DOI: 10.1111/ejop.12530

European Journal of Philosophy WILEY

BOOK REVIEW

THE PRIMACY OF METAPHYSICS

by Christopher Peacocke

Oxford University Press, 2019, ISBN 978-0-19-883557-8. 218 pp. $39.95

The discipline of philosophy has become highly specialized. Most professional philosophers, myself included, publish in one, or maybe two, narrow areas. By contrast, Christopher Peacocke's *The Primacy of Metaphysics* analyzes such variegated topics as the self, analog computation, temporal perception, theories of meaning and reference, the individuation of natural numbers, and the limits of intelligibility. There are not many philosophers who could write a book like this.

The book's main thesis is perhaps best understood in terms of what it rejects. According to "meaning-first" views, the meaning or intentional content of a given domain is explanatorily prior to the metaphysics for that domain. Peacocke firmly rejects meaning-first views for all domains in which truth and falsity are at play. Instead, he embraces the "Primary Thesis," which maintains that either the metaphysics is explanatorily prior to the intentional content ("metaphysics-first" cases) or else that neither is prior to the other ("no-priority" cases).

Peacocke argues for the Primary Thesis in two ways. First, he provides a general argument against meaning-first views (Chapter 1). Second, he argues for metaphysics-first views of particular domains, including magnitudes (Chapter 2), time (Chapter 3), the self (Chapter 4), and numbers (Chapter 5). The value of these chapters, however, transcends whatever inductive support they lend to the Primary Thesis. Each involves a thoughtful treatment in its own right that often extends into neighboring issues. Thus, Chapter 2 discusses not only magnitudes and their perception, but also analog computation, analog content, and Kuhn's claim that scientific revolutions change the way that scientists see the world. Chapter 3 argues that we perceptually experience durations (pace Kant), that phenomenal externalism is true of temporal experiences (pace Thompson and Chalmers), and that the perception of duration is not marked by constancies (pace Burge). It also attempts to pinpoint the sense in which we perceive the present. Chapter 4 argues that conscious mental events necessarily have a subject, disputes Johnston's claim that "personites" (subject-stages) are ontologically on a par with subjects, and explains how first-person reference is possible. Chapter 5 develops metaphysics-first "applicationist individuationist" accounts of the natural and real numbers, and closes by rejecting Carnap's claim that there are no questions external to a linguistic framework. (In what may be the book's boldest claim, Peacocke writes that constitutive questions "belong to a branch of science—a branch of knowledge—that Carnap does not seem to be acknowledging. This branch is the study of the constitutive" [168].) Chapter 6 argues that a metaphysics-first orientation can help to delineate the boundaries of the intelligible.

Given its centrality, I will first summarize Peacocke's general argument for the Primary Thesis. I will then critically review his accounts of analog computation and content. This will inevitably leave much undiscussed.

1 | THE PRIMARY THESIS

I have heard it said that each of us is forever locked in a battle with our dissertation advisor. That always struck me as too Freudian to take seriously, but there is no denying that Dummett looms large as a target of the Primary Thesis.

Apart from Brandom, whom Peacocke also identifies as a meaning-first theorist, there are not many other prominent contemporary philosophers who clearly qualify.

Peacocke argues against meaning-first views as follows: a correct account of the nature of a concept will advert to a privileged reference relation; specifying that relation, in turn, requires an appeal to the correct metaphysics of the reference; so a correct account of the concept will involve the correct metaphysics of the reference. For instance, a correct account of the concept *water* will indicate that employing the concept requires being causally related to H_2O, since that is what the correct metaphysics says that water is (let us suppose). An analysis of the concept *water* is thus not explanatorily prior to an analysis of the metaphysics of water.

If we wanted to summarize Peacocke's view in a slogan, we might try: *reference explains sense*. The nature of any given sense or concept is to be analyzed, at least in part, in terms of reference. So pace meaning-first views, you cannot provide an analysis of a sense or concept prior to getting your hands dirty with some metaphysics.

Two clarifications are in order. First, although he cites Evans as an influence, Peacocke is not committed to *de re* senses. The idea that reference helps to explain sense is not supposed to entail that every sense needs a referent. Empty senses are possible. But in specifying the nature of an empty sense you must provide the conditions that would need to be met for something to be its reference (even if nothing actually is), and in specifying those conditions you will be relying on some substantive metaphysics.

Second, although the Primary Thesis is most easily grasped by considering domains in which reference requires relations to one's physical and social environment (think of the water example above), anti-individualism is neither necessary nor sufficient for the Primary Thesis. It is not necessary because the Primary Thesis extends to domains, such as number, where anti-individualism does not apply. It is not sufficient because meaning-first theorists can be anti-individualists (as Dummett was).

Whether or not Peacocke's master argument for the Primary Thesis would move a committed meaning-first theorist such as Dummett, I suspect that most readers will feel its force. In any case, it helps to explain and motivate Peacocke's starting point, which usefully lays the groundwork for his discussion of specific cases in subsequent chapters.

