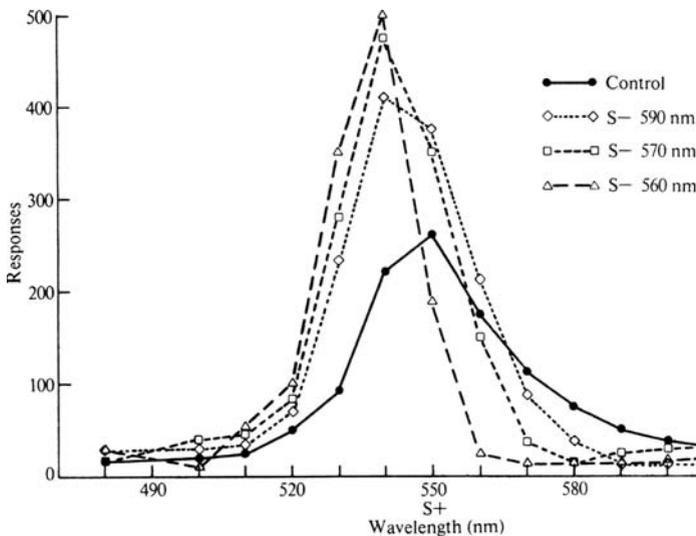


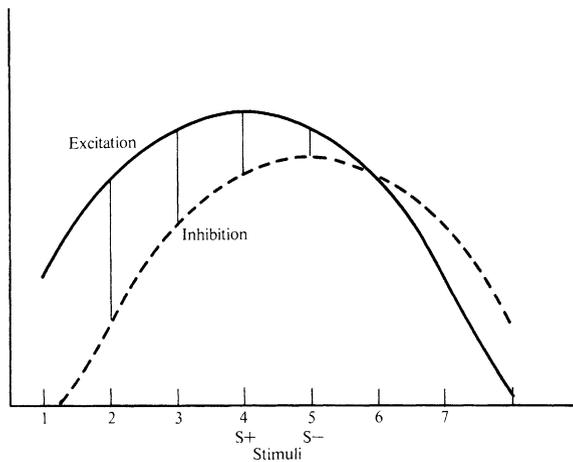
Fig. 2 The peak-shift effect

Now in the experiments represented in Fig. 2 by broken lines, pigeons were rewarded for responding to S+ but they were also shown another stimulus in the training period, which is called S-, which they were not rewarded for responding to. When the pigeons were tested after this kind of training, they responded more

vigorously to a stimulus that is different from S+, in the direction away from the S-, than they did to S+ itself. So the peak of the distribution was shifted to about 540 nanometers. This new peak is sometimes called S++. Hence the term “peak shift”.

Now we can see that in this experiment S+ and S- are very similar to each other. S+ is a 550 nm light, which is bright yellow. And S- varies from 560 nm, which is yellowy-orange, to 590 nm, which is orangey-yellow. In fact peak shift *only* occurs when S+ and S- are very similar, and the commonest theory of peak shift explains why. The theory, which is represented by Fig. 3, is that peak shift is the result of an interaction between an excitatory gradient around S+ and an inhibitory gradient around S-. What is thought to happen is that when the animal is trained to respond to S+, it also acquires a tendency to respond to stimuli that resemble S+, both to the left and to the right. But if it is also trained not to respond to S-, and S- is similar to S+, this part of its training also inhibits its tendency to respond to S+. So the net effect is that the animal responds more vigorously to a stimulus that resembles S- a bit less than S+ does.

Fig. 3 An interaction between an excitatory gradient around S+ and an inhibitory gradient around S-



The lessons of Fig. 3 are, first, that S- has to be very close to S+ in the subject’s quality space to produce the peak shift effect; and, second, that if the effect does occur, the new peak stimulus, S++, will be even closer to S+ than S+ is to S-. This means that if male subjects were predisposed to respond positively to a stereotypical female body at reproductive age—in other words, if that was the S+ body shape—the peak shift towards wider hips and larger breasts would only occur if an inhibitory gradient was created around a female body with slightly narrower hips and smaller breasts than average, and the predicted effect would be that the subject’s response would peak at a female body with *very* slightly wider hips and *very* slightly larger breasts than average.

