

BOOK REVIEWS

Review of Michela Massimi and Casey D. McCoy's *Understanding Perspectivism: Scientific Challenges and Methodological Prospects*

Michela Massimi and Casey D. McCoy, *Understanding Perspectivism: Scientific Challenges and Methodological Prospects*. New York: Routledge (2020), 210 pp. \$136 (hardcover)

“The trail of the human serpent is . . . over everything,” William James (1907/1981, 33) wrote in his classic *Pragmatism: A New Name for Some Old Ways of Thinking*. No part of human experience escapes the fact that it is *human*, and all knowledge-claims contain traces of their human origins. Depending on temperament, philosophers will take radically differing views on this claim. Scientific realists are optimistic that successful scientific theories track mind-independent reality, whereas relativists or constructivists grant that all knowledge is inescapably human. James probably wanted to find some middle way, maintaining optimistic realism while not divorcing realism from human activities. A new name for these old ways of thinking is *scientific perspectivism*, introduced by Ronald Giere in his 2006 book. Giere wanted to find a middle way between unrealistic realisms and constructivisms by recognizing the perspectival yet reliable nature of scientific knowledge.

Michela Massimi and Casey McCoy's edited volume follows Giere to show that perspectivism is neither trivially true nor obviously false. Perspectivism's positive prospect lies mainly in how it deals with the plurality of mutually incompatible models of the same target. Perspectivism is promising here, it is argued, because it helps us see that incompatible models can be complementary by providing different perspectives on the same target. The aim is to save realism by avoiding inconsistent beliefs about the world, without giving up on model pluralism. In what follows, I discuss each contribution, grouping them according to three broad themes.

Integration of multiple models is a theme taken up by multiple authors. Melinda Bonnie Fagan provides an illuminating discussion of perspectivism and interdisciplinarity, surveying how perspectives can interact to better understand what she calls the “explanatory challenge” for interdisciplinary research. This challenge arises because different disciplines have differing explanatory norms and commitments (30–31). Perspectivism is employed to give us resources for thinking about how different disciplines might come together. A great benefit of Fagan's chapter is its survey of recent debates of perspectivism, showing what kinds of approaches are available by looking at the ways in which proponents and opponents of perspectivism think about how perspectives interact with each other: whether they do so directly or indirectly, in complementary or interactive ways, or by conflicting (38).

Within this taxonomy, Anya Plutynski can be said to take a complementary approach to perspectives on cancer, arguing that different accounts of the origins and mechanisms of cancer are not as opposed to each other as their respective proponents presume. In particular, Plutynski investigates the claims of the so-called classical model of cancer and the cancer stem cell model of cancer. Plutynski argues that these two perspectives on cancer are actually compatible, because the notion of “cancer stem cell is multiply ambiguous” (170). This ambiguity leaves open a reconciliation between the two perspectives and that the multiple perspectives in cancer research offer complementary approaches to a highly complex issue (173–75).

Similarly, Sandra D. Mitchell takes up the relationship between her account of integrative pluralism and perspectivism, putting them both to use in demonstrating the value of multiple interactive perspectives in a case of research on protein folding. Modeling of protein structure takes place in the context of different aims and so of different selections of features according to those aims. Because of this selectivity, integrative pluralism becomes particularly important, “not only by filling out more features [left out by other models], but by correcting the systematic biases of different methods” (189). There is a joint refinement of models through integrating models and perspectives in an interactive way (190–91).

Another major theme is realism, with multiple authors arguing that perspectivism is a promising approach to a modest realism, taking into account model pluralism and scientists’ cognitive limitations. Building on Giere, Paul Teller sharpens the motivations for perspectivism, arguing that perspectivism provides the only plausible reading of realism. Teller argues that theory-neutral “tools of reference” establish reference only to ideal cases within some theoretical perspective; without this theoretical perspective, we are left with too many (and sometimes too few) putative referential targets. Nonperspectival referential realism fails because it gives no way of guaranteeing that terms we typically take to be referring—like *atom* or *water*—have unique extensions. Escaping to instrumentalism or empiricism will not do either, because this kind of referential indeterminacy infects even ordinary perception and talk.

Juha Saatsi takes up the worry that science has described the world from different and incompatible perspectives, which threatens a scientific realism that aims at “getting things right about the world” (65). Making use of perspectivism, Saatsi turns away from the usual discussions of knowledge to instead consider explanatory understanding in a perspectival light. Understanding, as Saatsi formulates the notion, is not factive, because it consists in an *ability* to make what-if-things-had-been-different inferences (66, 71). These inferences, to be correct, must correspond to “worldly dependence facts” (80). However, scientists’ ability to make these inferences will very much depend on nonfactive, heuristic aspects of theories and models embedded in what Saatsi calls *explanatory perspectives*. This account is applied to cases on historical explanations of rainbows (71–76).

