

***Perspectival Realism*. By MICHELA MASSIMI. (New York: Oxford University Press, 2022. Pp. vii + 419. Price \$99; open access)**

There's a recurrent divide among philosophical views about science—those focused on practice vs. those focused on metaphysics, assertions of pluralism vs. assertions of realism, accounts of how science's history could have gone otherwise vs. accounts of how science achieves knowledge. Michela Massimi's *Perspectival Realism* is ultimately a bridging project, aiming to cross this divide. The project is to recruit resources from perspectivism, a kind of pluralism about science, to show how science achieves knowledge and, thus, to inform a scientific realism compatible with this pluralism.

A bridging project like Massimi pursues is deeply appealing. This broad divide between a philosophical focus on the messy details of science and a philosophical focus on what science achieves recurs, I think, because philosophers are more or less united in our desire to accommodate both focuses. Massimi's *Perspectival Realism* positions itself to do justice to both focuses and ultimately transcend the divide. Along the way, it is incredibly expansive in the philosophical questions and philosophical work it engages with. The book is also rich with historical case studies, as well as artistic and literary references. For these reasons, my review will undoubtedly be partial and limited, reflecting my own philosophical interests, limitations, and blind spots. Indeed, this book is expansive and ambitious enough that it may need to be read perspectively.

In my view, Massimi's project of leveraging scientific plurality to enable and inform a scientific realism is important and inspiring, and this book provides many novel insights into how this might be done and to what end. In what follows, I more fully explore the nuances of both Massimi's perspectivism (section 1) and her realism (section 2). I then raise one challenge for each of these views. First, regarding Massimi's perspectivism, I ask whether this version of perspectival realism does justice to how epistemic communities shape our scientific knowledge (section 3). Then, regarding Massimi's realism, I ask

whether her account has given us reason to think that unitary natural kinds are the right target for a perspectival scientific realism (section 4).

1. Perspectivism

The first half of Massimi's book (Chapters 1-5) focuses on perspectivism, while the second half (Chapters 6-11) focuses on realism. This review will follow this division. Massimi's starting point of scientific perspectives is inspired ultimately by Giere's (2006) perspectivism. For Massimi, a *scientific perspective* is the set of scientific practices of a specific scientific community at a given point in time, including (1) knowledge claims; (2) experimental, theoretical, and technical resources that serve as the basis for the knowledge claims; and (3) methodological and epistemic principles that justify that basis (p.5-6). This definition emphasizes the epistemic resources of a scientific perspective and, thus, how epistemic resources vary across different perspectives. Massimi focuses specifically on perspectival modeling, though she does not mean a practice restricted to model-based science but rather how (1)-(3) above, in some given scientific perspective, are used to draw inferences (p.12). The focus on modeling thus amounts to a focus on activities rather than positionality—and, specifically, on inferential activities.

Important to Massimi's perspectivism, and ultimately to her realism as well, is a distinction between two senses in which a representation may be perspectival. With reference to how perspective is used in two-dimensional art, Massimi distinguishes *perspectival₁* (representation *from* a specific vantage point, with this vantage point having relevance for the representational content) from *perspectival₂* (representation *toward* one or more vanishing points, with the vantage point having no special relevance for representational content). She sees both senses of perspectival representation as applying to scientific representation. A scientific representation, as provided by a scientific model or other scientific account, is *perspectival₁* by prioritizing some features of a represented phenomenon over others, with the representational content including this prioritization. An example is the shell

model representing the nucleus *as* concentric orbitals for the specific purpose of isotopic phenomena, which Massimi likens to a point of view (p.40; Morrison, 2011). But a scientific representation is perspectival₂ by aiming toward some ‘vanishing point and, though it is from one specific scientific perspective, the aspiration is to transcend the limitations of that perspective. This is an opportunity for Massimi’s realism: if scientific representations are perspectival₂, these perspectives may together provide ‘a genuine window on reality’ (e.g. p.p270).

Massimi’s perspectivism, then, acknowledges that any scientific perspective is inevitably from a specific vantage point, an insight that Massimi attributes to the thesis of situated knowledge. But she resists the idea that the vantage point partially comprises the content of the perspective, insofar as the aim is to transcend the limitations of one’s scientific perspective by attending to insights provided by others with different scientific perspectives. So, while her perspectivism is a type of pluralism, it opposes some implications pluralism is sometimes thought to have. Exploratory investigation into what is possible, for Massimi, benefits from and thus opens scientific communities to negotiations across scientific perspectives. This opens up a shared space approaching the same vanishing point a *la* perspectival₂, as multiple scientific communities work across distinct perspectives₁ to revise and refine inferences. Perspectival models serve as ‘inferential blueprints,’ multiple inconsistent representations that can guide this negotiation. In the last chapter of the book, Massimi returns to her perspectivism to consider its implications for the recognition and preservation of perspectives across not just scientific but also global cultures.