It follows that Ramachandran’s explanation of the beauty of the Indian sculpture does not work. It is obvious that classical Indian sculptors gave goddesses

such as Parvati prominent breasts and narrow waists—as Ramachandran put it, they “amplify the ‘very essence’ of being feminine”. But there is no evidence that male spectators who find these sculptures beautiful have innate or learned stereotypes that interact to produce a peak shift in their response to female body-shapes. Besides, the body shape of the goddess deviates too far from the norm to be an example of peak shift. Peak shift is simply the wrong mechanism to explain how a “‘super stimulus’ in the domain of male/female differences” affects the male brain.²

4. That is the first reason for rejecting Ramachandran’s theory of art. The second is that the theory is not really about art at all. It is really a theory about why men are attracted to women with big breasts.

Remember: the theory is meant to be giving us “the key to understanding what art really is”. But the fact that the Indian sculpture is a work of art is completely irrelevant to this theory. It could just as well be a theory about Pamela Anderson. The theory would be that Pamela Anderson has amplified the “very essence” of being feminine—in other words, she has had her breasts enlarged—and the result is a “super stimulus” in the domain of male/female differences. And of course this is more or less true, although it cannot be described as a cutting-edge piece of science.

The point I want to underline is that Ramachandran’s theory of art (we can call it the *Baywatch* Theory of Art) doesn’t distinguish between a work of art and the kind of object that it represents. For example, if it doesn’t distinguish between a sculpture that represents a woman with big breasts and a woman with big breasts. And it follows that the theory cannot be telling us what “the key to understanding what art really is”.

This is something every undergraduate who studies aesthetics learns in the first couple of weeks. In Plato’s *Republic*, Socrates says that everyone can be an artist:

Don’t you see that you yourself could make all these things in a way? . . . Take a mirror and carry it about everywhere. You will quickly make the sun and all the things in the sky, and quickly the earth and yourself and the other animals and artefacts and plants and all the objects of which we just now spoke (*Republic*, 596d).

We can’t be sure how seriously Plato meant us to take the comparison between painting and mirroring. But every student learns how to criticize it. Every student learns that understanding “what art really is” means understanding first and foremost

²This line of criticism is elegantly advanced in Martindale (1999). In response, Ramachandran acknowledges that he is “not using the phrase ‘peak shift’ in its original, strict technical sense” (1999, 73), and he has added (in correspondence with me) that he isn’t “much concerned with the exact meaning of words and phrases like ‘peak shift’” and that he deplores “excessive preoccupation with purely semantic issues”. But these comments are not reassuring. For how nonchalant we can afford to be about the definition of a term depends on the term. “Peak shift” is a technical term, so it means nothing until it has been explained. And if it is not being used in its original, strict technical sense, no alternative sense has been introduced. Furthermore, scientists do need to think about semantic issues, i.e. about the concepts they use and the language in which these concepts are expressed. This is an indispensable part of the most serious and challenging work in science—try to imagine twentieth-century physics without Einstein’s analysis of the concept of simultaneity—and there is no reason for thinking that neuroscience is exempt.

that it is art. Ramachandran seems to have grasped half of this lesson. He seems to have grasped that a work of art isn't a true mirror image of the world. Remember, he says that the purpose of art is to enhance and to distort reality. But if a work of art isn't a true mirror image of the world, it isn't a silicone-enhanced mirror image of the world either. This is the part of the lesson he seems to have missed.

