

THEORETICAL NOTE

Perspectival Shapes Are Viewpoint-Dependent Relational Properties

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Recently, there is a renewed debate concerning the role of perspective in vision. Morales et al. (2020) present evidence that, in the case of viewing a rotated coin, the visual system is sensitive to what has often been called “perspectival shapes.” It has generated vigorous discussions, including an online symposium by Morales and Cohen, an exchange between Linton (2021) and Morales et al. (2021), and most recently, a fierce critique by Burge and Burge (2022), in which they launch various conceptual and empirical objections. Although Morales and Firestone (2022) have responded to them recently, and we are in agreement with Morales and Firestone in general, there are further problems in Burge and Burge (2022) that are worth highlighting. The main point of this comment is that what the Burge–Burge team call “viewpoint-dependent relational properties” are simply instances of what the Morales–Firestone team call “perspectival shapes”; the confusion arises from Burge and Burge’s misconstrual of Morales et al.’s claims. This shows that conceptually, the two teams are in large agreement, as Morales and Firestone (2022) also point out, and the focus should be put on the empirical disagreements, which has been covered by Morales and Firestone (2022). Relatedly, we argue that Burge and Burge (2022) misinterpret Morales et al. (2020) as supporting a new entity in perception science, and that this misinterpretation is a primary source of their apparent disagreement. This is worth pointing out because such misunderstanding generates many unnecessary quarrels that hinder progress.

Keywords: perspectival shape, objective shape, viewpoint-dependent relational properties, representation, perspectivalism

State of Play

Psychology in general and vision science in particular have been evolving since hundreds of years ago, so it is not surprising that many questions and discussions in contemporary psychological sciences have clear traces in age-old philosophical discourses. Ideally, the progress of science can solve or dissolve original puzzles in philosophy, and there are indeed many such cases, but nevertheless, we live in a nonideal world. Some traditional questions about the mind in philosophy, at least for now, have not been satisfactorily dealt with by current psychological sciences, at least according to many. A prominent example is Molyneux’s question, which hypothesizes a person born completely blind can be made to see, and asks whether such subject can successfully tell whether an object

is (say) a sphere rather than a cube solely by sight immediately. Held et al. (2011) is an example of the most recent effort in answering this question empirically, but although they have made much progress, skepticism ensues and remains (e.g., Cheng, 2015; Connolly, 2013; Schwenkler, 2012, 2013). Although the matter has not been settled, scientists’ efforts are not in vain, as the process of designing and conducting experiments and disagreeing about them can teach us much about the topic.

Now, a comparable case is the perspectival character of vision: Although everyone agrees that there are interplays between perspectival variations and spatial constancies in perspectival vision, how to understand them exactly is still a matter of dispute (Cheng, 2022; Green & Schellenberg, 2018). The most invoked example is a coin viewed head-on versus the same coin viewed from other angles (“tilted coin” or “rotated coin” as it is often called), so we will stick to it. Now, what exactly is the question? Actually, there might be multiple questions in this area, just like in the so-called “Molyneux’s question”, there are actually multiple questions. For present purposes, we stick to three questions for now.

- a. Is there any relevant sense in which the rotated circular coin *looks* elliptical?
- b. Are the elliptical shapes *represented* in the visual system when viewing the rotated circular coin?

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- c. Are the elliptical shapes *consciously represented* in the visual system when viewing the rotated circular coin?