I want to raise at this juncture a few lingering questions I have about this perspectivism. One regards Massimi’s focus on perspectival modeling. By ‘perspectival modeling,’ Massimi intends to refer broadly to inferential practices in science. But I’m not sure how to interpret the choice to call these practices *modeling*, particularly as Massimi tells us that not all scientific models are perspectival (p.327) and that not all perspectival modeling in her sense involves scientific modeling (p.6). A second question I

have regards how perspectives relate to one another. As Massimi defines it, a scientific perspective is quite sweeping—including knowledge claims as well as all experimental, theoretical, and technological resources as well as methodological and epistemic justificatory resources supporting them. If we delineate perspectives so broadly, I wonder how common it really is for scientific communities to engage across perspectives to negotiate about what there is and what things are like. But, it seems cross-perspective negotiations are essential for reaching genuine scientific knowledge. The third question I want to raise regards Massimi's idea, developed primarily in Chapters 8 and 11, that her perspectivism affords a central role in science for situated knowledge and epistemic diversity. I am not yet confident about the grounds for thinking this is a consequence of her view, and, indeed, I will raise a concern below about whether the expectation of negotiation across perspectives—and the limitations accordingly placed on scientific pluralism—sidelines insights about the situatedness of knowledge.

2. Realism

Phenomena are at the heart of Massimi's realism. Massimi defines *phenomena* as 'stable events indexed to a particular domain of inquiry, and modally robust across a variety of perspectival data-to-phenomena inferences' (p.207). Lawlikeness is a primitive relation of stable events; this is the 'realist tether' for Massimi's view (p.209), which I take to mean the way in which scientific knowledge is constrained by how the world is. Modal robustness, in turn, is a secondary quality arising from events' stability, data that provide evidence of that stability, and epistemic communities positioned to reliably infer the event's stability (p.211). Modal robustness of a phenomenon thus emerges from multiple epistemic communities with data to support their inferences from perspectival modeling. So, while the stability of events is independent of human knowers, phenomena are indexed to particular domains of inquiry, with their modal robustness emerging from events' stability as encountered via the inferences

of particular scientific perspectives, guided by inferential blueprints provided by relevant perspectival models (p.217).

Massimi is clear that her realism is 'epistemology-first' (rather than prioritizing metaphysics). What this means is clear from how modally robust phenomena are defined relative to the epistemic position, i.e. the inferential choices, of historically located scientific communities. Massimi regularly returns to a metaphor of an 'inferential garden of forking paths, where at every turn and junction lawlike dependencies point communities towards the directions to choose, which path to explore, and which one to leave behind' (p.217). Reality is not subject to convention or whim, yet it is always embedded in a historically contingent inferential structure of science. What is real, then, emerges from the results of our epistemic practices; it is not something prior to those practices that we aim to uncover. This strikes me as a clear limitation in the aim of Massimi's realism, but this is also at the heart of the jujitsu move of recruiting situated perspectives as not a hindrance but a resource for realism.

Though identification of phenomena is the starting point for Massimi's realism, the bulk of her discussion focuses on natural kinds, in particular, what she terms 'Natural Kinds with a Human Face' (NKHF). According to NKHF,

Natural kinds are (i) historically identified and open-ended groupings of modally robust phenomena, (ii) each displaying lawlike dependencies among relevant features, (iii) that enable truth-conducive conditionals-supporting inferences over time (p.226).

These three conditions amount to the ideas that kinds are shaped by scientific communities; kinds evolve over time but are based in the lawlikeness of the phenomena they group (the primitive relation that tethers realism); and kinds are not arbitrary or conventional but real insofar as they successfully play the proper inferential roles. NKHF thus are real due to their successful inferential roles based ultimately on lawlike dependencies, but the membership of kinds—which modally robust phenomena are grouped in a given kind—depends on the contingent process of cross-perspectival negotiations. On

this view, the primitive relation of lawlikeness takes the place of a reliance on essential properties to define necessary kinds (Lucas Dunlap, in conversation).