5. That is the second reason for rejecting Ramachandran's theory of art. The third is that it is based on a very limited knowledge of art. There are really two points here. First, as we saw earlier, Ramachandran begins with following observation: "The purpose of art, surely, is not merely to depict or represent reality—for that can be accomplished very easily with a camera—but to enhance, transcend, or indeed even to *distort* reality" (1999, 16f). When E.H. Gombrich (2000, 17) was asked to comment on Ramachandran's theory of art, he made the following remark:

To the historian of art, it is evident that the authors' notion of "art" is of very recent date, and not shared by everybody . . . They do not explain how one could photograph Paradise or Hell, the Creation of the World, the Passion of Christ, or the escapades of the ancient gods—all subjects that can be found represented in our museums.

I cannot improve on this remark. I would only add that photography itself is one of the visual arts, and has become increasingly important during the last hundred years. So even the kind of representation of reality that *is* accomplished with a camera cannot be excluded from the domain of art.

The second point is that even if we limit ourselves to erotic images made by male artists, and presumably in conformity with male taste, it is obvious that Ramachandran's idea about the distortion of reality, the idea that all art is caricature, is quite unconvincing. Here are a few examples, which were made in very different societies and with different techniques.

The first is a small red-figure jug made in Athens in about 430 BC, which is an unusually touching image of a boy and a girl making love by the standards of Greek art (Fig. 4). The boy is leaning back in his chair, his arms at his sides and his hands gripping the seat, his mantle pushed down around his knees. A young girl, naked except for a wide band around her hair, is about to straddle his uncovered lap. Their foreheads touch and they gaze into one another's eyes with a tenderness which is rare in this period. (I don't mean that tenderness between lovers was rare. I mean that it was rarely represented in art.)

My second example is a woodblock print by Utamaro made in the 1780s (Fig. 5). Several things contribute to the subtle eroticism of this image: the intense concentration of the couple, which is expressed in their hands and the man's eye, just visible below his lover's hair; the confusing tangle of limbs which is partly hidden by the man's delicate silk kimono; and the powerful contrast between the fabrics, with their intense colors and lively designs, and the graceful forms of the woman's bottom and neck, the clear white of her skin divided by two similar curves.

My final example is one of Rembrandt's last etchings, *Jupiter and Antiope*, which he made in 1659 (Fig. 6). The composition is based on an etching by Annibale Carracci which is dated to 1592 (Fig. 7). But the figure of Amor, the curtain in the

Fig. 4 Attributed to the shuvalov painter, *Attic Red-Figure Oinochoe*, ca. 430 BC (Altes Museum, Berlin)



Fig. 5 Utamaro, *Lovers*, from *The Poem of the Pillow*, 1788. Woodblock print



Fig. 6 Rembrandt van Rijn, *Jupiter and Antiope*, 1659. Etching, drypoint and burin

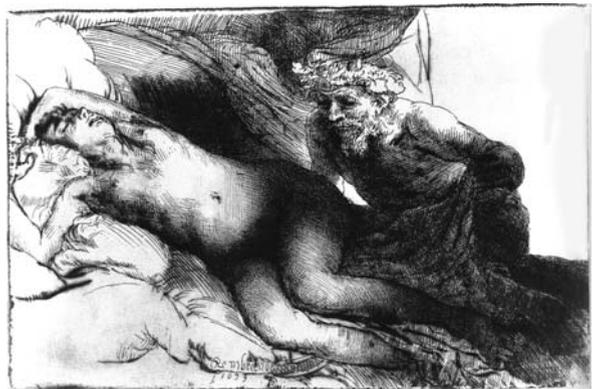


Fig. 7 Annibale Carracci, *Jupiter and Antiope*, 1592. Etching



foreground and the landscape have all been omitted, to concentrate on the two main figures, and Antiope has been given a more natural pose. Her arms are thrown back behind her head, and she is lost in a deep sleep.

None of these images confirms Ramachandran’s generalization about art, and of course they stand here for many hundreds of others.