Like Saatsi, Collin Rice is concerned with preserving realism in light of multiple incompatible models. Rice gives up on what Massimi (2018) calls the “representationalist assumption”: that the aim of a model is to represent a target system. This assumption leads to trouble for the realist, because incompatible models lead to potentially conflicting claims about a target system (91). Rice argues that scientists extract modal information about some target system through models by recognizing that they are in the same universality class. Universality classes are composed of systems that “display

similar patterns of behavior that are largely independent of their physical details” despite being instantiated in heterogeneous physical systems (85). Because a target system can realize counterfactual dependencies that occur in different universality classes, models in those different but partially overlapping universality classes will provide understanding of different counterfactual dependencies (96–97).

Structural realism and perspectival realism are both *selective* realisms in that they hold a realist attitude toward some aspects of theories, models, or representations, but not to all their parts. J. E. Wolff compares structural and perspectival realism through a discussion of measurement theory. She argues that structural realists typically look for similarities across models, whereas perspectival realists look for differences. Wolff discusses the way in which the representational theory of measurement (RTM) finds structuralism applicable through mapping numerical structures onto empirical structures. Though the content of the RTM is structural, the specific structures picked out are determined and warranted by the acceptance of some specific perspective, because a structure by itself does not represent anything without being interpreted (121). So, a full-blooded realism of measurement representations can come only through the complementarity of perspectivism and structuralism (123).

The contributions of Hasok Chang, Mazviita Chirimuuta, and David Danks step back from directly and positively applying the perspectival framework to familiar philosophical puzzles, instead thinking more broadly about what perspectivism is and what it can offer. Chang and Chirimuuta are both friendly toward perspectivism, but not without qualifications. Chang discusses the relationship of his pragmatism and commitment to integrated history and philosophy of science (iHPS) with perspectivism. Chang identifies pragmatism and perspectivism as deeply committed to a kind of *humanism* about science, that “science is something human agents do” (10). Perspectivists and pragmatists have some common ground, because they both reject a view from nowhere and the idea that science gives a description of ready-made, perspective-independent facts. Pragmatists, however, take a more active approach to knowledge in its explicit “action-orientation” (20). Because pragmatism is committed to the empirical grounding of knowledge and the cultural and social situatedness of scientific knowledge, Chang suggests that iHPS can help us learn “about learning” (23).

Chirimuuta investigates the way in which two different perspectives on the motor cortex could possibly come together in charting the Heraclitean brain, the brain as a constantly changing processual entity. The intentional perspective best models behaviors and processes as directed, whereas the dynamical perspective seems to better capture how the brain is a dynamic entity. There is some hope, Chirimuuta shows, to bring together the two perspectives through their formalisms, but not when those formalisms are interpreted. A dilemma is posed: either we accept that we can have Massimi’s perspectival integration, but only with regard to the formalisms, or we hold that there is little convergence across the perspectives, contra Massimi’s perspectivism, leading to a kind of tempered Kantianism—the brain is simply too complex to model from integrated perspectives, and so we know little about the supposed *real* Heraclitean brain. Here perspectivism does not quite get us the realism we hope for.

Danks’s contribution can be interpreted as addressing the question James faced head-on: how do we formulate a perspectivism that it is both *safe* (not obviously false) and *substantive* (not trivially true)? Danks draws on empirical work on how *concepts*, which do not straightforwardly represent the world but shape informational input

(129), and *goals*, which direct our epistemic and cognitive activities (132), make our ordinary perception and scientific knowledge perspectival (135–37). Like Teller, Danks argues that there is no escape to the security of ordinary observation or perception, because even that is rife with conceptual selection and goal-driven relativity. Human knowledge is perspectival through and through.

I want to highlight two great virtues of this collection. First, and perhaps of most interest to philosophers of science, is the thorough discussion of scientific cases. With perspectivists' emphasis on *differences* between perspectives and models, it is only natural that they pay close attention to the contingent and situated aspects of scientific practice. This is seen throughout the volume, demonstrating a real concern with the practice of science, providing detail on several interesting cases—from modeling rainbows to explaining cancer. Second, perspectivism brings human agents back into the analysis of scientific practice, especially in relation to the cultural and cognitive resources agents have at their disposal, as well as by considering the aims of the researchers. Scientific activities are *human* activities, which affects how research is done, what matters, and what the outcomes are, things that might otherwise get lost in abstract philosophical theorizing about science.