An epistemic-first project in realism asks not what is real but rather, ‘How it is possible for different epistemic communities to reach the same conclusion (e.g. *that* something is and *what is*)’ (p.318). Massimi is clear that convergence across scientific perspectives is not toward any predetermined endpoint; the ‘inferential garden of forking paths’ is shaped by the lawlikeness of stable events but so too is it shaped by contingencies of scientific and social history and negotiations across scientific communities (p.331). The convergence enabled by perspectival₂ representations is simply toward one or more vanishing point(s). The world is ‘teeming indeed with electrons, Higgs bosons, proteins, DNA strands, eukaryotic cells, hellebores, bees, and chemical elements’ (p.42). These and much more besides are modally robust phenomena, which, recall, are real in virtue of their tether to reality of lawlikeness, but also in virtue of our scientific communities raising them to the status of phenomena through our inferential practices and negotiations across perspectives. Figure 1 is my attempt to visually depict how Massimi’s perspectival realism varies from the traditional realism she contrasts her view to.

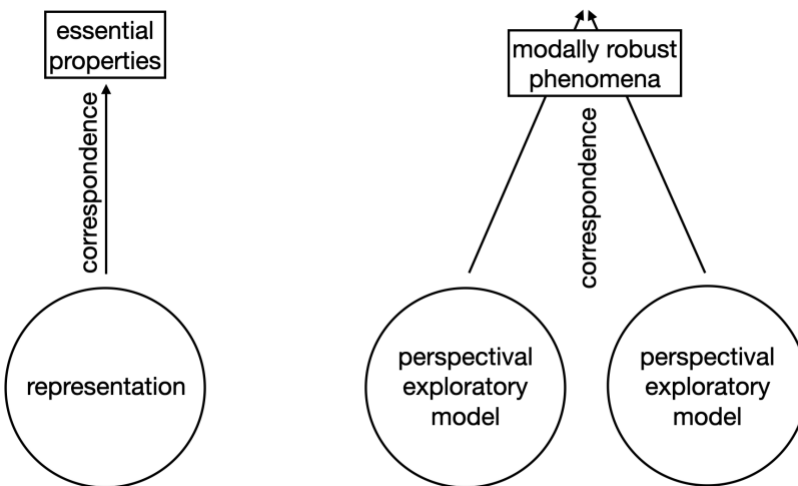


Figure 1: My construal of Massimi’s perspectival realism (right) in contrast to traditional scientific realism (left). Notable features of this view include: (a) epistemology-first: correspondence required for truth is not successful representation of some metaphysical reality outside epistemic practices; (b)

exploratory modeling of possibilities provides the opportunity to negotiate across perspectives; (c) what's real are not necessary kinds defined by essential properties but modally robust phenomena, which are defined partly via investigative choices made by historically located scientists; (d) those choices result from negotiated decisions made across multiple scientific perspectives with an eye to successful inference.

I will briefly mention just one question about this take on realism. Above, regarding Massimi's perspectivism, I asked whether perspectives as Massimi defines them, so broad as to include methodological and epistemic justificatory principles, are actually traversed to negotiate an understanding of reality. One might worry that requiring multiple perspectival approaches in this very broad sense of perspective is too high of a requirement to place on conclusions about what is real. I wonder whether Massimi's examples of cross-perspectival negotiations might actually take place within partially shared epistemic perspectives—and, if so, then we might ask whether it's really the differences in perspective at all that are key to knowledge of reality. Indeed, late in the book, Massimi points out that a key difference of her perspectives from Kuhnian paradigms is the fluidity and overlaps among perspectives (p.337-8). To summarize, I suppose my question is why we should see negotiations across perspectives as Massimi defines them as regularly occurring and, thus, as resources available to negotiate what is real.

3. What Is Perspectival

I would like to revisit the version of pluralism that results from Massimi's perspectivism. On her view, scientific accounts must be perspectival₂, i.e. negotiating a shared space of inquiry across perspectives, to justify knowledge claims, claims about what is real. But I take it to be an important theme of some pluralist takes on science that scientific communities regularly persist in different focal points and emphases, even of the same phenomena and kinds. For example, Longino (2013) provides an in-depth case study of behavioral science research on aggression and sexuality, and one of her main findings is that each scientific field (such as behavioral genetics, molecular genetics, and neuroscience) defines the

phenomenon (or perhaps kind) under investigation in a different way—in behavioral science research, aggression and sexuality are each ‘multiply operationalized.’ The differences relate to different tools and different aims of investigation across these subdisciplines.

