

Mirror and canonical neurons are crucial elements in esthetic response

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Our positions are not recognizable in this account. We did not suggest that the activation of mirror or canonical neurons was sufficient for esthetic appraisal or for judgments about artworks. Our claim was that canonical and mirror neurons often have a crucial role in esthetic responses – because of their role in various forms of simulated embodiment that are relevant in considering esthetic responses, and that offer the basis for understanding the neural substrate of empathetic reactions to works of art. As the respondents remark, we claimed that embodied and empathetic responses, too long neglected, have a much wider role in esthetic responses than hitherto acknowledged.

Our choice of artworks was limited by the constraints on a opinion paper in *Trends in Cognitive Sciences*. We chose the works we did because they offer clear illustrations of the felt bodily responses of beholders to works of art; but we made equally clear that such responses can also apply in the case of lesser known – and sometimes everyday – images (indeed, neither the Fontana nor the Pollock are especially well known, and of course, neither is gory).

If so, where do the esthetic implications of our claims lie? First, and most obviously, we claimed that no esthetic judgment is possible without a consideration of the role of mirroring mechanisms in the forms of simulated embodiment and empathetic engagement that follow upon visual observation. Second, we noted that such processes might be precognitive and not always dependent on perception informed by cognition and cultural stock (as in much traditional esthetics). Third, we suggested that artistic skill lies in the ways that artists more or less successfully make conscious and unconscious use of body knowledge to elicit the kinds of emotional and felt motoric responses we described in our paper.

We agree – and nothing in our paper suggests otherwise – that a crucial issue in esthetics is the inheritance of a drawing style from other draughtsmen (see [Box 1](#)).

Although some common ground can be found in the above remarks, in one area we differ substantially. The possibility that conceptual works of art might also activate motor responses can by no means be excluded (indeed the role of canonical neurons in activating motor responses suggests as

Box 1. Embodiment and style

The issue of the relationship between cognition and the inheritance of style has been fully dealt with by Gombrich [3], who clearly describes how this can influence the drawing acts of the observer. But claiming this does not exclude the possibility of empathetic corporeal involvement with the act of drawing itself, as we suggest in ref. [4]; this is clearly set out by Rosand [5], where full due is also given to the inheritance of artistic style. Here can be found well-worn and useful hypotheses of exactly the ‘productive mid-level’ kind wished for by Casati and Pignocchi. We take these hypotheses fully into consideration in our paper. We have no doubt that experience in drawing production could improve the ability to detect influences between draughtsmen, as suggested by Calvo-Merino *et al.* [6] whose work we cite in our article. Indeed, we would hope that attentiveness to just these possibilities could enhance esthetic appreciation of works of art, and possibly forms of therapeutic use of esthetics. Further hypotheses of our own will be forthcoming along exactly these lines.

much). This issue is amongst the many that we hope our article opens up for further experiments.

Are esthetic responses purely a matter of the way in which the concept of art is considered (as suggested, e.g., by Arthur Danto [1])? This view is sometimes held strongly these days; Collingwood [2] and others espoused it. The point of our article was to suggest that this view is mistaken. However much the concept of art is detached from emotional and embodied responses, and however much it is taken to be purely historical (all of which is perfectly possible), no form of esthetic appreciation, we claim, can be fully envisaged without considering mirror systems and their role in embodied and empathetic responses – and therefore of the kinds of motor simulation we outlined.

References

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- 2 Collingwood, R.G. (1955) *The Principles of Art* Clarendon Press
- 3 Gombrich, E.H. (1969) *Art and Illusion: A Study in the Psychology of Pictorial Representation* (2nd edn), Princeton University Press
- 4 Freedberg, D. and Gallese, V. (2007) Motion, emotion and empathy in esthetic experience. *Trends Cogn. Sci.* 11, 197–203
- 5 Rosand, D. (2002) *Drawing Acts, Studies in Graphic Expression and Representation* Cambridge University Press
- 6 Calvo-Merino, B. *et al.* (2006) Seeing or doing? Influence of visual and motor familiarity in action observation. *Curr. Biol.* 16, 1905–1910