6. I said earlier that Ramachandran has missed the basic point that understanding “what art really is” means understanding that it is art. In other words, works of art are produced with specific tools, materials and techniques. A comparison between these two etchings will help to bring out the significance of this point.³

When we look at Annibale’s etching, we can see that although he used the tools of an etcher he worked in the style of an engraver. So when he wanted to depict a shadow, he employed the regular cross-hatching of the engraver. The result is a competent print. But there is nothing personal about the technique: it is merely a useful means to an end.

By contrast, Rembrandt’s use of drypoint and burin over an initial layer of etching gives his print an extraordinary depth and subtlety of light and shadow. The burin is used to provide an intermediate tone of shading on Antiope’s stomach and thighs. And then various details on her arms and head are touched in with drypoint, as is the thick blanket of tone behind her, which sets off the bright upper part of her body. The mixture of these techniques yields a richness and variety of tone, and thereby a subtle atmosphere and register of feeling, far beyond anything Annibale’s straightforward method could provide.

The lesson of this example is twofold. First, the comparison brings home how deeply involved Rembrandt was in printmaking. A skilful etcher could follow Annibale’s design, but only Rembrandt himself could execute his plate, because the technique was so important to the final result. Second, it illustrates the fundamental

³This comparison is entirely derived from White (1999).

point that works of art are produced with specific tools, materials and techniques. Understanding “what art really is” has to involve understanding how the ability that works of art have to express meaning, and to communicate thoughts and feelings and perceptions, depends on these tools, materials and techniques.

Ramachandran’s theory of art therefore fails three times over. It fails because he has missed this fundamental point about what art is; it fails because his generalization about what works of art represent is not borne out by the facts; and it fails because even if the generalization were true, the peak shift mechanism would not explain why.

7. I shall turn now to Semir Zeki, and in particular to the two key ideas in his book *Inner Vision*, the book in which he attempts to lay the foundations for “an understanding of the biological basis of aesthetic experience”, and defends his “neurobiological definition of art”. One of these ideas is about the visual arts in particular and the other is about the arts in general.

The first idea is expounded in a large part of Zeki’s book. But it is expressed in the most striking way in his remark that “artists are in some sense neurologists, studying the brain with techniques that are unique to them” (1999, 10). Zeki happily concedes that this is a surprising thing to say. But although the formulation is surprising, the idea has been well established since the last quarter of the nineteenth century. I shall explain what is original about Zeki’s version of it shortly. But first I shall quote a passage from its original source, which is a lecture given by Helmholtz in 1871:

We must look upon artists as persons whose observation of sensuous impressions is particularly vivid and accurate, and whose memory for these images is particularly true. That which long tradition has handed down to the men most gifted in this respect, and that which they have found by innumerable experiments in the most varied directions, as regards means and methods of representation, forms a series of important and significant facts, which the physiologist, who has here to learn from the artist, cannot afford to neglect. The study of works of art will throw great light on the question as to which elements and relations of our visual impressions are most predominant in determining our conception of what is seen, and what others are of less importance. As far as lies within his power, the artist will seek to foster the former at the cost of the latter (1995, 280).

In this passage, Helmholtz combines the idea that artists test and explore the visual system with a theory of vision whose broad outlines he inherited from Locke and Kant. The theory is that visual perceptions occur when the unconscious mind interprets “sensuous impressions”. Sensuous impressions are raw patterns of color, without any intrinsic meaning. Artists, he claims, are particularly good at observing their sensuous impressions, and at figuring out which patterns trigger which interpretations.

Most visual scientists have abandoned Helmholtz’s theory of vision. They no longer talk about sensuous impressions, or about the unconscious mind interpreting sensuous impressions. Instead, it is generally held that different parts of the brain are simultaneously performing various highly specialized tasks, reacting to form, or to motion, or to color; and that somehow or other the results of these processes are combined to form a unified visual perception, although nobody is sure yet how this synthesis occurs.