As I noted above, Massimi describes her project in realism as answering the question of ‘How it is possible for different epistemic communities to reach the same conclusion (e.g. *that* something is and *what is*)’ (p.318). But this question presupposes different epistemic communities do reach the same conclusions, at least in a provisional way. A pluralist of a different variety might well ask why we should expect this to occur in science, citing as evidence continuing variation in how epistemic communities define their terms and understand their aims. Massimi regularly appeals to Otto Neurath’s famous boat, a metaphor for his anti-foundationalism about knowledge. Neurath’s alternative to epistemic foundationalism relied on *Ballungen*, imprecise and non-technical terms understandable across historical epochs and fields of expertise so able to support communication. Yet, for Neurath, *Ballungen* are associated with different technical definitions in different historical and scientific contexts, so their vagueness and ambiguity are refined in incompatible ways across different historical and scientific contexts (Cartwright et al., 1996).

A pluralist who does not anticipate scientific communities negotiating across perspectives to inform their inferences may thus resist Massimi’s perspectival₂ convergence to shared space approaching the same vanishing point. Such a pluralist may also wonder whether scientific representations are perspectival₁ also in the sense of including in their content reference to the vantage point, an idea Massimi resists. *Whether* something is, and *what* it is, may not have an answer simpliciter but only an answer relative to certain assumptions and purposes. If so, epistemic communities shape scientific projects in a way that goes beyond establishing their starting point of inquiry.

4. What Is Real

Massimi's realism focuses on how scientific communities establish the reality of kinds, such as atoms, water, bees, and bosons. As I sketched in the previous section, some pluralists might ask whether negotiations across scientific communities are central to determining such matters or whether communities are more insular in their epistemic practices. Genes, human aggression, phylogenetic lineages, and electrons are each targeted in several fields of science, but how each is understood, what properties each is taken to have, varies across these areas of inquiry and associated scientific inquiry. (My examples here have all received some philosophical attention for varying in these ways.) And the variations seem to contribute to the fields' individual epistemic aims rather than require transcending to achieve knowledge. A pluralist who infers from this a lack of convergence across lines of inquiry might nonetheless not give up all hope of realism, of scientific knowledge. Instead, such a pluralism might differently conceive of what science provides knowledge of.

Massimi's motivation for her perspectival realism focuses primarily on how the reality of natural kinds should be differently understood compared to a metaphysical realism of essential properties. But a pluralist who sees continued differences across the knowledge gained from different scientific investigations might ask what reason there is to think that what is real, what science provides knowledge of, is unitary natural kinds. Massimi emphasizes that, on her view of NKHF, kind membership is contingent and open ended, a matter for scientific communities to negotiate and renegotiate across their varying perspectives. But scientific classificatory schemes may not just advocate for broader or narrower kind membership, or an update to the extension of a kind; classificatory schemes may also group phenomena into different, crosscutting classes according to their own purposes. I think it's ultimately an empirical question whether and to what extent different classifications single out unitary kinds—even contingent, evolving kinds. So, while Massimi focuses on a contrast between evolving (real) kinds and empty kinds, she might also consider the possibility of distinct, incompatible but partly overlapping groupings tailored to different purposes.

What might a pluralist such as I have been describing see as the content of scientific knowledge if not natural kinds? Massimi's concept of modally robust phenomena can still be useful for this alternative project. In motivating her focus on kinds, Massimi says that,

One wants to find out what is common to groupings of phenomena *across different domains*, ... whether the lawlike dependencies at play in the phenomenon of Moon-Earth alignment and the times of the tides are related to the lawlike dependencies observed among the speeds of different kinds of balls rolling down inclined planes (p.268).

I feel the pull of this. But a pluralist impressed by science's crosscutting categories might interpret this pull to find out what is common across phenomena as resulting not in knowledge of kinds—of sets of phenomena that fully belong together—but rather in knowledge of patterns exhibited by a range of phenomena related in some regards but not others. The difference would consist in accommodating continued divergence among classificatory schemes based on particular, limited interests, something I read Massimi as disallowing (e.g. p.265). This might also entail resisting perspective₂—convergence to a shared space approaching the same vanishing point—in favor merely of perspective₁—different vantage points, perhaps maintained for principled reasons.

Of course, such an alternative approach to realism would need to be evaluated for its merits, as well as for how it differs from a scientific realism of natural kinds. My purpose here is simply to suggest that there might be a way to approach realism without accepting the idea that science is seeking unified kinds across perspectives. Such a realism would be compatible with a more thoroughgoing pluralism such as I briefly motivated in the previous section. Any scientific pluralist inspired by actual epistemic practices in science would do right to follow Massimi's model of an epistemology-first realism. What I remain uncertain of is whether science's epistemic practices reveal a reality consisting of kinds at all.

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