The relations between these questions are complicated. Question (a) is the official formulation in Morales et al. (2020) and Morales and Firestone (2022), and it shows that their experiments in the original article are designed to address the traditional philosophical question we know of from British empiricism, which centered on the way things look. Question (b) sounds more like a standard question in vision science, though there is a theoretical controversy over the nature of representation in cognitive sciences (Shea, 2018). Question (b) also can be found in the Morales–Firestone team, though less prominently; for example, in discussing their Experimental 6 “delayed responding,” they say that “requiring at least this much time to pass ensured that subjects’ visual systems would have fully processed the coins’ 3D shapes before they could even begin preparing their responses” (p. 14877; see also p. 14880 and p. 14881). Even if such remarks do not demonstrate that the experiments in question can also be seen as answering Question (b), at least it is a reasonable presumption. Question (c) is almost the same of (b) except that it requires the representations in question to be conscious, and given that consciousness takes longer time to emerge during perceptual processing, perhaps only Experiment 6 can distinctively allow the question about consciousness to be probed.¹ Now, (a) and (c) bear more similarities in that “looks” presumably are conscious, but if in most experiments in their article the participants have not enough viewing time, then it is safe to assume that Question (b) is primarily what is at the issue. Here, we do not settle this ambiguity for sure, but all parties in this debate should note that there are at least three interpretations of what’s being asked here, and there might be more.

Perspectival Shapes Are Properties, Not Entities

Now, the main message of this comment is that although the two teams do have much to disagree, especially concerning experimental designs and data interpretations, the overall framework is just the same, or at least close enough. This is worth pointing out because as Burge and Burge (2022) see things, the two teams strongly disagree with the overall framework, but this misunderstanding generates many unnecessary quarrels that hinder progress. To see this, we need to see how Burge and Burge (2022) conceive the dialectic.

According to them, the standard view of vision science concerning visual perspectives is that distal properties are perceptually represented, while proximal stimuli (i.e., retinal images) are *not* perceptually represented. Among the distal properties, there are viewpoint-independent properties and viewpoint-dependent relational properties. What is crucial, and crucially wrong we submit, is that Burge and Burge (2022) interpret Morales et al. (2020) as holding that “a new entity—perspectival shape—should be introduced into scientific explanations of shape perception” (p. 1), and this contradicts the standard picture. Now, why does Burge and Burge (2022) think that there is a new entity introduced? There is no clear reason. The only reason as far as we can tell is that, as they point out, Morales et al. (2020) do not provide a straightforward definition of perspectival shape as they understand it. But, there are two reasons why this interpretation invoking entity is ungrounded: First, if *objective shapes* are distal *properties*, as Burge and Burge (2022) have it (p. 1), the reasonable presumption should be that

perspectival shapes are *properties* too, and properties are *not* entities. Properties are instantiated by entities, for example, the objective circular shape is instantiated by a coin. Second, Morales et al. (2020) clearly borrow their use from the literature. A clear example would be Schwenkler and Weksler (2019), in which they have clear characterizations of such shapes; let us see two such examples:

1. Perspectival shape (in our example) is “the elliptical profile of a tilted plate or coin” (p. 855).
2. Perspectival shape is “the viewer-relative, 2D shape that would outline or occlude an object from a given point of view” (p. 856).

It should be abundantly clear that perspectival shapes, understood this way, are *not* entities. They are viewer-relative profiles, which should be read as the same as “viewer-dependent relational properties” in Burge and Burge (2022). The crucial difference here is that while Burge and Burge (2022) hold that they are 3D (p. 1), Schwenkler and Weksler (2019) think they are 2D. This can be a substantive disagreement, but even if Burge and Burge (2022) are right in this regard, it is *not* as if those who postulate perspectival shapes have postulated some entities: in nowhere of the texts of Morales et al. (2020) and Schwenkler and Weksler (2019) such reading is justified. Instead, perspectival shapes are viewer-relative profiles, or viewer-dependent relational properties.

The Real Dialectic and the Sense-Datum Inference

Now, if Burge and Burge (2022) misconstrue the dialectic—they think Morales et al. (2020) postulate some mysterious entities, but actually what is being postulated is what they approve, that is, viewer-dependent relational properties—then what is the real dialectic in this ballpark? Again, Schwenkler and Weksler (2019) provide a useful contrast between perspectivalism and antiperspectivalism. Without quoting them directly, though, we shall appropriate this set of terminology for the current purposes:

Perspectivalism: Perspectival shapes are represented.

Pure: Objective shapes are *not* represented (Locke, 1975; Hume, 1748/2000).