But abandoning Helmholtz's theory of vision does not entail abandoning the idea that artists test and explore the visual system. On the contrary, it allows for a more detailed and discriminating version of the same idea, since different kinds of art can now be shown to correspond to different parts of the visual system. For example, kinetic art specializes in V5, the part of the visual cortex that reacts to motion. Fauve art specializes in V4, which reacts to colors. A painting by Mondrian will excite V1, which reacts to horizontal and vertical lines. And so on. The message is that in some cases different kinds of art excite different groups of cells in the brain. This is the principal idea that Zeki defends in his book.

I want to make two comments about this idea. First, it is undeniable that we could not appreciate a painting by Mondrian if the cells in our brains which are excited by vertical and horizontal lines were not functioning properly. But this does not explain why the painting is pleasing or interesting to look at, or what it means. In fact, it reveals nothing whatever specifically about art. Because it is equally true that I could not see the text on a page or the railing in a fence if the cells in my brain which are excited by vertical and horizontal lines were not functioning properly.

The second comment I want to make is this. It may be an amusing paradox to describe painters as neurologists, studying the brain in their own special way. But the real substance of this claim is, *first*, that paintings are designed to have specific kinds of psychological effect on viewers; and *second*, that specific kinds of psychological effect are produced by specific kinds of activity in the nervous system. I do not want to dispute either of these ideas. They have been commonplace for more than a hundred years, and they are both surely true. But if we can think of paintings in this way, the same is true of many other things. For example, hamburgers and ice cream are designed to produce a specific kinds of psychological effect on consumers: the experience of tasting hamburgers in one case and the experience of tasting ice cream in the other. And these specific psychological effects are produced by specific kinds of activity in the nervous system.

So there are two reasons for doubting whether the claim that artists are in some sense neurologists is a useful one to make. First, it does not say anything distinctive about artists. It tells us nothing about Picasso and Cezanne that doesn't apply equally to Häagen Dazs and MacDonalds. And second, it skates over many interesting differences between artists, for example, the difference between painters who are interested in geometrical optics, such as Piero della Francesca, and painters who are interested in the psychology of perception, such as Seurat and Bridget Riley. Or the difference between painters who are interested in the character of visual experience, as Monet and Bonnard seem to have been, at least in theory; and painters who regard themselves as being more like naturalists, and are therefore uninterested in visual experience, but very interested in the visible world—for example, Constable and Turner.

8. The second idea I want to comment on is the boldest and most speculative in Zeki's book. "Aesthetic theories", Zeki maintains, "will only become intelligible and profound once based on the workings of the brain" (1999, 217). Encouraged by this thought, he proposes what he calls a "neurobiological definition of art" (1999, 22). He writes as follows:

Great art can thus be defined, in neurological terms, as that which comes closest to showing as many facets of the reality, rather than the appearance, as possible . . . The inestimable quality [of great art] is the opportunity that the brain is offered to give several interpretations, all of them valid (1999, 22f).

Zeki sometimes calls this inestimable quality of great art “ambiguity”. This may not be the right word for it. But I shall not quibble about terminology. The important question is whether the opportunity it affords us to give several valid interpretations *is* what we value in great art. There is also the interesting and contentious question of whether it is brains that do the interpreting, or whole animals. But I shall not address this question here.

So, is Zeki’s claim about the value of great art plausible or not? I am not sure that the category of great art is a useful one, in the history of art or in philosophy or science. But I think we all know roughly what properties make art repay serious and sustained attention. We think about these properties when we use the concepts to which criticism constantly returns—among them the concepts of imagination, truth, beauty, form and emotion. But we face two difficulties when we theorize about art. First, none of these concepts is pellucid. They all need careful study. And second, their significance lies in the very particular uses that we put them to, in criticism, so merely identifying them by name does not get us very far.