Although this collection pushes the agenda of perspectivism in new and interesting directions, I had also hoped to learn more about what perspectives *are* and, perhaps more importantly, what they are *not*. Few contributors pay much attention to the metaphorical talk of “perspectives,” preferring instead to put it to direct use in ways differing between the contributors. Talk of perspectives is intuitive, but also potentially misleading, because it is a visually loaded metaphor. Here Chang's and Chirimuuta's discussions are interesting because they question core aspects of perspectivism while staying with its spirit. Similarly, Danks clarifies the metaphor of “perspective” by thinking about the ways in which concepts and goals shape activities. But this is also different from the visual explication of “perspective” seen in many of the other contributions, where the focus is on typical representational devices like models. Chirimuuta demonstrates that perspectivism does not always get us what we want, with Chang and Danks pointing toward nonvisual kinds of “perspectivism,” also explored in Chirimuuta's (2016) articulation of “haptic realism.” Fruitful questions for future research concern whether integration of perspectives can really lead us to knowledge of *nonperspectival* facts and whether the metaphor of perspective is misleading, given that it is a visual metaphor. These questions ought to be answered for us to see better if and how perspectivism is offering something philosophically deeper than an elaboration of model pluralism. These are minor points about an otherwise excellent collection that pushes discussions of realism in fruitful and interesting new directions.

Perspectivists care about the human element in knowledge making and about how contingencies and choices affect even our deepest and most cherished scientific knowledge without thereby jeopardizing realism. We thus return to James's slogan: that the trail of the human serpent indeed is over everything.

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References

- Chirimuuta, Mazviita. 2016. "Vision, Perspectivism, and Haptic Realism." *Philosophy of Science* 83 (5): 746–56. <https://doi.org/10.1086/687860>.
- Giere, Ronald. 2006. *Scientific Perspectivism*. Chicago: University of Chicago Press. <https://doi.org/10.7208/chicago/9780226292144.001.0001>.
- James, William. 1907/1981. *Pragmatism: A New Name for Some Old Ways of Thinking*. Indianapolis, IN: Hackett.
- Massimi, Michela. 2018. "Four Kinds of Perspectival Truth." *Philosophy and Phenomenological Research* 96 (2):342–59. <https://doi.org/10.1111/phpr.12300>.

Review of Ronald J. Planer and Kim Sterelny's *From Signal to Symbol: The Evolution of Language*

Ronald J. Planer and Kim Sterelny, *From Signal to Symbol: The Evolution of Language*. Cambridge: The MIT Press (2021), 296 pp. \$35.00 (hardcover)

From Signal to Symbol is a recent contribution to the ongoing debate on how language evolved. Some tout this as the hardest problem in science (Christiansen and Kirby 2003). For one, the distinction between human linguistic communication systems and the simpler nonlinguistic communication systems of nonhuman animals is vast. Difficulties are exacerbated by the fact that any evidence for language origins is necessarily indirect—to wit, no fossils, no time machines. Furthermore, there is no consensus on what language is, so one's theory of language origins is (at least partially) determined by one's theory of language (Jackendoff 2011).

The question has been approached by linguists, anthropologists, evolutionary biologists, philosophers, primatologists, cognitive scientists, and more. Each discipline brings its tools and intuitions (or biases) to bear on the question, and researchers may carve the joints of the language-origins literature in several ways. Without delving too deeply into the divides (sometimes drama) between those who study the subject, Planer and Sterelny propose a theory of language origins that is (1) *wholly gradualist*, whereby language evolved incrementally via a series of increasingly rich *protolanguages* (lexically language-like communicative tools that lack overt morphology or syntax); (2) *gesture-first*, whereby complex signals began gesturally as combinations of simple point plus icon signals, later moving to the vocal-auditory channel; (3) an example of "*mosaic evolution*," whereby a set of initially independent abilities coevolved and gradually became more integrated (while still being relevant to other cognitive and social abilities); and (4) couched in a *sender-receiver framework*. Although none of these features is uncontroversial within the field, each claim is justified independently and fits well into Planer and Sterelny's overall picture.

Whether language origins is the most difficult problem in science, it is a *very difficult problem*. Hence one distinctive feature of this book is its clarity, despite its (vast) breadth and (relative) depth. Early on, Planer and Sterelny specify the rules of the game they are playing and then adhere to them strictly (5–7). They suggest that