2 | ANALOG REPRESENTATION AND COMPUTATION

After developing a realist, metaphysics-first account of spatial, temporal, and other magnitudes, Peacocke turns to the topics of analog representation and computation. He defines analog representation as "the representation of magnitudes, by magnitudes" (52). Analog computation, in turn, involves: (i) a system of magnitudes, $M_1 \ldots M_n$, that represent other magnitudes, $N_1 \ldots N_n$; and (ii) a set of special science laws that govern the relations among $M_1 \ldots M_n$ and map onto principles that relate $N_1 \ldots N_n$. For example, in an analog computer of the American economy that consists of water flowing through a system of channels and basins, the volumes of water in each of three basins (M_1, M_2, and M_3) might respectively represent the savings (N_1), investment (N_2), and spending (N_3) in the economy. When all goes well, the special science laws that govern the causal relations among those volumes of water (M_1, M_2, and M_3) will mirror the principles that specify how savings, investment, and spending (N_1, N_2, and N_3) are actually related to one another in the American economy.

Peacocke's account is in the same family as those of Lewis (1971) and Maley (2011, 2018). Like Lewis and Maley, Peacocke does not require analog representation to be continuous. Unlike Lewis but like Maley, Peacocke does not require representing magnitudes to be primitive, or nearly primitive, in the language of physics. This opens up the possibility that neural magnitudes can be analog, making room for explanations of mental phenomena in terms of analog computation. Unlike Maley, who requires the represented and representing magnitudes to be related by a monotonic function, Peacocke does not say how two magnitudes need to be related for one to represent the other. This lack of specificity might be seen as an advantage of Peacocke's account since it allows for the possibility that the representing and represented magnitudes could be mapped to one another by a non-monotonic function.

The hour hand of a standard circular-faced clock is plausibly an analog representation of the hour of the day even though the angle of the hand is non-monotonically related to the hour of the day (the morning and afternoon hours are represented by the same angles). But the lack of specificity in Peacocke's account also engenders the worry that it is too permissive. Presumably, gerrymandered mappings between magnitudes are not sufficient for analog representation. This does not render Peacocke's analysis inaccurate so much as incomplete. A full analysis of analog representation and computation would need to say more.

Peacocke helpfully distinguishes analog representation from iconic representation. In iconic representations such as photographs, the parts of the representation represent part of what the representation as a whole represents. Peacocke balks at Carey's (2009) suggestion that analog magnitude representations are iconic. Peacocke observes that analog magnitude representations might lack parts. For example, distance might be represented by neural firing rate, but while rate (frequency) is a magnitude, it does not have parts. "A firing of fifty times per second does not have a firing of seventeen times per second as a part" (p. 58). Thus, it will not do in general to attempt to reduce analog representation to iconic representation. (A similar point has been independently made, and further developed, by Clarke, forthcoming.)

Peacocke does not deny that some mental representations are iconic. In fact, he speculates that spatial cognition is iconic, and in the case of Kosslyn, Ball, and Reiser's (1978) famous mental scanning experiments, he asserts that the underlying representations *are* iconic. "It is true that the iconic character of certain representations can explain some features of mental phenomena, notably some of the phenomena of scanning of mental images of spatial layouts…" (p. 58). But even here it seems possible that the mental representations might be analog but not iconic. If the process of mental scanning is such that scanning over greater distances involves, say, increased rates of firing, and if it takes longer for neurons to ramp up to higher firing rates, then the timing effects in Kosslyn et al.'s scanning studies could be explained by mental magnitudes that are analog but not iconic. Of course, this is only a hypothetical example; it may turn out that the representations *are* iconic. But it suggests that it is the fact that they are analog that may be doing the heavy explanatory lifting.

A further point is worth stressing, though it is not made explicitly by Peacocke. If analog representation is "the representation of magnitudes, by magnitudes," then it follows that many mental representations will not be—indeed, *cannot* be—analog. That is because minds represent many things that are not magnitudes, such as objects, events, individuals, kinds, and categorical properties. Of course, it does not follow that such mental representations are digital. Some mental representations might be neither analog nor digital (cf. Maley, 2011). But this point does suggest that the claim, sometimes made in the popular media, that the mind/brain is an analog computer is at best an oversimplification.

3 | ANALOG CONTENT

When applied to the mind, the foregoing account of analog representation and computation pertains to representational *vehicles*. Peacocke also develops an account of analog *content* that he applies to perceptual experiences. In earlier work, Peacocke (1986, 1989) argued that perceptual content is analog because it is unit-free. For example, distances are not perceived in meters, feet, or any other units. Peacocke still endorses this position, and now links it to his metaphysics-first account of magnitudes. The fact that magnitudes themselves are unit-free helps to explain why they are perceived as unit-free. Magnitudes are perceived as unit-free, in part, because they are perceived as they really are.