Take the concept of imagination.⁴ Every serious work of art, every work of art that deserves close critical attention, is imaginative, at least in some respects. But the idea of imaginativeness works by contrast. To describe a work as imaginative is to say what it is *not*. It to say both that it is not banal, conventional or academic, and that it is not gimmicky or fanciful or kitsch. Of course it is sometimes hard to decide whether a work of art, or part of one, falls on one or the other side of imaginativeness. For example, consider the famous opening lines of T.S. Eliot’s poem, “The Love Song of J. Alfred Prufrock”:

Let us go then, you and I,
When the evening is spread out against the sky
Like a patient etherised upon a table ... (1980, 3)

Is the simile “like a patient etherised upon a table” imaginative, or is it meretricious? In many cases, opinions vary and it is hard to know. But part of the business of criticism is make these hard decisions, and to back them with convincing reasons.

So we cannot hope to assess the idea that imaginativeness is a central concept in the theory of art without considering examples. And the same is true of the idea that the value of great art—or art that repays serious attention—lies in “the opportunity that the brain is offered to give several interpretations, all of them valid”. Zeki acknowledges this, and in fact he offers many examples of the kind of art he thinks of as having several valid interpretations. He mentions, for instance, Vermeer’s painting *Woman in Blue Reading a Letter* and comments that there is no way of telling what the letter she is reading is about (Fig. 8). True. As it happens, there is an earlier painting by Vermeer entitled *A Girl Reading a Letter by an Open Window* (Fig. 9),

⁴My comments on imaginativeness are entirely derived from Passmore (1998).

Fig. 8 Jan Vermeer, *Woman in Blue Reading a Letter*, ca. 1662–1665. Oil on Canvas. (Rijksmuseum, Amsterdam)



and in this case an x-ray revealed a painting of Cupid hung on the wall behind the woman, the very same one we see in *A Lady Standing at a Virginal* (Fig. 10). This was a clue that the girl is reading a letter from a suitor or a lover. But Vermeer decided in the end to hide the clue, and I think we can see why.

But the difficult question is what kinds of indefiniteness or multiplicity can contribute to the value of a work of art. Multiplicity is not always a good thing, and more multiplicity is not always better than less multiplicity. For example, consider one of Chardin's still-life paintings of a hare, a partridge or a duck (Fig. 11). I doubt whether it would have been a greater painting if Chardin had managed to paint a duck-rabbit hanging on the wall instead, although this would have introduced an ambiguity which is not there now (Fig. 12).

Perhaps what we want is *imaginative* multiplicity—multiplicity that it is not banal, conventional or academic, and that is not gimmicky or kitsch. But if that is right, the idea that great art is art that has many valid interpretations boils down the idea that great art is art that is imaginative, in this specific way.

My last comment on this idea is that this kind of imaginativeness seems to me to be one property among many which sometimes contributes to the value or interest of a work of art. It certainly is not a definition of great art in neurological terms.

Fig. 9 Jan Vermeer, *A Girl Reading a Letter by an Open Window*, ca. 1657–1659. Oil on Canvas. (Staatliche Kunstsammlungen, Gemäldegalerie, Dresden)

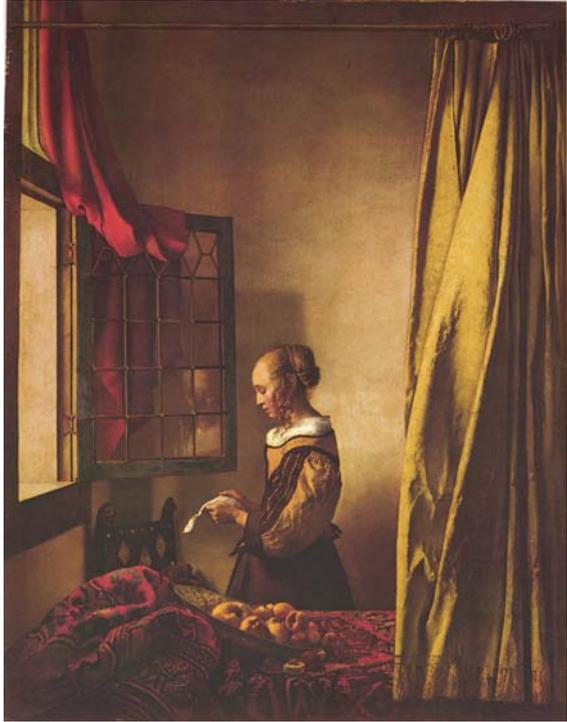


Fig. 10 Jan Vermeer, *A Lady Standing at a Virginal*, ca. 1670–1673. Oil on Canvas (National Gallery, London)