Mixed: Objective shapes are represented too (Brogard, 2010; Cohen, 2010; Fish, 2009; Gibson, 1950; Harman, 1990; Hellie, 2006; Hill, 2009; Lycan, 1996; Mack, 1978; Noë, 2004; Palmer, 1999; Rock, 1983; Schellenberg, 2008; Tye, 2002; and crucially Burge & Burge, 2022).

Antiperspectivalism: Perspectival shapes are *not* represented (Briscoe, 2008; Gibson, 1986; Hopp, 2013; Schroer, 2008, 2017; Schwitzgebel, 2011; Siewert, 2006).

¹ We say “perhaps” because the real 3D object experiments (8, 9, and s1) also have the required “sluggishness” present in Experiment 6 to allow making inferences about consciousness. In those experiments, participants saw the stimuli for a long time (>15 min). Even though individual responses were not delayed, participants had access to a small number of stimuli for a very long time during which conscious awareness of how the coins consciously appeared to them undoubtedly emerged, including a potential experience of perspectival elliptical shapes in rotated coins. We thank a reviewer for pointing this out.

In the current debate, pure perspectivalism is almost out of question. Although conceptually it is a possible view, it is unpopular nowadays and does not seem to be on the table in the recent discussions anyway.² So, the debate for now is between mixed perspectivalism and antiperspectivalism. Burge and Burge (2022) insist that their view—mixed perspectivalism in our terms—is the dominant one nowadays; we wish to stay neutral on this point. However, even if such view is indeed dominant, this does not automatically mean that antiperspectivalism is ruled out by science, although Burge and Burge (2022) certainly think so. Now, what is crucial is that Morales et al. (2020) obviously hold a version of mixed perspectivalism too. It is true that they disagree with Burge and Burge (2022) on some details, but no additional entity is postulated in the view.³ To think otherwise is to attribute the classic “sense-datum inference” to their opponents: the idea that certain elliptical property obtains, and since the coin itself is not elliptical, we have to postulate some new entities—sense-data, or perspectival shapes as Burge and Burge understand them—to instantiate the elliptical property. Something like this is called the “Phenomenal Principle” in contemporary philosophy: “If there sensibly appears to a subject to be something which possesses a particular sensible quality then there is something of which the subject is aware which does possess that sensible quality” (Robinson, 1994, p. 32). Note that the “sense-datum inference” in this context is only a label for certain kind of inferential move, as opposed to a commitment to sense-data themselves. That is why the “Phenomenal Principle” does not refer to sense-data explicitly. Note also that we do not think Burge and Burge make the sense-datum inference themselves; the claim is rather that Burge and Burge mistakenly think that the Morales–Firestone team makes such inference. Sense-datum inference is a common move in the history of philosophy, but no, it is not something invoked by Morales et al. (2020). In saddling such view to their opponents and misconstruing the overall dialectic, Burge and Burge’s (2022) critique, unfortunately, lacks perspective.

² A reviewer points out that pure perspectivalism seems to be Linton’s (2021) interpretation of nonstereo stimuli; for example, 3D shapes in pictures are cognitively inferred, but not perceived. In that case, it is still a lively theoretical option. We leave it for readers to decide.

³ A reviewer points out that perhaps Burge and Burge (2022), as well as many vision scientists, believe that antiperspectivalism has long been ruled out by the viewpoint-dependence empirical work in the 1990s and early 2000s. Given this, Burge and Burge (2022) might therefore infer that the Morales–Firestone team must be proposing something entirely new. Now, it will take us too far to expatiate how antiperspectivalists have been arguing for their views; one theoretical point can be made is that viewpoint-dependent properties that everyone acknowledges are at the subpersonal level, while the Morales–Firestone team sets out to test how the coin looks, which is presumably a personal level matter. Issues here are highly controversial, and we do not pretend to have a satisfactory treatment here. One practical point can be made is that many of those who hold antiperspectivalism nowadays are authors who are well-versed in vision science; it is unlikely that all of them are blind to the developments in the past 3 decades.

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