But the bulk of Peacocke's discussion of analog content in his new book now focuses on recognizability. Peacocke argues that perceptual experiences have digital content when they afford perceptual recognition and analog content when they do not. For example, your perceptual experience as of three vertical strokes has digital content because you can recognize the presence or absence of three strokes just by looking. Non-perceptual processes, such as counting, are not required. By contrast, your perceptual experience as of 29 vertical strokes is analog

because you cannot recognize the presence or absence of 29 strokes just by looking. If you were presented with 28 strokes instead, you would not know the difference just by looking. You would need to count them. Peacocke calls this the *recognizability condition*.

Given the recognizability condition, perceptual experience as of length, angle, duration, and many other magnitudes emerge as analog. "Magnitudes themselves are perceived; particular magnitudes slice more finely than just noticeable difference; so perception of magnitudes… can outrun the perceiver's recognitional capacity" (p. 65). In other words, although we experience precise magnitudes, our ability to perceptually reidentify magnitudes is relatively coarse. Thus, we are not able to perceptually recognize the precise magnitudes that we experience.

Peacocke's account of analog content takes inspiration from Goodman (1968) and Haugeland (1981), who emphasize the link between digital representation and the ability to differentiate the characters from which a representation is composed, and thus reliably reproduce it. For Peacocke, however, the critical concept is not differentiation in principle, but differentiation in practice—i.e., recognizability. In principle, 28 strokes can be differentiated from 29; but in practice, humans do not have the perceptual capacities to recognize the difference.

Peacocke seems to treat perceptual recognizability as all or none. Three strokes are recognizable; 28 strokes are not. But recognizability is really a graded phenomenon. For one thing, it depends on background conditions—for example, the contrast, size, distance, and duration of the stimulus. But let us stipulate optimal conditions. Still, there is the problem of defining reliability: how much reliability is required for recognizability? Suppose you can perceptually recognize *n* strokes 85% of the time. Is that sufficient for you to satisfy the recognizability condition, and thus for your perceptual experience of *n* strokes to be digital? What if it is only 75% of the time? Or 51%? This question is pressing because after three items (the limit for "subitizing"), the ability to recognize the number of items decreases gradually. But incredibly, it seems to never fall below chance so long as subjects are given a sufficient number of trials (Halberda & Odic, 2014). Given enough trials, even 28 and 29 strokes can be distinguished above chance.

This point is sometimes obscured by talk of "just-noticeable differences" (as in the passage from Peacocke quoted above). Psychophysicists determine the just-noticeable-difference threshold for a magnitude by selecting an arbitrary criterion—say, 75% of trials in which a test stimulus has to be successfully discriminated from a standard stimulus. To say that two magnitudes cannot be discriminated because they exceed a subject's just-noticeable-difference threshold is thus to say that they cannot be discriminated on some arbitrary percentage of trials. Were the criterion lowered, the just-noticeable-difference threshold would decrease, and the two magnitudes might emerge as discriminable.

It is tempting to suppose that categorical perception—for example, of phonemes—involves recognizability that is clearly reliable, and thus content that is clearly digital. But even here there will be stimuli that are reliably assigned to a given category only 80, or 70, or 60% of the time. Such stimuli will be fewer—the slope of the curve relating them to the perceived category much steeper—but some will remain. The curve is a sigmoid, not a step.

These points matter because they suggest that if we follow Peacocke in defining the analog–digital distinction in terms of recognizability—i.e., *reliable* recognition—then the distinction between analog and digital content will be graded rather than binary. We could maintain that the perceptual experience as of seven strokes is more analog and less digital than the experience as of six strokes, and less analog and more digital than the experience as of eight strokes; but unless we imposed some arbitrary criterion, we could not count the experience as of seven strokes as analog or digital simpliciter.

4 | UNIFYING ANALOG REPRESENTATION AND ANALOG CONTENT

Peacocke provides one account of analog representation (in terms of magnitudes representing magnitudes) and another account of analog content (in terms of recognizability). But he does not say much about how they are related. When perceptual contents are analog (or *relatively* analog—henceforth, I will take this qualification as

understood), are the representational vehicles that underpin them analog? Or do analog and digital contents crosscut analog and digital representational vehicles?

As a conceptual point, it would seem that analog contents could have digital vehicles, and vice versa. But at least for many magnitude contents, there are broad empirical reasons to think that the two categories do march in step.

The discrimination of spatial, temporal, and many other magnitudes are governed by Weber's Law, which says that the standard deviation in same/different judgments increases linearly with the value of the magnitude. One consequence of Weber's Law is that magnitude discrimination never exhibits perfect recognizability. Magnitudes will always be confused with their closest neighbors, at least some of the time. There is also reason to think that Weber's Law is best explained by analog vehicles (Beck, 2019). If that is right, then perceptual experiences as of numerosity, length, duration, and other magnitudes have analog contents in virtue of having analog vehicles.

5 | CONCLUSION

By focusing narrowly on a couple of topics, I hope to have displayed the depth of Peacocke's thinking. But this book is just as remarkable for its breadth. You do not need to care about analog representation or content to find something of relevance. Most philosophers of mind, language, epistemology, and metaphysics are likely to find insights that bear on their research.

ACKNOWLEDGMENTS

Thanks to Sam Clarke for very helpful comments on this review.

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