Fig. 11 Jean Siméon Chardin, *Un canard col-vert attaché à la muraille et une bigarade*, ca.1730. Oil on canvas. (Musée de la Chase et de la Nature, Paris)



Fig. 12 After Chardin, *Un canard-lapin attaché à la muraille et une bigarade*



And there are many other reasons for admiring art. Here, for variety, is a literary example.

It is a well-known fact that the most erotic line in English poetry—which is in Donne’s elegy “To his Mistris Going to Bed”—consists entirely of prepositions:

License my roving hands and let them go
Behind, before, above, between, below (1965, 15)

It is true that this line leaves room for different interpretations, or at least for different ideas about what exactly the author has in mind. For example, there are several things that Donne could want his roving hands to get between, although one doesn’t imagine that he has her teeth in mind. But I doubt whether this explains the line’s extraordinary effect. Surely it is the economy of means and the combination of imagination and technical control that enables Donne to pack such an erotic charge into a string of prepositions. In other words, it is sex and syntax, not ambiguity.

This example reminds us, again, that works of art are produced with specific materials, and it is often the relationship—in some cases the surprising relationship—between these materials and the thoughts and feelings they communicate that matters most. But please do not think this is my universal theory of art. It is just one kind of example. And it is meant to show that we should be pluralists about artistic value. It is a mistake to think that ambiguity or caricature or anything else of this kind defines all art, or all “great” art. Philosophers and historians have for a long time considered it a truism that there is no single source of value or single overarching motive in art. Why should there be such a thing in art, any more than in human life generally?

9. Zeki maintains that “aesthetic theories will only become intelligible and profound once based on the workings of the brain”. So, does neuroscience at last hold out the promise of an intelligible and profound aesthetic theory, or one that will provide “the key to understanding what art really is”? And will we soon be able to discard the unintelligible and shallow aesthetic theories proposed by Plato, Aristotle, Hume and Kant?

Extrapolating from the present, the answer must be no. Neuroscience can explain some features of some paintings. For example, some of the color effects of impressionist paintings are explained by lateral inhibition. But the idea that there is a neurological theory of art in prospect is utterly implausible, in my view. The eye-catching paradoxes Ramachandran and Zeki propose—that all art is caricature, that artists are neurologists—are in fact very weak ideas. And in Ramachandran’s case, this weak idea is dressed up as a piece of science by misleadingly associating it with the peak shift effect. This, in particular, gets a black mark in my book.

I shall add two final comments. First, the main defect in the work I have discussed is that both authors propose extravagant generalizations about art—all art is caricature; all great art is ambiguous—and then discuss a small number of examples, which are chosen to *illustrate* the generalization they favour and not to *test* it. Would Zeki or Ramachandran tolerate this procedure in their own subject? I expect

they'd laugh at it. How easily we shrug off our academic training when we take the brave step outside the furrows we were taught to plough!

Second, I firmly believe that neuroscience can contribute something to our understanding of the visual arts. But progress is only possible if we build on the intellectual tradition we have inherited. This is especially true of neuroscience, which is a nineteenth-century subject rooted in the philosophy of Locke and Kant. In neuroscience, and in psychology in general, philosophy is unavoidable; and if we ignore the philosophy of the past, we shall simply reinvent the wheel. In other words, our ideas will be based on mediocre and amateurish philosophy of our own.

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